

**ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS**

INFORMATION TECHNOLOGY

B.Tech Four Year Degree Course

(Applicable for the batches admitted from 2014-15)



GUDLAVALLERU ENGINEERING COLLEGE

(An Autonomous Institute with Permanent Affiliation to JNTUK, Kakinada)

Seshadri Rao Knowledge Village

GUDLAVALLERU - 521 356, Krishna District, Andhra Pradesh

CONTENTS

I.	COLLEGE VISION, MISSION	01
II.	DEPARTMENT VISION, MISSION	01
III.	PROGRAM EDUCATIONAL OBJECTIVES (PEOs)	02
IV.	PROGRAM OUTCOMES (POs)	02
V.	ACADEMIC REGULATIONS	03
	1. UG - B.Tech Programs	03
	2. Duration of the Program	03
	3. Minimum Instruction Days	03
	4. Program Credits	03
	5. Attendance Regulations	03
	6. Examinations and Scheme of Evaluation	04
	7. Criteria for Passing a Course and Award of Grades	08
	8. Supplementary Examinations	10
	9. Conditions for Promotion	10
	10. Revaluation	11
	11. Re-admission Criteria	11
	12. Break in Study	11
	13. Transitory Regulations	12
	14. Withholding of Results	14
	15. Malpractices	14
	16. Other Matters	19
	17. General	19
VI.	CURRICULAR COMPONENTS	19
VII.	COURSE STRUCTURE	20
VIII.	OPEN ELECTIVES	24
IX.	SELF STUDY COURSES	25
X.	SYLLABUS	26
	1st Year 1st Semester	
	i) Professional Communication - I	26
	ii) Mathematics - I	28
	iii) Mathematical Methods	30
	iv) Engineering Chemistry	32
	v) Introduction to Computers	34
	vi) Problem Solving Using C	36
	vii) Professional Communication Lab - I	38
	viii) Engineering Chemistry Lab	39
	ix) Programming Lab	40

1st Year 2nd Semester

i)	Professional Communication - II	42
ii)	Mathematics - II	44
iii)	Engineering Physics	46
iv)	Environmental Studies	48
v)	Engineering Drawing	50
vi)	Data Structures	52
vii)	Professional Communication Lab - II	54
viii)	Engineering Physics Lab	55
ix)	Data Structures Lab	56

2nd Year 1st Semester

i)	Discrete Mathematical Structures	58
ii)	Probability & Statistics	60
iii)	Managerial Economics and Financial Analysis	62
iv)	Basic Electronics	64
v)	Digital Logic Design	66
vi)	Object Oriented Programming	68
vii)	Professional Ethics and Patents	70
viii)	Basic Electronics Lab	72
ix)	Object Oriented Programming Lab	73

2nd Year 2nd Semester

i)	Formal Languages & Automata Theory	75
ii)	Software Engineering	77
iii)	Computer Organization	79
iv)	Advanced Data Structures Using C	81
v)	Database Management Systems	83
vi)	Design and Analysis of Algorithms	85
vii)	Employability Skills	87
viii)	Advanced Data Structures and Algorithms Lab	89
ix)	Database Management Systems Lab	90

3rd Year 1st Semester

i)	Micro Processors and Interfacing	91
ii)	Computer Networks	93
iii)	Object Oriented Analysis and Design	95
iv)	Operating Systems	97
v)	Open Elective – I	
	Remote Sensing and GIS Techniques	99
	Elements of Civil Engineering	101
	Modeling and Simulation of Engineering Systems	103
	Renewable Energy Sources	104
	Elements of Mechanical Engineering	106
	Computer Networks	108
	Object Oriented Programming	110

	Data Structures Using C	112
	Cyber Laws	114
	Open Source Software	116
	Fundamentals of Database Management Systems	118
	Fuzzy Mathematics	120
vi)	Micro Processors and Interfacing Lab	121
vii)	Computer Networks and Case Tools Lab	123
viii)	Operating Systems Lab	124
3rd	Year 2nd Semester	
i)	Compiler Design	125
ii)	.Net Technologies	127
iii)	Advanced Java and Web Technologies	128
iv)	Elective - I	
	Advanced Operating System	130
	Computer Graphics	132
	Cryptography & Network Security	134
	Computer Architecture	136
v)	Open Elective - II	
	Disaster Management	138
	Solid Waste Management	140
	Energy Audit, Conservation and Management	142
	Material Science	144
	Automotive Electronics	146
	Introduction to MP&MC	148
	Cloud Computing	150
	Web Technologies	152
	Virtual Reality	154
	Scripting Languages	155
	Big Data	156
	Multi-variate analysis and Special Functions	158
vi)	.Net Technologies Lab	159
vii)	Advanced Java and Web Technologies Lab	161
4th	Year 1st Semester	
i)	Data Warehousing and Data Mining	163
ii)	Multimedia Application Development	165
iii)	Elective - II	
	Distributed Databases	167
	Human Computer Interaction	169
	Bio-Metrics	171
	Software Testing Methodologies	173
iv)	Elective - III	
	Information Retrieval Systems	175
	Digital Image Processing	177

	Mobile Computing	179
	Software Project Management	181
v)	Open Elective - III	
	Building Services	183
	Modern Optimization Techniques	185
	Electrical Power Utilization	187
	Robotics	189
	Assistive Technologies	191
	Introduction to Embedded Systems	193
	Social Networks	195
	Mobile Application Development	196
	Real-Time Systems	198
	Network Management Systems	198
	Fundamentals of E-Commerce	201
	Statistical Methods using R Software	202
vi)	Mobile Application Development Lab	204
vii)	Multimedia Application Development Lab	205
viii)	Free and Open Source Software Lab	206
4th	Year 2nd Semester:	
i)	Elective - IV	
	E-Commerce	207
	Pattern Recognition	209
	Cloud Computing	211
	Business Intelligence	213
ii)	Elective - V	
	Big Data	215
	Soft Computing	217
	Computer Forensics	219
	Software Quality Assurance	221
iii)	Self Study Course	
	Global Positioning Systems	223
	Interior Design	225
	Electrical Safety Management	227
	Green Engineering	229
	Managing Innovation & Entrepreneurship	230
	Internet of Things	231
	Consumer Electronics	232
	e-Waste Management	233
	Management Information Systems	234
	Information & Communication Technology	235
	Organizational Behaviour	236

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VISION, MISSION
OF THE
COLLEGE & DEPARTMENT
PEOs & POs
ACADEMIC REGULATIONS
AND
CURRICULAR COMPONENTS

VISION & MISSION OF THE COLLEGE

Vision

To be a leading institution of engineering education and research, preparing students for leadership in their fields in a caring and challenging learning environment.

Mission

- * To produce quality engineers by providing state-of-the-art engineering education.
- * To attract and retain knowledgeable, creative, motivated and highly skilled individuals whose leadership and contributions uphold the college tenets of education, creativity, research and responsible public service.
- * To develop faculty and resources to impart and disseminate knowledge and information to students and also to society that will enhance educational level, which in turn, will contribute to social and economic betterment of society.
- * To provide an environment that values and encourages knowledge acquisition and academic freedom, making this a preferred institution for knowledge seekers.
- * To provide quality assurance.
- * To partner and collaborate with industry, government, and R and D institutes to develop new knowledge and sustainable technologies and serve as an engine for facilitating the nation's economic development.
- * To impart personality development skills to students that will help them to succeed and lead.
- * To instil in students the attitude, values and vision that will prepare them to lead lives of personal integrity and civic responsibility.
- * To promote a campus environment that welcomes and makes students of all races, cultures and civilizations feel at home.
- * Putting students face to face with industrial, governmental and societal challenges.

VISION & MISSION OF THE DEPARTMENT

Vision

To be a centre of innovation by adopting changes in Information Technology, imparting quality education, research to produce visionary computer professionals and entrepreneurs.

Mission

- * To provide an academic environment in which students are given the essential resources for solving real-world problems and work in multidisciplinary teams.
- * To impart value based education and research among students, particularly belonging to rural areas, for their sustained growth in technological aspects and leadership.
- * To collaborate with the industry for making the students adoptable to evolving changes in Information Technology and related areas.

III. PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- * To exhibit analytical skills in modeling and solving computing problems by applying mathematical, scientific and engineering knowledge and to pursue their higher studies.
- * To communicate effectively with multi-disciplinary teams to develop quality software systems with an orientation towards research and development for lifelong learning.
- * To use emerging technologies in project development to fulfil industry and societal needs for the growth of global economy following professional ethics.

IV. PROGRAM OUTCOMES (POs)

- * Apply the knowledge of mathematics, science and computing in the core information technologies.
- * Analyze real time problems using basic engineering knowledge and develop algorithms suitable for computing environment.
- * Design and demonstrate a system or a model that meets the desired specifications considering economic, environmental, and social aspects.
- * **Apply latest technical concepts and practices in IT related fields**, like user interface creation, information management, programming, networking and web systems.
- * Select and use current techniques, skills, and tools necessary for computing practice and provide IT-based solutions for the user environment.
- * Provide engineering solutions to meet the local and global challenges.
- * Recognize the importance of professional engineering skills, by inventing sustainable methodologies in software development useful for the society and environment.
- * Apply knowledge of mathematics, science and engineering to formulate and solve complex electrical & electronics engineering problems.
- * Ability to design and develop hardware and /or software system, a component thereof, and process in electrical and electronics engineering to meet desired performance needs, within realistic constraints.
- * Use various techniques and modern tools for modeling and simulation of various components, conduct experiments to analyze and provide valid conclusions on the performance of various components in electrical and electronics engineering.
- * Apply reasoning and contextual knowledge to solve various engineering, industry and societal problems
- * Understand the role of electrical and electronics engineering for sustainable development in a global, economic, environmental and societal context.
- * An ability to apply professional ethics, responsibilities and commitment to function effectively as an individual or as a member of a team to find successful design solutions to the problems related to electrical and electronics engineering.
- * An ability to communicate effectively on complex engineering activities
- * Apply principles of management and business practices to become good entrepreneur as well as in the industry.
- * Engage in independent and lifelong learning and to have knowledge of contemporary technologies.

V. ACADEMIC REGULATIONS

Applicable for the students of B.Tech from the Academic Year 2014-15.

1. UG – B.Tech Programs

The following B.Tech Programs are offered at present

- i. Civil Engineering (CE)
- ii. Electrical and Electronics Engineering (EEE)
- iii. Mechanical Engineering (ME)
- iv. Electronics and Communication Engineering (ECE)
- v. Computer Science and Engineering (CSE)
- vi. Information Technology (IT)

2. Duration of the Program

The duration of the program is four academic years consisting of eight semesters. However, a student is permitted to complete the course work of B.Tech program in the stipulated time frame of **EIGHT** years from the date of joining. Students admitted into third semester of B.Tech program directly, through Lateral Entry (LE), shall have to complete the course work of B.Tech program in the stipulated time frame of **SIX** years from the date of joining.

3. Minimum Instruction Days

Each semester consists of a minimum of ninety instruction days.

4. Program Credits

- i) Each discipline of the B.Tech program is designed to have a total of 180 credits and the student shall have to complete the four year course work and earn all the **180** credits for the award of B.Tech Degree.
- ii) Students joining the B.Tech program into the third semester directly through Lateral Entry (LE) Scheme shall have to complete the three year course work and earn **132** credits for the award of B.Tech degree.

5. Attendance Regulations

- 5.1 A student shall be eligible to appear for End Semester Examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.
- 5.2 Condoning of shortage of attendance in aggregate upto 10% (65% and above and below 75%) in each semester will be considered for genuine reasons such as medical grounds and participation in co-curricular and extra-curricular activities and shall be granted only after approval by a committee duly appointed by the college. The student should submit application for medical leave along with medical certificate from a registered medical practitioner within three days from reporting to the class work after the expiry of the Medical Leave. In case of participation in co-curricular and extra-curricular activities, either in the college or

other colleges, students must take prior written permission from HoD concerned and should also submit the certificate of participation from the organizer of the event within three days after the completion of the event. Only such cases will be considered for condoning attendance shortage.

- 5.3 A student shall be eligible to claim for condonation of attendance shortage for a maximum of two times during the four year (eight semesters) course work of regular B.Tech / three year (six semesters) course work of B.Tech, Lateral Entry.
- 5.4 A student will not be promoted to the next semester unless he satisfies the attendance requirement of the current semester. He may seek re-admission for that semester when offered next.
- 5.5 Shortage of Attendance below 65% in aggregate shall in *NO* case be condoned.
- 5.6 Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.
- 5.7 A fee stipulated by the college shall be payable towards condonation of attendance shortage.
- 5.8 A student is required to put up a minimum of 75% of attendance in the mandatory non-credit courses such as NSS and Games & Sports / Creative Arts.
- 5.9 A student whose shortage of attendance is condoned in the case of credit courses in that semester shall also be eligible for condoning shortage of attendance up to 10% in the case of mandatory non-credit courses also.

6. Examinations and Scheme of Evaluation

6.1 Theory Courses (3 Credits):

Each theory course shall be evaluated for a total of 100 marks, consisting of 40 marks for internal assessment and 60 marks for semester end examination.

Internal Assessment:

- i) Out of 40 marks for internal assessment, 20 marks are for continuous assessment in the form of class tests and 20 marks are based on two mid-term examinations. The first mid-term examination shall be from the first three units of syllabus and second mid-term from the last three units of syllabus, conducted during the semester.
- ii) Four class tests, two tests before first mid-term examination and the other two before second mid-term examination, each for 10 marks, with 45 minutes duration, are conducted in a semester and the average marks of the three best scored tests are scaled up for 20 marks and taken as marks for the continuous evaluation process.

- iii) Each mid-term examination is conducted for 40 marks with two hours duration. Each mid-term examination consists of four questions, each for 10 marks. All the questions need to be answered. First question shall have 5 short questions, each of two marks or 10 objective questions each of one mark and the remaining three questions are of descriptive type, one from each unit of syllabus.
- iv) Sum of the 75% marks of best scored mid-term examination and 25% marks of least scored mid-term examination are scaled down for 20 marks.
- v) For the subjects such as Engineering Graphics, Engineering Drawing, Machine Drawing, Design & Drawing of R.C. structures, Steel structures, Irrigation structures, Estimation Cost and Valuation, Building Planning and Drawing etc., the distribution of 40 marks for internal evaluation shall be 20 marks for day-to-day work and 20 marks for internal tests (average of 2 tests) and 60 marks for semester end examination.

External Assessment:

- i) Semester End Examination will have questions under Part-A and Part-B with three hours duration. **Part-A** is compulsory and consists of six 2 marks questions. **Part-B** consists of six questions, one question from each unit, out of which four questions are to be answered. All questions carry equal marks of 12 each.
- ii) For subjects like Engineering Drawing / Engineering Graphics, Machine Drawing, Building Planning & Drawing, etc., the pattern of semester end examination is given along with the syllabus of respective subject.

6.2 Theory Courses (2 Credits):

Each theory course shall be evaluated for a total of 75 marks, consisting of 25 marks for internal assessment and 50 marks for semester end examination.

Internal Assessment:

- i) Out of 25 marks for internal, 5 marks for assignments and 20 marks are based on two mid-term examinations.
- ii) Two assignments, each for 10 marks, are evaluated in a semester and the average marks of two assignments are scaled down for 5 marks.
- iii) Each mid-term examination is conducted for 40 marks with two hours duration. Each mid-term examination consists of four questions, each for 10 marks. All the questions need to be answered.
- iv) Sum of the 75% marks of the best scored mid-term examination and 25% marks of the least scored mid-term examination are scaled down for 20 marks.

External Assessment:

- i) Semester End Examination will have questions under Part-A and Part-B with three hours duration. **Part-A** is compulsory and consists of five 2 marks questions. **Part-B** consists of six questions, covering uniformly the entire syllabus, out of which four questions are to be answered. All questions carry equal marks of 10 each.

Employability Skills:

The distribution of marks shall be 25 marks for Internal Evaluation and 50 marks for the semester end examination. There shall be continuous evaluation by the internal subject teacher during the semester for 25 internal marks, of which 15 marks shall be for day-to-day performance and 10 marks shall be evaluated by conducting an internal test towards the end of semester.

Semester end examination shall be conducted by the teacher concerned and external examiner for 50 marks. The distribution of marks in the semester end examination will be:

Questionnaire / data collection	: 10 marks,
Project Report	: 10 marks,
Presentation of the Project	: 15 marks and
Viva-voce	: 15 marks

MOOCs (Massive Open Online Courses):

The evaluation procedures and award of grades in different MOOCs and equivalent letter grading of the college shall be prescribed for each MOOCs along with the notification of MOOCs.

6.3 Laboratory Courses:

- i) For practical subjects the distribution shall be 25 marks for Internal Evaluation and 50 marks for the semester end examinations. There shall be continuous evaluation by the internal subject teacher during the semester for 25 internal marks of which 15 marks shall be for day-to-day performance (10 marks for day-to-day evaluation and 5 marks for Record) and 10 marks shall be evaluated by conducting an internal laboratory test towards the end of semester.
- ii) Semester end examination shall be conducted by the teacher concerned and external examiner for 50 marks.

6.4 Mandatory Non-Credit Courses:

A student is required to take up two Non-Credit courses, viz. NSS and Sports & Games / Creative Arts, one in II year and the other in III year, either in the first semester or second semester. Marks are awarded based on the day-to-day participation and performance in the activities organized under each event. A student is required to score 40 marks out of 100 marks despite putting up a minimum of 75% attendance to be

declared satisfactory in each mandatory non-credit course. The B.Tech degree shall only be awarded if a student gets satisfactory grade in each of the two mandatory non-credit courses and besides acquiring 180 credits of the B.Tech degree course.

A student has to repeat the course if he does not get satisfactory grade in each non-credit course for getting the degree awarded.

