BAPATLA ENGINEERING COLLEGE :: BAPATLA

(AUTONOMOUS)

B.Tech
COMPUTER SCIENCE & ENGINEERING

[4 Year degree course semester system]

SYLLABUS

2010-2011

BAPATLA ENGINEERING COLLEGE

(SPONSORED BY BAPATLA EDUCATION SOCIETY)

BAPATLA, GUNTUR Dt. (A.P.) - 522 101

BAPATLA ENGINEERING COLLEGE
(*Autonomous*)
BAPATLA - 522 101.

SCHEME & SYLLABI
4 Year B.Tech Program
2010-2011

DEPARTMENT OF COMPUTER SCINECE & ENGINEERING
BAPATLA ENGINEERING COLLEGE
(Autonomous)
BAPATLA - 522101

CONTENTS

Academic Rules & Regulations

(Effective for students admitted into first year B.Tech. from the academic year 2010-2011).

1.0 EXTENT: All the rules and regulations, specified herein after shall be read as a whole for the purpose of interpretation and when a doubt arises, the interpretation of the Chairman, Academic Council, Bapatla Engineering College (Autonomous) is final. As per the requirements of the Statutory Bodies, Principal, Bapatla Engineering College (Autonomous), shall be the Chairman of the College Academic Council.

2.0 ADMISSIONS:

2.1 **Admission to first year of any Four Year B.Tech Programmes of study in Engineering:** Admissions into first year of B.Tech Programme of Bapatla Engineering College (Autonomous) (***Subsequently referred to as*** **B.E.C**) will be as per the norms stipulated by Acharya Nagarjuna University & Govt. of Andhra Pradesh.

2.2 **Admission to the Second year of any Four year B.Tech Programme of study in Engineering:** Admissions into second year of B.Tech Programme of B.E.C will be as per the norms stipulated by Acharya Nagarjuna University & Govt. of Andhra Pradesh.

2.3 **Admissions with advance standing:** These may arise in the following cases:

1) When a student seeks transfer from other colleges to B.E.C and desires to pursue study at B.E.C in an eligible branch of study.
2) When students of B.E.C get transferred from one regulation to another regulation or from previous syllabus to revised syllabus.
3) When a student after long discontinuity rejoins the college to complete his Programme of study for the award of a degree.
4) When a student is not able to pursue his/her existing Programme of study but wishes to get transferred to another Programme of study.

These admissions may be permitted by the Academic Council of B.E.C as per the norms stipulated by the statutory bodies and the Govt. of Andhra Pradesh. In all such cases for admission, when needed, permissions from the statutory bodies are to be obtained and the Programme of study at B.E.C will be governed by the transitory regulations given in ***5.3.***

3.0 DURATION OF THE PROGRAMME AND MEDIUM OF INSTRUCTION: The duration of the B.Tech. Programme is four academic years consisting of two semesters in each academic year. The medium of instruction and examination is English.

4.0 MINIMUM INSTRUCTION DAYS: Each semester shall consist of a minimum of 110 working days which includes instruction, term examinations and final examinations.

5.0 B.Tech. Programmes of study:

5.1 The Four year B.Tech Programme is offered in the following branches of study:

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.

5.2 Structure of the Programme:

5.2.1 Each Programme of a Discipline or branch of study shall consist of:

1) General core courses in Basic Sciences, Engineering Sciences, Humanities, Mathematics and Management.
2) Interdisciplinary courses in Engineering, to impart the fundamentals of Engineering to the student.
3) Compulsory core courses to impart broad based knowledge needed in the concerned branch of study.
4) Elective courses from either discipline or interdisciplinary areas to be taken by the student based on his/her interest and specialization preferred.
5) A Term paper and a Project approved by the Department to be submitted in the fourth year of study.

Every Programme of study shall be designed to have 45-50 theory courses and 20-25 laboratory courses and the distribution of types of courses from the above is indicated in the following table.

General Core courses	20 -35%
Interdisciplinary courses in engineering	15-25%
Compulsory Core courses in the branch of study	45-55%
Elective Courses	10-15%

Note: All components prescribed in the curriculum of any Programme of study shall be conducted and evaluated.

5.2.2 Contact hours: Depending on the complexity and volume of the course the number of contact hours per week will be determined.

5.2.3 Credits: Credits are assigned to each course as per norms mentioned in the following table.

Subject	Credits
Theory Course (3 Theory Periods/Week)	03
Theory Course (More than 3 Theory Periods/Week)	04
Laboratory Course	02
Term paper	02
Final year Project	10

5.3 Transitory Regulations: For students admitted under advance standing (mentioned in 2.3) these transitory regulations will provide the *modus operandi*.

At the time of such admission, based on the Programme pursued (case by case)

1) Equivalent courses completed by the student are established by the BOS concerned.
2) Marks/Credits are transferred for all such equivalent courses and treated as successfully cleared in the Programme of study prescribed by B.E.C.
3) A Programme chart of residual courses not cleared will be derived and a Programme of study with duration specified will be prescribed for pursuit at B.E.C.
4) Marks obtained in the previous system if the case be, are converted to grades and CGPA is calculated.

All other modalities and regulations governing shall be the same as those applicable to the stream of students with whom such a candidate is merged.

5.4 Curriculum for each Programme of study:

1) The Four year curriculum of any B.Tech Programme of study in any branch of engineering is formulated based on the guidelines mentioned in 5.2 and will be recommended by the concerned Board of Studies and is approved by the Academic council of the college.
2) In case of students admitted under lateral entry, the respective regular curriculum contents from second year onwards are to be pursued by them.
3) In case of students admitted under advanced standing, the Programme curriculum will be prepared by the concerned Board of Studies and the Academic Council has to approve the same.
4) After approval from the Academic Council, Programme curriculum for the same shall be prepared and made available to all the students along with the academic regulations.

5.5 The Maximum duration permitted and cancellation of admission:

5.5.1 The maximum duration permitted for any student to successfully complete any four year B.Tech. Programme of study shall be:

1) Eight academic years in sequence from the year of admission for a normal student admitted into first year of any Programme and
2) Six academic years in sequence from the year of admission for a Lateral entry student admitted into second year of any Programme and
3) For students admitted with advanced standing, the maximum time for completion of Programme study shall be twice the period in terms of academic years in sequence, stipulated in the Programme curriculum defined at the time of admission.

5.5.2 In case, any student fails to meet the applicable conditions for the eligibility of degree in the maximum stipulated period as in ***5.5.1***, his/her admission stands cancelled.

6.0 EXAMINATION SYSTEM & EVALUATION:

6.1 The performance of the students in each semester shall be assessed course wise. All assessments will be done on absolute mark basis. However, for the purpose of reporting the performance of a candidate, letter grades and grade points will be awarded as per section ***11.0.*** The performance of a student in each course is assessed with assignment tests, term examinations on a continuous basis during the semester called Continuous Assessment (CA) and a Final Examination (FE) conducted at the end of the semester. For each theory, design and/or drawing course, there shall be a comprehensive Final Examination (FE) of three hours duration at the end of each Semester, except where stated otherwise in the detailed Scheme of Instruction.

6.2 The distribution of marks between Continuous Assessment(CA) and Final Examination(FE) to be conducted at the end of the semester will be as follows:

Nature of the course	CA	FE
Theory subjects	40	60
Drawing	40	60
Practicals	40	60
Term Paper	40	60
Project work	50	100

6.3 Continuous Assessment (CA) in Theory and Drawing subjects:

1) In each Semester there shall be two Term examinations and two Assignment Tests in every theory course. The duration of the Assignment Test shall be 45 minutes and that of the Term Examination shall be 90 minutes. Assignment sheets shall be given at least one week in advance of the commencement of the tests. Students shall answer the question(s) [or question(s) similar in model] from the Assignment sheet stapled to or printed on the script which is distributed in the examination hall.

The Term Examination is conducted in the regular mode according to a schedule which will be common for a particular year of study. The maximum weightage for Term Examinations, Assignment Tests and the calculation of marks for CA in a theory course is given in the following table.

Weightage for different heads to calculate CA for 40 marks in a Theory course			
	Term Exams (Max. 20 marks)	Assignment Tests (Max. 15 marks)	Attendance (Max. 5 marks)
Better Performed test/exam	13	10	5
Other test/exam	7	5	

2) For drawing courses, there shall be only two Term examinations in a semester with no Assignment Tests. In case of such courses a maximum of 15 marks shall be given for day-to-day class work and a maximum of 20 marks shall be awarded to the Term examinations taking into account the performance of both the Term examinations giving weightage of 13 marks for the Term Examination in which the student scores more marks and the remaining 7 marks for the other term examination.

3) A maximum weightage of 5 marks will be given in the CA for attendance in all theory and drawing courses as indicated in ***7.1.1.***

6.4 Final Examination (FE) in Theory and Drawing subjects:

1) For each theory, design and/or drawing course, there shall be a comprehensive Final Examination (FE) of three hours duration at the end of each Semester for 60 marks, 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.

2) A minimum of 24 marks (40%) are to be secured exclusively in the final examination (FE) of theory/drawing course and a minimum total of 40 marks in FE and CA put together in a theory / drawing course is to be secured in order to be declared as passed in that course and for the award of the grade in the course.

6.5 Continuous Assessment (CA) in laboratory courses:

1) The evaluation for Laboratory course is based on CA & FE. The CA for 40 marks comprises of 20 marks for day to day laboratory work, 5 marks for record submission and 15 marks for a laboratory examination at the end of the semester.
2) In any semester, a minimum of 90 percent of prescribed number of experiments / exercises specified in the syllabi for laboratory course shall be taken up by the

students. They shall complete these experiments / exercises in all respects and get the record certified by the concerned internal lab teacher and the Head of the Department to be eligible to appear for the Final Examination in that laboratory course.

6.6 Final Examination (FE) in laboratory courses:

1) For each laboratory course, the final examination (FE) shall be conducted by one internal and one external examiner appointed by the Principal and the duration of the exam shall be for three hours. The FE is for 60 marks which include 30 marks for a lab experiment/exercise, 20 marks for Viva-voce and 10 marks for the certified record.
2) A minimum of 30 marks (50%) shall be obtained in FE and a minimum total of 40 marks in FE and CE put together in a laboratory course are to be secured in order to be declared as passed in the laboratory course and for the award of the grade in that laboratory course.

6.7 Evaluation of term paper:

1) A term paper is to be submitted by each student in the 7^{th} semester which would be a precursor to the project work to be done in the 8^{th} semester. The evaluation is based on CA for 40 marks, which includes a minimum of two seminars/presentations for 20 marks and the report submitted at the end of the semester which is evaluated for 20 marks.
2) The final examination (FE) shall be conducted for 60 marks by one internal and one external examiner appointed by the Principal. The FE contains Viva-voce and the demonstration of the model developed or work performed as a part of the term paper.
3) A minimum of 30 marks (50%) shall be obtained in FE and a minimum total of 40 marks in FE and CE put together in the term paper are to be secured in order to be declared as passed in the term paper and for the award of the grade in the term paper.

6.8 Evaluation of Project:

1) In case of the Project work, the evaluation shall be based on CA and FE. The CA for 50 marks consists of a minimum of two Seminars/ presentations for 25 marks and the Project Report submitted at the end of the semester which is evaluated for 25 marks.
2) FE shall be in the form of a Viva- voce and the demonstration of the thesis work for 100 marks. Viva-voce Examination in Project Work shall be conducted by one internal examiner and one external examiner to be appointed by the Principal. A minimum of 50 marks shall be obtained in FE exclusively and a minimum total of 60 marks in FE and CE put together are to be secured in order to be declared as passed in the Project and for the award of the grade.

6.9 A student who could not secure a minimum of 50% aggregate marks in CA of a semester is not eligible to appear for the Final Examinations conducted at the end of the semester and shall have to repeat that semester.

NOTE : A student who is absent for any Test / Exam / Seminar / Presentation as a part of Continuous Assessment (CA), for any reason whatsoever, shall be deemed to have scored zero marks in the respective component and no provision for make-up shall be provided.

7.0 ATTENDANCE REGULATIONS:

7.1 Regular course of study means a minimum average attendance of 75% in all the courses of study prescribed for a semester in the curriculum, computed by considering total number of hours / periods conducted in all courses as the denominator and the total number of hours / periods actually attended by the student in all courses, as the numerator.

7.1.1 A maximum of 5 marks weightage in CA in each theory/drawing course shall be given for those students who put in a minimum of 75% attendance in the respective theory/drawing course 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.

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

8.0 DETENTION: A student is said to have been detained and not allowed to appear for Final Examination(FE) at the end of the semester when

8.1 The student does not have a minimum 75% attendance or 65% attendance with condonation in all subjects put together in that semester or the student has not scored a minimum of 50% of marks in CA in all the courses of that semester put together.

Such a student shall have to repeat the same semester subsequently and satisfy the above requirements afresh to become eligible to appear for the Final Examination (FE), conducted at the end of the semester.

9.0 CONDITIONS FOR PROMOTION

9.1 A student not detained in the first semester of a year of study shall be promoted to second semester of that year of study.

9.2 A student shall be eligible for promotion to II year of B.Tech. Programme if he/she is not detained in the second semester of first year B.Tech. Programme irrespective of the number of backlog courses in I year B.Tech.

9.3 A student shall be eligible for promotion to III year of B.Tech. Programme if he/she is not detained in the second semester of II year B.Tech. Programme and has passed all but **three** courses of I year B.Tech. (including laboratory course).

9.4 A student shall be eligible for promotion to IV year of B.Tech. Programme if he/she is not detained in the second semester of III year B.Tech. Programme and has passed all but **three** courses of II B.Tech. (including laboratory course) and all but **one** course of I B.Tech. (including laboratory course).

10.0 Registration: Every eligible student (not detained and promoted) has to register himself /herself at the beginning of every semester indicating all the Courses taken up for pursuit by him/her during that Semester.

10.1 When a student is debarred for one or more semesters, his/her registration in the present semester is cancelled and the student is debarred from registering in future during the debarred period.

10.2 In any case while re registering in any semester, he or she will have to pay the requisite fee once again.

11.0 GRADING SYSTEM

11.1 Based on the student performance during a given semester, a final letter grade will be awarded at the end of the semester for each course. The letter grades and the corresponding grade points are as given in the Table.

Table: Grades & Grade Points

Grade	Grade points	% of Marks
O	10	90% and above
A+	9	80% – 89%
A	8	70% – 79%
B+	7	60% – 69%
B	6	50% – 59%
C	5	40% – 49%
F	Failed, 0	Less than 40%

11.2 A student who earns a minimum of 5 grade points (C grade) in a course is declared to have successfully completed the course, and is deemed to have earned the credits

assigned to that course. **However it should be noted that a pass in any course/term paper/Project shall be governed by the rules mentioned in 6.0**.

12.0 GRADE POINT AVERAGE

12.1 The Grade Point Average (GPA) will be calculated according to the formula:

$$GPA = \frac{\sum C_i G_i}{\sum C_i}$$

Where C_i = number of credits for the course *i*,

G_i = grade points obtained by the student in the course.

12.2 Semester Grade Point Average (SGPA) is awarded to candidates considering all the courses of the semester. Zero grade points are also included in this computation.

12.3 To arrive at Cumulative Grade Point Average (CGPA), the formula is used considering the student's performance in all the courses taken in all the semesters completed up to the particular point of time.

13.0 ELIGIBILITY FOR AWARD OF B.TECH. DEGREE: A student shall be eligible for award of the B.Tech degree if he/she fulfils all the following conditions;

1) Registered and successfully completed all the components prescribed in the Programme of study to which he/she is admitted,
2) Obtained CGPA greater than or equal to 5.0 (Minimum requirements for Pass), Has no dues to the Institute, hostels, Libraries, NCC/NSS etc., and
3) No disciplinary action is pending against him/her.

14.0 AWARD OF CLASS: A candidate who becomes eligible for the award of B.Tech. Degree shall be placed in one of the following Classes based on CGPA.

Table: CGPA required for award of Degree

Distinction	**≥ 8.0***
First Class	**≥ 7.0**
Second Class	**≥ 6.0**
Pass	**≥ 5.0**

* In addition to the required CGPA of 8.0, the student must have necessarily passed all the courses of every semester **in the minimum stipulated period for the Programme**.

14.1 Grade Sheet: A grade sheet (Memorandum) will be issued to each student indicating his performance in all courses taken in that semester and also indicating the Grades and SGPA.

14.2 **Transcripts**: After successful completion of the total Programme of study, a Transcript containing performance of all academic years will be issued as a final

record. Duplicate transcripts will also be issued if required after the payment of requisite fee. Partial transcript will also be issued up to any point of study to any student on request and by paying the stipulated fee in force.

14.3 Candidates shall be permitted to apply for recounting/revaluation of FE scripts within the stipulated period with payment of prescribed fee.

14.4 The Governing body of B.E.C (Autonomous) has to approve and recommend to the Acharya Nagarjuna University for the award of a degree to any student.

15.0 IMPROVEMENT OF CLASS:

15.1 A candidate, after becoming eligible for the award of the Degree, may reappear for the Final Examination in any of the theory courses 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 CA in any course or for Final Examinations (FE) in laboratory courses (including Project Viva-voce) for the purpose of improvement.

16.0 SUPPLEMENTARY EXAMINATIONS: In addition to the Regular Final Examinations held at the end of each semester, Supplementary Final Examinations will be conducted during the academic year. Candidates taking the Regular / Supplementary examinations as Supplementary candidates may have to take more than one Final Examination per day. A student can appear for any number of supplementary examinations till he/she clears all courses which he/she could not clear in the first attempt. However the maximum stipulated period cannot be relaxed under any circumstances.

17.0 INSTANT SUPPLEMENTARY EXAMINATIONS: Candidates who fail in one theory course of 4^{th} year 2^{nd} semester can appear for Instant Supplementary Examination conducted after declaration of the revaluation results of the said exam.

18.0 MALPRACTICES: The Principal shall refer the cases of malpractices in Continuous Assessments (CA) and Final Examinations (FE) to an Enquiry Committee constituted by him / her. The Committee will submit a report on the malpractice committed by the student to the Principal. The Principal along with the members of the Committee is authorised to award a suitable punishment.

19.0 ADDITIONAL ACADEMIC REGULATIONS:

19.1 Any attempt to impress upon the teachers, examiners, faculty and staff of Examinations, bribing for either marks or attendance will be treated as malpractice.

19.2 When a student is absent for final examination, he/she is treated as to have appeared and obtained zero marks in that component and Grading is done so.

19.3 When a component of Continuous Assessment (CA) or Final Examination (FE) is cancelled as a penalty, he/she is awarded zero marks in that component.

20.0 AMENDMENTS TO REGULATIONS:

The Academic Council of Bapatla Engineering College (Autonomous) reserves the right to revise, amend or change the Regulations, Schemes of Examinations, and/ or Syllabi or any other matter pertained suitable to the needs of the students, society, industry without any notice.