NSS

There shall be internal valuation for 100 Marks, out of which 60 marks are for participation and involvement in day-to-day activities and 40 marks for participation and involvement in a three days NSS camp arranged during the semester.

Sports and Games / Creative Arts

There shall be two internal valuations, each for 50 marks, in the chosen activity, one in the middle of semester and the other towards the end of semester. Sum of the two valuations shall be taken as the final marks for 100.

6.5 Industrial / Practical Training:

Industrial / Practical training shall be evaluated for a total of 100 marks, consisting of 40 marks for internal assessment of day-to-day work and 60 marks for the assessment of the training report and viva-voce examination, conducted by a panel of examiners appointed by the college.

6.6 Mini Project:

Industrial / Practical training shall be evaluated for a total of 75 marks, consisting of 25 marks for internal assessment of day-to-day work and 50 marks for the assessment of the project report and viva-voce examination, conducted by a panel of examiners appointed by the college.

6.7 Project Work:

- i) The final project work shall be carried out during the 8th semester and will be evaluated for 200 marks.
- ii) Out of 200 marks, 80 marks shall be for Internal Evaluation and 120 marks for the assessment of project thesis and viva-voce examination.
- iii) Each student needs to give two seminars on the topic of his project, and each seminar is evaluated for 40 marks by a committee consisting of the supervisor and a senior faculty of the department. The sum of the marks of two seminars is taken as internal marks for 80.
- iv) The assessment of Project Thesis and Viva-Voce shall be conducted by the committee consisting of an External Examiner, Head of the Department and Supervisor of the Project. The evaluation of project work shall be conducted at the end of the fourth year second semester.

7. Criteria for Passing a Course and Award of Grades:

7.1 Criteria for Passing a Course:

- i) A candidate shall be declared to have passed in individual theory/ drawing/ design course if he secures a minimum of 40% aggregate marks (internal & semester end examination marks put together), subject to securing a minimum of 35% marks in the semester end examination.
- ii) A candidate shall be declared to have passed in individual laboratory/ project course if he secures a minimum of 50% aggregate marks (internal & semester end examination marks put together), subject to securing a minimum of 40% marks in the semester end examination.
- iii) The candidate shall be declared to have passed in Employability Skills / Industrial / Practical Training / Mini Project / Project Work course if he secures 50% marks.
- iv) On passing a course of a program, the student shall earn the credits as assigned to that course.

7.2 Method of Awarding Letter Grade and Grade Points for a Course:

A letter grade and grade points will be awarded to a student in each course based on his performance, as per the grading system given below.

Theory / Drawing Course (%)	Laboratory/ Employability Skills / Industrial / Practical Training/ Mini Project/ Project Work (%)	Grade Points	Letter Grade
≥ 90	≥ 90	10	O (Outstanding)
≥ 80 & < 90	≥ 80 & < 90	9	A+ (Excellent)
≥ 70 & < 80	≥ 70 & < 80	8	A (Very Good)
≥ 60 & < 70	≥ 60 & < 70	7	B+ (Good)
≥ 50 & < 60	≥ 50 & < 60	6	B (Above Average)
≥ 45 & < 50	–	5	C (Average)
≥ 40 & < 45	–	4	P (Pass)
< 40	< 50	0	F (Fail)

7.3 Calculation of Semester Grade Point Average (SGPA)* for semester:

The performance of each student at the end of the each semester is indicated in terms of SGPA. The SGPA is calculated as given below:

$$SGPA = \frac{\sum (CR \times GP)}{\sum CR}$$

where CR = Credits of a course

GP = Grade Points awarded for a course

- * SGPA is calculated for a candidate who passed all the courses in that semester.

7.4 Eligibility for Award of B.Tech Degree:

A student will be declared eligible for the award of the B.Tech. Degree if he fulfills the following academic regulations.

i) 4 Year B.Tech Course:

- (a) Pursued a course of study for not less than four academic years and not more than eight academic years.
- (b) Registered for **180** credits and secured **180** credits.
- (c) Students, who fail to complete their Four years Course of study within Eight years or fail to acquire the **180** Credits for the award of the degree within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

ii) 3 Year B.Tech Course under Lateral Entry:

- (a) Pursued a course of study for not less than three academic years and not more than six academic years.
- (b) Registered for **132** credits and secured **132** credits.
- (c) Students, who fail to complete their Three years Course of study within Six years or fail to acquire the **132** Credits for the award of the degree within six academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

7.5 Calculation of Cumulative Grade Point Average (CGPA) for Entire Program:

The CGPA is calculated as given below:

$$\text{CGPA} = \frac{\sum(CR \times GP)}{\sum CR}$$

where CR = Credits of a course

GP = Grade points awarded for a course

7.6 Award of Division:

After satisfying the requirements prescribed for the completion of the program, the student shall be eligible for the award of B.Tech Degree and shall be placed in one of the following grades:

CGPA	Class
≥ 7.5	First Class with Distinction
≥ 6.5 & < 7.5	First Class
≥ 5.5 & < 6.5	Second Class
< 5.5	Pass Class

7.7 Consolidated Grade Card

A consolidated grade card containing credits & grades obtained by the candidate will be issued after completion of the four year B.Tech program.

8. Supplementary Examinations

- i) Supplementary examinations will be conducted twice in a year at the end of odd and even semesters.
- ii) Semester end supplementary examinations shall be conducted till next regulation comes into force for that semester, after the conduct of the last set of regular examinations under the present regulation.
- iii) Thereafter, supplementary examinations will be conducted in the equivalent courses as decided by the Board of Studies concerned.
- iv) **Advanced Supplementary Examinations:** Candidate(s), who failed in theory / project work courses in 4th B.Tech 2nd Semester can appear for advanced supplementary examination conducted within one month after declaration of the revaluation results. However, those candidates who fail in these advanced supplementary examinations shall appear for subsequent examination along with regular candidates in the examinations conducted at the end of the respective semester.

9. Conditions for Promotion

- i) A student shall be eligible for promotion to next Semester of B.Tech program, if he satisfies the conditions as stipulated in Regulation 5.
- ii) The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in Regulation 5 for promotion into III Year I semester and IV year I semester.

a) 4 Year B.Tech Program:

- i) A student shall be promoted from II year to III year only if he acquires the academic requirement of a minimum of 50% credits up to second year second semester as shown below.
 1. Two regular and two supplementary examinations of I year I semester,
 2. Two regular and one supplementary examinations of I year II semester,
 3. One regular and one supplementary examinations of II year I semester
 4. One regular examination of II year II semester,
irrespective of whether the candidate takes the examination or not.
- ii) A student shall be promoted from III year to IV year only if he acquires the academic requirement of a minimum of 50% of credits upto third year second semester as shown below.
 1. Three Regular and three supplementary examinations of I year I sem.,
 2. Three Regular and two supplementary examinations of I year II sem.,
 3. Two Regular and two supplementary examinations of II year I semester,
 4. Two Regular and one supplementary examinations of II Year II semester,
 5. One Regular and one supplementary examinations of III Year I semester,
 6. One regular examination of III Year II semester,
irrespective of whether the candidate takes the examination or not.

b) 3 Year B.Tech Program under Lateral Entry Scheme:

- i) A student shall be promoted from III to IV year only if he acquires the academic requirement of a minimum of 50% credits up to third year second semester as shown below.
 - 1. Two regular and two supplementary examinations of II year I semester,
 - 2. Two Regular and one supplementary examinations of II year II semester,
 - 3. One regular and one supplementary examinations of III year I semester
 - 4. One regular examination of III year II semester,irrespective of whether the candidate takes the examination or not.

10. Revaluation

- i) Students can submit the applications for revaluation, along with the prescribed fee receipt for revaluation of his answer script(s) of theory course(s) as per the notification issued by the Controller of Examinations.
- ii) The Controller of Examinations shall arrange for revaluation of such answer script(s).
- iii) An external examiner, other than the first examiner, shall reevaluate the answer script(s).
- iv) If the variation in marks of two evaluations is less than 15% of total marks, the best mark of two evaluations shall be taken into consideration.
- v) If the variation in marks of two evaluations is more than 15% of total marks, there shall be third evaluation by an examiner other than the first two examiners. The best marks of two evaluations (which are nearer) shall be taken into consideration.

11. Re-admission Criteria

- i) A candidate, who is detained in a semester due to lack of attendance has to obtain written permission from the Principal for readmission into the same semester after duly fulfilling the required norms stipulated by the college and by paying the required tuition fee and special fee in addition to paying an administrative fee of Rs.1,000/-.
- ii) A candidate, who is not promoted either to III year or IV year due to lack of required credits can seek admission into III / IV year in subsequent years after obtaining the required credits as stipulated in regulation 9 by paying the required tuition fee and special fee in addition to paying an administrative fee of Rs. 1,000/-.

12. Break in Study

Student, who discontinues the studies for what-so-ever reason, can get readmission into appropriate semester of B.Tech program only with the prior permission of the Principal of the College, provided such candidate shall follow the transitory regulations applicable to the batch he joins. An administrative

fee of Rs.2,000/- per each year of break in study in addition to the prescribed tuition and special fees should be paid by the candidate to condone his break in study.

13. Transitory Regulations

A candidate, who is detained or discontinued in a semester, on readmission shall be required to do all the courses in the curriculum prescribed for the batch of students in which the student joins subsequently. However, exemption will be given to those candidates who have already passed such courses in the earlier semester(s) he was originally admitted into and substitute subjects are offered in place of them as decided by the Board of Studies. However, the decision of the Board of Studies will be final.

a) Four Year B.Tech Regular course:

13.1 A student who is following JNTUK curriculum and detained due to shortage of attendance at the end of the first semester of first year shall join the autonomous batch of first year first semester. Such students shall study all the courses prescribed for the batch in which the student joins and considered on par with regular candidates of Autonomous stream and will be governed by the autonomous regulations.

13.2 A student who is following JNTUK curriculum, detained due to lack of credits or shortage of attendance at the end of the second semester of first year or at the subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute subjects will be offered in place of them as decided by the Board of Studies. The student has to clear all his backlog subjects up to previous semester by appearing for the supplementary examinations conducted by JNTUK for the award of degree. The total number of credits to be secured for the award of the degree will be sum of the credits up to previous semester under JNTUK regulations and the credits prescribed for the semester in which a candidate seeks readmission and subsequent semesters under the autonomous stream. The class will be awarded based on the academic performance of a student in the autonomous pattern.

b) Three Year B.Tech program under Lateral Entry Scheme:

13.3 A student who is following JNTUK curriculum and detained due to

shortage of attendance at the end of the first semester of second year shall join the autonomous batch of second year first semester. Such students shall study all the courses prescribed for the batch in which the student joins and considered on par with Lateral Entry regular candidates of Autonomous stream and will be governed by the autonomous regulations.

13.4 A student who is following JNTUK curriculum, detained due to lack of credits or shortage of attendance at the end of the second semester of second year or at the subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute subjects are offered in place of them as decided by the Board of Studies. The student has to clear all his backlog subjects up to previous semester by appearing for the supplementary examinations conducted by JNTUK for the award of degree. The total number of credits to be secured for the award of the degree will be sum of the credits up to previous semester under JNTUK regulations and the credits prescribed for the semester in which a candidate seeks readmission and subsequent semesters under the autonomous stream. The class will be awarded based on the academic performance of a student in the autonomous pattern.

c) Transfer candidates (from non-autonomous college affiliated to JNTUK):

13.5 A student who is following JNTUK curriculum, transferred from other college to this college in second year first semester or subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute subjects are offered in their place as decided by the Board of Studies. The student has to clear all his backlog subjects up to previous semester by appearing for the supplementary examinations conducted by JNTUK for the award of degree. The total number of credits to be secured for the award of the degree will be the sum of the credits upto

previous semester under JNTUK regulations and the credits prescribed for the semester in which a candidate joined after transfer and subsequent semesters under the autonomous stream. The class will be awarded based on the academic performance of a student in the autonomous pattern.

d) Transfer candidates (from an autonomous college affiliated to JNTUK):

10. A student who has secured the required credits upto previous semesters as per the regulations of other autonomous institutions shall also be permitted to be transferred to this college. A student who is transferred from the other autonomous colleges to this college in second year first semester or subsequent semesters shall join with the autonomous batch in the appropriate semester. Such candidates shall be required to pass in all the courses in the program prescribed by the Board of Studies concerned for that batch of students from that semester onwards to be eligible for the award of degree. However, exemption will be given in the courses of the semester(s) of the batch which he had passed earlier and substitute subjects are offered in their place as decided by the Board of Studies. The total number of credits to be secured for the award of the degree will be the sum of the credits upto previous semester as per the regulations of the college from which he is transferred and the credits prescribed for the semester in which a candidate joined after transfer and subsequent semesters under the autonomous stream. The class will be awarded based on the academic performance of a student in the autonomous pattern.

14. Withholding of Results

If the student has not paid the dues, if any, to the College or if any case of indiscipline is pending against him, the result of the student will be withheld. His degree will be withheld in such cases.

15. Malpractices

- i) The Principal shall refer the cases of malpractices in internal assessment tests and semester end examinations to a malpractice enquiry committee constituted by him for the purpose. Such committee shall follow the approved levels of punishment. The Principal shall take necessary action against the erring students based on the recommendations of the committee.
- ii) Any action by the candidate trying to get undue advantage in the performance or trying to help another, or derive the same through unfair means is punishable according to the provisions contained hereunder.

DISCIPLINARY ACTION FOR MALPRACTICES/IMPROPER CONDUCT IN EXAMINATIONS

Nature of Malpractices / Improper conduct		Punishment
If the candidate		
1.a	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination.)	Expulsion from the examination hall and cancellation of the performance in that subject only.
b	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through Cell phones with any candidates or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester. The hall ticket of the candidate shall be cancelled.

3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for the examinations of the remaining subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the impostor is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles in the Answer book or takes out or arranges to send out the question paper during the examination or answer book during or after the examination.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of performance in that subject.

6.	<p>Refuses to obey the orders of the Chief Superintendent / Assistant Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in or around the examination hall or organises a walkout or instigates others to walkout or threatens the officer-in-charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the Officer-in-charge or any person on duty in or outside the examination hall of any of his relations or indulges in any other act of misconduct or mischief which results in damage to or destruction of property in the examination hall or any part of the college campus or engages in any other act which in the opinion of the Officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.</p>	<p>In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.</p>
7.	<p>Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.</p>	<p>Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester. The candidate is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.</p>
8.	<p>Possess any lethal weapon or firearm in the examination hall.</p>	<p>Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester. The candidate is also debarred and forfeits the seat.</p>

9	If student of the college who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the college will be handed over to the police and a police case is registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be referred to the Chief Superintendent of Examinations for future action towards suitable punishment.	

- iii) The involvement of the staff, who are in charge of conducting examinations, valuing examination papers and preparing / keeping records of documents related to the examinations in such acts (inclusive of providing incorrect or misleading information) that infringe upon the course of natural justice to one and all concerned at the examination shall be viewed seriously and appropriate disciplinary action will be taken after thorough enquiry.

16. Other Matters

- i) Physically challenged candidates who have availed additional examination time and a scribe during their Intermediate/EAMCET examinations will be given similar concessions on production of relevant proof/documents. Students who are suffering from contagious diseases are not allowed to appear either for internal or semester end examinations.
- ii) The students who participated in coaching / tournaments held at State / National / International levels through University / Indian Olympic Association during semester end external examination period will be promoted to subsequent semesters as per the guidelines of University Grants Commission Letter No. F.1-5/88 (SPE/PES), dated 18-08-1994.
- iii) The Principal shall deal in an appropriate manner with any academic problem which is not covered under these rules and regulations, in consultation with the Heads of the Departments and subsequently such actions shall be placed before the Academic Council for ratification. Any emergency modification of regulation, approved in the meetings of the Heads of the Departments shall be reported to the Academic Council for ratification.

17. General

- i) The Academic Council may, from time to time, revise, amend or change the regulations, schemes of examination and /or syllabi.
- ii) The academic regulations should be read as a whole for the purpose of any interpretation.
- iii) In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Chairman of the Academic Council is final.
- iv) Wherever the word he, him or his occurs, it will also include she, her and hers.

VI. CURRICULAR COMPONENTS

Sl.No.	Course Work - Subject Areas	Credits %
1.	Humanities and Social Sciences (HSS)	10
2.	Baisc Sciences (BS)	14
3.	Engineering Sciences (ES)	21
4.	Professional Subjects Core (PSC)	33
5.	Professional Subjects Electives (PSE)	08
6.	Open Subjects Electives (OSE)	06
7.	Project / Industrial / Practical Training	08
8.	Non-Credit Courses	03

COURSE STRUCTURE
&
SYLLABUS

COURSE STRUCTURE

I Year - I Semester

Sl. No.	Name of the Course / Laboratory	No. of Periods per week		No. of Credits
		L	P	
1	Professional Communication – I	3+1*	-	3
2	Mathematics – I	3+1*	-	3
3	Mathematical Methods	3+1*	-	3
4	Engineering Chemistry	3+1*	-	3
5	Introduction to Computers	3+1*	-	3
6	Problem Solving Using C	3+1*	-	3
7	Professional Communication Lab – I	-	3	2
8	Engineering Chemistry Lab	-	3	2
9	Programming Lab	-	3	2
Total		21	9	24

I Year - II Semester

Sl. No.	Name of the Course / Laboratory	No. of Periods per week		No. of Credits
		L	P	
1	Professional Communication – II	3+1*	-	3
2	Mathematics – II	3+1*	-	3
3	Engineering Physics	3+1*	-	3
4	Environmental Studies	3+1*	-	3
5	Engineering Drawing	3+1*	-	3
6	Data Structures	3+1*	-	3
7	Professional Communication Lab – II	-	3	2
8	Engineering Physica Lab	-	3	2
9	Data Structures Lab	-	3	2
Total		24	9	24

* Tutorial

II Year - I Semester

Sl. No.	Name of the Course / Laboratory	No. of Periods per week		No. of Credits
		L	P	
1	Discrete Mathematical Structures	3+1*	-	3
2	Probability & Statistics	3+1*	-	3
3	Managerial Economics and Financial Analysis	3+1*	-	3
4	Basic Electronics	3+1*	-	3
5	Digital Logic Design	3+1*	-	3
6	Object Oriented Programming	3+1*	-	3
7	Professional Ethics and Patents	2	-	2
8	Basic Electronics Lab	-	3	2
9	Object Oriented Programming Lab	-	3	2
Total		26	6	24

II Year - II Semester

Sl. No.	Name of the Course / Laboratory	No. of Periods per week		No. of Credits
		L	P	
1	Formal Languages & Automata Theory	3+1*	-	3
2	Software Engineering	3+1*	-	3
3	Computer Organization	3+1*	-	3
4	Advanced Data Structures Using C	3+1*	-	3
5	Database Management Systems	3+1*	-	3
6	Design and Analysis of Algorithms	3+1*	-	3
7	Employability Skills	1	2	2
8	Advanced Data Structures and Algorithms Lab	-	3	2
9	Database Management Systems Lab	-	3	2
Total		26	8	24
10	Sports & Games / Creative Arts (Mandatory Non-Credit Course)	-	2	-

* Tutorial

III Year - I Semester

SI. No.	Name of the Course / Laboratory	No. of Periods per week		No. of Credits
		L	P	
1	Micro Processors and Interfacing	3+1*	-	3
2	Computer Networks	3+1*	-	3
3	Object Oriented Analysis & Design	3+1*	-	3
4	Operating Systems	3+1*	-	3
5	Open Elective – I (see the list of Open Electives)	3+1*	-	3
6	Micro Processors and Interfacing Lab	-	3	2
7	Computer Networks and Case Tools Lab	-	3	2
8	Operating Systems Lab	-	3	2
Total		20	9	21

III Year - II Semester

SI. No.	Name of the Course / Laboratory	No. of Periods per week		No. of Credits
		L	P	
1	Compiler Design	3+1*	-	3
2	.Net Technologies	3+1*	-	3
3	Advanced Java and Web Technologies	3+1*	-	3
4	Elective – I i) Advanced Operating Ssystem ii) Computer Graphics iii) Cryptography and Network Security iv) Computer Architecture	3+1*	-	3
5	Open Elective – II (see the list of Open Electives)	3+1*	-	3
6	.Net Technologies Lab	-	3	2
7	Advanced Java and Web Technologies Lab	-	3	2
8	Mini Project	-	3	2
Total		20	9	21
9	NSS (Mandatory Non-Credit Course)	-	2	-

* **Tutorial**

IV Year - I Semester

Sl. No.	Name of the Course / Laboratory	No. of Periods per week		No. of Credits
		L	P	
1	Data Warehousing and Data Mining	3+1*	-	3
2	Multimedia Application Development	3+1*	-	3
3	Elective – II i) Distributed Databases ii) Human Computer Interaction iii) Bio-Metrics iv) Software Testing Methodologies	3+1*	-	3
4	Elective – III i) Information Retrieval Systems ii) Digital Image Processing iii) Mobile Computing iv) Software Project Management	3+1*	-	3
5	Open Elective – III (see the list of Open Electives)	3+1*	-	3
6	Mobile Application Lab	-	3	2
7	Multimedia Application Development Lab	-	3	2
8	Free and Open Source Software Lab	-	3	2
Total		20	9	21

IV Year - II Semester

Sl. No.	Name of the Course / Laboratory	No. of Periods per week		No. of Credits
		L	P	
1	Elective – IV i) E-Commerce ii) Pattern Recognition iii) Cloud Computing iv) Business Intelligence	3+1*	-	3
2	Elective – V i) Big Data ii) Soft Computing iii) Computer Forensics iv) Software Quality Assurance	3+1*	-	3
3	Self Study Course (see the list of Self Study Courses)	-	-	2
4	Industrial / Practical Training	-	-	4
5	Project Work	-	9	9
Total		8	9	21

* Tutorial

Open Elective - I

Sl. No.	Title of the Subject	Department Offering the Subject	No. of Periods per week		No. of Credits
			L	P	
1	Remote Sensing and GIS Techniques	CE	3+1*	-	3
2	Elements of Civil Engineering (other than CE)	CE	3+1*	-	3
3	Modeling and Simulation of Engineering Systems	EEE	3+1*	-	3
4	Renewable Energy Sources	ME	3+1*	-	3
5	Elements of Mechanical Engineering (other than ME)	ME	3+1*	-	3
6	Computer Networks (other than CSE & IT)	CSE	3+1*	-	3
7	Object Oriented Programming (other than CSE & IT)	CSE	2+1*	-	3
8	Data Structures Using C (other than EEE, ECE, CSE & IT)	CSE	2+1*	-	3
9	Cyber Laws	CSE	3+1*	-	3
10	Open Source Software	IT	3+1*	-	3
11	Fundamentals of Data Base Management Systems (other than CSE & IT)	IT	3+1*	-	3
12	Fuzzy Mathematics	Maths	3+1*	-	3

* **Tutorial**

Open Elective - II

Sl. No.	Title of the Subject	Department Offering the Subject	No. of Periods per week		No. of Credits
			L	P	
1	Disaster Management	CE	3+1*	-	3
2	Solid Waste Management (other than CE)	CE	3+1*	-	3
3	Energy Audit, Conservation and Management	EEE	3+1*	-	3
4	Material Science (other than ME)	ME	3+1*	-	3
5	Automotive Electronics	ECE	3+1*	-	3
6	Introduction to MP&MC (other than EEE, ECE, CSE & IT)	ECE	3+1*	-	3
7	Cloud Computing (other than CSE & IT)	CSE	3+1*	-	3
8	Web Technologies (other than CSE & IT)	CSE	2+1*	-	3
9	Virtual Reality	CSE	3+1*	-	3
10	Scripting Languages	IT	3+1*	-	3
11	Big Data (other than CSE & IT)	IT	3+1*	-	3
12	Multi-variate analysis and Special Functions	Maths	3+1*	-	3

* **Tutorial**

Open Elective - III

Sl. No.	Title of the Subject	Department Offering the Subject	No. of Periods per week		No. of Credits
			L	P	
1	Building Services (other than CE)	CE	3+1*	-	3
2	Modern Optimization Techniques	EEE	3+1*	-	3
3	Electrical Power Utilization (other than EEE)	EEE	3+1*	-	3
4	Robotics (other than ME)	ME	3+1*	-	3
5	Assistive Technologies	ECE	3+1*	-	3
6	Introduction to Embedded Systems (other than ECE, CSE & IT)	ECE	3+1*	-	3
7	Social Networks	CSE	3+1*	-	3
8	Mobile Application Development (other than CSE & IT)	CSE	3+1*	-	3
9	Real-Time Systems	CSE	3+1*	-	3
10	Network Management Systems	IT	3+1*	-	3
11	Fundamentals of E-Commerce (other than CSE & IT)	IT	3+1*	-	3
12	Statistical Methods using R Software	Maths	3+1*	-	3

* **Tutorial**

Self Study Courses

Sl. No.	Title of the Subject	Department Offering the Subject	No. of Credits
1	Global Positioning Systems	CE	2
2	Interior Design	CE	2
3	Electrical Safety Management	EEE	2
4	Green Engineering	ME	2
5	Managing Innovation & Entrepreneurship	ME	2
6	Internet of Things	ECE	2
7	Consumer Electronics	ECE	2
8	e-Waste Management	CSE	2
9	Management Information Systems	CSE	2
10	Information & Communication Technology	IT	2
11	Organizational Behaviour	MBA	2
12	MOOCs	--	2

SYLLABUS

PROFESSIONAL COMMUNICATIONICS – I (Common to All Branches)

I Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To equip students for their present and future academic pursuits: to understand classroom lectures, read textbooks, do reference reading, participate in classroom discussions, and write assignments and examination answers.
- To develop in them the communication skills and social graces necessary for functioning effectively in the social and other situations in which they may be called upon to use English.

Learning Outcomes:

Students will be able to:

- Produce and process language for academic, professional and social life.
- Produce coherent spoken and written discourse of various kinds with attention to appropriate strategies and conventions of speaking and writing.

Speaking, Listening, Intensive Reading and Grammar Practice

UNIT – I:

- To transfer textual information to a table
- To introduce yourself
- To make polite conversations
- To comprehend subject-verb agreement

UNIT – II:

- To communicate well with your peers
- To express your views on a topic
- The present simple and present continuous tenses
- To write a text that has unity

UNIT – III:

Extensive Reading

Simplified Classics from the series Great Stories in Easy English:

- A Tale of Two Cities by Charles Dickens
- Treasure Island by R.L.Stevenson

Vocabulary Builder: English in Contexts for students of Engineering and Technology'

- GRE words 75 words
- Collocations 15
- Idioms 25
- One word substitutes 25

Speaking, Listening, Intensive Reading and Grammar Practice

UNIT – IV:

- To interact with your faculty members
- To express futurity
- To write a text that has cohesion
- To make your writing clutter-free

UNIT – V:

- To represent information in a diagram
- To make notes
- To offer your advice/suggestions
- To understand and use auxiliary verbs
- To write a letter to a company

UNIT – VI:

Extensive Reading

Simplified Classics from the series *Great Stories in Easy English*

- *Tales from Shakespeare by Charles and Mary Lamb*

Vocabulary Builder: English in Contexts for students of Engineering and Technology'

- GRE words 75 words
- Idioms 25
- Words often confused 15
- Collocations 15
- One word substitutes 25
- Phrasal verbs 25

Text Books:

1. Samson, T. (2010). *Innovate with English*. Hyderabad : Foundation **Great Stories in Easy English Published by S.Chand & Company Limited:**
2. *Treasure Island* by R.L. Stevenson
3. *Tales From Shakespeare* by Charles and Mary Lamb
4. *A Tale of Two Cities* by Charles Dickens
5. *Vocabulary Builder: English in Contexts for students of Engineering and Technology*

Reference Books:

1. Comfort, J. and others (2012). *Speaking Effectively*. U.K: Cambridge University Press.
2. Murphy, Raymond. *Intermediate English Grammar*. Cambridge University Press.
3. Lewis, N.(2005). *Word Power Made Easy*.U.K: Bloomsbury.
4. McCarthy and O'Dell. F (2008). *Test Your English Vocabulary in Use: Upper – Intermediate* U.K: Cambridge University Press
5. O'Dell. F and McCarthy (2010). *English Collocations in Advanced Use*. New Delhi :Cambridge University Press
6. *Cambridge IELTS Examination Papers*. New Delhi :Cambridge University Press.
7. *TOEFL Examination Papers*.
8. *BEC Examination Papers*.
Hornby.A.S. (2010). *Oxford Advanced Learner's Dictionary*. New Delhi: Oxford University Press.

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MATHEMATICS – I
(Common to All Branches)
I Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To find the solutions of 1st and 2nd order Differential equations.
- To find the solutions of multiple integral problems using calculus and vector concepts.

Learning Outcomes:

Students will be able to

- apply 1st and 2nd order differential equations to various Engineering Problems.
- apply the techniques of partial differentiation to find maxima and minima of two variables.
- evaluate single and double integrals using various types of curves.
- apply the concepts of vector differentiation and integration to the surface and volume integrals.

UNIT – I: Linear Differential Equations of first order

Differential equations of first order – Exact – Equations reducible to Exact, Linear and Bernoulli.

Applications: Newton's law of cooling, law of natural growth and decay.

UNIT – II: Linear Differential Equations of Second and higher order

Linear differential equations of second and higher order with constant coefficients- Complete solution, Operator D, Rules for finding complementary function, Inverse operator for D, Rules for finding particular integral with Right hand side term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax} V(x)$, $x.V(x)$. Applications: LCR circuits.

UNIT – III: Partial Differentiation

Introduction - Total derivative - Chain rule - Functional dependence –Jacobian. Application: Maxima and Minima of functions of two / three variables with or without constraints

UNIT – IV: Multiple Integrals

Introduction to Curve Tracing [Cartesian and Polar Curves]. Change of order of integration, Areas by double integrals, Volumes by triple integrals.

UNIT – V: Vector Differentiation

Vector Differentiation: Gradient- Divergence- Curl - Laplacian operator

UNIT – VI: Vector Integration

Line, surface and volume integrals. Integral theorems: Greens - Stokes - Gauss Divergence Theorems (Without proof) and related problems. Applications: Work done, flux across the surface.

Text Books:

1. B.S.Grewal, Higher Engineering Mathematics : 42nd edition, Khanna Publishers,2012, New Delhi.
2. Dr. T.K.V.Iyengar, Dr. B.Krishna Gandhi, S.Ranganatham and Dr.M.V.S.S.N.Prasad, Engineering Mathematics, Volume-I : 11th edition, S. Chand Publishers, 2012, New Delhi.

Reference Books:

1. B.V.Ramana, Engineering Mathematics: 4th Edition, Tata McGraw Hill, 2009, New Delhi.
2. U.M.Swamy, A Text Book of Engineering Mathematics – I & II: 2nd Edition, Excel Books, 2011, New Delhi.
3. Erwin Kreyszig, Advanced Engineering Mathematics : 8th edition, Maitrey Printech Pvt. Ltd, 2009, Noida.

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MATHEMATICAL METHODS (Common to ECE, CSE & IT)

I Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To understand the various numerical techniques .
- To gain the knowledge of Laplace, z-transforms and their inverse transforms.

Learning Outcomes:

Students will be able to

- apply numerical techniques for solutions of Algebraic, transcendental and ordinary differential equations.
- transform ordinary function into Analytical function using Milne-Thompson Method.
- apply Laplace transforms to find the solutions of ordinary differential equations.
- apply Z–transforms to find solutions of difference equations.

UNIT – I: Algebraic and Transcendental Equations

Solution of Algebraic and Transcendental Equations- Introduction – Bisection Method – Method of False Position – Newton-Raphson Method.

UNIT – II: Interpolation

Interpolation- Introduction – Finite differences- Forward Differences –Back ward differences –Central differences – Symbolic relations – Newton formulae for interpolation – Lagranges interpolation.

UNIT – III: Numerical Solutions Of Ordinary Differential Equations

Solution by Taylors series – Euler and Modified Euler method – Picard method - 4th order Runge-Kutta methods - Predictor and corrector method.

UNIT- IV: Introduction To Complex Variables

Continuity – Differentiability – Analyticity – Properties- Cauchy Riemann - Equations in Cartesian and Polar coordinates. Harmonic functions and conjugates : Milne Thomson method.

UNIT – V: Laplace Transforms and Inverse Laplace Transforms

Laplace transforms of standard functions – Shifting Theorems, Transforms of derivatives and integrals – Unit step function –Dirac Delta function. Applications : Evaluation of Improper Integrals. Inverse Laplace transforms – Convolution theorem. Application: Solution of ordinary differential equations.

UNIT – VI: Z- Transforms

Z-transform – properties – Damping rule – Shifting rule – Initial and final value theorems -Inverse z- transform using Partial fractions, Convolution theorem.

Application: Solution of Difference equations by Z-transforms.

Text Books:

1. B.S.Grewal, Higher Engineering Mathematics : 42nd edition, Khanna Publishers,2012 , New Delhi .
2. Ravindranath. V, and Vijayalaxmi. A. : 2nd edition, A Text Book on Mathematical Methods, Himalaya Publishing House, Bombay.

Reference Books:

1. Dr. T.K.V.Iyengar, Dr. B.Krishna Gandhi, S.Ranganatham and Dr.M.V.S.S.N.Prasad, Mathematical Methods :6th edition, S. Chand Publications, 2011, New Delhi.
2. B.V.Ramana, Engineering Mathematics : 4th Edition, Tata McGraw Hill, 2009, New Delhi.
3. Erwin Kreyszig, Advanced Engineering Mathematics : 8th edition, Maitrey Printech Pvt. Ltd, 2009, Noida.

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ENGINEERING CHEMISTRY (Common to ECE, CSE & IT)

I Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To impart the knowledge of chemical and solar energy.
- To familiarize with various types of polymers, fuels and lubricants and their applications in engineering.

Learning Outcomes:

Students will be able to

- apply various methods of water treatment.
- understand the applications of chemical and solar energy in various engineering aspects.
- apply various chemical methods to prevent corrosion of metals.
- understand the process to prepare synthetic polymers used for various applications.
- know the characteristic features of lubricants and their applications.
- understand the need of green synthesis.

UNIT – I: Water and Its Treatment

Introduction, Hardness of water, types of hardness, Degree of hardness, Determination of hardness by EDTA Method, Numerical Problems on hardness of water by EDTA method. Softening of hard water by Permutit and Ion Exchange Processes, Treatment of brackish water by reverse osmosis, Potable Water, General Outline of municipal water treatment (Sedimentation, Filtration and chlorination).

UNIT – II: Energy Sources

Chemical Sources of Energy: Galvanic Cell - Single electrode potential – Electrochemical series-Problems on electrode potential using Nernst equation - Hydrogen and Calomel reference electrodes and measurement of pH by glass electrode – Leclanche cell, Lead - Acid accumulator, Hydrogen-Oxygen fuel cell and Methanol Fuel cell.

Solar Energy: Introduction–Harnessing of solar energy – Applications of solar energy - Photovoltaic cells-Solar reflectors (Parabolic trough, Solar dish and Solar tower) and Solar water heater.

UNIT – III: Corrosion and Its Prevention

Dry & wet corrosion – Mechanism – Pilling and Bedworth Rule - Factors influencing the rate of corrosion (Temperature, pH, Humidity of environment and position of metal in Galvanic series) - Types of Corrosion (galvanic corrosion, concentration

cell corrosion, pitting corrosion and stress corrosion) - Sacrificial Anodic method, Impressed voltage method – Metallic coatings (galvanization and tinning methods).