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BAPATLA ENGINEERING COLLEGE : BAPATLA
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w.e.f 2010-2011 (Semester System)

I/IV B.Tech., SEMESTER I

Code No.	Subject	Scheme of Instruction (Periods per week)			Scheme of Examination (Maximum marks)			No. of Credits
		Theory	Tutorial	Lab	CA	FE	Total Marks	
CS111 / MA01	Mathematics – I	4	1	-	40	60	100	4
CS112 / PH01	Engineering Physics – I	3	1	-	40	60	100	3
CS113 / CY01	Engineering Chemistry – I	3	1	-	40	60	100	3
CS114 / EN01	English Language and Communication	3	1	-	40	60	100	3
CS115 / CE01	Engineering Mechanics	4	1	-	40	60	100	4
CS116 / CS01	Computer Programming with C	4	1	-	40	60	100	4
CS151 / PHL01	Physics lab – I	-	-	3	40	60	100	2
CS152 / CYL01	Chemistry lab – I	-	-	3	40	60	100	2
CS153 / CSL01	Computer Programming lab	-	-	3	40	60	100	2
	TOTAL	21	6	9	360	540	900	27

CA: Continuous Assessment **FE:** Final Examination

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I/IV B.Tech., SEMESTER II

Code No.	Subject	Scheme of Instruction (Periods per week)			Scheme of Examination (Maximum marks)			No. of Credits
		Theory	Tutorial	Lab	CA	FE	Total Marks	
CS121 / MA02	Mathematics – II	4	1		40	60	100	4
CS122 / PH02	Engineering Physics – II	3	1		40	60	100	3
CS123 / CY02	Engineering Chemistry – II	3	1		40	60	100	3
CS/IT 124	Digital Logic Design	3	1		40	60	100	3
CS125 / BT01	Environmental Studies	3			40	60	100	3
CS126 / ME01	Engineering Graphics	3	3		40	60	100	3
CS161 / PHCYL01	Physics & Chemistry Lab – II	-	-	3	40	60	100	2
CS162 / ENL01	English Language Lab	-	-	3	40	60	100	2
CS163 /MEL01	Workshop	-	-	3	40	60	100	2
	TOTAL	19	7	9	360	540	900	25

CA: Continuous Assessment **FE:** Final Examination

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II/IV B.Tech., SEMESTER I

Code No.	Subject	Scheme of Instruction (Periods per week)			Scheme of Examination (Maximum marks)			No. of Credits
		Theory	Tutorial	Lab	CA	FE	Total Marks	
CS 211/ MA03	Mathematics – III	4	-	-	40	60	100	4
CS/IT212	Computer Organization	3	1	-	40	60	100	3
CS/IT213	Computer Graphics	3	1	-	40	60	100	3
CS/IT214	Object Oriented Programming	4	1	-	40	60	100	4
CS/IT215	Discrete Mathematical Structures	4	1	-	40	60	100	4
CS/IT216	Data Structures	4	1	-	40	60	100	4
CS/IT251	Object Oriented Programming Lab	-	-	3	40	60	100	2
CS/IT252	Data Structures Lab	-	-	3	40	60	100	2
CS/IT253	Computer Hardware & Software Lab	-	-	3	40	60	100	2
	TOTAL	22	5	9	360	540	900	28

CA: Continuous Assessment **FE:** Final Examination

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II/IV B.Tech., SEMESTER II

Code No.	Subject	Scheme of Instruction (Periods per week)			Scheme of Examination (Maximum marks)			No. of Credits
		Theory	Tutorial	Lab	CA	FE	Total Marks	
CS221/ MA05	Probability & Statistics	4	1	-	40	60	100	4
CS222/ EC01	Electronic Devices & Circuits	3	1	-	40	60	100	3
CS223 / EE04	Electrical Technology	3	1	-	40	60	100	3
CS/IT224	GUI Programming	4	1	-	40	60	100	4
CS/IT225	System Software	3	1	-	40	60	100	3
CS/IT226	Microprocessors & Microcontrollers	4	1	-	40	60	100	4
CS/IT261	Electronic Devices & Circuits Lab	-	-	3	40	60	100	2
CS/IT262	Microprocessors & Microcontrollers Lab	-	-	3	40	60	100	2
CS/IT263	GUI Programming Lab	-	-	3	40	60	100	2
	TOTAL	21	6	9	360	540	900	27

CA: Continuous Assessment **FE:** Final Examination

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III/IV B.Tech., SEMESTER I

Code No.	Subject	Scheme of Instruction (Periods per week)			Scheme of Examination (Maximum marks)			No. of Credits
		Theory	Tutorial	Lab	CA	FE	Total Marks	
CS/IT 311	Professional Ethics & Human Values	3	1	-	40	60	100	3
CS/IT 312	Data Communications	3	1	-	40	60	100	3
CS/IT 313	Automata Theory & Formal Languages	3	1	-	40	60	100	3
CS/IT 314	Operating Systems	4	1	-	40	60	100	4
CS/IT 315	Database Management Systems	4	1	-	40	60	100	4
CS/IT 316	Web Technologies	4	1	-	40	60	100	4
CS 351/ ENL02	Soft Skills Lab	-	-	3	40	60	100	2
CS/IT 352	RDBMS Lab	-	-	3	40	60	100	2
CS/IT 353	Web Technologies Lab	-	-	3	40	60	100	2
	TOTAL	21	6	9	360	540	900	27

CA: Continuous Assessment **FE:** Final Examination

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III/IV B.Tech., SEMESTER II

Code No.	Subject	Scheme of Instruction (Periods per week)			Scheme of Examination (Maximum marks)			No. of Credits
		Theory	Tutorial	Lab	CA	FE	Total Marks	
CS/IT 321	Computer Networks	4	-	-	40	60	100	4
CS/IT 322	Compiler Design	3	1	-	40	60	100	3
CS/IT 323	UNIX Programming	4	1	-	40	60	100	4
CS/IT 324	Software Engineering	4	-	-	40	60	100	4
CS/IT 325	Enterprise Programming	4	1	-	40	60	100	4
CS/IT 326	Elective – I	4	1	-	40	60	100	4
CS/IT 361	UNIX Programming Lab	-	-	3	40	60	100	2
CS/IT 362	Enterprise Programming Lab	-	-	3	40	60	100	2
CS/IT 363	Elective – I Lab	-	-	3	40	60	100	2
	TOTAL	23	4	9	360	540	900	29

CA: Continuous Assessment **FE:** Final Examination

Elective – I
CS/IT 326 (A) Bioinformatics
CS/IT 326 (B) Digital Image Processing
CS/IT 326 (C) Open Source Systems
CS/IT 326 (D) Soft Computing
CS/IT 326 (E) .Net Technologies

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IV/IV B.Tech., SEMESTER I

Code No.	Subject	Scheme of Instruction (Periods per week)			Scheme of Examination (Maximum marks)			No. of Credits
		Theory	Tutorial	Lab	CA	FE	Total Marks	
CS/IT 411	Cryptography & Network Security	3	1	-	40	60	100	3
CS/IT 412	Distributed Systems	3	1	-	40	60	100	3
CS/IT 413	Object Oriented Analysis & Design	4	1	-	40	60	100	4
CS/IT 414	Design & Analysis of Algorithms	4	1	-	40	60	100	4
CS/IT 415	Elective – II	4	1	-	40	60	100	4
CS/IT 416	Open Elective	3	1	-	40	60	100	3
CS/IT 451	Term Paper	-	-	3	40	60	100	2
CS/IT 452	OOAD Lab	-	-	3	40	60	100	2
CS/IT 453	Algorithms Lab	-	-	3	40	60	100	2
	TOTAL	21	6	9	360	540	900	27

CA: Continuous Assessment

FE: Final Examination

Elective – II

CS/IT 415 (A) Cloud Programming
CS/IT 415 (B) Advanced Database Management Systems
CS/IT 415 (C) Grapy Theory
CS/IT 415 (D) Principals of Programming Languages
CS/IT 415 (E) Machine Learning

Open Elective

The Students of CSE will choose one of the Open Electives offered by other Departments. For details see the list of Open Electives offered by other departments in
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BAPATLA ENGINEERING COLLEGE : BAPATLA
(Autonomous)
SCHEME OF INSTRUCTION & EXAMINATION
FOR
COMPUTER SCIENCE & ENGINEERING
w.e.f 2010-2011 (Semester System)

IV/IV B.Tech., SEMESTER II

Code No.	Subject	Scheme of Instruction (Periods per week)			Scheme of Examination (Maximum marks)			No. of Credits
		Theory	Tutorial	Lab/ Project	CA	FE	Total Marks	
CS 421 / ME05	Industrial Management & Entrepreneurship Development	3	1	-	40	60	100	3
CS/IT 422	Data Engineering	4	1	-	40	60	100	4
CS/IT 423	Elective – III	4	1	-	40	60	100	4
CS/IT 424	Elective – IV	4	1	-	40	60	100	4
CS/IT 461	Project Work	-	-	9	50	100	150	10
CS/IT 462	Data Engineering Lab	-	-	3	40	60	100	2
	TOTAL	15	4	12	250	400	650	27

CA: Continuous Assessment **FE:** Final Examination

Elective – III

CS/IT 423 (A) Real-Time Systems
CS/IT 423 (B) Grid Computing
CS/IT 423 (C) Wireless Networks
CS/IT 423 (D) Biometrics
CS/IT 423 (E) Network Management Systems

Elective – IV

CS/IT 424 (A) Advanced Computer Architecture
CS/IT 424 (B) Natural Language Processing
CS/IT 424 (C) Information Retrieval
CS/IT 424 (D) Multimedia Systems
CS/IT 424 (E) Software Testing Methodologies

Open Electives offered by other departments

Department	Subject Name	Subject Code
Biotechnology.	Intellectual Property Rights, Patent Laws &Ethical Issues	BT 100
	Bioinformatics Algorithms	BT 200
Chemical Engineering.	Industrial Pollution & Control	ChE 100
	Energy Engineering	ChE 200
Civil Engineering.	Air Pollution and Control	CE 100
	Remote Sensing and GIS	CE 200
Electrical & Electronics Engineering.	Optimization Techniques	EE 100
	Non-Conventional Energy Sources	EE 200
Electronics & Communication Engineering.	Consumer Electronics	EC 100
	Embedded Systems	EC 200
Electronics & Instrumentation Engineering.	Virtual Instrumentation Using Labview	EI 100
	Sensors and Transducers	EI 200
Information Technology.	Web Technologies	IT 100
	.Net Technologies	IT 200
Mechanical Engineering.	Robotics	ME 100
	Power Plant Engineering	ME 200

Summary of Marks and Credits

Year	Semester	Marks			Total Credits
		CA	FE	Total Marks	
I Year	I Semester	360	540	900	27
I Year	II Semester	360	540	900	25
II Year	I Semester	360	540	900	28
II Year	II Semester	360	540	900	27
III Year	I Semester	360	540	900	27
III Year	II Semester	360	540	900	29
IV Year	I Semester	360	540	900	27
IV Year	II Semester	250	400	650	27
			Grand Total	6950	217

MATHEMATICS – I

(Common for all branches)

CS111/ MA01

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT - I

Matrix Algebra: Rank of a Matrix, Linear Independence, Vector Space, Solutions of Linear Systems, Inverse of a Matrix by Gauss-Jordan Elimination, Vector Spaces, Inner Product Spaces, Linear Transformations. Eigen Values, Eigen Vectors, Some applications of Eigen value problems. Symmetric, Skew-Symmetric and Orthogonal Matrices.

UNIT - II

Matrix Algebra: Complex Matrices: Hermitian, Skew-Hermitian and Unitary.
Similarity of Matrices, Basis of Eigen Vectors, Diagonalization.

Differential Calculus: Rolle's Theorem, Lagrange's Mean Value Theorem and Taylor's Theorem (without Proofs), Taylor's and, Maclaurin's Series for functions of one variable. Maxima and Minima of functions of Two Variables, Lagrange's method of Multipliers.

UNIT - III

First Order Differential Equations: Basic concepts, Geometrical meaning, Separable Differential Equations, Exact Differential Equations, Integrating Factors, Linear Differential Equations, Bernoulli's Equation, Orthogonal Trajectories of curves, Some Engineering Applications: Growth-Decay and Newton's Law of Cooling.

UNIT - IV

Linear Differential Equations of Second Order: Homogeneous Linear Equations of Second Order, Second Order Homogeneous Equations with Constant Coefficients, Case of Complex Roots, Euler-Cauchy Equations, Non-Homogeneous Equations, Solution by Undetermined Coefficients, Solution by Variation of Parameters, Applications-Modeling of Electric Circuits.

TEXT BOOK:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", 8th edition, John Wiley & Sons.

REFERENCE BOOK:

1. George B, Thomas, Jr. and Ross L. Finney, "Calculus and Analytic Geometry", Addison Wesley.

ENGINEERING PHYSICS – I

(Common to all branches)

CS112/ PH01

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

OPTICS **(11 Periods)**

INTERFERENCE: Two-wave interference, coherence, cosine law, Michelson interferometer and its applications, (determination of wavelengths of monochromatic light and resolution of two nearby wavelengths).

DIFFRACTION: Fresnel &Fraunhoffer diffraction, fraunhoffer diffraction due to single slit, plane diffraction grating, dispersive and resolving power of grating.

POLARISATION: Introduction, Brewester's and Malus law, double refraction,Nicol prism, quarter wave plate, half wave plate.

UNIT – II

LASERS & FIBER OPTICS **(10 Periods)**

LASERS: Properties of lasers**,** Spontaneous and stimulated emission, Population inversion, active medium, Solid state (Ruby) laser, Gas(He-Ne) laser, semiconductor (Ga-As) laser, Applications.

HOLOGRAPHY: Principle, recording and reproduction of holography, Applications.

FIBER OPTICS: Structure and types of optical fibers, acceptance angle, Numerical aperture, fiber optic communication and its advantages.

UNIT – III

ELECTRICITY & MAGNETISM **(10 Periods)**

Gauss's law in static electricity (qualitative only), Gauss's law of magnetism, circulating charges, Cyclotron-constructing, working and limitations, Hall effect and its applications, displacement current, Maxwell's equations (qualitative treatment), E M oscillations, velocity of EM waves, energy transport and the pointing vector, radiation pressure, AC circuit containing series LCR circuit-resonance condition.

UNIT – IV

MODERN PHYSICS **(11 Periods)**

Dual nature of light, de-Brogli's concept of matter waves, Davison-Germer electron diffraction experiment, Heisenberg's uncertainty experiment and applications (non-existence of electron in a nucleus and finite width of spectral lines), one dimensional time-independent Schrödinger wave equation, physical significance of wave function, applications of time-independent wave equation to particle in a box(one dimensional), tunneling, the scanning tunneling microscope.

TEXT BOOK:

1. R.K Goure and S.C. Gupta, "Engineering Physics", New Delhi.
2. Halliday, Resnik, Krane, "PHYSICS", John Wiley & Sons.

REFERENCE BOOKS:

1. “Optics”, A. Ghatak (TMH).
2. “Concepts of Modern Physics”, AurthurBeiser (TMG).
3. “A text book of engineering physics”, M.N. Avadhanulu, P.G. Kshirasagar, S.Chand& Co.,.
4. Serway and jewett, “Physics for scientist and engineers with Modern physics”, 6th edition, Tomson Brooks/Cole, Indian reprint.

ENGINEERING CHEMISTRY – I

(Common to all branches)

CS113/ CY01

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(11 Periods)

WATER TECHNOLOGY

Characteristics – alkalinity – types of alkalinity and determination – hardness – types and estimation by EDTA method (problems); Domestic water treatment – disinfection methods (Chlorination, ozonation. UV treatment) – Boiler feed water – requirements – disadvantages of using hard water in boilers: Scales, Sludges, Caustic embrittlement, boiler corrosion, Priming and foaming – internal conditioning (phosphate, calgon and carbonate conditioning methods) – external conditioning –demineralization process –Lime Soda Process-desalination of brackish water by electro dialysis and reverse osmosis.

UNIT – II

(12 Periods)

POLYMERS:

Polymers: Definition, Polymerization, types, addition and condensation polymerization, free radical polymerization mechanism.

Plastics: Classification, Preparation, Properties and uses of PVC, Teflon, polycarbonate, polyurethane, nylon-6,6, PET.

Rubber: vulcanization of rubber, synthetic Rubbers: Buna-S, Buna-N and Polyurethane rubbers.

SURFACE CHEMISTRY:

Surface Chemistry: Solid surfaces, types of adsorption, Frendlich and Longmuir adsorption isotherm, BET adsorption equip. Calculation of surface area of solid & application adsorption: role of adsorbents in catalysis, ion-exchange adsorption and pollution abatement; classification of colloids, Electrical & optical properties micelles, applications of colloids in industry.

UNIT – III

(11 Periods)

RENWEBLE AND NON RENWEABLE ENERGY SOURCES

Thermal and Chemical energy: Introduction to solid fuels - calorific value (lower, higher)-determination of calorific value(Bomb Calorimeter) - pulverized coal – carbonization (Bee Haive method - Otto Hoffman by product method)- Proximate and ultimate analysis of coal - Flow Chart in Thermal Power Stations.- Introduction to Geo Thermal Energy-working – applications-Introduction to Solar Cells –Solar Panels-Applications-Green House Concept - wind energy – fuel cells – hydrogen – oxygen fuel cell – batteries – alkaline batteries – lead–acid, nickel–cadmium and lithium batteries.

UNIT – IV

(11 Periods)

ENGINEERING MATERIALS

Refractories – classification – acidic, basic and neutral refractories – properties: refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling – manufacture of alumina, magnesite and zirconia bricks, Abrasives – natural and synthetic abrasives – quartz, corundum, emery, garnet, diamond, silicon carbide and boron carbide.

Composites: definition, types, polymer matrix composites.

Lubricants – mechanism of lubrication, liquid lubricants - properties: viscosity index, flash and fire points, cloud and pour points, oiliness –solid lubricants – graphite and molybdenum sulphide.

Nanomaterials: Introduction to nanochemistry – preparation of few Nano materials:carbon nanotubes, Fullerenes etc – Properties of Nano materialas and their Engineering applications.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. P.C.Jain and Monica Jain, "Engineering Chemistry", DhanpatRai Pub, Co., New Delhi (2002).
2. S.S. Dara & Mukkati K., "A text book of engineering chemistry", S.Chand & Co.Ltd., New Delhi (2006).
3. "Text Books of Engineering Chemistry", C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006).

REFERENCE BOOKS:

1. B.K.Sharma, "Engineering chemistry", Krishna Prakasan Media (P) Ltd., Meerut (2001).
2. B. Sivasankar, "Engineering Chemistry", Tata McGraw-Hill Pub.Co.Ltd, New Delhi (2008).
3. "Enginering Chemistry", J.C. Kuriacase & J. Rajaram, Tata McGraw Hill co., New Delhi 1. (2004).
4. "Chemistry of Engineering Meterials", R.P Mani and K.N.Mishra, CENGAGE learning.
5. "Applied Chemistry – A text for Engineering & Technology", Springar (2005).
6. "Text Book of Engineering Chemistry", ShasiChawla, DhantpatRai Publishing Company, NewDelhi (2008).
7. "Engineering Chemistry", R. Gopalan, D. Venkatappayya, D.V. SulochanaNagarajan, Vikas Publishers (2008).

ENGLISH LANGUAGE AND COMMUNICATION

(Common to all branches)

CS114/ EN01

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

Objective of the course: To impart Basic skills of communication in English in through intensive practice to the First year student, So as to enable them to function confidently and effectively in that language in the professional sphere of their life.

UNIT – I

Grammar: This area exposes the learners to improve the standard proficiency level, avoiding grammatical mistake in communication.

1. Tenses
2. Preposition
3. Parts of speech

UNIT – II

Writing skills: This area promotes a format and well structured sentences required in professional writing

1. Paragraph writing
2. Letter writing
3. Essay writing

UNIT – III

Vocabulary: This unit offers an extensive knowledge of words and word meaning, essential for communication and contemporary test

1. Analogies
2. Idioms and phrases and their use
3. Antonyms & Synonyms

UNIT – IV

Reading skills: Reading skills enable the student to turn writing into meaning and achieve the goals of reading independently, comprehensibly and fluently

1. Reading comprehension
   i. Scanning
   ii. Skimming
   iii. Glance

TEXT BOOK:

1. "Objective English for Competitive Examination (Third edition)", Hari Mohan Prasad, Uma ReniSinha, Tata McGraw Hill.

REFFRENCE BOOKS:

1. “Effective Technical Communication”, M.AshrafRizvi, Tata McGraw Hill.
2. “Cambridge Preparation Guide for TOFEL”.
3. “Dictionary of Technical Terms”.
4. “Cambridge Advanced Learner’s Dictionary”.
5. “Cambridge Idioms Dictionary”.
6. “Basic Correspondence & Report Writing”, Sharma, Tata McGraw Hill.
7. “Business Correspondences and Report Writing”, R.C.Sharma, Krishna Mohan, Tata McGraw Hill.
8. “Dictionary of Misspelled and Easily Confused Words”, David Downing, Deborah K.Williams, Tata McGraw Hill.

ENGINEERING MECHANICS

(Common to all branches except Mechanical Engineering)

CS115/ CE01

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

General Principles: Mechanics, Fundamental concepts, Units of measurements, International systems of units, Numerical calculations, General procedure for analysis.

Force Vectors: Scalars and vectors, Vector operations, Vector addition of forces, Addition of a system of coplanar forces.

Equilibrium of a Particle: Condition for equilibrium of a particle, The free body diagram, Coplanar force system.

Force System Resultants: Moment of a force (Scalar formation), Principle of moments, Moment of a couple (Scalar formation), and Equivalent system, Resultants of a force and couple system (Coplanar force system), further reduction of a force and couple system (Coplanar force system).

Equilibrium of a Rigid Body: Conditions for rigid body equilibrium (Equilibrium in two dimensions), Free body diagrams, Equations of equilibrium, Two and three force members.

UNIT – II

Friction: Characteristics of dry friction, Problems involving dry friction.

Center of Gravity and Centroid: Center of gravity and center of mass for system of particles, Center of gravity, center of mass and centroids for a body, Composite bodies.

Moments of Inertia: Definition of moments of inertia for areas, Parallel axis theorem for area, radius of gyration of an area, Moments of inertia of an area by integration, Moments of inertia for composite areas.

UNIT – III

Kinematics of a Particle: Introduction, Rectilinear kinematics: Continuous motion, General curvilinear motion, Curvilinear motion: Rectangular components, Motion of a projectile, Curvilinear motion: Normal and tangential components, Absolute dependent motion analysis of two particles.

Kinetics of a Particle: Force and Acceleration: Newton's law of motion, The equation of motion, Equation of motion for a system of particles, Equation of motion: Rectangular coordinates, Equation of motion: Normal and tangential coordinates.

UNIT – IV

Kinetics of Particle: Work and Energy: The work of a force, Principle of work and energy, Principle of work and energy for a system of particles, Power and efficiency, Conservative forces and potential energy, Conservation of energy.

Kinetics of Particle: Impulse and Momentum: Principle of linear impulse and momentum, Principle of linear impulse and momentum for a system of particles, Conservation of linear momentum for a system of particles, Impact.

TEXT BOOK:

1. "Engineering Mechanics Statics and Dynamics", R.C. Hibbeler and Ashok Gupta. Pearson Education.

REFERENCE BOOKS:

1. "Vector mechanics for Engineers Statics and Dynamics", Beer and Johnston, Tata McGraw-Hill publishing company, New Delhi.
2. "Engineering Mechanics", S. Timoshenko and D. H. Young – McGraw-Hill International Edition.
3. "Engineering Mechanics Statics and Dynamics", J. L. Meriam and L. Kraige.
4. "Engineering Mechanics for Engineers. Statics and Dynamics", Beer and Irving H. Shames, Pearson Education.

COMPUTER PROGRAMMING WITH C

(Common to all Branches)

CS116/ CS01

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(22 Periods)

Introduction:

Computer Fundamentals: Computer and it's components, hardware/software**,** algorithm, characteristics of algorithms, flowchart, symbols used in flowchart, history of C, basic structure of a C program.

C Tokens: Character set, variables, keywords, data types and sizes, type qualifiers, numeric constants and their forms of representation, character constants, string constants, declaration and initialization of variables.

Operators & Expressions: Arithmetic operators and expressions, type-conversion rules, coercion, assignment operators and expressions, increment and decrement operators, conditional operator, statements, preprocessor directives, input/ output functions and other library functions. Relational operators and expressions, boolean operators and expressions, operator precedence and associativity.

Control Statements: if-else statement, else-If statement and switch statement.

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. Programs using Scientific and Engineering formulae. Finding the largest of the three given numbers. Computation of discount amount on different types of products with different discount percentages. Finding the class of an input character, finding the type of triangle formed with the given sides, computation of income-tax, computation of electricity bill and conversion of lower case character to its upper case.

UNIT – II

(21 Periods)

Control Statements: while loop, for loop, do while loop, nested Control statements, break and continue statements.

Arrays: One-Dimensional numeric and character arrays and Two-Dimensional numeric and character arrays.

Programming Exercises for Unit - II:

To print the sum of the digits of a given number and to display the image of a given number. To find whether a given number is prime, printing Fibonacci sequence and to find prime factors of a given number. To print graphic patterns of symbols and numbers and computation of statistical parameters of a given list of numbers. To find the length of a string, compare strings, reverse a string, copy a string and to find whether the given string is

palindrome or not. Transpose of a matrix, product and sum of matrices and sorting of names using arrays.

UNIT – III

(21 Periods)

Functions: Function definition, parameter passing mechanisms and simple recursion.
Scope & extent: Scope rules and storage classes.
Pointers and Dynamic Memory Allocation: Pointer variables**,** pointer arithmetic, dynamic memory allocation, array of pointers, command line arguments, passing pointer variables as parameters to functions.

Programming Exercises for Unit - III:
Functions - Insertion sort, Linear search. Recursive functions to find factorial &GCD(Greatest Common Divisor), string operations using pointers and pointer arithmetic and dynamic memory allocation. Swapping two variable values. Sorting a list of names using array of pointers and command line arguments.

UNIT – IV

(16 Periods)

Structures: Structures, array of structures, pointers to structures, unions and difference between structure and union.
Files: File handling functions for input and output.

Programming Exercises for Unit - IV:
Operations on complex numbers, matrix operations with the matrix and the size of the matrix as a structure, sorting a list of student records on register number using array of pointers and to read an input file of marks and generate a result file.

TEXT BOOK:
1. Byron Gottfried, “Programming with C”, Schaum's Outline series.

REFERENCE BOOKS:
1. Kernighan BW and Dennis Ritchie M, “C programming language”, 2nd ed, Prentice Hall.
2. Yashavant P. Kanetkar, “Let us C”, BPB Publications.
3. E.Balagurusamy, “Programming in ANSI C”, 4th ed, Tata Mcgraw-Hill.
4. Herbert Schildt, “C: The Complete Reference”, 4th edition, Tata Mcgraw-Hill.

PHYSICS LAB – I

(Common to all branches)

CS151/ PHL01

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

1. Determination of acceleration due to gravity at a place using compound pendulum.
2. Study the variation of intensity of magnetic field along the axis of a circular coil using Stewart-Gee's apparatus.
3. Determination of thickness of thin wire using air wedge interference bands.
4. Determination of radius of curvature of a Plano convex lens by forming Newton's rings.
5. Determination of wavelengths of mercury spectrum using grating normal incidence method.
6. Determination of dispersive power of a given material of prism using prism minimum deviation method.
7. Draw the resonant characteristic curves of L.C.R. series circuit and calculate the resonant frequency.
8. Draw the characteristic curves of a photocell and calculate the maximum velocity of electron.
9. Verify the laws of transverse vibration of stretched string using sonometer.
10. Determination of numerical aperture of an optical fiber.

CHEMISTRY LAB – I

(*Common to all branches)*

CS152/ CYL01

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

1. Introduction to Chemistry Lab (the teachers are expected to teach fundamentals like Primary, Secondary Standard Solutions , Normality, Molarity, Molality etc and laboratory ware used, error ,accuracy, precision, Theory of indicators, use of volumetric titrations.

2. Volumetric Analysis:
    a. Estimation of acid content in un-known solution
    b. Estimation of Iron by Dichrometric method
    c. Estimation of Copper by Iodometric method
    d. Estimation of available chlorine in bleaching powder

3. ANALYSIS OF WATER: Estimation of :
    a. TOTAL HARDNESS BY EDTA METHOD
    b. TURBIDITY
    c. CONDUCTIVITY
    d. pH
    e. TOTAL DISSOLVED SALTS
    f. SALANITY
    g. ALKALINITY
    h. DISSOLVED OXYGEN

4. BACTERIAL COUNT: The student has to get his water sample and the teacher has to explain the analysis and the results are to be compared with the INDIAN STANDRDS.

5. CONSTRUCTION OF GALVANIC CELL: Based on the position of the metals in the electrochemical series a model electrochemical Cell is constructed and the values are determined and effect of metal ion concentration, Temperature etc. on emf are calculated.

TEXT BOOK:

1. “Practical Engineering Chemistry”, K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. “Inorganic quantitative analysis”, Vogel.

REFERENCE BOOKS:

1. “Text Book of engineering chemistry”, R. N. Goyal and HarrmendraGoel.
2. “A text book on experiments and calculation Engg.”, S.S. Dara.
3. “Instrumental methods of chemical analysis”, Chatwal, Anand, Himalaya publications.

COMPUTER PROGRAMMING LAB

(Common to all Branches)

CS153/ CSL01

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF PROGRAMS

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

Domestic Customer:	
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
Commercial Customer:	
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 following (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

3. Write a C program to check whether the given number is
   a) Prime or not.
   b) Perfect or Abundant or Deficient.

4. Write a C program to display statistical parameters (using one – dimensional array).
   a) Mean
   b) Mode
   c) Median
   d) Variance.

NOTE: Use functions for each subtask in the following programs

5. Write a C program to read a list of numbers and perform the following operations
   a) Print the list.
   b) Delete duplicates from the list.
   c) Reverse the list.

6. Write a C program to read a list of numbers and search for a given number using Binary search algorithm and if found display its index otherwise display the message “Element not found in the List”.

7. Write a C program to read two matrices and compute their sum and product.

8. A menu driven program with options (using array of character pointers).
    a) To insert a student name
    b) To delete a name
    c) To print the names

9. Write a C program to read list of student names and perform the following operations
    a) To print the list of names.
    b) To sort them in ascending order.
    c) To print the list after sorting.

10. Write a C program that consists of recursive functions to
    a) Find factorial of a given number
    b) Solve towers of Hanoi with three towers (A, B & C) and three disks initially on tower A.

11. 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 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.

12. Write a C program to read a data file of student’s records with fields(Regno, Name, M1,M2,M3,M4,M5) and write the successful students data (percentage > 40%) to a data file.

MATHEMATICS – II

(Common for all branches)

CS121/ MA02

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Fourier Series: Periodic Functions, Trigonometric Series, Fourier Series, Functions of Any Period P = 2L, Even and Odd Functions, Half Range Expansions, Complex Fourier Series, Approximation by Trigonometric polynomials.

UNIT – II

Laplace Transforms: Laplace Transform, Inverse Transform, Linearity, Shifting, Transforms of Derivatives and Integrals, Differential Equations, Unit Step Function, Second Shifting Theorem, Dirac's Delta Function, Convolution theorem (without proof).

UNIT – III

Integral Calculus: Evaluation of double integrals (Cartesian & Polar), Changing the order of integration, Evaluation of triple integrals, Applications of triple integrals to find area and volume.

UNIT – IV

Vector calculus: Scalar and vector point functions, Gradient of a scalar field, Directional derivative, Divergence of a vector field, curl of a vector field, Line integrals, Line integrals independent of path, Green's theorem in the plane (without proof), Surface integrals, Triple integrals, Divergence theorem of Gauss (without proof), Applications to Engineering problems, Stokes theorem(without proof).

TEXT BOOK:

1. "Advanced Engineering Mathematics", Erwin Kreyszig, 8th edition, John Wiley & Sons.

REFERENCE BOOKS:

1. "Advanced Engineering Mathematics", Peter V. O'Neil, Thomsons Brooks/Cole.
2. "Advanced Calculus", Murray R Spiegel, Schaum's outline series.

ENGINEERING PHYSICS – II

(Common to all branches)

CS122/ PH02

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT - I

Electron theory of solids & semiconductor physics (10 periods)

Electron theory of solids:Failure of classical free electron theory, quantum free electron theory, Fermi-Dirac distribution and its temperature dependence, Kronig-Penny model (Qualitative), effective mass of electron, concept of hole.

Semiconductor physics: Classification of semiconductors, P-N junction diode and its characteristics, carrier concentration in P and N type semiconductors, Equation of continuity.

UNIT – II

Magnetic, Dielectric and Ferro-electric materials (10 periods)

Origin of magnetic moment of an atom, Bohr magneton, Weiss theory of Ferro magnetism (Qualitative), Hysteresis curve, soft and hard magnetic materials, ferrites and its applications.

Dielectric materials, Types of polarizations, internal field (qualitative), Classius – Mossetti equation, Frequency dependence of polarization, Ferroelectrics and its applications.

UNIT – III

Advanced materials (12 periods)

Nano-materials: Introduction to nano-materials, Fabrication of nano-materials and carbon nano tubes (CVD and sol-gel), physical and chemical properties of nano materials, Applications of nano materials (Structural point, Storage of information, Strength point)

Superconductivity: Meissner effect, types of superconductors, elements of BCS theory, Applications of superconductors.

Opto-electronic devices: Working and applications of solar cell,LED, LCD, Photo Diode.

UNIT – IV

Analytical techniques (10 periods)

Nuclear techniques: Radio isotopes and its applications (Medical and Industrial), GM-counter, scintillation counter.

Ultrasonics: Properties of ultrasonics, General applications of ultrasonics.

Medical applications: Cardiology, Neurology, Ultrasonic imaging.

NDT: Pulse echo technique, cavitation effect, Time of flight diffraction technique.

Structure determination: Crystal planes, Bragg's law, structural analysis of crystal using X-Ray powder diffraction method.

TEXT BOOKS:

1. "Engineering physics",M.R.Sreenivasan, Newage International Publication.
2. "Engineering Physics", Palaniswamy, ScitechPulishers.
3. "Solid State Physics", Dekkar.

REFERENCE BOOKS:

1. "Material Science for scientists and Engineers", Srinivasan&Srivastava, TMH Publishers.
2. "A text book of engineering physics", M.N.Avadhanulu& P. Krushisagar, S.Chand Pub.
3. "Material Science", VijayaRangarajan.

ENGINEERING CHEMISTRY – II

(Common to all branches)

CS123/ CY02

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

ELECTROCHEMISTRY (11 Periods)

Electrochemical cells – reversible and irreversible cells – EMF – measurement of emf – Single electrode potential – Nernst equation (problem) – reference electrodes –Standard Hydrogen electrode -Calomel electrode – Ion selective electrode – glass electrode and measurement of pH – electrochemical series – significance –potentiometer titrations (redox - Fe^{2+}vs dichromate and precipitation – Ag^{+} vs Cl^{-}titrations) and conduct metric titrations (acid-base – HCI vs, NaOH) titrations.

UNIT - II

CORROSION AND CORROSION CONTROL (11 Periods)

Chemical corrosion – Pilling – Bedworth rule – electrochemical corrosion – different types – galvanic corrosion – differential aeration corrosion – factors influencing corrosion – corrosion control – sacrificial anode and impressed cathodic current methods – corrosion inhibitors – protective coatings – paints – constituents and functions – metallic coatings – electroplating (Au) and electroless (Ni) plating.

GREEN CHEMISTRY: Introduction-concepts-Engineering Applications.

UNIT – III (12 Periods)

LIQUID AND GASEOUS FUELS AND COMBUSTION: Petroleum based: Petroleum processing and fractions – cracking – catalytic cracking and methods-knocking and anti-knocking Agents – octane number and cetane number – synthetic petrol – Fischer Tropsch and Bergius processes.

Gaseous fuels- water gas, producer gas, CNG and LPG, Flue gas analysis – Orsat apparatus – theoretical air for combustion.

PHASE RULE AND ALLOYS: Statement and explanation of terms involved – one component system – water system – condensed phase rule – construction of phase diagram by thermal analysis – simple eutectic systems (lead-silver system only) – alloys – importance, ferrous alloys – nichrome and stainless steel – heat treatment of steel, non-ferrous alloys – brass and bronze.

UNIT – IV (11 periods)

ANALYTICAL TECHNIQUES: Beer-Lambert's law (problem) – UV-visible spectroscopy and IR spectroscopy –principles – instrumentation (problem) (block diagram only) – estimation of iron by colorimetry – flame photometry – principle – instrumentation (block diagram only) – estimation of sodium by flame photometry – atomic absorption spectroscopy – principles – instrumentation (block diagram only) – estimation of nickel by atomic absorption spectroscopy.

TOTAL: 45 PERIODS

TEXT BOOKS:

1. P.C.Jain, Monica Jain, “Engineering Chemistry”, DhanpatRai Pub, Co., New Delhi (2002).
2. S.S.Dara, Mukkanti K.,“A text book of Engineering Chemistry”, S.Chand& Co., Ltd., New Delhi (2006).
3. B. Sivasankar, “Engineering Chemistry”, Tata McGraw-Hill Pub.Co.Ltd, New Delhi (2008).