UNIT – IV: Polymers

Definitions of Polymer and Polymerization, Degree of polymerization and Functionality - Classification of polymers, Types of Polymerisation– Addition, Condensation and Co-polymerizations –Plastics – Thermoplastics – Thermosetting plastics, - Biodegradable polymers (PHBV & PHA). Preparation, properties and uses of poly styrene, PVC, PTFE, Bakelite, Buna-S rubber, Buna-N rubber, Thiokol rubber.

UNIT – V: Fuels & Lubricants

Fuels: Classification of fuels, calorific value, LCV & HCV and determination of calorific value of a solid fuel using Bomb calorimeter, Problems based on calorific values, Fischer-Tropsch Method and Bergius Method for preparation of Synthetic Petrol.

Lubricants: Definition and explanation of Lubrication-Types of Lubricants-Definition and significance of Viscosity, Flash and Fire Point, Pour and Cloud Point, Aniline point of a lubricant. - Engineering applications of lubricants.

UNIT – VI: Green Chemistry

Introduction- Principles of Green Chemistry, Methods of Green synthesis (aqueous phase, supercritical fluid extraction, green solvents and microwave induced methods), IWM (Integrated Waste Management), ZWT (Zero Waste Technology) Engineering Applications.

Text Books:

1. Text book of Engineering Chemistry by Jain & Jain. Dhanpat Rai Publishing Company.
2. Text book of Engineering Chemistry-II by Srinivasulu Doddaga, Ashima Srivastava, Roliverma. Parshva Publication.
3. Engineering Chemistry by Dr. Bharathi Kumari Yalamanchili, VGS Publication.

Reference Books:

1. A Text book of Engineering Chemistry by S.S.Dara. S.Chand&Company Ltd.
2. Engineering Chemistry by J.C.Kuriscose and J.Rajaram. Tata Mc Graw-Hill Publishing
3. A Text book of Engineering Chemistry by Balaram Pani. Galgotia Publications
4. A Text book of Engineering Chemistry by Shashi Chawla. Dhanpat Rai Publications
5. Industrial Chemistry by O.P.Veeramani and A.K.Narula. Galgotia Publications
6. Text book of Engineering Chemistry by Jain & Jain. Dhanpat Rai Publishing Company.

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INTRODUCTION TO COMPUTERS

I Year – I Semester

Lecture : 3 + 1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To familiarize with physical components of a computer.
- To expose to the working of various input and output devices.
- To introduce the concepts of storage devices and their functionalities.
- To expose to different operating systems.

Learning Outcomes:

Students will be able to

- describe various Input and output devices and their functionalities.
- draw the computer block diagram and identify the hardware components.
- describe different Storage/Memory devices and their functionalities.
- distinguish different operating systems and file system formats.
- demonstrate various types of networks.
- distinguish various printing devices.

UNIT – I: Introduction to Computers

The parts of a computer system: Hardware, software, users, data, looking into the machine: the processor, memory, input and output devices

UNIT – II: Input Devices

keyboard, mouse, variants of the mouse, Alternative input devices: devices for the hand- pens, touch screens, game controllers, optical input devices- bar code readers, image scanners and optical character recognition, audiovisual input devices- microphones and speech recognition, video input, digital cameras

UNIT – III: Output Devices

Monitors and sound systems: monitors-CRT monitors, Flat-panel monitors, the video controller, digital light projectors, sound systems, Devices that output hard copy: overview of printers, dot matrix printers, ink jet printers, laser printers, other high quality printers.

UNIT – IV: Transforming Data into Information

How computers represent data, how computers process data, factors effecting processing speed, Types of storage devices: magnetic disk, floppy disk, hard disk, tape drives, pc cards and optical storage devices

UNIT – V: Operating System and Use Interface

The operating system and user interface Operating system basis: running programs, managing files, managing hardware PC operating systems: UNIX, DOS, the Macintosh operating systems, windows NT, 2000, XP,.NET,3.X, OS/2 Warp, Linux, embedded operating systems

UNIT – VI: Networking Basics

Users of a network, types of networks, Internet basics: TCP/IP, major features of internet: WWW, E-mail, Telnet, FTP and IRC

Text Books:

1. Introduction to Computers by Peter Nortans, Fourth Edition

Reference Books:

1. Introduction to computers, SHELLY CASHMAN SERIES, Eight Edition.

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PROBLEM SOLVING USING C (Common to EEE, ECE, CSE & IT)

I Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To introduce the steps of problem solving.
- To emphasize the role of logical flow charts and pseudo code in problem solving on computers.
- To impart skills for solving problems using C.

Learning Outcomes:

Students will be able to

- develop logical flow charts for solving problems.
- develop pseudo code for solving problems.
- solve simple to moderate problems on computer using C.
- self-learn advanced features of C.
- self-learn for solving complex problems on computers.

UNIT – I: Problem Solving Steps

Understanding problem, Formulating a mathematical model, Solving the mathematical model, Developing algorithm, Representing algorithm as pseudo code or logical flow chart, Coding, Testing and Debugging.

General form of a C program, C Tokens – Constants, Identifiers, Operators, Punctuation and Keywords.

Basic data types, Data modifiers, Variable declaration statement, Console I/O statements, Assignment statement and Order of evaluation. Simple problems such as evaluating formulae.

UNIT – II: Control Statements

Selection Statements –if-else, nested if, switch, nested switch and ? Operator; Control Statements – For loop, while loop and do while loop; Jump Statements – return, goto, break, exit() and continue.

Problem Solving – Exchanging the values of two variables, Summation of a set of numbers, Factorial Computation, Sine function computation, Generation of Fibonacci sequence, reversing digits of an integer, Base conversion and Character to number conversion, LCM and GCD computation, Generating prime numbers, Computing prime factors of an integer, Raising a number to a large power, Computing the n^{th} Fibonacci number.

UNIT – III: Arrays

Declaring, initializing and accessing of one dimensional and two dimensional arrays and strings; and multidimensional arrays.

Problem Solving – Computing mean, range and variance of a set of numbers, Array order reversal, Histogramming, Removal of duplicates from an ordered array, Partitioning an array, Finding k^{th} smallest element and Longest monotone subsequence.

UNIT – IV: Pointers and functions

Pointers – Variables, Operators, Expressions and Multiple indirection. Functions – General form of functions, Passing parameters by value and Passing parameters by address, Dynamic memory allocation functions, Pointers and arrays, Pointers and functions, recursive functions and String handling functions, Problem solving using functions.

UNIT – V: Structures and Unions

Structures -Definition, declaration, initialization of structures, accessing structure members, nested structures, arrays of structures, array within structures, structures and functions. Unions - Bit-Fields and enumerations; Problem solving using structures, unions, Bit-fields and enumerations.

UNIT – VI: Files

File Handling- Text and binary files, commonly used C file system functions, File Processing Operations – inserting, deleting, searching and updating a record and displaying file contents. Random access files. Problem solving – Billing at Checkout counter of a supermarket, Preparing consolidated attendance / marks statements, and Performing banking operations.

Text Books:

1. R G Dromey, How to Solve it by Computer, Prentice-Hall of India, 1999.
2. Jeri R Hanly and Elliot B Koffman, Problem Solving and Program Design in C, Seventh Edition, Pearson, 2014.
3. Herbert Schildt, C: The Complete Reference, Tata McGraw-Hill, 2008.

Reference Books:

1. C Programming, E Balaguruswamy, 3rd edition, TMH.
2. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE.
3. Programming in C, Second Edition Pradip Dey and Manas Ghosh, OXFORD Higher Education.

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PROFESSIONAL COMMUNICATION LAB - I
(Common to All Branches)
I Year – I Semester

Practical	: 3	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- To strengthen the oral communication skills of the learners for communicative functions;
- To hone their pronunciation;
- To build confidence in them to communicate effectively in English.

Learning Outcomes:

Students will be able to

- enhance their basic communication skills to interact with people around them;
- shed their inhibition and take part in different speaking activities;
- respond in several contexts using the expressions they will have learned;
- speak English with reasonably good pronunciation.

UNIT – I:

- Greeting others
- Taking leave
- Introducing
- Identifying and pronouncing vowel sounds

UNIT – II:

- Asking for information
- Giving information
- Identifying and pronouncing diphthongs

UNIT – III:

- Inviting
- Accepting and declining invitations
- Identifying and pronouncing consonants

UNIT – IV:

- Giving commands or instructions
- Requesting
- Using accent on the appropriate syllable
- Speak rhythmically

UNIT – V:

- Giving suggestions
- Expressing opinions
- Using different tones in connected speech

Text Books:

1. Strengthen your communications skills by Maruthi Publications

Reference Books:

1. Strengthen your steps by Maruthi Publications
2. Speak well by Orient Blackswan.
3. Jones, D. English Pronunciation Dictionary.

ENGINEERING CHEMISTRY LAB
(Common to ECE, CSE & IT)
I Year – I Semester

Practical	: 3	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- To practice the titrations of chemical analysis for determining the quality of water.
- To know the preparation of Bakelite.

Learning Outcomes:

Students will be able to

- apply various titrations required for water quality analysis.
- understand the preparation of resin.

List of Experiments

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.

1. Practice experiment-Determination of the amount of HCl using standard Na_2CO_3 .
2. Determination of alkalinity of water sample.
3. Determination of acidity of water sample.
4. Determination of Ferrous iron by permanganometric method.
5. Determination of Ferric Iron using standard $\text{K}_2\text{Cr}_2\text{O}_7$ solution.
6. Determination of Total hardness of the water sample by EDTA method.
7. pH metric titrations - Determination of concentration of HCl using glass electrode.
8. Determination of pH of the water sample by using pH meter.
9. Determination of conductivity of the water sample by using conductivity meter.
10. Conductometric titrations between strong acid and strong base
11. Determination of turbidity of the water sample by using turbidity meter.
12. Estimation of total dissolved salts in water sample.
13. Preparation of Phenol - Formaldehyde resin.

Lab Manual:

1. Engineering chemistry laboratory manual & record By Srinivasulu. D Parshva publications.
2. Engineering Chemistry Lab Manual by Dr. K.Anji Reddy. Tulip publication.
3. Engineering Chemistry Lab Manual by Dr. Jyotsna Cherukuri. V.G.S publication.
4. K.Mukkanti (2009) Practical Engineering Chemistry, B.S. Publication.

PROGRAMMING LAB
(Common to EEE, ECE, CSE & IT)
I Year – I Semester

Practical	: 3	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- To familiarize with the discrete components of computers and networking components.
- To familiarize with usage of MS Office Tools.
- To provide the practice of solving problems on computer using C.

Learning Outcomes:

Students will be able to

- identify discrete components of computers and networking components and describe their functions.
- employ MS Office Tools for documentation and presentations and making computations.
- use computer for solving problems.

Part- A

Exercise - 1: IT Workshop

- a) Identifying the discrete components of a computer and networking components
- b) Demonstration of assembling a computer
- c) Demonstrating installation of OS and applications

Exercise - 2: IT Workshop

- a) Creating a document using MS Word
- b) Creating a document using LaTeX

Exercise - 3: IT Workshop

- a) Familiarizing with the usage and applications of MS Excel Using Excel.
- b) Creating a presentation using MS Power point.

Exercise - 4: IT Workshop

Familiarizing with the Integrated Development Environment (IDE) for developing C programs

Part – B

Exercise - 5: Write a C program for the following

- a) Calculate the area of triangle using the formula $area = (s(s-a)(s-b)(s-c))^{1/2}$ where $s = (a+b+c)/2$
- b) Find the largest of three numbers using ternary operator.
- c) Find the roots of a quadratic equation.

Exercise - 6: Develop a C program for the following

- a) Read two integer operands and one operator from the user, perform the operation and then print the result. (Consider the operators +, -, *, /, % and use Switch Statement)
- b) Check whether given number is Prime (or) not
- c) Display first N natural numbers.
- d) Calculate electricity bill for the consumed units – assume suitable constraints.
- e) Find the sum of individual digits of a positive integer and find the reverse of the given number.

Exercise - 7: Design a C program for the following

- a) Find the largest and smallest numbers in the array.
- b) Search whether the given element is in the array.
- c) Perform Addition, subtraction and multiplication of Matrices
- d) Delete n Characters from a given position in a given string.
- e) Illustrate at least five string handling functions.

Exercise - 8: Implement a C program for the following

- a) Calculate mean, standard deviation and variance for a given set of values using functions
- b) Sort a given set of numbers in ascending order using functions
- c) Both recursive and non-recursive functions for the following
 - i) To find the factorial of a given integer.
 - ii) To find the GCD (greatest common divisor) of two given integers.
 - iii) To generate Fibonacci sequence.

Exercise - 9: Prepare a C program for the following

- a) To implement a structure to read and display the Name, date of Birth and salary of ten Employees.
- b) To display the Name, Marks in five subjects and total marks of given number of students. (Using array of structures).
- c) Functions to perform the following operations using Structure:
 - i) Reading a complex number
 - ii) Writing a complex number
 - iii) Addition of two complex numbers
 - iv) Multiplication of two complex numbers

Exercise - 10: Develop C program for the following

- a) Function to exchange (Swap) values of two integers using call by reference.
- b) Illustrate the usage of dynamic memory management functions.
- c) Develop a program to operations on a file.
- d) To copy contents of one file to another.
- e) To count the number of characters, words and lines in a file.

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PROFESSIONAL COMMUNICATION - II (Common to All Branches)

I Year – II Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To equip students for their present and future academic pursuits: to understand classroom lectures, read textbooks, do reference reading, participate in classroom discussions, and write assignments and examination answers.
- To develop in them the communication skills and social graces necessary for functioning effectively in the social and other situations in which they may be called upon to use English.
- To prepare them to secure employment and to function successfully in their career.

Learning Outcomes:

Students will be able to:

- Produce and process language for academic, professional and social life.
- Produce coherent spoken and written discourse of various kinds with attention to appropriate strategies and conventions of writing.
- To take part in job interviews with confidence and competence.

Speaking, Listening, Intensive Reading and Grammar Practice

UNIT – I:

- To make effective telephone conversations
- To use the modal auxiliaries *can* and *could*
- To write persuasive letters
- To write a winning resume

UNIT – II:

- To effectively participate in an informal meeting
- To use articles and other determiners
- To get some practice in composing professional emails
- To plan a professional presentation

UNIT – III:

Extensive Reading

Simplified Classics from the series Great Stories in Easy English:

- *Oliver Twist* by Charles Dickens
- *Robinson Crusoe* by Daniel Defoe

Vocabulary

'Vocabulary Builder: English in Contexts for students of Engineering and Technology'

- GRE words 75 words
- Idioms 25
- Words often confused 15
- Collocations 15
- One word substitutes 25
- Phrasal verbs 25

Speaking, Listening, Intensive Reading and Grammar Practice

UNIT – IV:

- To effectively participate in an informal meeting
- To use passive voice
- To identify the structure of reader-oriented technical reports

UNIT – V:

- To use prepositions
- To use visual aids in a presentation

UNIT – VI:

Extensive Reading

Simplified Classics from the series Great Stories in Easy English:

- *Round the World in Eighty Days* by Jules Verne

Vocabulary

'Vocabulary Builder: English in Contexts for students of Engineering and Technology'

- GRE words 75 words
- Idioms 25
- Words often confused 15
- Collocations 15
- One word substitutes 25
- Phrasal verbs 25

Text Books:

1. Samson, T. (2010). *Innovate with English*. Hyderabad : Foundation

Great Stories in Easy English Published by S.Chand & Company Limited:

1. *Oliver Twist* by Charles Dickens
2. *Robinson Crusoe* by Daniel Defoe
3. *Round the World in Eighty Days* by Jules Verne
4. *Vocabulary Builder : English in Contexts for Students of Engineering and Technology*

Reference Books:

1. Comfort, J. and others (2012). *Speaking Effectively*. U.K: Cambridge University Press.
2. Murphy, Raymond. *Intermediate English Grammar*. Cambridge University Press.
3. Lewis, N.(2005). *Word Power Made Easy*.U.K: Bloomsbury.
4. McCarthy and O'Dell. F (2008). *Test Your English Vocabulary in Use: Advanced* U.K: Cambridge University Press.
5. O'Dell. F and McCarthy (2010). *English Collocations in Advanced Use*. New Delhi: Cambridge University Press
6. Cambridge IELTS Examination Papers. New Delhi :Cambridge University Press.
7. TOEFL Examination Papers.
8. BEC Examination Papers.
9. Hornby.A.S. (2010). *Oxford Advanced Learner's Dictionary*. New Delhi: Oxford University Press.

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MATHEMATICS - II
(Common to All Branches)
I Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To determine the eigenvalues and eigenvectors.
- To understand the concepts of Fourier Series and Fourier Transforms.
- To solve partial differential equations of 1st and 2nd order.

Learning Outcomes:

Students will be able to

- use the concepts of eigenvalues and eigenvectors in Engineering problems.
- apply to transform a function into Fourier Series and Fourier Integral form.
- apply 1st and 2nd order partial differential equations to Engineering Problems.

UNIT – I: Matrices

Rank of Matrix- Echelon form, Normal form – System of Linear equations – Consistency-Gauss elimination Method. Applications to electrical circuits [Finding the current in an electric circuit].

UNIT – II: Eigenvalues & Eigenvectors

Eigenvalues - Eigenvectors – Properties – Cayley Hamilton Theorem (without proof) - Inverse and powers of a matrix using Cayley Hamilton theorem, Quadratic forms- Reduction of quadratic form to canonical form by Orthogonal Transformation– Rank - index – signature. Applications: Free vibration of a two mass system.