REFERENCE BOOKS:

1. B.K.Sharma, “Engineering Chemistry”, Krishna Prakasan Media (P) Ltd., Meerut (2001).
2. “Enginering Chemistry”, J.C.Kuriacase&J.Rajaram, Tata McGraw Hill, New Delhi (2004).
3. “Chemistry of Engineering Materials”, R.P Mani, K.N.Mishra, CENGAGE learning.
4. “Applied Chemistry - A text for Engineering & Technology”, – Springar (2005).
5. “Text Book of Engineering Chemistry”, ShasiChawla, DhantpatRai Publishing Company, NewDelhi (2008).
6. “Engineering Chemistry”, R. Gopalan, D. Venkatappayya, D.V. SulochanaNagarajan, Vikas Publishers (2008).

DIGITAL LOGIC DESIGN

(Common to Computer Science & Information Technology)

CS124/ IT124

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(16 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

(16 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

(16 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

(16 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:

1. 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.Anandkumar, “Fundamentals of digital circuits”, 4th edition, PHI.

ENVIRONMENTAL STUDIES

(Common for all branches)

CS125/ BT01

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Introduction: Definition, Scope and Importance, Need for public awareness.

Ecosystems: Introduction, types, Structure and Functions of Ecosystems, Forest, Grassland, Desert, Aquatic (lakes, rivers and estuaries)

Biodiversity: Definition and levels of Biodiversity, Bio-geographical Classification of India, India as a mega diversity nation and Hot Spots of Biodiversity.

Values of Biodiversity: Consumptive use, Productive use, Social, Ethical, Aesthetic and Option values.

Threats to Biodiversity: Habitat loss, Extinction of Species, Poaching of wildlife

Conservation of Biodiversity: In-situ and Ex-situ conservation of biodiversity

UNIT – II

Natural Resources: Exploitation and Related Pollution Problems

Land: Land as a resource, causes and effects of land degradation

Forest: Use of forests, causes and effects of deforestation and conservation of forests

Water: Distribution of Water Resources, floods and drought, causes, effects and control of water pollution.

Energy: Classification of Resources, Importance of energy, causes and effects of nuclear pollution.

Causes, Effects and Control of Air Pollution and Noise Pollution.

Solid Waste Management: Urban and Industrial wastes, Composting and Vermiculture and 3 R - approach.

UNIT – III

Sustainability: Theory and Practice, Equitable use of resources for sustainable life styles. Rain water harvesting, Watershed management, Cloud Seeding, Acid rain, Ozone layer depletion, Global warming, Population Growth and its Impact on environment, Green Revolution, Resettlement and Rehabilitation program, Mining and Dams and their conflictions, 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 and Copenhagen Conference 2009

Case Studies: Chipko movement, Narmada BachaoAndolan, Silent Valley Project, Madhura Refinery and TajMahal, Chernobyl Nuclear Diaster, Ralegaon Siddhi (Anne Hazare) and Bhopal Tragedy.

TEXT BOOK:

1. Environmental Studies by Benny Joseph,Tata McGraw-Hill Publishing Company Limited, New Delhi.

REFERENCE BOOKS:

1. Text Book of environmental studies, ErachBharucha, UGC.
2. Environmental Studies, AnubhaKaushik and C. P. Kaushik.
3. A basic course in environmental studies, S. Deswal and A. Deswal, DhanapathRai& Co.
4. Essentials of environmental studies, Kurian Joseph and R.Nagendram, Pearson Education Pt 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.
9. Comprehensive environmental studies- JP Sharma, Laxmi Publications.
10. Environmental Science, 11th Edition – Thomson Series – By G Tyler Miller, Jr.
    Environmental Science and Engineering by Dr. Suresh, K.Dhaneja, Publishers SK Kataria& Sons, New Delhi-110006.

ENGINEERING GRAPHICS

(Common to all branches)

CS126/ ME01

Lectures	:	3 Periods/Week, Tutorial: 3	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

INTRODUCTION: Introduction to Drawing instruments and their uses, geometrical construction procedures (**2x3 =6 periods)**

CURVES: Conic sections – general construction methods for ellipse, parabola and hyperbola. Other methods to construct ellipse only, cycloid, involute of a circle (**4x3=12 periods)**

UNIT – II

METHOD OF PROJECTIONS: Principles of projection - First angle and third angle projection of points. Projection of straight lines.Traces of lines. (**6x3=18 periods)**

UNIT – III

PROJECTIONS OF PLANES: Projections of plane figures: circle, square, rhombus, rectangle, triangle, pentagon and hexagon. (**4x3=12 periods)**

UNIT – IV

PROJECTIONS OF SOLIDS: Projections of Cubes, Prisms, Pyramids, Cylinders and Cones with varying positions. (**5x3=15 periods)**

UNIT – V

ISOMETRIC PROJECTIONS: Isometric Projection and conversion of Orthographic views into isometric views. (Treatment is limited to simple objects only). (**3x3=9 periods)**

ORTHOGRAPHIC PROJECTIONS: Conversion of pictorial views into Orthographic views. (Treatment is limited to simple castings). (**4x3=12 periods)**

TEXT BOOK:

1. Engineering Drawing by N.D. Bhatt & V.M. Panchal. (Charotar Publishing House, Anand). (First angle projection)

REFERENCE BOOK:

1. Engineering Drawing by Dhananjay A Jolhe, Tata McGraw hill publishers Engineering Drawing by Prof.K.L.Narayana& Prof. R.K.Kannaiah.

PHYSICS & CHEMISTRY LAB – II

(Common to all branches)

CS161/ PHCYL01

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

(A Selected list of Experiments from the following)

PHYSICS LABORATORY – II

1. Determine the rigidity modulus of the given material of the wire usingTorsionalpendulum.
2. Determination of room temperature using platinum resistant thermometer.
3. Draw the load characteristic curves of a solar cell.
4. Determination of Hall coefficient of a semiconductor.
5. Determination of velocity of ultrasonic wave in a given liquid usingultrasonicinterferometer.
6. Draw the characteristic curves of a G.M. counter and calculate the bestoperatingvoltage.
7. Determination of voltage and frequency of an A.C. signal using C.R.O.
8. Draw the I/V characteristic curves of a P-N junction diode.
9. Determination of Forbidden energy gap of Si &Ge.
10. Determination of wavelength of laser source using Diode laser.

CHEMISTRY LABORATORY – II

1. **PRODUCTION OF BIODIESEL**: The teacher has to perform the transesterfication reaction of FATTY ACID and the Biodiesel thus produced can be used for analysis.

2. Estimation of properties of oil:
    a. Acid Number
    b. Viscosity
    c. Saponification value
    d. Aniline point
    e. Flash and Fire points
    f. Pour and Cloud point.

3. **PREPARATION OF**:
    a. PHENOL –FORMALDEHYDE RESIN
    b. ASPIRIN
    c. Phenylbenzoate
    d. Soap

4. **SOIL ANALYSIS**: pH, Determination of Zinc, Iron and Copper.

5. **Kinetics:** To determine the rate constant of hydrolysis of methyl acetate catalyzed by an acid and also the energy of activation. (or) To study the kinetics of reaction between $K_2S_2O_8$ and KI.

6. **Demonstration Experiments (Any two of the following) :**
    a. Determination of dissociation constant of weak acid-by pH metry
    b. Preparation of Thiokol rubber
    c. Adsorption on Charcoal
    d. Heat of reaction
7. **FOOD ANALYSIS:** Determination Saturated and Unsaturated Fatty Acids, pH,etc.

TEXT BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Vogels Text Book of Quantitative Chemical Analysis 6th Edition (2002).

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R. N. Goyal and HarrmendraGoel.
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications, 5th edition 2004

ENGLISH LANGUAGE LAB

(Common to all branches)

CS162/ ENL01

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

OBJECTIVES

This course enables the students to expedite the process of improving communication in both formal and in formal situation. A special attention has been paid to the needs of competitive and current demands.

Introduction to communication: Difference between communication and communication skills, Types of communication, Barriers to communication.
Introduction to skills: Listening skills, writing skills, Reading skills, and Speaking skills.
Pronunciation drills: Phonetics, British English and American English.
Conversational skills: Dialogue, Telephonic Interaction.
Professional writings & skills: Resumes, Reports, Business letters and Interview skills.
Practical: Extempore Debates, Group discussion, and Oral presentation.

RECOMMENDED SOFTWARES:

Digital Language Lab - Networking Software, HiClass – Software.

English Language – Listening, Speaking Reading, Writing Skills: A lania series – English Mastery, Levels A, B (Set of 2 CDs), English Discoveries (Set 0f 12 CDs).

English Grammar / Pronunciation: Live Action English Interactive, Speech Solutions

Dictionaries: Cambridge Advanced Learner's**,** Oxford Genie & Advanced

Writing: Easy writer, Creative writing

Professional English: Telephonic English**,** English in mind

English for ETS: Barron's**,** TOEFL Mastery**,** IELTS**,** GRE

WORKSHOP

(Common to all branches)

CS163/ MEL01

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

1. **Carpentry**
    a. Half Lap joint
    b. Dovetail joint
    c. Mortise &Tenon joint

2. **Welding using electric arc welding process/gas welding**
    a. Lap joint
    b. Tee joint
    c. Butt joint

3. **Sheet metal operations with hand tools**
    a. Trapezoidal tray
    b. Funnel
    c. T-joint

4. **House wiring**
    a. To control one lamp by a single switch
    b. To control two lamps by asingle switch
    c. Stair-case wiring

MATHEMATICS – III
CS211/ MA03

Lectures	:	4 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(16 Periods)

Fourier integrals: From Fourier series to the Fourier integral, Application of the Fourier integral, Fourier Cosine and Sine integral, Evaluation of integrals, Fourier cosine and sine Transforms: Fourier Cosine Transforms, Fourier Sine Transforms, Linearity, Transforms of Derivatives, Fourier Transform: Complex form of the Fourier integral, Fourier Transform and its inverse, Linearity. Fourier Transform of Derivatives, Convolution.

UNIT – II

(16 Periods)

Partial differential equations: Basic concepts, Modeling-Vibrating string, Wave EquationSeparation of Variables Use of Fourier series, D'Alembert's Solution of the Wave Equation, Heat Equation-Solution Fourier series, Steady-State Two-Dimensional Heat Flow

UNIT – III

(16 Periods)

Numerical Methods in general: Introduction, Solution of Equations by Iteration, newton's Method for Solving Equations f(x) = 0, Convergence of Newton's method, Interpolation:Lagrange interpolation, Newton's divided difference interpolation, Equal spacing: Newton's forward Difference formula, Newton's Backward Difference formula, Inverse interpolation, Numerical integration and Differentiation: Trapezoidal Rule, Error Bounds and Estimate for the Trapezoidal Rule, Simpson's Rule of integration, Error of Simpson's rule.

UNIT – IV

(16 Periods)

Numerical methods in linear algebra: Linear Systems: Gauss Elimination, LU Factorization, Gauss-Seidel iteration Method, Method of least Squares, Methods of First order Differential Equations: Euler's method, Runge-Kutta methods, Methods for Elliptic Partial Differential Equations: Laplace equation, Poisson equation

TEXT BOOK:

1. "Advanced Engineering Mathematics", Erwin Kreyszig, 8th edition, John Wiley & Sons.

REFERENCE BOOK:

1. "Advanced Engineering Mathematics", Peter V. O'Neil, Thomsons Brooks/Cole.

COMPUTER ORGANIZATION
CS/IT 212

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(17 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

(17 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 BOOK:

1. “Computer Organization”, Carl Hamacher, ZvonkoVranesic, SafwatZaky, 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, 6th Edition, Pearson/PHI.
3. “Computer Systems Architecture”, M. Morris Mano, Third Edition, Pearson/PHI.

COMPUTER GRAPHICS
CS/IT 213

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I **(17 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 transformations, 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

(17 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

(16 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 BOOK:

1. "Computer Graphics", Donald Hearn and M.Pauline Baker, 2nd Edition, Pearson Education.

REFERENCE BOOKS:

1. "Computer Graphics Principles & practice", 2nd edition in C, Foley, VanDam, Feiner and Hughes, Pearson Education.
2. "Computer Graphics", Steven Harrington, TMH.
3. "Computer Graphics Second edition", Zhigandxiang, Roy Plastock, Schaum's outlines, Tata Mc- Graw hill edition.

OBJECT ORIENTED PROGRAMMING
CS/IT 214

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
University Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

An Overview of C++: Origins of C++, Object Oriented Programming concepts, C++ Keywords, General form of a C++ Program.

Classes and Objects: Classes, Structures and Classes, Unions and Classes, Friend Functions, Friend Classes, Inline Functions, Parameterized Constructors, Static Class members, Execution procedure of Constructors and Destructors, Scope Resolution Operator, Nested Classes, Local Classes, Passing and Returning Objects, Object Assignment.

Arrays, Pointers, References and the Dynamic Memory Allocation: Arrays of Objects, Pointers, References, Dynamic Memory Allocation and De-allocation Operators, set_new_handler() function.

UNIT – II

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 and delete, Overloading Special Operators & Comma Operator.

Inheritance: Base-Class Access Control, Base Class and Derived Class Pointers, Function Overriding, Base Class Initialization ,Inheritance and protected members, Inheriting Multiple Base Classes, Order of Invocation of Constructors and Destructors, Granting Access, Virtual Base Classes.

UNIT – III

Virtual Functions & Polymorphism: Significance of Virtual Functions, Virtual qualification and inheritance, Hierarchy of Virtual Functions, Pure Virtual Functions, Using Virtual Functions, Early Vs Late Binding, Virtual Destructor.

Templates: Generic Functions, Applications of Generic Functions, Generic Classes, type name and export Keywords, Benefits of Templates.

Exception Handling: Fundamentals, Derived-Class Exceptions, terminate (), unexpected(), and uncaught_exception() functions, exception and bad_exception Classes.

UNIT – IV

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(), ignore(), peak(), putback() and flush() functions, Detecting EOF, 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: Introduction of STL, vectors, lists and maps

TEXT BOOK:

1. "The Complete Reference C++", Herbert Schieldt, 4th edition, 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++", Venugopal.

DISCRETE MATHEMATICAL STRUCTURES
CS/IT 215

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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

(20 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

(20 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

(22 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".

DATA STRUCTURES
CS/IT 216

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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

(19 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

(17 Periods)

Preliminaries, Binary Trees, Implementation, Expression trees, The Search Tree ADT, Binary Search Trees, Implementation.

AVL Trees, Single Rotations, Double rotations.

UNIT – IV

(20 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”, ThomsonBrooks / COLE, 1998.
3. Aho, J.E. Hopcroft and J.D. Ullman, “Data Structures and Algorithms”, Pearson Education Asia, 1983.

OBJECT ORIENTED PROGRAMMING LAB
CS/IT 251

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
University Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

1. Implement class Complex with the following data members and member functions for performing arithmetic operations.

```
class Complex {
        private:
                floatreal_part;
                floatimag_part;
        public:
                Complex();
                Complex(float rp,floatip);
                addComplex(Complex c2);
                subComplex(Complex c2);
                mulComplex(Complex c2);
};
```

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.

DATA STRUCTURES LAB
CS/IT 252

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

1. Code the following list ADT operations using array, single linked list, double linked list.
   (a) voidis_emptyList(List L) (b) List makeNullList(size n)
   (c) Position firstPost(List L) (d) Position endPost(List L)
   (e) Position nextPost(List L, Position p) (f) Position prevPos(List L, position p)
   (g) Position find(List L, Element x) (h) Position findKth(List L, int k)
   (i) void insert(List L, Position p) (j) void delete(List L, Position p)
   (k) void append(List L, Element x) (l) intcmp(List L, Position p1, Position p2)
   (m) int cmp2(List L, List L, Position p1, Position p2)
   (n) void swap(List L, Position p1, Position p2)
   (o) Element retrieveElement(List L, Position p)
   (p) void printelement(List L, 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.

COMPUTER HARDWARE AND SOFTWARE LAB
CS/IT 253

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

1. Identifying external ports and interfacing.
2. Identifying PCI cards and interfacing.
3. Explore Mother Board components and Layouts.
4. Partitioning and formatting Hard disks.
5. Install and Uninstall system and application software.
6. Understand BIOS configuration.
7. Connect computers in a network.
8. Types of input/output devices.
9. Assemble a Computer.
10. Troubleshoot a Computer.
11. Operating system commands
    a. Directory Related Utilities.
    b. File and Text Processing Utilities.
    c. Disk, Compress and Backup Utilities.
    d. Networking Utilities and
    e. Vi editor

PROBABILITY & STATISTICS
CS221/ MA05

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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.

Sampling Distribution: Populations and Samples, Sampling Distribution of the Mean (σ known), Sampling Distribution of the Mean (σ Unknown), Sampling Distribution of the Variance.

UNIT – II

(21 Periods)

Inferences Concerning Means: Point Estimation, Interval Estimation, Tests of Hypotheses, Null Hypotheses and significance of tests, Hypotheses Concerning one Mean, Inferences Concerning Two Means.

Inferences Concerning Variances: Estimation of Variances, Hypotheses Concerning One Variance, Hypotheses Concerning Two Variances.

UNIT –III

(19 Periods)

Inferences Concerning Proportions: Estimation of Proportions, Hypotheses Concerning One Proportion, Hypotheses Concerning Several Proportions, Goodness of Fit.

Analysis of Variance: General Principles, Completely Randomized Designs, Randomized – Block Designs.

UNIT – IV

(22 Periods)

Statistical Content of Quality-Improvement Programs: Quality-Improvement Programs**,** Starting a Quality Improvement Program, Experimental Designs of Quality-Improvement, Quality Control, Control Charts of Measurements, Control Charts for Attributes.

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:

1. Miller, Freund's, "Probability and Statistics for Engineers", Richard A. Johnson, 6th Edition, PHI.

REFERENCE BOOKS:

1. "Probability & Statistics for Engineers and Scientists", R.E Walpole, R.H. Myers & S.L. Myers, 6th Edition, PHI.
2. "Probability & Statistics", Murray R Spiegel, John J.Schiller, R.AluSrinivasa, Schaum's Outline series.

ELECTRONIC DEVICES & CIRCUITS
CS222/ EC01

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(18 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

(16 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

(15 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

(15 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 McGraw Hill Publishers.

ELECTRICAL TECHNOLOGY
CS223/ EE04

Lectures	:	3Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

DC AND AC CIRCUITS: Kirchoff's laws -Series & Parallel circuits - Alternating Current - waveforms – RMS – average values – J Notation – Series, Parallel R-L-C- circuits - Power factor - 3-phase balanced circuits. Three Phase Circuits - Relationship between Line & Phase Values for balanced 3 phase circuits.

UNIT – II

NETWORK THEOREMS: Star-Delta transformations – Superposition – Thevenin – Norton – Reciprocity -Maximum Power -application of theorems to DC & AC circuits.

TWO PORT NETWORK: Two-port network - Open circuit impedance (Z) - short circuit admittance (Y) – transmission -hybrid parameters and inverse hybrid parameters. Inter-relationships of different parameters.

UNIT – III

D.C. MACHINES: Constructional features – methods of excitation-load characteristics of shunt, series and compound generators. Torque development in motor - torque equation. Speed control of DC shuntmotors. Losses and efficiency calculations for motors and generators. Principle of 3-point starter.

TRANSFORMERS: E.M.F. equation-equivalent circuit – regulation – losses and efficiency.

UNIT – IV

INDUCTION MACHINES: Constructional features, principle of operation, concept of rotating magnetic field, torque-slip characteristics, principle of starters, Operations of single-phase induction motors and their starting methods.

SYNCHRONOUS MACHINES: Principle, constructional features, E.M.F. equation, applications of synchronous motors.

TEXT BOOKS:

1. Rajendra Prasad, "Fundamentals of Electrical Engineering", PHI Learning PVT Ltd.
2. A. Sudhakar&Shyam Mohan S Palli, "Circuits & Networks Analysis &Synthsis", McGrawHill Publications.
3. JB Gupta, "A Course in Electrical Technology", SK Kataria& Sons.

REFERENCE BOOKS:

1. Ghosh, "Network analysis & Synthesis", TataMCGraw-Hill.
2. B L Theraja, "Text Book of Electrical Technology", S Chand & Company.

GUI PROGRAMMING
CS/IT 224

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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 specifires, 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 multiplethreads, 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,Menubar.

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 Connectivity: 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, Datagram's, java.net package.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

SYSTEM SOFTWARE
CS/IT 225

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I (13 Periods)

BACKGROUND: Introduction to System Software; System Software and Machine Architecture; The simplified Instructional Computer (SIC):SIC Machine Architecture; SIC/XE Machine Architecture;SIC Programming examples; Traditional (CISC) Machines: VAX Architecture; Pentium Pro Architecture; Risc Machines: Ultra SPARC Architecture; Power PC Architecture; Cray T3E Architecture.

UNIT–II (14 Periods)

ASSEMBLERS: Basic Assembler Functions: A Simple SIC Assembler; Assembler Algorithm and Data Structure; Machine – Dependent Assembler Features: Instruction Formats and Addressing modes; Program Relocation; Machine – Independent Assembler Features: Literals; Symbol -Defining Statements; Expressions; Program Blocks; Control Sections and Program Linking;
Assembler Design Option: One – Pass Assembler; Multi – Pass Assembler;
Implementation Examples: MSAM Assembler; SPARC Assembler; AIX Assembler.

UNIT–III (18 Periods)

LOADERS AND LINKERS: Basic Loader Functions: Design of an Absolute Loader;
A simple Bootstrap Loader; Machine Dependent Loader Features: Relocation; Program Linking; Algorithm and data structures for a Linking Loader.
Machine Independent Loader Features: Automatic Library Search; Loader Options;
LOADER DESIGN OPTIONS: Linkage editors; Dynamic linking; Bootstrap loaders;
Implementation Examples: MS – DOS Linker; Sun OS Linker; Cray MPP Linker.

UNIT – IV (19 Periods)

MACRO PROCESSORS & OTHER SYSTEM SOFTWARE: Basic Macro Processor Functions: Macro definition and Expansion; Macro Processor Algorithm and Data Structures; Machine independent Macro Processor features: Concatenation of Macro Parameters; Generation of unique labels; Conditional macro expansion; Macro Processor design Option: Recursive macro expansion; General purpose macro processors; Macro Processing with in Language translators; Implementation Examples: MASM Macro Processor; ANSIC Macro Language; The ELENA Macro Processor;
Text Editors: Overview of the Editing Process; User Interface; Editor Structure;
Interactive Debugging Systems: Debugging functions & Capabilities; Relationship with other parts of the system; User – Interface Criteria.

TEXT BOOK:

1. "System Software", Leland. L. Beck, 3rd Edition, Addison-Wesley, 1997.

REFERENCE BOOK:

1. "System Programming and Operating Systems", D.M.Dhamdhere, 2nd Edition, Tata McGraw - Hill, 1999.

MICROPROCESSORS AND MICROCONTROLLERS
CS/IT 226

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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

(15 Periods)

MICRO CONTROLLERS: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”, Kenneth J.Ayala.

ELECTRONIC DIVICES AND CIRCUITS LAB
CS261/ ECL01

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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

MICROPROCESSORS AND MICROCONTROLLER LAB
CS/IT 262

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

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 a 8086 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 40H b)add them and save in 60Hc)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.

GUI PROGRAMMING LAB
CS/IT 263

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

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 inheritances.
6. Write a program to demonstrate packages.
7. Write a java program to create user defined exception class and test this class.
8. Write an 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.

PROFESSIONAL ETHICS & HUMAN VALUES
CS/IT 311

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(16 Periods)

Human Values: Degeneration in Values, Holistic Code of Living, Universal Values, Right Conduct, Peace, Truth, Love, Non-violence, Fundamental Values, Holistic Vision, Quality of Life Sources.

Understanding Ethics: Ethics-Action Oriented, Ethical Vision, Indian Ethos, Ethics Defined, Engineering Ethics, Ethical Decisions, Science of Ethics, Nature of Ethical Problems, Ethical Thinking, Approaches to Ethical Behavior, Deontological Theories, Consequentiality Theories, Virtue, Fundamental Virtues, Various Connotations of Engineering Ethics, Why Study Engineering Ethics?, Personal and Business Ethics, Ethics and the Law.

Ethics and Design Problems, Duties and Rights, Morality and Law, What is a Profession?, Who is a Professional, An Analysis, Medicine and Law, Engineering as a Profession, Professional Societies, Core Qualities of Professional Practitioners, Professional Institutions, Operating in a Pluralistic Society, Environments and Their Impact, Economic Environment, Capital Labor, Price Levels, Government Fiscal and Tax Policies, Customers, Technology, Impact of Technology: Benefits and Problems, Categories and Technological Change, social Environment, Complexity of Environmental Forces, Political Environment, Legal Environment, Social Attitudes, Beliefs, and Values, Social Responsibility and Social Responsiveness, Arguments for Social Involvement of Business, Arguments against Social Involvement of Business, Social Audit, Institutionalizing Ethics, Code of Ethics, Purpose of Code of Ethics, Objections to Codes, Codes of Engineering Societies.

Resolving Internal Conflicts in Codes, Other Types of Codes of Ethics, Solving Ethical Conflicts, Guidelines Procedure for Solving Ethical Conflicts, Ethical Judgment, Law, Contract, Liability, Product Liability.

Moral Reasoning and Ethical Theories - I: Theories of Right Action Utilitarianism, Cost-Benefit Analysis, Duty Ethics and Right Ethics, Which Theory to Use? Uses of Ethical Theories, Variety of Moral Issues, Major Ethical Issues, Analysis of Issue in Ethical Problems, Three Types of Inquiry, Normative Inquiries, Conceptual Inquiries, Factual Inquiries, Engineering and Management Decision, Sustainability, Kohiberg's Stages of Moral Development, Piaget's Theory, Carol Gilligan Theory.

UNIT – II

(16 Periods)

Moral Reasoning and Ethical Theories - II: Moral Dilemmas, Examples, Concept of Moral Dilemma, Problems, Dilemmas and Consistency, Moral Residue, Types of Moral Dilemmas, Moral Autonomy, Moral Disagreement, Moral Absolutism, Moral Relativism, Moral Pluralism, Morality as Consequence, Ethical Egoism, Feminist Consequentialism, Conformity to God's Commands, Proper Intention, Universalizability. Respect for Other Persons.

Engineering as Social Experimentation: Comparison with Standard Experiments, Knowledge Gained Conscientiousness, Relevant Information, Learning from the Past, Engineers as

managers, consultants, and Leaders, Accountability, Role of Codes, Codes and Experimental Nature of Engineering.

Engineers' Responsibility for Safety and Risk: Safety and Risk, Concept of Safety, Types of Risks, Voluntary vs. Involuntary Risk, Short-term vs. Long-term Consequences, Expected probability, Reversible Effects, Threshold Levels for Risk, Delayed vs. Immediate Risk, Safety and the Engineer, Designing for Safety, Risk-Benefit Analysis, Accidents.

UNIT – III

(16 Periods)

Responsibilities and Rights: Collegiality Techniques for Achieving Collegiality, Two Senses of Loyalty, Obligations of Loyalty, Misguided Loyalty, Professionalism and Loyalty, Professional Rights, Professional Responsibilities, Confidential and Proprietary Information, Conflict of Interest, Solving Conflict Problems, Self-interest, Customs and Religion, Ethical EgoismCollective Bargaining, Confidentiality, Acceptance of Bribes/Gifts, When is a Gift a Bribe? Examples of Gifts vs. Bribes, Problem Solving, Interests in Other Companies, Occupational Crimes, Industrial Espionage, Price Fixing, Endangering Lives, Whistle Blowing, Type of Whistle Blowing, When should Whistle Blowing be Attempted?, Preventing Whistle Blowing.

Global Issues: Globalization, Cross-cultural Issues, Environmental Ethics, Computer Ethics, Computers as the Instrument of Unethical Behavior, Computers as the Object of Unethical Acts, Autonomous Computers, Computer Codes of Ethics, Weapons Development Ethics and Research, Analyzing Ethical Problems in Research, Intellectual Property Rights (IPRs).

UNIT – IV

(16 Periods)

Ethical Audit: Aspects of Project Realization, Ethical Audit Procedure, The Decision Makers, Variety of Interests, Formulation of the Brief, The Environment, The Audit Statement, The Audit Reviews.

Case Studies: Bhopal Gas Tragedy, the Chernobyl Disaster.

Appendix 1: Institution of Engineers (India): Sample Codes of Ethics.

Appendix 2: ACM Code of Ethics and Professional Conduct.

TEXT BOOK:

1. “Engineering Ethics”, M.GovindaRajan, S.Natarajan, VS.SenthilKumar,PHI Publications.

REFERENCE BOOKS:

1. “Ethics in Engineering”, Mike W Martin, Ronald Schinzinger, TMH Publications.

DATA COMMUNICATIONS
CS/IT 312

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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

(15 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

(17 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. BehrouzA.Forouzan, “Data Communications and Networking”, Fourth edition, TMH.
3. GodBole, “Data Communications & Networking”, TMH.

AUTOMATA THEORY & FORMAL LANGUAGES
CS/IT 313

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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

(Construction based treatment & proofs are excluded) **(18 Periods)**

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.

TEXT BOOK:

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

OPERATING SYSTEMS
CS/IT 314

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Introduction: General introduction to O.S, Operating system structures.
Process Management: Process concept, Operations on processes, Inter-process communication.
Threads: Threads, UNIX usage and Unix System Calls.

UNIT – II

CPU Scheduling: Scheduling criteria, Scheduling algorithms, Multiple-processor scheduling, Thread scheduling.
Process Synchronization: Critical section problem, Synchronization hardware, Semaphores and monitors, Classic problems of synchronization.

UNIT – III

Deadlocks: The deadlock problem, Methods for handling deadlocks, Deadlock detection, avoidance, prevention, and recovery.
Memory management: Address translation: logical versus physical address space, Paging and segmentation.
Virtual Memory: Virtual memory, Replacement policies for paging and segmentation, Thrashing.

UNIT – IV

File systems: File system interface, File system structure, Access and protection.
Protection: Goals and domain of protection, Protection methods

TEXT BOOK:

1. Silberschatz & Galvin, “Operating System Concepts”, 8th edition, John Wiley & Sons (Asia) Pvt.Ltd.,.

REFERENCE BOOKS:

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

DATABASE MANAGEMENT SYSTEMS
CS/IT 315

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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 BOOK:

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

REFERENCE BOOKS:

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

WEB TECHNOLOGIES
CS/IT 316

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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

(18 Periods)

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

UNIT - IV

(22 Periods)

Java Server Faces.
Web Services.

TEXT BOOK:

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

REFERENCE BOOKS:

1. Jason Cranford Teague, “Visual Quick Start Guide CSS, DHTML &AJAX”, 4e, Pearson Education.
2. Tom NerinoDoli 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. Marty Hall, Larry Brown, “Core Servlets and JavaServer Pages™: Volume 1: Core Technologies”, 2nd Edition, Prentice Hall.

SOFT SKILLS LAB
CS 351 / ENL02

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

1. **NON-VERBAL COMMUNICATION**
   a. Voluntary & Involuntary Body Language.
   b. Facial Expressions.
   c. Kinesics.
   d. Oculesics.
   e. Haptics.
   f. Proxemics.
   g. Chronemics.
   h. Para Linguistics.

2. **LIFE SKILLS**
   a. Good Attitude & Self Motivation.
   b. Social Behaviour &Social Norms.
   c. Ethics, Values and Positive Work Ethics.
   d. Desire to Learn and Responsibility**.**

3. **EMOTIONAL INTELLIGENCE**
   a. Self Awareness.
   b. Self Control.
   c. Self Motivation.
   d. Empathy.
   e. Relationship Skills.
   f. Self Esteem.

4. **PEOPLE SKILLS**
   a. Effective Listening.
   b. Managing Stress.
   c. Persuading Techniques.
   d. Questioning Techniques – Close End, Open End Questions and Answers.
   e. Role Perception.

5. **COGNITIVE SKILLS**
   a. Situational Analysis.
   b. Critical Thinking.
   c. Lateral Thinking.
   d. Creative Thinking.

6. **EMPLOYABILITY**

   a. Corporate Information.
   b. Group Discussion.
   c. Team Building.
   d. Conflict Management.
   e. Negotiating Skills.
   f. Interview Techniques.

RFFERENCE BOOKS:

1. "The Definitive Book Of Body Language", Allan & Barbara Pease
2. "You Can Win", Shiv Khera.
3. "Lateral Thinking", Edward De Bono.
4. "How To Prepare For Group Discussions And Interview", Hari Mohan Prasad, Rajnish Mohan, 2nd Edition, TMH.
5. "Emotional Intelligence", Daniel Goleman.
6. "The 7 Habits of Highly Effective People", Stephen R. Covey.
7. "Working in Teams", Sandy Pokras.

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

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

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

TEXT BOOKS:

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

WEB TECHNOLOGIES LAB
CS/IT 353

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

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.

COMPUTER NETWORKS
CS/IT 321

Lectures	:	4 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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. LeonGartia, IndraWidjaja, "Communication Networks Fundamental Concepts and Key Architectures", TMH.
3. Nader F.Mir, "Computer and Communication Networks", PHI.

COMPILER DESIGN
CS/IT 322

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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 BOOK:

1. Alfred V.Aho, RaviSethi, JD Ullman, “Compilers Principles, Techniques and Tools”, Pearson Education, 2007.

REFERENCE BOOKS:

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.

UNIX PROGRAMMING
CS/IT 323

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I **(20 Periods)**

Introduction to UNIX: UNIX Architecture, Features of Unix.

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

The STREAM EDITOR (sed) - Line addressing, multiple instructions, context addressing, writing selected lines to a file, text editing, substitution, Basic regular expressions.

Programmable text processing: awk – Sample awk filtering, splitting a line into fields, formatting output, variables and expressions, comparison operators, number processing, storing awk programs in a file, the BEGIN and END sections, Built-in Variables, arrays, functions, control structures, extended regular expressions.

UNIT – II **(18 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, functions, arrays.

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.

UNIT – IV **(18 Periods)**

Signals: The defined signals, A list of 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 Concepts and Applications, Sumithabha Das, 4th edition, TATA McGraw Hill.
2. "UNIX for programmers and users", 3rd edition, Graham Glass, King Ables, Pearson education.

REFERENCE BOOKS:

1. "The Design of UNIX operating System", Maurice J.Bach, PHI.
2. "Advanced programming in the UNIX environment", W Richard Stevens, 2nd Edition, Pearson education.
3. "UNIX programming environment", Kernighan and pike, Pearson education.
4. "Your UNIX the ultimate guide",Sumitabha Das, TMH, 2nd edition.
5. "Advanced UNIX programming", Marc J. Rochkind, 2nd edition, Pearson Education.

SOFTWARE ENGINEERING
CS/IT 324

Lectures	:	4 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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.

TEXT BOOK:

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.

ENTERPRISE PROGRAMMING
CS/IT 325

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(16 Periods)

Introduction: Java and the J2EE Platform, XML Fundamentals.
Patterns: Presentation-Tier Patterns, Service-Tier Patterns and Data-Tier Patterns.
The Presentation Tier: Servlets

UNIT – II

(20 Periods)

The Presentation Tier: JSP.
The Service Tier: EJB Component Model, Roles, Relationships, and Responsibilities, Enterprise JavaBean, EJB Container Functionality, Performance and Scalability Issues, Session Beans, Entity Beans andMessage-Driven Beans.

UNIT – III

(18 Periods)

The Enterprise Information System Tier: Review of Java RMI, CORBA and Java IDL, Java Mail API, Java Messaging Service and JNDI

UNIT – IV

(20 Periods)

Web Services: Introduction, SOAP, WSDL, UDDI, Electronic Business XML, Integrating J2EE and Web Services.

TEXT BOOK:

1. Jim James McGovern, Rahim Adatiaetal., “Java™ 2 Enterprise Edition 1.4 Bible”, Wiley Publishing, Inc.

REFERENCES BOOKS:

1. Eric Armstrong, Jennifer Ball etal., “The J2EE™ 1.4 Tutorial for Sun Java System Application Server Platform Edition 8.2”, Sun Microsystems, Inc. available at the link http://java.sun.com/j2ee/1.4/docs/tutorial/doc/index.html
2. Subrahmanyam Allamarajuetal, “Professional Java Server Programming”, Wrox Publications.
3. Rima Patel Sriganesh, Gerald Brose and Micah Silverman “Mastering Enterprise JavaBeans3.0”, Wiley Publishing. Inc.
4. David R. Heffelfinger, “Java EE 5 Development with NetBeans 6”, PACKT Publishing.
5. Marty Hall, Larry Brown, “Core Servlets and JavaServer Pages™: Volume 1: Core Technologies”, 2nd Edition, Prentice Hall.

BIOINFORMATICS
CS/IT 326(A)

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I **(16 Periods)**

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

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 **(14 Periods)**

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

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)**

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

Secondary database Searching: Importance and need of secondary database searches, secondary database structure and building a sequence search protocol.

UNIT – IV **(12 Periods)**

Gene Expression and Microarrays: Introduction, DNA Microarrays, Clustering Gene Expression Profiles, Data Sources and tools, Applications.

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", ImtiyazAlam Khan, Pharma Book Syndicate.