UNIT – III: Fourier Series

Fourier series: Determination of Fourier coefficients (without proof) – Fourier series – even and odd functions – Fourier series in an arbitrary interval– Half-range sine and cosine series.

UNIT – IV: Fourier Transforms

Fourier integral theorem (only statement) – Fourier transform – sine and cosine transforms – properties – inverse Fourier transforms – Finite Fourier transforms.

UNIT – V: 1st order Partial Differential equations

Formation of partial differential equations by eliminating arbitrary functions – solutions of quasi linear equations using Lagrange’s method, solutions of non-linear equations by 4 standard forms and Charpit’s method.

UNIT – VI: 2nd order Partial Differential equations

Method of Separation of Variables. One dimensional Heat, Wave and Laplace equations.

Text Books:

1. B.S.Grewal, Higher Engineering Mathematics : 42nd edition, Khanna Publishers,2012 , New Delhi.
2. Dr. T.K.V.Iyengar, Dr. B.Krishna Gandhi, S.Ranganatham and Dr.M.V.S.S.N.Prasad, Engineering Mathematics – II : 6th edition, S.Chand Publications, 2012, New Delhi.

Reference Books:

1. B.V.Ramana, Mathematical Methods: 4th Edition, Tata McGraw Hill, 2009,New Delhi.
2. Ravindranath, V. and Vijayalaxmi, A. : 2nd edition, A Text Book on Mathematical Methods, Himalaya Publishing House,2012, Bombay.
3. Dean G. Duffy, Advanced engineering mathematics with MatLab, CRC Press
4. Erwin Kreyszig, Advanced Engineering Mathematics:8th edition,Maitrey Printech Pvt. Ltd, 2009, Noida.

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ENGINEERING PHYSICS (Common to ECE, CSE & IT)

I Year – II Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To understand principles of solid state materials for use in the engineering applications.

Learning Outcomes:

Students will be able to

- apply the principles of light for optical communication.
- Identify the appropriate solid state materials for engineering applications.
- apply Quantum mechanics to study the behavior of a particle.

UNIT – I: Wave Optics

Interference: Introduction – Interference in thin films by reflection – Newton's rings.

Diffraction: Introduction – Fraunhofer diffraction - Fraunhofer diffraction at single slit– Diffraction grating – Resolving power of a grating

Polarization: Introduction – Types of Polarization – Double refraction – Quarter wave plate and Half Wave plate.

UNIT – II: Lasers & Fiber Optics

Lasers: Introduction – coherent sources – Characteristics of lasers – Spontaneous and Stimulated emission of radiation – Einstein's coefficients– Population inversion – Helium Neon laser – Co₂ laser – semi conductor lasers.

Fiber Optics : Introduction, Principle of Optical Fiber - Total Internal Reflection, Conditions for Light to Propagate - Numerical Aperture and Acceptance Angle, Optical Fiber Construction, Types of Optical Fibers - Step Index Fibers and Graded Index Fibers, Advantages of Optical Fibers in Communications.

UNIT – III: Introductory Solid State Physics

Crystal Structure: Introduction, Basic Terms - Lattice, Basis, Crystal Structure, Coordination Number, Atomic Radius, Packing Fraction, Free Volume, Lattice Parameters, Unit Cell and Primitive Cell, Crystal Systems and Bravais Lattices, Structure and Packing Fractions of Simple Cubic, Body Centered Cubic and Face Centered Cubic Crystal Structures.

X-Ray Diffraction: Crystal Planes, Directions and Miller Indices, Distance of Separation between successive hkl Planes – Inter Planar Spacing, Diffraction of X-Rays by Crystal Planes – Bragg's Law

UNIT – IV: Essentials Of Materials Science

Magnetic Properties: Magnetic permeability – Magnetization – Origin or magnetic moment – Classification of Magnetic materials – Dir, para, Ferro, Hysteresis curve.

Dielectric Properties: Introduction – Dielectric constant – Electronic, ionic and orientational polarization – internal fields – Clausius –Mossotti equation

Superconductivity: General properties – Meissner effect – Type I and Type II superconductors – BCS Theory – Penetration depth – DC and AC Josephson effects (Qualitative). Applications of Super conductors.

UNIT – V: Semiconductor

Introduction – Intrinsic semiconductor and carrier concentration – Equation for conductivity – Extrinsic semiconductor and carrier concentration – Drift and diffusion – Einstein s equation – Hall Effect – direct & indirect band gap semiconductors

UNIT – VI: Preliminary Quantum Mechanics & Solid State Physics

Preliminary Quantum Mechanics:

Introduction to matter waves – Schrodinger Time Independent and Time Dependent wave equations – Particle in a box.

Free Electron Theory and Band Theory (Solid State Physics):

Classical free electron theory – electrical conductivity – Fermi energy (Qualitative) -Quantum free electron theory – Bloch theorem (qualitative) – Kronig – Penney model.

Text Books:

1. Engineering Physics by Mani Naidu, Pearson Publications Chennai
2. A text book of Engineering Physics by M.N. Avadhanulu & P.G.Kshirasagar (S. Chand publications).
3. Engineering Physics by Gaur and Gupta.
4. Optics – 5th Edition – Ghatak (TMH Publications)

Reference Books:

1. Solid state Physics by A.J. Dekker (Mc Millan India Ltd)
2. Engineering Physics b;y M.R. Srinivasan (New Age international publishers)
3. Fundamental of Physics by Resnick, Halliday and Walker.

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ENVIRONMENTAL STUDIES (Common to ECE, CSE & IT)

I Year – II Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To know the multidisciplinary nature of Environment.
- To understand various measures of improvement & protection of Environment.

Learning Outcomes:

Students will be able to

- apply various mitigation measures to minimize environmental pollution.
- know the principles of Ecosystem.
- understand the various stages of Environmental Impact Assessment (EIA).

UNIT – I: Ecology & Environment

Multidisciplinary Nature of Environmental Studies:

Definition, Scope, Importance and public awareness of Environmental Studies - Concept of an Ecosystem – Components of an Ecosystem – Food Chain, Food Web, Ecological Pyramids – Energy flow – Bio-Geochemical Cycles – Ecological Succession – Major Types of Ecosystems – Forest, Grassland, Desert Land & aquatic Ecosystem.

UNIT – II: Natural Resource: Classification and status

Water Resources: Used and over utilization of surface & ground water – Conflicts over water – Big dams, Benefits and problems.

Land Resource: Land as a resource, Soil Erosion, Sources of Land degradation, Soil conservation practices – case studies.

Forest Resources: Use and over – Exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people – Case Studies related to deforestation.

Food & Fodder Resources: World food problems, changes caused by agriculture and overgrazing – effects of modern agriculture – fertilizer, pesticide related problems, water logging, Eutrophication, super pest, salinity, organic farming – Case studies.

Mineral Resources: Use and exploitation problems, environmental effects of extracting and using mineral resources – Case studies.

Energy Resources

UNIT – III: Biodiversity and its conservation

Introduction, Definition – genetic and ecosystem diversity – Biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, Aesthetic, option values and ecosystem service values – India as a mega diversity nation – Threats to biodiversity: habitat loss, poaching of wild life – man, wild life conflicts – Endangered and endemic species of India – conservation of biodiversity: In – situ and Ex-situ conservation of biodiversity.

UNIT – IV: Environmental pollution

Definition, cause, effects and control measures of

- a) Air pollution
- b) Water pollution
- c) Noise pollution
- d) Soil pollution
- e) Environmental Impact Assessment (EIA) – Definition, Significance & Classification.

UNIT – V: Waste Management

Industrial solid waste – Municipal solid waste – Industrial waste waters – Solid waste – Biomedical waste – hazardous waste – e-waste – Green building – Green Development Mechanism – Carbon Credits – Carbon Trading.

UNIT – VI: Social Issues and Environment

Climate change: Global warming, Acid rains, Ozone layer depletion – case studies. Sustainable development and unsustainability–Rain water harvesting, watershed management, water conservation–Environmental Ethics–environmental Law (Air, Water, Wild life, forest, Environmental protection act)

Text Books:

1. Environmental studies: Anubha Kaushik, C.P. Kaushik: New Age International Publishers
2. Society and Environment: Dr. Suresh K. Dhameja: S.K. Kataria and Sons
3. Environmental Studies: Benny Joseph: Tata Mc Graw-Hill Publishing Company Limited.

Reference Books:

1. A text of Environmental Studies: Shashi chawala: Tata Mc graw Hill Education Private Limited.
2. Environmental Science & Engineering: P. Anandan, R. Kumaravelan, Scitech Publications (India) Pvt. Ltd.
3. Environmental Studies by R. Rajagopalan 2nd Edition 2011, Oxford University Press
4. Environmental Studies by Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.

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ENGINEERING DRAWING

(Common to CSE & IT)

I Year – II Semester

Lecture : 1 + 3

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To highlight the significance of universal language of engineers.
- To visualize and represent the 3-D objects in 2-D planes and pictorial views. with proper dimensioning and scaling.

Learning Outcomes:

Students will be able to

- apply principles of drawing in representing dimensions of an object.
- construct polygons, scales and curves.
- draw projections of points, lines and planes.
- draw projections of solids in different positions.
- convert orthographic views into isometric views and vice-versa.

UNIT – I: Introduction

Geometrical Construction,

Conic Sections: Ellipse, parabola, hyperbola – general method.

Scales: Plane, Vernier and Diagonal Scales.

UNIT – II: Orthographic Projections

Introduction to Orthographic Projections; Projections of Points; Projections of Straight Lines parallel to both planes; Projections of Straight Lines-Parallel to one and inclined to other plane.

UNIT – III: Projections of Straight Lines

Projections of Straight Lines inclined to both planes, determination of true lengths, angle of inclinations and traces.

UNIT – IV: Projections of Planes

Regular Planes Perpendicular / Parallel to one Reference Plane and inclined to other Reference Plane; inclined to both the Reference Planes.

UNIT – V: Projections of Solids

Prisms, Cylinders, Pyramids and Cones with the axis inclined to one Plane.

UNIT – VI: Transformation of Projections

Conversion of Isometric Views to Orthographic Views and Orthographic to Isometric Views.

Semester End Examination Pattern:

Semester end examination paper consists of eight questions out of which five questions are to be answered. All questions carry equal marks.

Text Books:

1. Engineering Drawing by N.D. Bhatt, Chariot Publications.
2. Engineering Drawing by K. Venugopal, V. Prabhu Raja, G. Sreekanjana, New Age International Publishers.

Reference Books:

1. Engineering Drawing by M.B. Shah and B.C. Rana, Pearson Publishers.
2. Engineering Drawing by Dhananjay A. Jolhe, Tata McGraw Hill Publishers.
3. Engineering Graphics for Degree by K.C. John, PHI Publishers.

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DATA STRUCTURES

(Common to ECE & IT)

I Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To introduce the concepts of linear and non-linear data structures.
- To choose appropriate data and storage structures for solving problems.
- To impart the concepts of searching and sorting.

Learning Outcomes:

Students will be able to

- represent linear and nonlinear data structures using arrays and linked lists.
- perform insertion, deletion, searching, updating and traversal operation on linear and non-linear data structures.
- implement searching and internal sorting techniques on data sets.
- choose appropriate data and storage structures for solving problems.

UNIT – I: Concepts of Data Structures

Concepts of data structures, storage structures and file structures; Primitive data structures; Non-primitive data structures- Linear and Non-linear; Operations on data structures –Create, Insert, Delete, Search, Update and Traverse; Abstract Data Type (ADT)

Linear List – ADT, array representation and performing operations, linked list representation and performing operations, circular lists and doubly linked lists. Application of linear lists for performing operations on polynomials

UNIT – II: Stacks

Stacks –ADT, array representation and performing operations, linked representation and performing operations, conversion of infix expression into postfix expression, evaluation of postfix expression.

UNIT – III: Queues

Queues – ADT, array representation and performing operations, linked list representation and performing operations, circular queues and dequeues.

UNIT – IV: Binary Trees - Properties

Binary Trees- Properties, ADT, linked representation and performing operations; Binary search trees- Properties, ADT, linked representation and performing operations ;Heap – Properties, ADT, array representation and performing operations, linked list representation and performing operations ; Applications - Expression trees, Priority queues and Histogramming.

UNIT – V: Internal Searching & Sorting

internal searching- Linear and binary Search methods

Internal sorting – Selection, insertion, bubble, quick, radix, merge and heap sorting methods

Introduction to external searching and sorting

UNIT – VI: Basic Concepts of Graphs

Graphs – Basic concepts, ADT, Representations of graphs – adjacency matrix and adjacency list, Graph traversals – Breadth First Search (BFS) and Depth First Search (DFS), Graph algorithms – Dijkstra's Prim's and Kruskal's algorithms.

Text Books:

1. Richard F. Gilberg and Behrouz A. Forouzan, Data Structures: A Pseudocode Approach with C, Cengage Learning (India Edition), 2005.
2. Sartaj Sahni, Data Structures, Algorithms and applications in C++, Second Edition, University Press, 2005.
3. Debasis Samanta, Classic Data structures, Second Edition, PHI, 2011.

Reference Books:

1. Jean-Paul Trembaly and Pau G Sorenson, An introduction to Data structures with Applications, Tata McGraw Hill, 2003.
2. Data Structures and Algorithms, 2008, G.A.V.Pai, TMH.
3. Data Structure with C, Seymour Lipschutz, TMH.

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PROFESSIONAL COMMUNICATION LAB – II (Common to All Branches)

I Year – II Semester

Practical : 3

Internal Marks : 25

Credits : 2

External Marks : 50

Course Objectives:

- To strengthen the oral communication skills of the learners for communicative functions at an advanced level;
- To train them in handling complex communication situation;
- To give them adequate practice for communication in professional situations like group discussions, presentations and interviews.

Learning Outcomes:

Student will be able to:

- enhance their oral communication skills to perform communicative functions;
- speak confidently in public and handle complex communication situation;
- face job interviews with confidence and competence.

UNIT – I:

- Body Language
- Know how body language is used in communication
- Interpret non-verbal symbols

UNIT – II:

- Dialogues
- Starting a conversation
- Useful functions
- Telephone Etiquette
- Making a small talk

UNIT – III:

- Presentation Skills
- Present information with confidence, clarity and conviction
- Use the language of presentations
- Evaluate presentations

UNIT – IV:

- Group Discussion
- Participate in a group discussion
- Expressing ideas logically
- Using appropriate language in group discussions

UNIT – V:

- Become aware of various types of interviews
- Be able to participate in interviews confidently

UNIT – VI:

- Debates
- Able to argue for or against something
- Able to participate in debates

Text Books:

1. Strengthen your communications skills by Maruthi Publications

Reference Books:

1. Strengthen your steps by Maruthi Publications
2. Speak well by Orient Blackswan.
3. Patnaik., Group Discussion and Interview Skills. by Foundation.

ENGINEERING PHYSICS LAB (Common to ECE, CSE & IT)

I Year – II Semester

Practical : 3

Internal Marks : 25

Credits : 2

External Marks : 50

Course Objectives:

- To understand Active and Passive Electronic Components.
- To measure magnetic field along the axis of circular coil.
- To learn waves and oscillations.
- To explore the nature of light.

Learning Outcomes:

Students will be able to

- calculate the time constant of RC circuit & Predict resonance frequency of LCR circuit.
- verify magnetic field along the axis of a circular coil.
- observe the regulatory nature of Zener diode & Identify energy gap of semiconductor.
- estimate rigidity modulus of a given wire.
- determine radius of curvature of a given Plano convex lens.

S.N.	Name of the experiment- Aim
	<u>Electromagnetism and Electronics</u>
1	Study the variation of Magnetic field along the axis of a Solenoid coil using Stewart-Gee's Apparatus.
2	Draw the frequency response curves of LCR Series and Parallel circuits
3	Determine the time constant for a CR Circuit
4	Determine the Band Gap of a semiconductor using a PN junction diode.
5	Study of characteristic curves (I/V) of a Zener diode to determine its breakdown voltage.
6	Determine the rigidity modulus of given wire
7	Determine the radius of curvature of given planoconvex lens
8	Determine the thickness of thin objects by optical wedge method
9	Determine the velocity of sound in air by using volume resonator
10	Determine the wave length of Y1 and Y2 lines by diffraction grating normal incidence

Reference Books:

(lab manuals, equipment user manuals, text books, data books, code books, etc.)

1. College lab manuals
2. Practical Physics for engineering students by Vijay Kumar & T. Radha Krishna.
3. Lab manual of Engineering Physics by Dr. Y.Aparna and Dr. K.Venkateswara Rao (VGS Books links, Vijayawada)

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DATA STRUCTURES LAB
(Common to ECE & IT)
I Year – II Semester

Practical : 3

Internal Marks : 25

Credits : 2

External Marks : 50

Course Objectives:

- To Familiarize with the implementation of linear and non-linear data structures.
- To Familiarize with choosing appropriate data and file structures for solving problems and implementing the same.

Learning Outcomes:

Students will be able to

- implement the basic operations of linear and non-linear data structures in C.
- apply the appropriate data and storage structures for solving problems.
- implement internal searching and sorting techniques on Data sets.

Exercise - I:

- a) Write a C program that uses functions to
 - (i) create a singly linked list
 - (ii) Insert an element into a singly linked list
 - (iii) delete an element from a singly linked list
- b) Write a C program to reverse elements of a single linked list.
- c) Write a C program that uses functions to
 - (i) create a Doubly linked list
 - (ii) Insert an element into a Doubly linked list
 - (iii) delete an element from a Doubly linked list
- d) Write a C program that uses functions to
 - (i) create a circular linked list
 - (ii) Insert an element into a circular linked list
 - (iii) delete an element from a circular linked list

Exercise - II:

- a) Write a C programs that implement stack (its operations) using arrays
- b) Write a C programs that implement stack (its operations) using Linked list
- c) Write a C program that uses Stack operations to evaluate postfix expression
- d) Write a C program that uses Stack operations to Convert infix expression into postfix expression

Exercise - III:

- a) Write C programs that implement Queue (its operations) using arrays.
- b) Write C programs that implement Queue (its operations) using linked lists

Exercise - IV:

- a) Write a C program to create a Binary Search Tree of integers, insert, delete and search integers into (from) Binary search tree.
- b) Write a C program using recursive functions to traverse a binary tree in preorder, inorder and post order.