DIGITAL IMAGE PROCESSING
CS/IT 326(B)

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

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

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

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 Exapnsions, Wavelet Transforms in One Dimension, The Fast Wavelet Transform, Wavelet Transforms in Two-Dimesions.

UNIT – IV

IMAGE COMPRESSION: Image Compression Models, Error Free Compression, Lossy Compression, Image Compression Standards.

IMAGE SEGMENTATION: Detection of Discontinuties, 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.

OPEN SOURCE SYSTEMS
CS/IT 326(C)

Lectures	:	4 Periods/week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT - I

Introduction: Need of Open Sources – Advantages of Open Sources – Applications – Commercial aspects of Open Source movement – Certification courses issues.

Open Source Operating Systems: LINUX - Introduction - General Overview - Kernal mode and User mode process.

Advanced Concepts: Scheduling, Time Accounting – Personalities – Cloning and Backup your Linux System – Linux Signals – Development with Linux.

Linux Networking: Configuration Files – Red Hat Linux network GUI configuration tools – Assigning an IP address – Subnets – Route – Tunneling – Useful Linux network commands – Enable Forwarding.

UNIT – II

Using PHP – PHP Crash Course, Storing and Retrieving Data, Using Arrays, String Manipulation and Regular Expressions, Reusing Code and Writing Functions, Object-Oriented PHP, Exception Handling.

UNIT – III

Using MySQL – Designing your Web Database, Creating Your Web Database, Working with Your MySQL Database, Accessing Your MySQL Database from the Web with PHP, Advanced MySQL Administration, Advanced MySQL Programming.

UNIT – IV

Advanced PHP Techniques – Interacting with the File System and the Server, Using Network and Protocol Functions, Managing the Data and Time, Generating Images, Using Session Control in PHP, Other Useful Features.

TEXT BOOK:

1. PHP and MySQL Web Development, Luke Welling, Laura Thomson, Person Education.
2. The LINUX Kernal Book ZRem Card, Eric Dumas and Frank Mevel, Willey Publications, 2003.

REFERENCE BOOKS:

1. Red Hat Linux Bible by Christoopher Negus Wiley Dreamtech.
2. Core Web Applications Development with PHP and MySQL by Marc Wandschneider.
3. Beginning PHP5, Apache, MySQL Web Development by Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jermy Stolz, Michael K. Glass, Wiley Dreamtech (Wrox) 2006.
4. PHP5 and MySQL Bible by Tim Converse, Joyce Park, Clark Morgan Wiley India 2004.

SOFT COMPUTING
CS/IT 326(D)

Lectures	:	4 Periods/week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Basic tools of soft computing – Fuzzy logic, neural network , evolutionary computing.

Fuzzy Logic System:Basic of fuzzy logic theory , crisp and fuzzy sets, Basic set operation like union , interaction , complement , T-norm , T-conorm , composition of fuzzy relations, fuzzy if-then rules , fuzzy reasoning.

Fuzzy inference System: Zadeh's compositional rule of inference, defuzzification ,Mamdani Fuzzy Model, Sugeno Fuzzy Model, Introduction to type –II Fuzzy System.

UNIT - II

Neural Network: Supervised NN: Single layer network, Perception , Activation function, Adaline , Gradient descent method, least square training algorithm, Multilayer perceptron , error back propagation, generalized delta rule, Radial Basis Function Network, interpolation and approximation RBFNS, comparison between RBFN and MLP, Support Vector Machines : Optimal hypeplane for linearly separable patterns, optimal hyperplane for non-linearly separable patterns. Inverse Modeling.

UNIT – III

Unsupervised NN and other NN: Competitive learning networks, kohonenself organizing networks, learning vector quantization, Hebbian Learning Hopfield Network: Content addressable nature, binary and continuous valued Hopfield network , simulated annealing NN. Recurrent Neural Network: NARX Model, Simple Neural Network, State – Space Model, Back Propagation Through Time (BPTT) Algorithm, Real-time Recurrent Learning (RTRL) Algorithm.

Neuro-Fuzzy Modeling: Adaptive Neuro-Fuzzy Inference System (ANFIS) , ANFIS architecture , Hybrid Learning Algorithm , modeling of a three input nonlinear function , simulation of on-line identification in control system.

UNIT – IV

EVOLUTIONARY AND BIO INSPIRED COMPUTING

Evolutionary computing: Genetic algorithm: Basic concept , encoding , fitness function , Reproduction , Basic genetic programming concepts , differences between GA and Traditional optimization methods , Applications, Variants of GA.

Bio Inspired optimization Techniques: Particle Swarm optimization , Ant colony optimization, Bacteria foraging method , Applications.

TEXT BOOK:

1. Neuro-Fuzzy and soft computing by J S R Jang, CT Sun and E.Mizutani , PHI PVT LTD.
3. Principles of soft computing –by sivandudam and Deepa publisher –John mikey India.

REFERENCE BOOKS:

1. S.haykins- Neural Networks: A comprehensive foundation.

.NET TECHNOLOGIES
CS/IT 326 (E)

Lectures	:	4 Periods/week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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

UNIX PROGRAMMING LAB
CS/IT 361

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

LABCYCLE I: AWK Programming

1. Design a command "**wishme**" that will greet you "goodmorning", "good afternoon" according to current time.
2. Design a command "**verbosedate**" that displays day and month completely spelled.
3. Design a command "**fages**" that will list the files and their ages, to date.
4. Design a command "**word-freq**" that will print the words and number of occurrences of that word in the given text.
5. Design a command "**reminders**" that will print the events happening today, where events and their dates are edited in the file "events".
6. Design a command "**backwards**" that will prints the line and reverse order.
7. Design a command "**sales-totals**" that will consolidate the sales made by salespersons, from the file sales where each line contains the name of sales person and sales made.
8. Design a command "**wcount**" that will count the number of words in a file.
9. Design a command "**sqeeze**" that will convert tabs or more than one blank space to one blank one blank space.
10. Design a command "**replaceover**" that will replace the variable with the specified variable in a file.

LABCYCLE II: Shell scripts and Programming

Write Shell scripts for the following

1. Design a command **which**, that prints the path of the command (file) given as argument.
2. Design a command **search** that prints the path of the given as argument located in your home directory.
3. Design a command **filelist [- c <char>]** which prints all filenames beginning with the character specified as argument to the command, if the option is not specified it should print all the file names.
4. Design a command **monthly-file [-m <month>]** which lists the files created in a given month where month is argument to be command .if the option is not specified ,it lists the files in all the months.
5. Design a command **getline [-f <filename>-n <lineno>]** which prints the line number **lineno** in the file specified with –f option. If the line number is not specified it should list all the lines in the given file.
6. Design a command **listlines [-f <filename> -v <varname>]** which prints the line from the given file **filename,** which containing the variable **varname**. If **varname** is not specified it should list all the lines.
7. Design a command **avg [-n <colon> -f <filename>]** which prints the average of the given column in a file where **colon** and **filename** are arguments to the command.
8. Program which takes two file names as arguments, if their contents are same then remove the second file.

LABCYCLE III: File & Process Management Programming

1. Write a C program for copy data from source file to destination file, where the file names are provided as command-line arguments.
2. Write a C program that reads every 100th byte from the file, where the file name is given as command-line argument.
3. Write a C program to display information of a given file which determines type of file and inode information, where the file name is given as command-line argument.
4. Write a C program to display information about the file system.
5. Write a C program for demonstrating dup and dup2 system calls.
6. Write a C program that prints entries in a directory.
7. Write a C program that prints files recurcively in a given directory.
8. Write a C program to create a process by using fork()system call.
9. Write a C program to create an Orphan Process.
10. Write a C program to demonstarate Zombie process.
11. Write a C program to demonstrate a parent process that use wait() system call to catch child's exit code.
12. Write a C program to Overlay child address space by a program, where the program name is given as command-line argument.
13. Program that demonstrates both child and parent processes writes data to the same file.

LABCYCLE IV: Signal and IPC Programming

1. Write a C program for Requesting an alarm signal to executes user defined alarm handler.
2. Write a C program to demonstate terminal signals (control-c & control-z).
3. Write a C program to Override child termination signal by the parent process.
4. Write a C program to demonstrate Suspending and Resuming Processes.
5. Write a C program for Un-named pipes to send data from first process to the second process.
6. Write two C programs that demonstrates Named pipes, Reader and Writer Processes.
7. Write C program that demonstrates IPC through shared memory.

LABCYCLE V

To implement the following Client & Server Programs using ‘C’ Language

1. Simple Web Server (TCP/UDP).
2. Concurrent Server (using Child Process/Threads) (TCP/UDP).
3. Simple FTP Server (TCP).

ENTERPRISE PROGRAMMING LAB
CS/IT 362

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

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.

BIO-INFORMATICS LAB
CS/IT 363 (A)

Lectures	:	3 Periods/week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

1. Searching Bibliographic databases for relevant information
2. Sequence retrieval from DNA and protein databases.
3. Pair wise comparison of sequences.
4. BLAST services
5. FASTA services.
6. Multiple sequence alignment (CLUSTAL).
7. Evolutionary/PHYLOGENITIC analysis.
8. Protein data bank retrial and visualization.
9. Structure exploration of proteins.
10. Restriction mapping.
11. Identification of genes in genomes.
12. Primer Design

DIGITAL IMAGE PROCESSING LAB
CS/IT 363 (B)

Lectures	:	3 Periods/week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

1. Write a program to read, show access image pixel values and write image in MAT lab.
2. Write a program to find set of connected components in binary images based on 4 adjacent neighbors and 8 adjacent neighbors.
3. Write a program to perform various gray level transformations on gray scale image.
4. Write a program to calculate histogram of a digital image and perform histogram equalization and histogram matching.
5. Write a program for image enhancement using various in spatial domain.
6. Write a program for image enhancement using various in frequency domain.
7. Write a program to detect edges in a digital image using various edge detection operators.
8. Write a program for image restoration.
9. Write a program for image segmentation.
10. Write a program for image compression using wavelets.

OPEN SOURCE SYSTEMS LAB
CS/IT 363 (C)

Lectures	:	3 Periods/week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

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.

SOFTCOMPUTING LAB
CS/IT 363(D)

Lectures	:	3 Periods/week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

ARTIFICIAL NEURAL NETWORK

1. Write a program to implement and function using adaline with bipolar inputs and outputs.
2. Write a program to implement and function using madaline with bipolar inputs and outputs.
3. Write a mat lab program to implement discrete hopfield network and test for input pattern.
4. Write a mat lab program to implement full counter propagation network for a given input pattern.
5. Write a mat lab program to implement back propagation network for a given input pattern.
6. Write a program to implement art 1 network for clustering input vectors with vigilance parameter.

FUZZY LOGIC

7. Write a MAT Lab program to implement FUZZY set operation and properties..
8. Write a program to implement composition of fuzzy and crisprelations.
9. Write a program to perform MAX-MIN composition of two matrices obtained from Cartesian product.
10. Write a program to verify the various laws associated with fuzzy set.

GENETIC ALGORITHM

11. Write a MAL lab program for maximizing F(X)=X2 using GA, where X is ranges from 0 to 31. Perform only 5 iterations.

.NET TECHNOLOGIES LAB
CS/IT 363(E)

Lectures	:	3 Periods/week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

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.

CRYPTOGRAPHY AND NETWORK SECURITY
CS/IT 411

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I **(15 Periods)**

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

Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography.

Block cipher and the Data Encryption Standard: 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 **(13 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 **(13 Periods)**

Hash Algorithms: Secure Hash Algorithm, HMAC.

Digital Signatures and authentication protocols: Digital Signatures, Authentication Protocols, Digital Signature Standard.

Authentication Application: Kerberos,X-509 Authentication Service.

Electronic Mail Security: Pretty Good Privacy (PGP).

UNIT – IV **(13 Periods)**

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Pay Load.

WEB Security: Web Security Considerations, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

Intuders: Intruders, Intrusion Detection, Password Management.

Firewalls: Firewall Design Principles.

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.

DISTRIBUTED SYSTEMS
CS/IT 412

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT- I

(13 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: Persistenceand 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

(13 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.

OBJECT ORIENTED ANALYSIS AND DESIGN
CS/IT 413

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(25 Periods)

What is Object-Orientation: Basic Concepts, The Origins of Object Orientation, Object-Oriented Languages today;

Agate Ltd Case Study: Introduction to Agate Ltd.

Modeling 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 State chart, 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-Hill 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. AtulKahate, "Object Oriented Analysis &Design", The McGraw-Hill Companies, 2004.

DESIGN AND ANALYSIS OF ALGORITHMS
CS/IT 414

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(16 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: Traveling Salesman Problem, longest Common subsequence, Multi stage Graphs – Forward & Backward Approach, All Pairs Shortest Path Problems – Matrix Multiplication, Floyd's Warshall Algorithm.

UNIT – III

(22 Periods)

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

Back tracking: Overview, n-queen problem, Knapsack problem and Sum of Subsets.

UNIT – IV

(22 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, PolynomialVs 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.

CLOUD PROGRAMMING
CS/IT 415 (A)

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Introduction to Cloud Computing & Windows Azure Platform - Approaches to Cloud Computing, Infrastructure as a Service, Software as a Service, Platform as a Service, Cloud Services Defined, Windows Azure and Cloud Computing.

Windows Azure Websites - WebMatrix – Razor syntax, Forms and validation, Working with data, Creating and publishing simple and database driven ASP.NET web sites, Websites with PHP and MySQL – PHP language features, Forms, Database connectivity.

UNIT – II

Cloud Applications - Software Development Kits, Windows Azure Tools for Visual Studio, Cloud Project with a Web Role, Deployment to Windows Azure, Configuration and Upgrading, Service Definition File, and Role Properties. Windows Azure tools for Eclipse and Windows Azure Deployment Project in Java. Cloud applications using ASP.NET and J2EE.

UNIT – III

Windows Azure Storage - Local Storage, Windows Azure Storage Account, Windows Azure Management Tool, Blobs, Tables, Queues. Worker Roles - Table Service, Queue Service.

Virtual Machines – Virtual Machine creation, Installing SQL server and J2EE Platform, Connecting to SQL Server on Virtual Machine.

UNIT – IV

SQL Azure - SQL Azure Features, SQL Azure Database Access, Database Server Creation in the Cloud, SQL Azure Access, SQL Azure Relational Engine Features, Existing Database Migration, SQL Azure Migration Wizard, Applications connecting to SQL Azure.

Service Bus - Service Bus, Relayed messaging, Brokered Messaging- Queues, Topics.

TEXT BOOK:

1. Windows Azure Technical Documentation Library-MSDN-Microsoft. *(msdn.microsoft.com/en-us/library/windowsazure)*
2. "Building ASP.NET Web Pages with Microsoft WebMatrix", Steve Lydford, Apress.
3. "Introducing Microsoft WebMatrix", Laurence Moroney, Microsoft Press
4. "Windows Azure Step by Step", Roberto Brunetti, Microsoft Press.
5. "Programming Windows Azure", Sriram Krishnan, O'Reilly Media.

ADVANCED DATABASE MANAGEMENT SYSTEMS
CS/IT 415 (B)

Lectures	:	4 Periods/week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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 (15 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 BOOK:

1. "Database Systems: A practical approach to design, implementation and management", ThomasM Connolly and Carolyn E.Begg.
2. "Fundamentals of Database Systems", ElmasriNavate, 5/e, Pearson Education.

REFERENCES BOOKS:

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

GRAPH THEORY
CS/IT 415 (C)

Lectures	:	4 Periods/week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Graphs, Sub graphs, some basic properties, various example of graphs & their sub graphs, walks, path & circuits, connected graphs, disconnected graphs and component, euler graphs, various operation on graphs, Hamiltonian paths and circuits, the traveling sales man problem.

UNIT – II

Trees and fundamental circuits, distance diameters, radius and pendent vertices, rooted and binary trees, on counting trees, spanning trees, fundamental circuits, finding all spanning trees of a graph and a weighted graph, algorithms of primes, Kruskal and Dijkstra Algorithms.

UNIT – III

Cuts sets and cut vertices, some properties, all cut sets in a graph, fundamental circuits and cut sets , connectivity and separability, network flows, Planer graphs, combinatorial and geometric dual: Kuratowski graphs, detection of planarity, geometric dual, Discussion on criterion of planarity, thickness and crossings.

UNIT – IV

Vector space of a graph and vectors, basis vector, cut set vector, circuit vector, circuit and cut set subspaces, Matrix representation of graph – Basic concepts; Incidence matrix, Circuit matrix, Path matrix, Cut-set matrix and Adjacency matrix.
Coloring, covering and partitioning of a graph, chromatic number, chromatic partitioning, chromatic polynomials, matching, covering, four color problem
Discussion of Graph theoretic algorithm wherever required.

TEXT BOOK:

1. DeoNarsingh, Graph theory with applications to Engineering and Computer Science, PHI

REFERENCE BOOKS:

1. Gary Chartrand and Ping Zhang, Introduction to Graph Theory, TMH
2. Robin J. Wilson, Introduction to Graph Theory, Pearson Education
3. Harary, F, Graph Theory, Narosa
4. Bondy and Murthy: Graph theory and application. Addison Wesley.
5. V. Balakrishnan, Schaum's Outline of Graph Theory, TMH
6. GeirAgnarsson, Graph Theory: Modeling, Applications and Algorithms, Pearson Education

PRINCIPLES OF PROGRAMMING LANGUAGES
CS/IT 415 (D)

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

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

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

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

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, and Concurrency in ADA 95, Java Threads, and Statement level concurrency.

Exception handling: Introduction, Exception Handling in: PL1, ADA, C++, Java.

TEXT BOOK:

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.

MACHINE LEARNING
CS/IT 415 (E)

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(12 Periods)

Introduction to machine learning

Concept Learning and the General to Specific Ordering: Concept learning task, concept learning as search, Find-S: finding a Maximally Specific hypothesis, Version Spaces and the Candidate-Elimination algorithm, remarks on Version Spaces and Candidate-Elimination and inductive bias.

Decision Tree Learning: Decision Tree representation, appropriate problems for Decision Tree learning, hypothesis space search in Decision Tree learning, inductive bias in Decision Tree learning and issues in Decision Tree learning.

UNIT – II

(18 Periods)

Artificial Neural Networks: Neural Network representations, appropriate problems for Neural Network learning, Perceptrons, Multilayer Networks and the Back propagation algorithm and remarks on the Back propagation algorithm.

Evaluating Hypotheses: Estimating hypothesis accuracy, basics of sampling theory, general approach for deriving confidence intervals, difference in error of two hypotheses and comparing learning algorithms.

UNIT – III

(18 Periods)

Bayesian Learning: Bayes theorem and concept learning, maximum likelihood and least squared error hypotheses, maximum likelihood hypotheses for predicting probabilities, minimum description length principle, Bayes optimal classier, Gibbs algorithm, Naive Bayes classier, Bayesian belief networks and EM algorithm.