Exercise - V:

- a) Write C programs that use both recursive and non recursive functions to perform Linear search for a Key value in a given list.
- b) Write C programs that use both recursive and non recursive functions to perform Binary search for a Key value in a given list.
- c) Write C programs that implement following techniques to sort a given list of integers in ascending order
 - i. Insertion sort, Bubble sort
 - ii. Selection sort, Quick sort
 - iii. Merge sort, Heap sort

Exercise - VI:

- a) Write a C program to implement operations on graphs
 - i. Vertex insertion
 - ii. Vertex deletion
 - iii. Finding vertex
 - iv. Edge addition and deletion
- b) Write a C program to implement Depth First Search of a graph.
- c) Write a C program to implement Breadth First Search of a graph.

DISCRETE MATHEMATICAL STRUCTURES

(Common to CSE & IT)

II Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To comprehend the structure of statements (and arguments) involving predicates and quantifiers.
- To understand the applications of graph theory to various practical problems.
- To know how to solve a recursive problem.

Learning Outcomes:

Students will be able to

- apply the concept of Mathematical logic in software development process.
- use the concept of Pigeon hole principle to derive the $\Omega(n \log n)$ lower bound.
- apply the concepts of group theory in robotics, computer vision & computer graphics.
- use the concepts of graph theory to provide solutions for routing applications in computer networks.
- apply the recurrence relation for analyzing recursive algorithms.

UNIT – I: Mathematical Logic

Propositional Calculus- statements and notations, connectives, truth tables, tautologies, equivalence of formulas, tautological implications, normal forms, theory of inference for statement calculus, consistency of premises, concept of quantifiers.

UNIT - II: Relations & Functions

Relations- properties of binary relations, equivalence, compatibility and partial order relations, hasse diagram functions: inverse, composite and recursive functions, pigeon hole principle and its application.

UNIT - III: Algebraic Structures

Algebraic systems and examples, general properties, semi group, monoid, groups, subgroups, lattice and properties.

UNIT - IV: Graph Theory - I (Theorems without proofs)

Concepts of graphs, sub graphs, multi graphs, matrix representation of graphs: adjacency matrices, incidence matrices, isomorphic graphs, paths and circuits, Eulerian graph.

UNIT - V: Graph Theory - II(Theorems without proofs)

Hamiltonian Graph, Planar Graphs, Trees- Spanning Trees, BFS, DFS, chromatic number of a graph.

UNIT - VI: Recurrence Relation

Recurrence relations- formulation, solving linear homogeneous recurrence relations by substitution, the method of characteristic roots, solving inhomogeneous recurrence relations

Text Books:

1. J.P.Trembley, R Manohar, Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw Hill, New Delhi.
2. Mott, Kandel, Baker, Discrete Mathematics for Computer Scientists & Mathematicians, PHI, 2nd edition.
3. Rosen, Discrete Mathematics and its Application with combinatorics and graph theory, Tata McGraw Hill, New Delhi, 7th edition.

Reference Books:

1. S.Santha, Discrete Mathematics, Cengage publications.
2. J K Sharma, Discrete Mathematics, Macmillan Publications, 2nd edition.

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PROBABILITY & STATISTICS

II Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To understand the concepts of probability and statistics.
- To know sampling theory and principles of hypothesis testing.
- To appreciate Queuing theory and models.

Learning Outcomes:

Students will be able to

- use the probability in different problems.
- utilize where the certain probability distributions would be appropriate.
- calculate confidence intervals for estimating population parameters.
- apply a range of statistical tests appropriately.
- examine correlation between variables and find the relation between them.
- solve the different queuing models.

UNIT – I: Probability

Axioms of Probability – addition, conditional, multiplication and Baye's theorem. (Without Proof) Random variables- Discrete and Continuous Random Variable, Distribution functions - Evaluation of mean and variance.

UNIT – II: Standard Probability Distributions

Discrete distributions- Binomial distribution, probability-mean, variance, Poisson distribution, probability-mean, variance - fitting of Poisson distribution. Continuous distributions: normal distribution-properties – Problems.

UNIT – III: Sampling Distributions

Population and sample-types of sampling-Sampling distribution of mean - Sampling distribution of sums and differences. Point and interval estimation, Confidence Interval for mean and proportions.

UNIT – IV: Testing of Hypothesis (Large Samples)

Null hypothesis-Alternative hypothesis-level of significance-degrees of freedom. Type I and Type II errors- One tail and two tailed tests - Testing of hypothesis concerning means and proportions

UNIT – V: Testing of Hypothesis (Small Samples)

t-test, F-test and χ^2 test (independence of attributes and goodness of fit)

UNIT – VI: Correlation, Regression and Queuing Theory

Simple Correlation and regression, Queuing Theory M/M/1 model with finite and infinite Queue size and simple problems related to the evaluation of waiting time, length of the queue.

Text Books:

1. Dr. T. K. V. Iyengar, Dr. B. Krishna Gandhi, S. Ranganatham and Dr. M.V. S. S. N. Prasad, Probability and Statistics, S. Chand & Company Ltd.
2. Miller, John E. Freund, Probability and Statistics for Engineers, PHI.

Reference Books:

1. Trivedy, John Wiley, Probability, Statistics and Queuing theory applications for Comp. Sciences, 2nd edition.
2. S.C. Gupta & V.K. Kapoor, Fundamentals of Mathematical Statistics, S.Chand & Company Ltd.

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MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS (Common to CSE & IT)

II Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To learn about various types of business organizations.
- To access the demand for a particular product.
- To study the various types of cost concepts.
- To have an idea about the types of markets.
- To make the students expertise in account principles and concepts.

Learning Outcomes:

Students will be able to

- know the various factors that influence demand of particular product.
- forecast the future demand using various tools & techniques.
- take the further decisions based on the demand.
- aware of costs incurred in the production.
- alter the combination of inputs to attain the desired results.
- Access the minimum level of production that a firm should carry by using BEP.
- understand which market is suitable to introduce the product.
- ability to know various methods to determine the pricing.

UNIT – I: Introduction to Managerial Economics

Definition, Nature and Scope of Managerial Economics– Relation of Managerial Economics with other disciplines.

Demand Analysis: Demand Determinants, Law of Demand and its exceptions, Significance & Types of Elasticity of Demand. Factors governing demand forecasting- Methods of Demand forecasting.

UNIT – II: Theory of Production and Cost Analysis

Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas production function. Production function, Laws of Returns, Internal and External Economies of Scale.**Cost Analysis:** Cost concepts & BEP Analysis Break-Even Point (simple problems)

UNIT – III: Introduction to Markets & Pricing strategies

Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price & output determination under Perfect Competition

Pricing strategies: Methods of Pricing: Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization.

UNIT – IV: Introduction to Business Organizations

Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario & Phases of Business Cycle.

UNIT – V: Introduction to accountancy

Introduction to Accountancy, Types of Accounts, Ledgers, Maintenance of Ledgers & Trial Balance, Introduction to Final Accounts, Problems on Trading , Profit & Loss Account and Balance sheet, Problems with simple adjustments

UNIT – VI: Ratio Analysis & Capital Budgeting

Ratio Analysis: Introduction to financial Analysis; analysis& Interpretation of financial statements through Liquidity ratios, Profitability & Solvency ratios, turnover ratios

Capital budgeting: capital & its significance, estimation of fixed & working capital requirements, methods of raising capital, introduction to capital budgeting, traditional methods of capital budgeting & discounted cash flow methods(simple problems)

Text Books:

1. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

References:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.
3. Suma Damodaran, Managerial Economics, Oxford University Press.
4. Lipsey & Chrystel, Economics, Oxford University Press.
5. S. A. Siddiqui & A. S. Siddiqui, Managerial Economics & Financial Analysis, New age International Space Publications.
6. Domnick Salvatore: Managerial Economics in a Global Economy, 4th Edition, Thomson.
7. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI.

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BASIC ELECTRONICS

II Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To familiarize the construction, characteristics and applications of various semiconductor devices.
- To introduce various electronic circuits and their operation.

Learning Outcomes:

Students will be able to

- distinguish the behavior of PN junction diode under forward bias and reverse bias conditions.
- select appropriate semiconductor devices for different electronic circuits.
- analyze the rectifier circuits with and without filters.
- characterize the performance of BJT, FET, and MOSFETS

UNIT – I: Introduction

Passive circuit components: Resistors, capacitors, inductors, Material classification, Mobility and conductivity, Intrinsic and extrinsic semiconductor, mass-action law, Hall effect, drift and Diffusion currents.

UNIT – II: Semiconductor Diode Characteristics

Open circuited pn junction, Current components in a pn diode, Diode forward and reverse currents, The volt-ampere characteristics, Temperature dependence of V-I characteristics, Resistance, Transition capacitance, Diffusion capacitance.

UNIT – III: Special Semiconductor Devices

Breakdown diodes, Tunnel diode, Varactor diode, Photo diode, LED, UJT and SCR.

UNIT – IV: Rectifiers and Filters

Diode as a rectifier, half wave rectifier, Full wave bridge rectifiers and comparison, With inductor filter, capacitor filter, L section filter, π -section filter, comparison, Zener diode voltage regulator.

UNIT – V: Bipolar Junction Transistor

Construction of a transistor, transistor current components, Transistor configurations – CB, CE and CC, Early effect, comparison of CB, CE and CC, Transistor operating regions, typical transistor junction voltage values, Maximum voltage rating, Operating point, Transistor as a switch, Transistor as an amplifier.

UNIT – VI: Field Effect Transistor

Classification of FETs, Construction of JFET, Characteristics of FET, FET as a voltage variable resistor, Transfer Characteristics, comparison with BJT, Depletion type MOSFET, Enhancement type MOSFET.

Text Books:

1. Jacob Millman and Christos C Halkias, Electronic Devices and Circuits, 2nd Edition, TMH, 2002.
2. Robert L Boylested and Louis Nashelsky, Electronic Devices and Circuit Theory, 8th Edition, PHI, 2003.

Reference Books:

1. K.Rajarajeswari, B. Visvesvararao, K.Bhaskararamamurthy and P.Chalamraju pantulu Electronic Devices and Circuits, 2nd Edition, Pearson Education.
2. Theodore F Bogart Jr., Jeffrey S Beasley and Guillermo Rico, Electronic Devices and Circuits, 6th Edition, Pearson Education 2004.
3. David A Bell, Electronic Devices and Circuits, 4th Edition, PHI, 2003.
4. Floyd, Thomas, Electronic Devices, Pearson Education, 5th Edition.

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DIGITAL LOGIC DESIGN (Common to CSE & IT) II Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To learn minimization of logic functions.
- To familiarize with the design of digital logic circuits.

Course Outcomes:

Students will be able to

- understand various methods for representing numbers.
- minimize the logic functions using appropriate methods.
- design combinational logic circuits.
- realize the switching functions using decoders, multiplexers.
- design registers and counters.

UNIT – I: Number Systems

Binary, Octal, Decimal, Hexadecimal number systems, conversion of numbers from one radix to another radix, r 's, $(r-1)$'s complement, subtraction of unsigned numbers, signed binary numbers, weighted and non weighted codes.

UNIT – II: Logic Gates and Boolean Algebra

NOT, AND, OR, Universal Gates, Ex-Or and Ex-Nor Gates, Boolean Theorems, Complement and Dual, SOP, POS, two level realization of logic functions using universal gates, minimizations of logic functions (POS and SOP) using Boolean theorems, K-map (upto four variables), don't care conditions.

UNIT – III: Combinational Logic Circuits-1

Design of half adder, full adder, half subtractor, full subtractor, ripple adders and subtractors, ripple adder / subtractor using 1's and 2's complement method, serial adder.

UNIT – IV: Combinational Logic Circuits-2

Design of decoders, encoders, priority encoder, multiplexers, demultiplexers, higher order demultiplexers and multiplexers, realization of boolean functions using decoders, multiplexers, PROM, PAL and PLA.

UNIT – V: Sequential Logic Circuits

Classification of Sequential Circuits, Latch and Flip-Flop, RS- Latch Using NAND and NOR Gates, Truth Tables, RS, JK, T and D flip flops, truth and excitation tables, conversion of flip flops, flip flops with asynchronous inputs (Preset and Clear).

UNIT – VI: Registers and Counters

Design of registers, bidirectional shift registers, universal shift register, design of ripple counters, synchronous counters and variable modulus counters, ring counter, Johnson counter.

Text Books:

1. M. Morris Mano, Michael D Ciletti, Digital Design, PEA, 5th edition.
2. Roth, Fundamentals of Logic Design, Cengage, 5th edition.

Reference Books:

1. Kohavi, Jha, Switching and Finite Automata Theory, Cambridge, 3rd edition.
2. Leach, Malvino, Saha, Digital Logic Design, TMH.
3. R.P. Jain, Modern Digital Electronics, TMH.

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OBJECT ORIENTED PROGRAMMING

(Common to CSE & IT)

II Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To get acquainted with the concepts of object-oriented programming.
- To create GUI using AWT components

Learning Outcomes:

Student will be able to

- understand the programming constructs of JAVA
- apply concepts of inheritance.
- implement interfaces and packages through JAVA.
- simulate the concept of multi threading.
- handle run time errors.
- design and implement an effective GUI for various applications.

UNIT – I: Fundamentals of OOP and Java

Need of OOP, Principles of OOP Languages, Procedural Languages vs OOP, Applications of OOP, History of JAVA, Java Virtual Machine, Java Features.

Java Programming constructs: variables, primitive data types, identifiers, keywords, literals, operators, arrays, type conversion and casting,

UNIT – II: Class Fundamentals and Inheritance

Class fundamentals, declaring objects, methods, constructors, this keyword, garbage collection, overloading methods and constructors, argument passing, recursion, access control.

Inheritance- Basics, types, using super keyword, method overriding, dynamic method dispatch, abstract classes, using final with inheritance, object class, string class.

UNIT – III: Interfaces and Packages

Interfaces: Defining an interface, implementing interfaces, nested interfaces, applying interfaces, variables in interfaces and extending interfaces.

Packages: Defining, creating and accessing a package.

UNIT – IV: Exception Handling and Multithreading

Exception Handling- exception-handling fundamentals, exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, java's built-in exceptions, user-defined exception sub classes.

MultiThreading- differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

UNIT – V: Applets and Event Handling

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

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

UNIT – VI: AWT

The AWT class hierarchy, user interface components- label, button, checkbox, checkboxgroup, choice, list, scrollbar, menubar, layout managers –Flow, Border, Grid, Card, GridBag.

Text Books:

1. Herbert schildt, Java The complete reference, TMH, 7th edition.
2. Sachin Malhotra, Saurabh choudhary, Programming in JAVA, Oxford.

Reference Books:

1. Joyce Farrel, Ankit R.Bhavsar, JAVA for Beginners, Cengage Learning, 4th edition.
2. Y.Daniel Liang, Introduction to Java Programming, Pearson, 7th edition.
3. P.Radha Krishna, Object Oriented Programming Through Java, Universities Press.

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PROFESSIONAL ETHICS AND PATENTS
(Common to CE, CSE & IT)
II Year – I Semester

Lecture	: 2	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- To understand the basic concepts of Ethics and Human values.
- To enable the students understand the role and importance of ethics in Engineering.
- To familiarize the rights and responsibilities of Engineers.
- To know the laws and protect author's rights.
- To understand the legal aspects present in intellectual property law.

Learning Outcomes:

Students will be able to

- comprehend different Moral Perspectives and enabling him to frame one's own Ethical standards.
- find solutions for issues related to growth with reference to absolute ethical tenets.
- resolve Professional/Moral Dilemmas and be able to guide productivity.
- analyze the likelihood of confusion in Trademark Claims.
- understand different forms of infringement of Intellectual Property Rights.
- recognize the relevant criteria for protecting Creativity.

UNIT – I: Human Values

Morals, Values and Ethics – Integrity – Work Ethics – Service Learning – Civic Virtue -Value time – Co-operation – Commitment – Empathy – Self-confidence – Character.

Ethics- Types of Inquiry – Kohlberg's Theory – Gilligan's Argument – Heinz's Dilemma.

UNIT – II: Engineers' Responsibilities and Rights

Safety and Risk – 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 Collegiality – Techniques for achieving Collegiality – Group / Team – Two Senses of Loyalty, Rights – Professional Responsibilities – Confidential and Proprietary information – Conflict of Interest – Conflict resolution – Self-interest.

UNIT – III: Patent Law, Trade Marks and Copyrights

Introduction – Rights and Limitations – Application process – Patent requirements – Ownership – Transfer – Infringement – Litigation – International Patent Law – Double Patenting – New development in Patent Law.

Trade Mark and Copyrights: Introduction – Registration Process – Transfer – Infringement – Dilution of Ownership – Imitation – Litigations.

UNIT – IV: Cyber Law

Introduction to Cyber Law – Cyber Crime and E-Commerce – Online Crime – Innovations and Inventions in Trade Related Intellectual Property Rights.

Text Books:

1. “Principia Ethica” by Goerge Edward Moore, Cambridge University Press, 11-Nov-1993, Cambridge.
2. “Engineering Ethics includes Human Values” by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd-2009.
3. Deborah E.Bouchoux: “Intellectual Property”, Cengage Learning, New Delhi

Reference Books:

1. “Professional Ethics and Human Values” by A.Alavudeen, R.Kalil Rahman and M.Jayakumaran- Laxmi Publications.
2. R.Radha Krishnan, S.Balasubramanian: “Intellectual Property Rights”, Excel Books, New Delhi.
3. Prabhuddha Ganguli: “Intellectual Property Rights” Tata Mc-Graw- Hill, New Delhi.