Computational learning theory: Introduction, probably learning an approximately correct hypothesis, sample complexity for finite hypothesis spaces, and sample complexity for infinite hypothesis spaces and mistake bound model of learning.

UNIT – IV

(16 Periods)

Instance Based Learning: Introduction, k-Nearest Neighbor learning, locally weighted regression, radial basis functions, Case Based Reasoning and remarks on Lazy and Eager learning.

Genetic Algorithms: Introduction, hypothesis space search, Genetic programming and models of evolution and learning.

TEXT BOOK:

1. Tom M. Mitchell, “Machine Learning”, Mc. Graw Hill Publishing.

OPEN ELECTIVE

INTELLECTUAL PROPERTY RIGHTS, PATENT LAWS &ETHICAL ISSUES

CS 416 / BT 100

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Intellectual Property Rights: Introduction, forms of Intellectual property, international & regional agreements/ treaties in IPR; IPR related Legislations in India; IPR and Agricultural Technology- implications in India and other developing countries; GATT, TRIPS, and WIPO;

Other IPR issues:Trade Secrets, Copy Rights, Trade Marks and their legal implications; Farmer's Rights, Plant Breeder's rights; Traditional knowledge and their commercial exploitation and protection.

UNIT – II

Patents and Patent processing: Introduction, Essential requirements, Patent application, Procedures and granting, Patent search, PCT, UPOV, Patents in Biotechnology and controversies involved.

UNIT – III

Regulatory Affairs: Regulatory affairs: Indian contest- requirements and guidelines of GMP, understanding of Drugs and cosmetic act 1940 and rules 1945 with reference schedule M, U & Y. Related quality systems- objectives and guidelines of USFDA, WHO &ICH, Introduction to ISO series.

Documentation and Protocols: Documentation: Types related to pharmaceuticals industry, protocols, harmonizing formulation development for global fillings, NDA, ANDA, CTD, Dealing with post approval changes- SUPAC, handling and maintenance including electronic documentation.

UNIT – IV

Ethics: Research and ethical issues; Ethical issues in use of animals in research and testing; ethical issues in research involving human participants; Protecting Genetic Privacy; Gene testing – Pros & Cons. Human Cloning & Human Dignity – an ethical enquiry; Ethical, Legal and Social Issues (ELSI) concerning recent advancements in key areas of biotechnology- pre-natal diagnostics.

TEXT BOOKS:

1. Good manufacturing practices for pharmaceuticals, S.H.Willing
2. Protection of Industrial property Rights, P.Das&Gokul Das
3. Intellectual property rights on Biotechnology, Singh K, BCIL, New Delhi
4. Biotechnologies in developing countries present and future, Sasson A, UNESCO Publications.
5. Bioethics and Biosafety- M.K.Sateesh, I.K. International, New Delhi.

OPEN ELECTIVE
BIOINFORMATICS ALGORITHMS
CS 416 / BT 200

Lectures	:	3 Periods/Week, 1 Tutorial	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

INTRODUCTION: Algorithms and Complexity- Biological algorithms versus computer algorithms – The change problem –Correct versus Incorrect Algorithms – Recursive Algorithms – Iterative versus Recursive Algorithms – Big-O Notations– Algorithm Design Techniques.

GREEDY ALGORITHMS: Molecular Biology Primer – Exhaustive Search – Mapping Algorithms – Motif-Search Trees – Finding Motifs –Finding a Median String – Greedy Algorithm – Genome Rearrangements – Sorting by Reversals – Approximation Algorithms – A Greedy Approach to Motif Finding.

UNIT – II

DYNAMIC PROGRAMMING ALGORITHMS: DNA Sequence comparison – Manhattan Tourist Problem – Edit Distance and Alignments – Longest Commons Sub sequences – Global Sequence Alignment – Scoring Alignment – Local Sequence Alignment – Alignment with Gap Penalties – Multiple Alignment-Gene Predictions – Approaches to Gene Prediction – Spiced Alignment – Divide and Conquer Algorithms.

UNIT – III

GRAPH ALGORITHMS: Graphs – Graphs and Genetics – DNA Sequencing – Shortest Superstring Problem – DNA arrays as alternative sequencing techniques – Sequencing by Hybridization – Path Problems – Fragment assembly in
DNA Sequencing – Protein Sequencing and Identification – The Peptide Sequencing Problem – Spectrum Graphs – Spectral Convolution and Alignment – Combinatorial Patter matching.

UNIT – IV

CLUSTERING AND TREES: Clustering and trees – Gene expression analysis – Hierarchical clustering-k-means clustering – Clustering and corrupted Cliques – Evolutionary Trees – Distance-based tree reconstruction – Reconstruction trees from additive matrices – Evolutionary trees and hierarchical clustering – Character-based tree reconstruction – Small and large Parsimony Problem – Hidden Markov Models- Randomized Algorithms.

TEXT BOOKS:

1. Neil C. Jones and Pavel A. Pevzner, *An Introduction to Bioinformatics Algorithms*, MIT Press, FirstIndian Reprint 2005.
2. Gary Benson Roderic page (Eds), *Algorithms in Bioinformatics*, Springer International Edition, FirstIndian Reprint 2004.

REFERENCE BOOKS

1. Gusfields G, Algorithms on strings, trees and sequences- Computer Science and ComputationalBiology, Cambridge University Press 1997.
2. Steffen Schulze-Kremer, Molecular Bioinformatics: Algorithms and Applications, Walter de Gruyter, 1996.

OPEN ELECTIVE
INDUSTRIAL POLLUTION & CONTROL
CS 416 / ChE 100

Lectures	:	3 Periods/Week, 1 Tutorial	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Man & Environment, Types of Pollution, Pollution control aspects, Industrial emissions-Liquids, Gases, Environmental Legislation, Water quality management in India, Air (Prevention & Control of Pollution) Act.

UNIT – II

Removal of BOD, Biological oxidation, Anaerobic treatment, Removal of Chromium, Removal of Mercury, Removal of Ammonia, Urea, Treatment of Phenallic effluents.

UNIT – III

Removal of Particulate matter, Removal of Sulfur Oxides, Removal of Oxides of Nitrogen, Removal of Organic vapors from Effluent.

UNIT – IV

Pollution control in Chemical Industries, General considerations, pollution control aspects of Fertilizer industries, Pollution control in Petroleum Refineries and Petrochemical units, Pollution control in Pulp and Paper Industries.

TEXT BOOK:

1. Pollution control in Process Industries, S.P .Mahajan, Tata McGraw Hill Publishing Company Ltd, New Delhi

REFERENCE BOOKS:

1. Environmental Pollution Control Engineering, C.S.Rao, Wiley Eastern Ltd., New Age International Ltd.,
2. Air pollution, M.N.Rao, H.V.N.Rao, Tata McGrawhill.
3. Water Pollution control, W.Wesley Eckenfelder Jr.Industrial, Tata McGrawHill.

OPEN ELECTIVE
ENERGY ENGINEERING
CS 416 / ChE 200

Lectures	:	3 Periods/Week, 1 Tutorial	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Conventional energy resources, the present scenario, scope for future development.

Coal: Origin, occurrence and reserves, classification, ranking, analysis and testing, coal carbonization, manufacture of coke, coal gasification, coal liquefaction.

UNIT – II

Petroleum: Origin, occurrence and reserves, composition, classification, characteristics, exploration and production.

Petroleum Refining: Refinery processes, petroleum products, testing and analysis of petroleum products.

UNIT – III

Non conventional energy sources: Solar energy, solar radiation, principles of heating and cooling, photo voltaic cells.

Bio gas products, bio-mass, wind energy, hydrogen energy, geothermal and ocean thermal energy, fuel cells.

UNIT – IV

Energy storage, mechanical energy storage, water storage, solar pond, phase change storage, chemical storage.

Energy Conservation: Conservation methods in process industries, Theoretical analysis, practical limitations, equipment for energy saving / recovery.

TEXT BOOKS:

1. Conventional Energy technology, S.B.Pandy, Tata McGraw Hill
2. Fuel Science, Harker and Allen, Oliver & Boyd.
3. Energy conversion, Culp, Mc Graw Hill.

OPEN ELECTIVE
AIR POLLUTION AND CONTROL
CS 416 / CE 100

Lectures	:	3 Periods/Week, 1 Tutorial	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Air Pollution – Definitions, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, point and Non- Point, Line and Areal Sources of air pollution- stationary and mobile sources.

Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

UNIT – II

Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagrams.

UNIT – III

Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for PlumeDispersion.

Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control. Equipment's – Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers, Electrostatic precipitators.

UNIT – IV

General Methods of Control of NOx and Sox emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling.

Air Quality Management – Monitoring of SPM, SO; NO and CO Emission Standards.

NOTE:

Two questions of 12 marks each will be given from each unit out of which one is to be answered. Twelve questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS:

1. Air pollution By M.N.Rao and H.V.N.Rao – Tata Mc.Graw Hill Company.
2. Air pollution by Wark and Warner.- Harper & Row, New York.

REFERENCE BOOKS:

1. An introduction to Air pollution by R.K. Trivedy and P.K. Goel, B.S. Publications.

OPEN ELECTIVE
Remote Sensing and GIS
CS 416 / CE 200

Lectures	:	3 Periods/Week, 1 Tutorial	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Concepts and Foundations of Remote Sensing: Introduction, Energy sources and radiation principles, Energy interactions in the atmosphere, Energy interactions with Earth surface features, an ideal remote sensing system, characteristics of remote sensing systems, application of remote sensing .

UNIT – II

Visual Image Interpretation: Introduction, Fundamentals of visual image interpretation, basic visual image interpretation equipment, land use and land cover mapping, geologic and soil mapping, agricultural applications, forestry applications, water resources applications, urban and regional planning applications.

UNIT – III

Digital Image Processing: Introduction, Image rectification and restoration, Image enhancement, contrast manipulation, spatial feature manipulation, Image Classification, Supervised classification, the classification stage, the training stage, Un-supervised classification, Classification accuracy assessment.

UNIT – IV

Geo-graphical Information Systems (GIS):Introduction, spatial information system: an overview, conceptual model of spatial information, concept of databases, digitizing, editing, and structuring map data, data quality and sources of errors in GIS, spatial data analysis (vector based), spatial data analysis (raster based), Fundamental concepts of GPS, Types of GPS, GPS satellite, Application of GPS in resource surveys, mapping and navigation.

TEXT BOOKS:

1. Lillisand.T.M, Keifer.R.W, and Chipman.J.WRemote sensind Image interpretation, 2004, John Wlley and Sons.
2. Chrisman, N.R. (1997), Exploring Geographic Information systems, John Willey and sons
3. Remote Sensing and its applications by LRA Narayana University Press 1999.
4. Principals of Geo physical Information Systems - Peter A Burragh and Rachael A. Me Donnell, Oxford Publishers 2004.

REFERENCE BOOKS:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.
2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001.
3. B.S.Publications.GIS by Kang - tsung chang, TMH Publications & Co.
4. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
5. Fundamental of GIS by Mechanical designs John Wiley & Sons.

OPEN ELECTIVE
OPTIMIZATION TECHNIQUES
CS 416 / EE 100

Lectures	:	3 Periods/Week, 1 Tutorial	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Linear Programming: Introduction and formulation of models – Convexity - simplex method - Bid method - two phase method – degeneracy – non existent and unbounded solutions - duality in L.P. - dual simplex method - sensitivity analysis - revised simplex method - transportation and assignment problems.

UNIT – II

Non-linear Programming: Classical optimization methods - equality and inequality constraints - Lagrange multipliers and Kuhn-Tucker conditions - quadratic forms - quadratic programming and Bessel's method.

UNIT – III

Search Methods: One dimensional optimization - sequential search - Fibonacci search - multi dimensional search method - Univariate search - gradient methods - steepest descent / ascent methods - conjugate gradient method -Fletcher – Reeves method - penalty function approach.

UNIT – IV

Dynamic Programming: Principle of optimality recursive relation - solution of linear programming problem - Simple examples

TEXT BOOKS:

1. Engineering Optimization: Theory and Practice by S.S. Rao, 3rd Ed., New Age International, 1998
2. Optimization Methods in Operations Research and Systems Analysis by K.V. Mittal and C. Mohan, 3rd Ed, New Age International, 1996.

REFERENCE BOOKS:

1. Non-linear Programming by P.L. Mangassarian.
2. Operations Research by S.D. Sharma.
3. Operations Research: An introduction by H.A. Taha, 6th Edition, PHI.
4. Linear Programming by G. Hadley.

OPEN ELECTIVE
NON-CONVENTIONAL ENERGY SOURCES
CS 416 / EE 200

Lectures	:	3 Periods/Week, 1 Tutorial	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Principle of Renewable Energy: Comparison of renewable and conventional energy sources - Ultimate energy sources - natural energy currents on earth - primary supply to end use - Spaghetti & Pie diagrams - energy planning - energy efficiency and management.

UNIT – II

Solar Radiation: Extra terrestrial solar radiation - terrestrial solar radiation - solar thermal conversion - solar thermal central receiver systems - photovoltaic energy conversion - solar cells – 4 models.

UNIT – III

Wind energy: Planetary and local winds - vertical axis and horizontal axis wind mills - principles of wind power - maximum power - actual power - wind turbine operation - electrical generator.

UNIT – IV

Energy from Oceans: Ocean temperature differences - principles of OTEC plant operations - wave energy - devices for energy extraction – tides - simple single pool tidal system.
Geothermal energy: Origin and types - Bio fuels – classification - direct combustion for heat and electricity generator - anaerotic digestion for biogas - biogas digester - power generation.

TEXT BOOKS:

1. Renewable Energy Sources by John Twidell & Toney Weir : E&F.N. Spon.

REFERENCE BOOKS:

1. Power plant technology by EL-Wakil, Mc Graw-Hill.
2. Non-Conventional Energy Sources by G.D.Rai, Khanna Pub.

OPEN ELECTIVE
CONSUMER ELECTRONICS
CS 416 / EC 100

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Microphones, Headphones and Headsets, Loud Speakers, Disc Recording and Reproduction , Amplifying Systems Equalizers and Mixers, Electronic Music Synthesizers.

UNIT – II

Commercial Sound, Theatre Sound System, Audio Systems , Color TV standards and Systems, Remote Controls, Video Systems.

UNIT – III

Electronic Gadgets and Home Appliances:
Telecommunication Systems, Switching Systems, Modulation Techniques, Carrier Systems, Fibre Optics

UNIT – IV

Data Services, Mobile Systems, Facsimile fax, Xerography

TEXT BOOK:

1. Consumer Electronics by S.P.Bali, Pearson Education, ISBN: 9788131717592.

REFERENCE BOOKS:

1. Consumer Electronics for Engineers by Philip Herbert Hoff, Cambridge University Press (July 28, 1998), **ISBN-10:** 0521582075
2. Digital Consumer Electronics Handbook by RonadlK.Jurgen, (Editor) by McGraw Hill Professional Publishing, 1997. **ISBN-10:** 0070341435.

OPEN ELECTIVE
EMBEDDED SYSTEMS
CS 416 / EC 200

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Introduction to embedded systems, design challenges, processor technology, IC technology, design technology, tradeoffs, single purpose processor, RT level combinational logic, sequential logic (RT level) custom single purpose processor design, optimizing custom single purpose processors. General purpose processors: basic architecture, pipelining, programmers view, development environment, ASIPS, microcontrollers and digital signal processors

UNIT – II

State machine and concurrent process models: models vs. languages, FSMD, using state machines, PSMM, concurrent process model, concurrent processes, communication and synchronization among processes, data flow model and real time systems. Need for communication interfaces, RS232/UART, RS422/RS485, USB, Infrared, IEEE 802.11, and Bluetooth.

UNIT – III

Embedded system and RTOS concepts: Architecture of kernel, tasks and task scheduler, interrupt service routines, semaphores, mutex. Mail boxes, message queues, event registers, pipes and signals.

UNIT – IV

Embedded system and RTOS concepts: Timers, memory management, priority inversion problem, embedded OS and real time OS, RT Linux, and Handheld OS. Design technology: Introduction, automation, synthesis, parallel evolution of compilation and synthesis, logic synthesis, RT synthesis, behavioural synthesis, system synthesis, HW / SW co- design, verification, and co-simulation.

TEXT BOOKS:

1. Frank Vahid, Tony D Givargis, Embedded system design – A unified HW/ SW Introduction, John Wily & sons, 2002.
2. KVKK Prasad, Embedded and real time systems, Dreemtech Press, 2005.

REFERENCE BOOKS:

1. Raj Kamal, Embedded system architecture, programming and design, TMH edition.
2. Mohammad Ali Mazidi, Janice G., The 8051 microcontroller and embedded systems, Pearson edition.
3. Jonathan W Valvano, Embedded Microcomputer Systems, Brooks/cole, Thompson Learning.
4. David E. Simon, An Embedded Software Primer, Pearson edition.

OPEN ELECTIVE
VIRTUAL INSTRUMENTATION USING LABVIEW
CS 416 / EI 100

Lectures	:	3 Periods/Week, 1 Tutorial	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

REVIEW OF VIRTUAL INSTRUMENTATION: Historical perspective, Need of VI, Advantages of VI, Define VI, block diagram & architecture of VI, data flow techniques, graphical programming in data flow, comparison with conventional programming.

PROGRAMMING TECHNIQUES: VIS and sub-VIS, loops & charts, arrays, clusters, graphs, case & sequence structures, formula modes, local and global variable, string & file input. Graphical programming in data flow, comparison with conventional programming.

UNIT – II

DATA ACQUISITION BASICS: ADC, DAC, DIO, Counters & timers, PC Hardware structure, timing, interrupts, DMA, Software and Hardware Installation. GPIB/IEEE 488 concepts, and embedded system buses - PCI, EISA, CPCI, and USB & VXI. A

UNIT – III

COMMON INSTRUMENT INTERFACES: Current loop, RS 232C/RS 485, GPIB, System basics, interface basics: USB, PCMCIA, VXI, SCXI, PXI etc,networking basics for office & industrial application VISA & IVI, image acquisition & processing, MotionControl. ADC, DAC, DIO, DMM, waveform generator.

UNIT – IV

USE OF ANALYSIS TOOLS AND APPLICATION OF VI: Fourier transforms, Power spectrum, Correlation methods, windowing & flittering. Application in ProcessControl projects, Major equipments- Oscilloscope, Digital Multimeter, Pentium Computers, temperature data acquisition system, motion control employing stepper motor.

TEXT BOOKS:

1. Gary Johnson, LABVIEW Graphical Programming , 2nd Edition, McGraw Hill, 1997.
2. Lisa K. Wells and Jeffrey Travis, LABVIEW for Everyone , PHI, 1997.
3. Skolkoff, Basic concepts of LABVIEW 4 , PHI, 1998.