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BASIC ELECTRONICS LAB

II Year – I Semester

Practical : 3

Internal Marks : 25

Credits : 2

External Marks : 50

Course Objectives:

- To Assist students in obtaining a better understanding of the operation, v-i characteristics and specifications of the electronic components.
- To develop the necessary skills in analyzing electronic circuits involving diodes, BJTs and FETs as well as practical skills required for constructing and making measurements using various lab instruments.
- To develop the skills such as work with a small team to carryout experiments.

Learning Outcomes:

Students will be able to

- measure voltage and currents; identify shorts and opens in a given circuit.
- build different transistor configurations and observe its input and output characteristics.
- build amplifier circuits with different transistor configurations and measure its voltage gain, as well as looking at ac waveforms throughout the circuit.

List of Experiments:

1. Identification & Testing of R,L,C and other components.
2. Soldering Practice – Simple circuits using passive and active components.
3. PN Junction diode Characteristics a) Forward bias b) Reverse bias.
4. Zener diode Characteristics a) Forward bias b) Reverse bias.
5. Half – Wave Rectifier with & without Filter.
6. Full – Wave Rectifier with & without Filter.
7. CB Transistor Characteristics.
8. CE Transistor Characteristics.
9. JFET Characteristics.
10. SCR Characteristics.
11. UJT Characteristics.
- 12.. CE amplifier

Additional Experiments

1. FET amplifier
2. CC amplifier

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OBJECT ORIENTED PROGRAMMING LAB
(Common to CSE & IT)
II Year – I Semester

Practical	: 3	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- To gain hands on experience on concepts of object-oriented programming.
- To create GUI using AWT components

Learning Outcomes:

Students will be able to

- implement OOP concepts in JAVA.
- implement exception handling and multi threading concepts.
- design an applet for various applications.
- design effective GUI using AWT components.

List of Experiments:

Write Java Code to

Exercise I

1. Find the roots of the quadratic equation $ax^2 + bx + c=0$.
2. Display the Fibonacci sequence upto a given value.

Exercise II

1. Sort the given list of numbers.
2. Search for an element in a given list of elements using linear search.
3. Search for an element in a given list of elements using Binary search.

Exercise III

1. Perform addition of two matrices.
2. Perform multiplication of two matrices.

Exercise IV

1. Sort an array of strings.
2. Check whether given string is palindrome or not.

Exercise V

1. Illustrate the use of 'super' keyword.
2. Illustrate multiple inheritance.
3. Create an abstract class named shape, that contains an empty method named numberofsides(). Provide three classes named Trapezoid, Triangle and Hexagon, such that each one of the classes contains only the method numberofsides(), that contains the number of sides in the given geometrical figure.

Exercise - VI

1. Create three threads (by using **Thread** class and **Runnable** interface) where the First thread displays “Good Morning” every one second, the second thread displays “Hello” every two seconds and the third thread displays “Welcome” every three seconds.
2. Create and access a user defined package where the package contains a class named CircleDemo, which in turn contains a method called circleArea() which takes radius of the circle as the parameter and returns the area of the circle.

Implement the following using Applets:

Exercise VII

1. Display the position of x and y co-ordinates of the cursor movement using mouse.
2. Handle keyboard events, which echoes keystrokes to the applet window and shows the status of each key event in the status bar.

Exercise VIII

1. Create a list of items and display the selected item of the list in a text field. Arrange these components by using Flow Layout control.
2. Arrange components by using Border Layout control.

Exercise IX

1. Create a simple arithmetic calculator

Text Books:

1. Herbert schildt, Java: the complete reference, TMH, 7th edition.
2. T. Budd, Understanding OOP with Java, pearson education, updated edition.

Reference Books:

1. J.Nino and F.A. Hosch, John wiley & sons, An Introduction to programming and OO design using Java, John wiley & sons.
2. Y. Daniel Liang, Introduction to Java programming, pearson education, 6th edition.
3. R.A. Johnson- Thomson, An introduction to Java programming and object oriented application development.
4. Cay.S.Horstmann and Gary Cornell, Core Java 2, Vol 1, Fundamentals, Pearson Education, 7th edition.
5. Cay.S.Horstmann and Gary Cornell, Core Java 2, Vol 2, Advanced Features, Pearson Education, 7th edition.
6. P. Radha Krishna, Object Oriented Programming through Java, University Press.

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FORMAL LANGUAGES AND AUTOMATA THEORY

II Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To classify machines by their power to recognize languages and to solve problems in computing.
- To familiarize how to employ deterministic and non-deterministic machines.

Learning Outcomes:

Student will be able to

- design DFA's and NFA's for the regular languages.
- convert NFA to DFA and NFA with epsilon transitions to NFA without Epsilon transitions.
- construct regular expression for the given regular language.
- convert from FA to regular grammar and regular grammar to FA.
- design PDA's for the context free languages.
- design Turing machine for the phrase-structured languages.

UNIT – I: Fundamentals

Strings, alphabet, language, operations, finite state machine, finite automaton model, acceptance of strings and languages, deterministic finite automaton and non deterministic finite automaton, transition diagrams and language recognizers.

UNIT – II: Finite Automata

NFA with ϵ transitions - significance, acceptance of languages, equivalence between NFA with and without ϵ transitions, NFA to DFA conversion, minimization of FSM, myhill Nerode theorem, equivalence between two FSM's, finite Automata with output-moore and melay machines, applications of FA.

UNIT – III: Regular Languages

Regular sets, regular expressions, identity rules, construction of finite Automata for a given regular expressions and its inter conversion, pumping lemma of regular sets, closure properties of regular sets (proofs not required), applications of regular languages.

UNIT – IV: Grammar Formalism

Chomsky hierarchy of languages, regular grammars - right linear and left linear grammars, equivalence between regular linear grammar and FA and its inter conversion, context free grammar, derivation trees, sentential forms, rightmost and leftmost derivation of strings.

UNIT – V: Context Free Grammars

Ambiguity in context free grammars, minimization of Context Free Grammars, chomsky normal form, greibach normal form, pumping Lemma for Context Free Languages. enumeration of Properties of CFL (proofs not required), applications of CFLs.

Push down automata: Push down automata, model of PDA, design of PDA, introduction to DCFL and DPDA, applications of PDA.

UNIT – VI: Turing Machine

Turing Machine, model, design of TM, types of Turing Machines (Proofs not required), computable functions, recursively enumerable languages, church's hypothesis.

Computability Theory: Decidability of problems, universal Turing Machine, undecidability of posts correspondence problem, turing reducibility, definition of P and NP problems, NP complete and NP hard problems.

Text Books:

1. John E.Hopcroft, Rajeev Motwani & Jeffrey D.Ullman J.D., "Introduction to Automata Theory Languages and Computation" - Pearson Education,3rd edition.
2. John C Martin, "Introduction to languages and the Theory of Computation" - McGraw Hill.

Reference Books:

1. Daniel I.A. Cohen, John Wiley, 'Introduction to languages and the Theory of Computation'.
2. Sipser, Thomson, Introduction to Theory of Computation, 2nd edition.
- 3.. Lewis H.R. & Papdimitriou 'Elements of Theory of Computation' - C.H. Pearson / PHI.
4. Mishra and Chandrashekar, 'Theory of computer science - Automata, Languages, and Computation', PHI, 2nd edition.

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SOFTWARE ENGINEERING

II Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To illustrate basic taxonomy and terminology of the software engineering
- To plan and monitor the control aspects of project.

Learning Outcomes:

Students will be able to

- explore the basic concepts of software engineering.
- choose appropriate life cycle model for a project.
- implement the phases of the traditional software development process.
- design various test cases for a software product.
- analyze different architectural views.

UNIT – I: Introduction to Software Engineering

The evolving role of software, Changing Nature of Software, Software myths.

The software problem: Cost, schedule and quality, Scale and change.

UNIT – II: Software Process

Process and project, component software process, Software development process models: Waterfall model, prototyping, iterative development, relational unified process, Extreme programming and agile process.

UNIT – III: Planning, analysis and specification of a software project

Planning a software project: Effort, Cost and Duration estimation, project schedule and staffing, quality planning, risk management planning, project monitoring plan.

Software requirement analysis and specification: Value of good SRS, requirement process, requirement specification, functional specifications with use-cases.

UNIT – IV: Software Architecture

Role of software architecture, architecture views, components and connector view, architecture styles for C & C view, documenting architecture design, evaluating architectures.

UNIT – V: Design

Design concepts, function-oriented design, object oriented design, detailed design, verification and validation, metrics for design.

UNIT – VI: Coding and Testing

Programming principles and guidelines, testing concepts, testing process, black-box testing, white-box testing, and metrics for testing.

Text Books:

1. Pankaj Jalote, A Concise introduction to software engineering (undergraduate topics in computer science), Springer International Edition.
2. Roger S. Pressman, Software Engineering, TMH , 3rd edition & 7th edition.

Reference Books:

1. Pankaj Jalote, Wiley, Software Engineering, A Precise approach.
2. W S Jawadekar, Software Engineering principles and practice, TMH
3. Sommerville, Software Engineering, Pearson, 8th edition.
4. R Fairley, Software Engineering concepts, TMH.

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COMPUTER ORGANIZATION

II Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To understand the structure of computer , its micro operations and addressing modes
- To learn taxonomy of micro instructions and summarize Arithmetic Operations
- To familiarize with memory hierarchy and functions of I/O processors

Learning Outcomes:

Students will be able to

- differentiate various micro operations and addressing modes
- describe the working of Arithmetic Logic Unit
- illustrate hard wired and micro programmed control unit
- describe input-output organization and Direct Memory Access

UNIT – I: Basic Structure Of Computers

Computer Types, Functional unit, Basic OPERATIONAL concepts, Bus structures, Software, Performance, multiprocessors and multi computers, Data Representation Floating – Point Representation, Error Detection codes

UNIT – II: Register Transfer Language And Micro operations

Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit, Instruction codes, Computer Registres, Computer instructions.

Memory– Reference Instructions, Input– Output and Interrupt, STACK organization, Instruction formats, Addressing modes, Reduced Instruction Set Computer.

UNIT – III: Micro Programmed Control

Control memory, Address sequencing, micro program example, design of control unit hard wired control, Micro programmed control, Taxonomy of Micro Instructions, Micro Instruction Execution.

UNIT – IV: Computer Arithmetic

Addition and subtraction, multiplication Algorithms, Decimal Arithmetic operations.

Pipeline Processing- Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline.

UNIT – V: The Memory System

Memory Hierarchy, Main Memory, Auxiliary Memory, Associate Memory, Cache Memory, Virtual Memory

UNIT-VI: Input-Output Organization

Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access, Input –Output Processor (IOP) Serial communication.

Text Books

1. M.Moris Mano *Computer Systems Architecture* –, IIIrd Edition, Pearson/PHI.
2. William Stallings *Computer Organization and Architecture* –Sixth Edition, Pearson/PHI

Reference Books

1. Carl Hamacher, Zvonks Vranesic, SafeaZaky, *Computer Organization* –Vth Edition, McGraw Hill
2. Andrew S. Tanenbaum *Structured Computer Organization* , 4th Edition, PHI/ Pearson
3. Sivaraama Dandamudi *Fundamentals or Computer Organization and Design*, Springer Int. Edition.
4. John L. Hennessy and David A. Patterson, *Computer Architecture a quantitative approach*, Fourth Edition, Elsevier.
5. Joseph D. Dumas *Computer Architecture: Fundamentals and principles of Computer Design*, II, BS Publication.

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ADVANCED DATA STRUCTURES USING C

II Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To know the concept of dictionaries , Hashing
- To learn the concepts of AVL trees and 2-3 trees
- To gain the knowledge on graphs and pattern matching techniques

Learning Outcomes:

Students will be able to

- outline the role of dictionaries and how to implement the various hashing techniques and its functions
- describe the AVL trees, 2-3 trees and its operations
- demonstrate the graph operations and graph traversals
- Implement the minimum cost spanning trees, shortest path and pattern matching algorithms

UNIT – I: Dictionaries

Sets, Dictionaries, Hash Tables, Open Hashing, Closed Hashing, Rehashing Methods, Hashing Functions- Division Method, Multiplication Method, Universal Hashing.

Analysis of Closed Hashing Result: Unsuccessful Search, Successful Search, Hash Table Restructuring.

UNIT – II: Balanced Trees

AVL Trees: Maximum Height of an AVL Tree, Insertions and Deletions. 2-3 Trees : Insertion, Deletion.

UNIT – III : Priority Queues

Binary Heaps : Implementation of Insert and Delete min, Creating Heap. Its applications.

UNIT – IV: Graphs

Operations on Graphs: Vertex insertion, vertex deletion, find vertex, edge addition, edge deletion, Graph Traversals- Depth First Search and Breadth First Search. Graph storage Representation- Adjacency matrix, adjacency lists.

UNIT – V: Graph algorithms

Minimum-Cost Spanning Trees- Prim's Algorithm, Kruskal's Algorithm Shortest Path Algorithms: Dijkstra's Algorithm,

UNIT – VI:

All Pairs Shortest Paths Problem: Floyd's Algorithm, Warshall's Algorithm,
Pattern matching and Tries : Pattern matching algorithms- the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm

Text Books :

1. Richard F Gilberg, Behrouz A Forouzan *Data Structures, A Pseudocode Approach*, Cengage.
2. Horowitz , Sahani, Anderson-freed *Fundamentals of DATA STRUCTURES in C: 2nd ed*, Universities Press

Reference Books:

1. Mark Allen Weiss *Data structures and Algorithm Analysis in C*, 2nd edition, Pearson
2. Michel J Folk, Greg Riccardi, Bill Zoellick *File Structures :An Object oriented approach with C++*, 3rd ed,
3. NB Venkateswarlu & EV Prasad, S Chand *C and Data Structures: A Snap Shot oriented Treatise with Live examples from Science and Engineering*,, 2010.

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DATABASE MANAGEMENT SYSTEMS

II Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To familiarize with the design, implementation and use of database management systems
- To gain knowledge of secured database transaction and recovery management.

Learning Outcomes:

Students will be able to

- understand the Advantages and Structure of DBMS.
- build Queries using SQL to retrieve required information from Database
- apply Normalization Techniques on given Database Design to avoid Anomalies
- understand Serializability- Recoverability of Transactions
- understand Concurrent – Executions of Transactions
- know Database Recovery and indexing Techniques

UNIT – I: Introduction to Data Base

Purpose of Database Systems, Data Models, Schema and instances, DBMS Architecture, Entity- Relationship Model- Attributes and Keys, Relationship Types, Weak Entity set, Strong Entity Set, Enhanced E–R Modeling- specialization and generalization, database design for banking enterprise, reduction to relational schemas

UNIT – II: Relational Model & SQL

Relational model concepts, constraints, relational algebra, SQL- DDL, DML, DCL, Set operations, Aggregate Functions, Null values, Nested queries, Defining different constraints on a table, Creating Views and Indices.

UNIT – III: Data Base Design

Functional Dependencies and Normalization for Relational Databases- Informal design guidelines for relation schemes, Functional dependencies, Normal forms- First, second and third normal forms, Boyce- Cod normal form, Multi valued & Join Dependencies, 4th & 5th Normal forms.

UNIT – IV: Transaction Management

Transaction Management- Transaction concept, ACID properties, schedules and recoverability, serializability of schedules

UNIT – V: Concurrency Control

Concurrency control- Concurrent execution of transactions, Lock-based protocols, Timestamp-based protocols, multiple granularities locking, Deadlock handling

UNIT – VI: Crash Recovery & Indexing

Failure classification, Different types of Recovery techniques- deferred update, immediate update, Shadow paging, Check points, media recovery,

Indexing- Order indices, Multi level indices, Dynamic Multilevel indices using B trees and B+- Trees.

Text Books:

1. Korth & Sudarshan, Database system concept, MH.
2. Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, MH.

Reference Books:

1. Peter Rob & C Coronel, Database Systems design, Implementation, and Management, 7th Edition.
2. Elmasri Navrate, Fundamentals of Database Systems, Pearson Education
3. C.J.Date, Introduction to Database Systems, Pearson Education.

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DESIGN AND ANALYSIS OF ALGORITHMS

II Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- Analyze the asymptotic performance of algorithms.
- Apply efficient algorithmic design paradigms.

Learning Outcomes:

Students will be able to

- write an algorithm and analyze the performance of algorithm for a given problem.
- find bi-connected components of a graph and perform various disjoint set operations.
- apply the suitable algorithm design technique for a given problem.

UNIT – I: Introduction

Algorithm, Pseudo code for expressing algorithms, Performance Analysis- Space and Time complexity, Asymptotic Notation- Big oh, Omega, Theta and Little oh notations.

UNIT – II: Disjoint sets & Divide and conquer

Disjoint Sets- disjoint set operations, union and find algorithms, bi-connected components.

Divide and conquer- General method, applications-Binary search, Quick sort, Merge sort.

UNIT – III: Greedy Method

General method, applications- knapsack problem, Job sequencing with deadlines, Minimum cost spanning trees.

UNIT – IV: Dynamic Programming

General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, Travelling sales person problem

UNIT – V: Back Tracking

General method, applications-n queens problem, sum of subsets problem, graph-coloring, Hamiltonian cycle.

UNIT – VI: Branch and Bound

General method, applications - Travelling sales person problem,0/1 knapsack problem- LC BB, FIFO BB solutions.

Text Books:

1. Ellis Horowitz, Satraj Sahni and Rajasekharam, Fundamentals of Computer Algorithms, Galgotia publications pvt. Ltd.
2. Aho, Ullman and Hopcroft, Design and Analysis of algorithms, Pearson education.