REFERENCE BOOKS:

1. S. Gupta, J.P. Gupta, *PC Interfacing for Data Acquisition and Process Control*, ISA, 2nd Edition, 1994.
2. Technical Manuals for *DAS Modules of Advantech* and National Instruments.
3. L.T. Amy, *Automation System for Control and Data Acquisition*, ISA, 1992.

OPEN ELECTIVE
SENSORS AND TRANSDUCERS
CS 416 / EI 200

Lectures	:	3 Periods/Week, 1 Tutorial	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Introduction: Definition related to measurements /instrumentation, static and dynamic characteristics of instruments, classification of transducers.

UNIT – II

Displacement Measurement: Variable resistance devices, variable inductance devices, variable capacitance devices, digital displacement transducers.

Strain measurement: Stress-strain relations, resistance strain guages, types of strain gauges, strain gauge measurement techniques, static measurements ,dynamic measurements. Calibration of strain gauge, strain gauge load cell, force and torque measurements using strain gauge.

UNIT – III

Pressure measurement: Diaphragm, Bellows, Bourdon tubes, Resistive inductive and capacitive transducers, piezo-electric transducers.

Low pressure measurement: McLeod gauge, Knudson gauge, Ionization gauge.

Temperature measurement: RTD, Thermocouple and thermistor.

UNIT – IV

Flow measurement: Head type flowmeters, Rotometer, Electromagnetic flow meter.

Measurement of liquid level, viscocity, humidity and moisture.

TEXT BOOKS:

1. A.K.Ghosh,Introduction to Instrumentation and Control, PHI.
2. BC Nakra, KK Chaudhry,Instrumentation measurement and analysis, TMH, New Delhi second edition.

REFERENCE BOOKS:

1. Patranabis D,"Sensors and transducers", second edition, PHI,New Delhi 2003.
2. Ernest O Doeblin, "Measurement Systems Application and Design", TMH.

OPEN ELECTIVE
WEB TECHNOLOGY
CS 416 / IT 100

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(15Periods)

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

UNIT – II

(16Periods)

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

UNIT – III

(15 Periods)

Building Ajax-Enabled Web Applications, Web Servers (IIS and Apache).

UNIT – IV

(18 Periods)

Servlets and Java Server Pages.

TEXT BOOK:

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

REFERENCE BOOKS:

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. Marty Hall, Larry Brown, “Core Servlets and Java Server Pages™: Volume 1: Core Technologies”, 2nd Edition, Prentice Hall.

OPEN ELECTIVE
.NET TECHNOLOGIES
CS 416 / IT 200

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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, Programming with SQL Server 2005.

UNIT – III

HTML, Introduction to ASP.NET 2.0 and Web forms, ASP.NET Web Controls, State management in ASP-NET 2.0, Using master pages, ASP.NET personalization and customization, Building rich, database-driven Web applications, Securing your ASP.NET applications, Exposing functionality with Web services.

UNIT – IV

Introduction to Windows Forms 2.0, The Windows Forms control library, Advanced user, interface programming, Data binding with Windows Forms 2.0, Remoting

TEXT BOOKS:

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.

OPEN ELECTIVE
ROBOTICS
CS 416 / ME 100

Lectures	:	3 Periods/Week, 1 Tutorial	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

Introduction to Robotics, major components of a robot, robotic like devices, classification of robots – Classification by coordinate system and by control method, Specifications of robots, fixed versus flexible automation, economic analysis, overview of robot application.

UNIT – II

Robot end Effectors : Introduction, end effectors, interfacing, types of end effectors, grippers and tools, considerations in the selection and design of remote centered devices.

UNIT – III

Robotic sensory devices : Objective, Non-optical position sensors – potentiometers, synchros, inductocyn, optical position sensors – optic interrupters, optical encoders (absolute & incremental).

Proximity sensors: Contact type, non contact type – reflected light scanning laser sensors.

Touch & slip sensors: Touch sensors – proximity rod & photo detector sensors, slip sensors – Forced oscillation slip sensor, interrupted type slip sensors, force and torque sensors.

UNIT – IV

Transformations and Kinematics: Objectives, homogenous coordinates, basic transformation operations, forward solution – Denavit Hartenberg procedure. Simple problems involving planar manipulators, inverse or backward solution – problems involved, techniques.

Introduction to Trajectory Planning, the manipulator jacobian.

TEXT BOOKS:

1. Robotic Engineering by Richard D.Klafter.
2. Industrial Robotics by Mikell P.Groover.

REFERENCE BOOKS:

1. Introduction to Robotics – John J.Craig.
2. Robotics – K.S.Fu, Gonzalez & Lee.
3. Robotics for Enginers by Yoram Koren.
4. Robotics Technology and Flexible Automation by S.R.Deb.
5. Robotics by Saeed.B.Niku.

OPEN ELECTIVE
POWER PLANT ENGINEERING
CS 416 / ME 200

Lectures	:	3 Periods/Week, 1 Tutorial	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

INTRODUCTION: Various Energy sources, types of power plants.

HYDRO ELECTRIC POWER PLANT: Hydrology, Rainfall, Run off and their measurement, hydrograph, Flow duration curve, Mass curve and calculation of storage capacity, site selection of hydro plant, different types of hydro plants.

DIESEL AND GAS TURBINE POWER PLANTS: Classification, main components of plant, plant layout, application and comparison with other plants.

UNIT – II

THERMAL POWER PLANT: General layout, Fuels, Coal analysis, Coal handling, burning of coal - stoker and pulverized systems, Ash handling systems, ESP, Need for Draught, High-pressure boilers, Condensers, cooling ponds and towers (wet and dry types), Deaeration.

UNIT – III

NUCLEAR POWER PLANTS: Nuclear Fission, Nuclear Fuels, Components of Reactor, types of Nuclear Reactors, Breeding, Fast Breeder Reactor, Radiation shields, nuclear waste disposal.

FLUCTUATING LOADS ON POWER PLANTS: Various performance Factors (load factor, diversity factor, use factor etc.).

POWER PLANT ECONOMICS: Fixed costs, operating costs, cost per kWh, comparison of fixed and operating costs of hydro, thermal, nuclear plants, power tariffs.

POLLUTION AND CONTROL: Introduction, particulate and gaseous pollutants, thermal pollution and solid waste pollution, methods to control pollution - brief description.

UNIT – IV

SOLAR ENERGY: Solar collectors, solar energy storage, solar ponds, solar energy utilization and applications. **POWER:** Basic principle, different types of wind mills, wind energy conversion systems, other applications.

GEOTHERMAL POWER: sources, energy conversion system.

OTEC: ocean thermal energy conversion systems, introduction to tidal power.

DIRECT ENERGY CONVERSION SYSTEMS: Fuel cells, MHD, Solar cell.

TEXT BOOKS:

1. Power Plant Engineering - G.R. Nagpal, Khanna publ, New Delhi
2. Power Plant Engineering –P.K.Nag, TMH
3. Non Conventional Energy Sources - G.D. Rai, Khanna publ, New Delhi.

REFERENCE BOOKS:

1. Power Plant Technology - M.M. El Wakil, MGH, New York.
2. Principles of Energy Conversion - A.W.Culp, MGH, New York.

TERM PAPER
CS/IT 451

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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 Continuous Assessment (CA):

1.	Day to day work	-	10 marks
2.	Seminar – I	-	10 marks
3.	Term Paper Report	-	10 marks
4.	Seminar – II	-	10 marks

	TOTAL		40 marks

Final Examination (FE) shall be conducted for 60 marks by one internal and one external examiner appointed by the principal. The FE contains Viva-voce and the demonstration of the model developed or work performed as a part of the term paper.

OBJECT ORIENTED ANALYSIS AND DESIGN LABORATORY
CS/IT 452

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

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.

ALGORITHMS LAB
CS/IT 453

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

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.

INDUSTRIAL MANAGEMENT & ENTREPRENEURSHIP DEVELOPMENT
CS 421 / ME05

Lectures	:	3 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

General management: Management definition, functions of management and principles of management. Forms of Business Organization: Salient features of Sole Proprietorship, Partnership, Joint Stock Company; Private Limited and Public Limited companies; Cooperative and Government owned companies; Merits and Demerits of above types;

Marketing Management: Functions of Marketing; Concepts of Selling and Marketing-Difference; Market Research; Product pricing; Distribution channels; Marketing mix (4 Ps); Advertising and sales promotion; Product life cycle.

UNIT – II

Production and Materials Management: Functions of Production planning and control; Production systems-Types; Inventory control-Relevant costs, EOQ, Deterministic single item model with static demand, ABC, VED and FSN analysis; Introduction to MRP;

Financial Management: Concept of time value of money; Interest formulae; Present and Future worth amounts for different cash flow patterns; Evaluation of alternative investment proposals (Capital budgeting); Types of Capital-Fixed and Working capital; Working capital management- Factors and Principles; **Depreciation**- Straight line depreciation, declining balance and Sum of Years digits methods.

UNIT – III

Personnel Management: Functions of personnel management, human resource planning, recruitment, selection, placement, training and development and performance appraisal. Motivation theories, leadership styles.

UNIT – IV

Entrepreneur Development: Introduction, Entrepreneural characteristics, Functions of an Entrepreneur; Factors affecting entrepreneurship; Role of communication in entrepreneurship; Entrepreneurial development-Objectives, Need of Training for enterprises; Finance for the enterprises; Product, Process and Plant Design- Product analysis and Product Design process. Steps in process design and Plant Design.

TEXT BOOKS:

1. Industrial Engineering and Operations Management, S.K.Sharma, Savita Sharma and Tushar Sharma.
2. Industrial engineering and production management, Mahajan.
3. Industrial Economics, R.R.Bharatwal.

REFERENCE BOOKS:

1. Operations Management, Joseph G Monk.
2. Production, Planning and Control, Samuel Eilon.
3. Marketing Management, Phillip Kotler.
4. Financial Management I.M.Pandey.
5. Projects, Prasanna Chandra.
6. The Essence of Small Business, Barrow colin.
7. Small Industry Ram K Vepa.

DATA ENGINEERING
CS/IT 422

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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

(17 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.

TEXT BOOK:

1. "Data Mining Concepts & Techniques", Jiawei Han MichelineKamber, 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.

REAL-TIME SYSTEMS
CS/IT 423(A)

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(12 Periods)

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

UNIT – II

(16 Periods)

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

UNIT – III

(20 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

(16 Periods)

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

TEXT BOOK:

1. Jane W.S.Liu, “Real-Time Systems”, Pearson Education Asia.

REFERENCE BOOKS:

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

GRID COMPUTING
CS/IT 423(B)

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

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

(18 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

(20 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

(18 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.

WIRELESS NETWORKS
CS/IT 423(C)

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(20 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

(22 Periods)

Telecommunication Systems: GSM, DECT, TETRA, UMTS and IMT-2000.

Satellite Systems – History, Applications, Basics (GEO, LEO, MEO), Routing, Localization, Handover.

Broadcast Systems: Over view, Cyclic repetition of data, Digital Audio Broadcasting, Digital Video Broadcasting.

UNIT – III

(21 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

(18 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.

TEXT BOOK:

1. J.Schiller, “Mobile communications”, Addison-Wesley, 2003

REFERENCE BOOKS:

1. William Stallings, “Wireless Communication Networks”, Pearson Education.
2. UWE Hansmann, LotherMerk, Martin S.Nicklous, Thomas Stober, “Principles of Mobile Computing”, 2nd Edition.

BIOMETRICS
CS/IT 423 (D)

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(16 Periods)

Introduction, Benefits of biometric security, Verification and identification, Basic working of biometric matching, Accuracy, False match rate, False non-match rate, Failure to enroll rate, Derived metrics, Layered biometric solutions.

Finger scan, Features, Components, Operation (Steps), Competing finger Scan technologies, Strength and weakness. Types of algorithms used for interpretation.

UNIT – II

(20 Periods)

Facial Scan, Features, Components, Operation (Steps), Competing facial Scan technologies, Strength and weakness.

Iris Scan, Features, Components, Operation (Steps), competing iris Scan technologies – Strength and weakness.

UNIT – III

(22 Periods)

Voice Scan, Features, Components, Operation (Steps), Competing voice Scan (facial) technologies, Strength and weakness.

Other physiological biometrics, Hand scan, Retina scan, AFIS (Automatic Finger Print Identification Systems), Behavioral Biometrics, Signature scan, keystroke scan.

UNIT – IV

(22 Periods)

Biometrics Application, Biometric Solution Matrix, Bio privacy, Comparison of privacy factor in different biometrics technologies, Designing privacy sympathetic biometric systems.

Biometric standards – (BioAPI , BAPI) – Biometric middleware.

Biometrics for Network Security. Statistical measures of Biometrics. Biometric Transactions.

TEXT BOOK:

1. "Biometrics – Identity Verification in a Networked World", Samir Nanavati, Michael Thieme, Raj Nanavati, WILEY Dream Tech.

REFERENCE BOOKS:

1. "Biometrics for Network Security", Paul Reid, Pearson Education.
2. "Biometrics – TheUltimate Reference", John D. Woodward, Jr. Wiley Dreamtech.

NETWORK MANAGEMENT SYSTEMS
CS/IT 423(E)

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I (14 Periods)

Data communications and Network Management Overview : Analogy of Telephone Network Management, Communications protocols and Standards, Case Histories of Networking and Management, Challenges of Information Technology Managers, Network Management: Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network Management.

SNMPV1 Network Management: Organization and Information and Information Models. **Managed network:** Case Histories and Examples, The History of SNMP Management, The SNMP Model, The Organization Model, System Overview, The Information Model.

UNIT – II (15 Periods)

SNMPv1 Network Management: Communication and Functional Models. The SNMP Communication Model, Functional model.

SNMP ManagementSNMPv2: Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information, The SNMPv2 Management Information Base,SNMPv2 Protocol, Compatibility With SNMPv1.

UNIT – III (18 Periods)

SNMP Management RMON: What is Remote Monitoring? , RMON SMI and MIB, RMON1,RMON2, ATM Remote Monitoring, A Case Study of Internet Traffic Using RMON. **Telecommunications Management Network:** Why TMN? , Operations Systems, TMN Conceptual Model, TMN Standards, TMN Architecture, TMN Management Service Architecture, An Integrated View of TMN, implementation Issues.

UNIT – IV (17 Periods)

Network Management Tools and Systems: Network Management Tools, Network Statistics Measurement Systems, History of Enterprise Management, Network Management systems, Commercial Network management Systems, System Management, and Enterprise Management Solutions.

Web-Based Management: NMS with Web Interface and Web-Based Management, Web Interface to SNMP Management, Embedded Web-Based Management, Desktop management Interface, Web-Based Enterprise Management, WBEM: Windows Management Instrumentation, Java management Extensions, Management of a Storage Area Network: Future Directions.

TEXT BOOK:

1. "Network Management - Principles and Practice", Mani Subrahmanian, Pearson Education.

REFERENCES BOOKS:

1. "Network management", Morris, Pearson Education.
2. "Principles of Network System Administration", Mark Burges, Wiley Dreamtech.

"Distributed Network Management", Paul, John Wiley.

ADVANCED COMPUTER ARCHITECTURE
CS/IT 424 (A)

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(22 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, Hierarchical bus systems, Crossbar switch and multi-port memory, Multistage and combining network.

UNIT – II

(21 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

(22 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.

NATURAL LANGUAGE PROCESSING
CS/IT 424 (B)

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(10 Periods)

Introduction to Natural Language Understanding, Syntactic Processing: Grammars and Parsing.

UNIT – II

(25 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

(20 Periods)

Context and World Knowledge: Using World Knowledge, Discourse Structure, Defining a Conversational Agent.

TEXT BOOK:

1. 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.

INFORMATION RETRIVAL
CS/IT 424(C)

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(15 Periods)

Boolean retrieval, The term vocabulary & postings lists, Dictionaries and tolerant retrieval Index construction.

UNIT – II

(15 Periods)

Index compression, Scoring, term weighting & the vector space model, Computing scores in a complete search system, Evaluation in information retrieval.

UNIT – III

(17 Periods)

Relevance feedback & query expansion, XML retrieval, Probabilistic information retrieval, Language models for information retrieval

UNIT – IV

(17 Periods)

Text classification & Naive Bayes, Vector space classification, Support vector machines &Machine learning on documents, Matrix decompositions & latent semantic indexing.

TEXT BOOK:

1. Christopher D. Manning, Prabhakar Raghavan and Hinrich Schuetze, “Introduction to Information Retrieval”, Cambridge University Press. 2008. ISBN: 0521865719.

REFERENCES BOOKS:

1. Ricardo Baeza, Yates, Berthier Ribeiro, Neto, “Modern Information Retrieval”, Addison Wesley.
2. http://www.dcs.gla.ac.uk/Keith.

MULTIMEDIA SYSTEMS
CS/IT 424(D)

Lectures	:	4 Periods/week, Tutorial: 1	Continuous Assessment	:	40
University Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(22 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

(22 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

(20 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

(16 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 BOOK:

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

REFERENCE BOOKS:

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.

SOFTWARE TESTING METHODOLOGIES
CS/IT 424 (E)

Lectures	:	4 Periods/Week, Tutorial: 1	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

UNIT – I

(20 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

(20 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

(20 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, and 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 BOOK:

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

REFERENCES BOOKS:

1. "Software Testing techniques", BarisBeizer, 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", RenuRajani, Pradeep Oak, TMK.
5. "Effective methods of Software Testing", Perry, John Wiley.

PROJECT WORK
CS/IT 461

Lectures	:	9 Periods/Week	Continuous Assessment	:	50
Final Exam	:	3 hours	Final Exam 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 in charge 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. 3^{rd} 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.

DATA ENGINEERING LAB USING
ORACLE 9i & 10g, ORACLE OWB, INFORMATICA, Clementine Tools
CS/IT 462

Lectures	:	3 Periods/Week	Continuous Assessment	:	40
Final Exam	:	3 hours	Final Exam Marks	:	60

LIST OF EXPERIMENTS

1. Analyzing data with ROLLAP, CUBE.
2. Cube slicing – come up with 2-D view of data.
3. Drill-down or Roll-down- going from summary to more detailed data.
4. Roll up – summarize data along a dimension hierarchy.
5. Dicing – projecting 2-D view of data.
6. Creating Star Schema/snowflake Schema.
7. Create and populate FACT table.
8. Building dimensions.
9. ETL : Extraction Options
    a. Full extraction
    b. Incremental extraction
    c. Change Data Capture(CDC)
10. ETL: Transformation Options
    a. Transformation: during extraction, in staging area, during load, etc.
    b. Multi-state transformation
    c. Pipelined transformation
11. ETL: DW Load options
    a. Loader: SQL(DML)
    b. Data Pump
12. DW index design options
    a. B*tree index – how they work
    b. Bitmapped index – how they work
    c. NULL value considerations

TEXT BOOKS & WEB REFERENCES:

1. Oracle 10G & 9i Oracle Press Manual.