Reference Books:

1. T.H.Cormen, C.E.Leiserson, Introduction to Algorithms, PHI Pvt. Ltd./ Pearson Education, 2nd edition.
2. Allen Weiss, Data structures and Algorithm Analysis in C++, Pearson education, 2nd edition,
3. M.T.Goodrich, R.Tomassia, John wiley and sons, Algorithm Design: Foundations, Analysis and Internet examples.
4. Steven S .Skiena, The algorithm Design Manual, 2nd edition, Springer.

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EMPLOYABILITY SKILLS (Common to CE, CSE & IT)

II Year – I Semester

Lecture : 1 + 2

Internal Marks : 25

Credits : 2

External Marks : 50

Course Objectives:

- To equip the learners to gain employability skills and to have successful careers.
- To enable them to use English in different socio-cultural and professional contexts.
- To assist them to communicate their ideas relevantly and coherently in globalized contexts.

Learning Outcomes:

Students will be able to

- gain employment and function successfully in their careers.
- use English successfully in different socio-cultural and professional contexts
- communicate their ideas coherently in globalized situations.

Syllabus:

Listening:

- Listening Comprehension- 4 exercises
- Active Listening

Reading:

- Reading Comprehension – 4 Passages
- Book Review-Any Novel among the list prescribed by the Department
- Cloze Test

Speaking:

- Extempore
- One Act Plays
- Public Speaking
- Group Discussions
- Interpersonal skills
- Ad Making
- Poster presentation
- Mock Interviews
- Assertiveness

Writing:

- Information Transfer
- Report Writing
- Team building
- Paragraph Writing
- Project Work

Vocabulary:

- Business Vocabulary

Short Films:

- Creativity
- Leadership

Books Recommended:

1. Effective Technical Communication, M. Ashraf Rizvi, Tata Mc. Graw-Hill Publishing Company Ltd.
2. Communication Skills by Leena Sen, Prentice-Hall of India, 2005.
3. Academic Writing- A Practical guide for students by Stephen Bailey, Rontledge Falmer, London & New York, 2004.
4. English Language Communication: A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai.
5. Body Language- Your Success Mantra by Dr. Shalini Verma, S. Chand, 2006.
6. DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice, New Age International (P) Ltd., Publishers, New Delhi.
7. Books on TOEFL/GRE/GMAT/CAT by Barron's/cup.
8. IELTS series with CDs by Cambridge University Press.
9. Technical Report Writing Today by Daniel G. Riordan & Steven E. Pauley, Biztantra Publishers, 2005.
10. Communication Skills for Engineers by Sunita Mishra & C. Muralikrishna, Pearson Education, 2007.
11. Objective English by Edgar Thorpe & Showick Thorpe, 2nd edition, Pearson Education, 2007.
12. Cambridge Preparation for the TOEFL Test by Jolene Gear & Robert Gear, 4th Edition.

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ADVANCED DATA STRUCTURES AND ALGORITHMS LAB

II Year – II Semester

Practical : 3

Internal Marks : 25

Credits : 2

External Marks : 50

Course Objectives:

- To understand the concepts of Hashing, AVL, 2-3 trees
- To understand the various Graph traversal and pattern matching techniques
- To outline the applications of dynamic programming and back tracking

Learning Outcomes:

Students will be able to

- implement the dictionaries using various hashing techniques
- implement various spanning tree algorithms
- demonstrate the AVL trees, 2-3 trees operations
- demonstrate the pattern matching using Boyer-Moore algorithm and Knuth-Morris algorithm

List of Experiments:

1. To implement functions of Dictionary using hashing (division method).
2. To perform various operations i.e, insertions and deletions on AVL trees
3. To implement Prim's algorithm to generate a min-cost spanning tree.
4. To implement Kruskal's algorithm to generate a min-cost spanning tree.
5. To implement Dijkstra's algorithm to find shortest path in the graph.
6. To implement pattern matching using Boyer-Moore algorithm.
7. To implement Knuth-Morris-Pratt algorithm for pattern matching.
8. To implement 0/1 knapsack with greedy method and dynamic programming.
9. To implement travelling sales person problem using dynamic programming.
10. To implement N-Queen problem using backtracking approach.
11. To implement graph coloring using backtracking approach.

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DATABASE MANAGEMENT SYSTEMS LAB

II Year – II Semester

Practical : 3

Internal Marks : 25

Credits : 2

External Marks : 50

Course Objectives:

- To execute DDL, DML, DCL and TCL Commands and creation of database tables with constraints, group functions specified by the user.
- To create Views, Assertions, Triggers and PL/SQL procedure on the data base

Learning Outcomes:

Students will be able to

- design and implement a database schema for a given problem-domain
- normalize a database
- implement the PL/SQL programming for a given problem
- implement the triggers
- implement Assertions
- implement the E-R diagrams

List of Experiments:

1. Execute DDL, DML, DCL and TCL Commands.
2. Execute Orderby, Groupby form of Select Command on various Relations.
3. Execute a single line and group (Aggregate) functions for a table.
4. Implement the following Integrity Constraints
a.Primary Key b.Foreign Key c.Unique d.Not NULL and Check.
5. Execute Sub Queries and Co-Related Nested Queries.
6. Perform the following join operations
a.Natural b.Equi
c.Theta d.Outer
7. Creating Views
8. Implement the query in SQL for a)insertion b)retrieval c) updation d)deletion
9. Writing Assertion
10. Write PL/SQL procedure for an application using exception handling.
11. Write a PL/SQL block for transaction operations of a typical application using triggers.
12. Design and develop an application using any front end and back end tool (make use of ER diagram and DFD).
Typical Applications – Banking, Electricity Billing, Library Operation, Pay roll, Insurance, Inventory etc.

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MICROPROCESSORS AND INTERFACING

III Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To familiarize the students with architecture of 8086 microprocessor
- To introduce the assembly language programming concepts of 8086 processor
- To expose the students to various interfacing devices with 8086 using 8255

Learning Outcomes:

Student will be able to

- understand the architecture and instruction set of 8086 microprocessor and 8051 micro controller.
- design and develop various interfacing circuits with 8086 using 8255.
- understand the concepts of interrupt mechanism and serial communication

UNIT – I: 8086 Microprocessor

Introduction 8086 Processor, Architecture-Functional diagram, Register Organization, Memory Segmentation, Physical memory organization, signal descriptions of 8086- common function signals, Minimum and Maximum mode signals, Timing diagrams.

UNIT – II: Instruction Sets and Addressing Modes

Instruction formats, Instruction sets, Addressing modes

UNIT – III: Assembly language programming of 8086

Assembler directives, macros, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.

UNIT – IV: Basic Peripherals and Their Interfacing

8255 PPI various modes of operation and interfacing to 8086. Interfacing keyboard, display, stepper motor interfacing, D/A and A/D converter, Keyboard/Display Controller-8279 , Memory interfacing to 8086, Interfacing DMA controller 8257 to 8086

UNIT – V: Interrupt Structure & Serial Communication

Interrupt structure of 8086, Vector interrupt table, Interrupt service routine, Interfacing Interrupt Controller 8259, Serial communication standards, Serial data transfer schemes, 8251 USART architecture and interfacing, RS- 232, IEEE-4-88, Prototyping and trouble shooting.

UNIT – VI : Advanced Micro Processors

Salient features of 0386DX, architecture and signal description of 80386, register organization of 80386 and addressing modes, data types of 80386, real address mode of 80386, protected mode of 80386, segmentation and Paging, virtual 8086 mode and enhanced mode. Instruction set of 80386. The coprocessor 80387, the CPU with a numeric coprocessor-80486DX.

Text Books :

1. D. V. Hall. *Microprocessors and Interfacing*, TMGH.2'1 edition 2006.
2. Brey *The Intel Microprocessors 8086- Pentium processor* , PHI

Reference Books:

1. Triebel & Singh *The 8088 & 8086 Microprocessors-Programming, interfacing, Hardware & Applications* ,PHI
2. Yu- Chang Liu & Glenn A Gibson *Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design* , PHI.
3. Badri Ram *Advanced Microprocessors and Interfacing* , TMH.

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COMPUTER NETWORKS

III Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To understand the fundamental concepts of computer networking.
- To introduce advanced networking concepts

Learning Outcomes:

Students will be able to

- understand basic computer network terminology.
- identify the different types of network protocols.
- describe the layers of the OSI and TCP/IP model.

UNIT – I: Introduction

OSI overview, TCP/IP and other networks models, Examples of Networks: Novell Networks, Arpanet, Internet, Network Topologies WAN, LAN, MAN.

UNIT – II: Physical Layer and overview of PL Switching

Multiplexing: frequency division multiplexing, wave length division multiplexing, synchronous time division multiplexing, statistical time division multiplexing, Introduction to switching: Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks.

UNIT – III: Data link layer

Design issues, Framing, error control, error detection and correction, CRC, Checksum, services provided to Network Layer

Elementary Data Link Layer protocols- simplex protocol, Simplex stop and wait, Simplex protocol for Noisy Channel.

Sliding window protocol- One bit, Go back N, Selective repeat, Stop and wait protocol, Data link layer in HDLC, PPP

UNIT – IV: Random Access

ALOHA, MAC addresses, Carrier sense multiple access (CSMA), CSMA with Collision Detection, CSMA with Collision Avoidance,

Controlled Access: Reservation, Polling, Token Passing, Channelization: frequency division multiple access (FDMA), time division multiple access (TDMA), code division multiple access (CDMA).

Network Layer: Virtual circuit and Datagram subnets-Routing algorithm shortest path routing, Flooding, Hierarchical routing, Broad cast, Multi cast, distance vector routing.

UNIT – V: IEEE Standards

Data link layer, physical layer, Manchester encoding, Standard Ethernet- MAC sub layer, physical layer, Fast Ethernet- MAC sub layer, physical layer, IEEE-802.11- Architecture, MAC sub layer, addressing mechanism, frame structure.

UNIT – VI: Application layer (WWW and HTTP)

ARCHITECTURE - Client (Browser) ,Server ,Uniform Resource Locator HTTP-HTTP Transaction, HTTP Operational Model and Client/Server Communication, HTTP Generic Message Format, HTTP Request and Response Message Format.

The wireless web - WAP—The Wireless Application Protocol.

Text Books:

1. Behrouz A Fourzan,Data communications and networking,TMH,4th edition
2. Andrew S Tanenbaum,Computer networks, Pearson, 4th edition
3. Mayank Dave,Cengage, Computer networks

Reference Books:

1. S. Keshav, An Engineering Approach to Computer Networks 2nd Edition, Pearson Education.
2. W.A. Shay, Thomson, Understanding communications and Networks, 3rd Edition.

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OBJECT ORIENTED ANALYSIS & DESIGN (Common to CSE & IT) III Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To gain knowledge of the Object Oriented analysis and design of a system from the requirements.
- To describe and choose an appropriate Design Pattern to refine the model.

Learning Outcomes:

Students will be able to

- apply the object oriented concepts and designs in software development.
- familiar with the UML diagrams and UML tools.
- create static conceptual models of the system to meet the user.
- create dynamic behavioral models of your system.
- utilize object oriented architectural and design patterns.
- describe and choose an appropriate Design Pattern to refine the model.

UNIT – I: Object Oriented Analysis and Design

Concepts, complexity of Software, structure of complex Systems, designing complex systems.

Introduction to UML- Importance of modeling, principles of modeling, object oriented modeling, Conceptual model of the UML, Architecture, and Software Development Life Cycle.

UNIT – II: Structural Modeling

Classes, Relationships, Class diagrams

Advanced Structural Modeling- Advanced classes, advanced relationships, Object Diagrams: Common modeling techniques, interfaces and packages.

UNIT – III: Behavioral Modeling

Interactions, Interaction diagrams, Use cases, Use case Diagrams, Activity Diagrams.

UNIT – IV: Advanced Behavioral Modeling

Events and signals, state machines, state chart diagrams.

UNIT – V: Architectural Modeling

Components, Deployment, Component diagrams, Deployment diagrams, Common Modelling Techniques for Component and Deployment Diagrams. Case Study: The Unified Library application

UNIT – VI: Introduction to Design patterns

What Is a Design Pattern?, Describing Design Patterns, The Catalog of Design Patterns, Organizing the Catalog, How Design Patterns Solve Design Problems, How to Select a Design Pattern, How to Use a Design Pattern

Text Books:

1. Grady Booch, Object Oriented Analysis and Design with Applications-Pearson Education Asia, 2nd Edition.
2. Booch, James Rumbaugh, Ivar Jacobson: The Unified Modeling Language User Guide, Pearson Education.
3. Erich Gamma, Ralph Johnson, John Vlissides, Richard Helm, Design Patterns: Elements of Reusable Object-Oriented Software.

References Books:

1. Meilir Page-Jones: Fundamentals of Object Oriented Design in UML, Pearson Education.
2. Pascal Roques: Modeling Software Systems Using UML2, WILEY- Dreamtech India Pvt. Ltd.
3. B.Dathan, S.Ramnath, Oriented Analysis, Design and Implementation, Universities Press.
4. Wolfgang Pree, Patterns Patterns for Object-Oriented Software Development, Addison- Wesley/ACM Press, 1995.

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OPERATING SYSTEMS

III Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To introduce the basic concepts and functions of various operating systems
- To develop the concepts of process and memory management techniques
- To know the problems of deadlock and study the various avoidance mechanisms
- To understand the file systems and concurrent programming

Learning Outcomes:

Students will be able to

- outline the role and functions of Operating System.
- calculate various measures such as Average waiting time, Turn-around time used in CPU scheduling algorithms
- explain various Memory management schemes and describe the differences between Segmentation and Paging
- describe the files and directory structures and their implementations.
- summarize various disk scheduling algorithms

UNIT – I: Introduction

Operating system structure, Operating system goals, evolution of operating systems, operating system services, system calls.

UNIT – II: Process Management

Process, process state, process controls block (PCB), process scheduling-scheduling queues, schedulers, context switch, scheduling criteria, scheduling algorithms, operations on processes, inter process communication.

Multithreaded programming- benefits, multithreading models.

UNIT – III: Memory Management Strategies

Swapping, contiguous memory allocation, paging, structure of the page table, segmentation

Virtual-Memory Management: Demand paging, page replacement, Allocation of frames, Thrashing.

UNIT – IV: Deadlocks and Mass-storage structure

Deadlocks- System model, deadlock characterization, methods for handling deadlocks, deadlock- prevention, avoidance, detection, recovery.

Mass-storage structure- Overview, Disk Scheduling, Disk Management, Swap-Space Management.

UNIT – V: File system Interface

Concept of a file, Access Methods, Directory structure, File system mounting, files sharing and protection.

UNIT – VI: Synchronization

The critical section problem, Peterson’s solution, synchronization hardware, semaphores, classic problems of synchronization, monitors.

Text Books:

1. Abraham Silberschatz, Peter B, Galvin, Greg Gagne, Operating System Principles, John Wiley, 7th edition.
2. Stallings, Operating Systems - Internal and Design Principles, Pearson education, 6th edition–2005.

Reference Books:

1. D. M. Dhamdhere, Operating systems- A Concept based Approach, TMH, 2nd edition.
2. Andrew S Tanenbaum, Modern Operating Systems, PHI, 3rd edition.

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Open Elective - I

REMOTE SENSING AND GIS TECHNIQUES

III Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course objectives:

- To introduce the students to the basic concepts and principles of various components of remote sensing.
- To provide an exposure to GIS and its practical applications in civil engineering.
- To demonstrate the process of remote sensing and theories related to EMR.
- To establish the interpretation of spatial data in various platforms.

Learning Outcomes:

Students will be able to

- Identify various satellites, which are advantage for managing the resources available on earth.
- Develop thematic maps with the help of raster and vector data.
- Employ the analysis and interpretation techniques in the data models.
- Apply the strategies of GIS in land information highway system.

UNIT – I: EMR and Its Interaction with Atmosphere & Earth Material

Definition of remote sensing and its components – Electromagnetic spectrum – wavelength regions important to remote sensing – Wave theory, Particle theory, Stefan-Boltzmann and Wien's Displacement Law – Atmospheric scattering, absorption – Atmospheric windows – spectral signature concepts – typical spectral reflective characteristics of water, vegetation and soil.

UNIT – II: Platforms and Sensors

Types of platforms – orbit types, Sun-synchronous and Geosynchronous – Passive and Active sensors – resolution concept – Pay load description of important Earth Resources and Meteorological satellites – Airborne and spaceborne TIR and microwave sensors.

UNIT – III: Image Interpretation and Analysis

Types of Data Products – types of image interpretation – basic elements of image interpretation - visual interpretation keys – Digital Image Processing – Pre-processing – image enhancement techniques – multispectral image classification – Supervised and unsupervised.

UNIT – IV: Geographic Information System

Introduction – Maps – Definitions – Map projections – types of map projections – map analysis – GIS definition – basic components of GIS – standard GIS software's – Data type – Spatial and non-spatial (attribute) data – measurement scales – Data Base Management Systems(DBMS).

UNIT – V: Data Entry, Storage and Analysis

Data models – vector and raster data – data compression – data input by digitization and scanning – attribute data analysis – integrated data analysis – Modeling in GIS Highway alignment studies – Land Information System.

UNIT VI: RS and GIS Applications

Land cover and land use, agriculture, forestry, geology, geomorphology, urban applications, hydrology- flood zone delineation and mapping, groundwater prospects and recharge, reservoir storage estimation.

Text Books:

1. Remote sensing by Basudeb Bhatta, Oxford University Press.
2. Anji Reddy, M. (2001). Textbook of Remote Sensing and Geographical Information System. Second edn. BS Publications, Hyderabad.

Reference Books:

1. Remote sensing and its applications by LRA Narayana University Press 1999.
2. Basics of Remote Sensing & GIS by S.Kumar, Laxmi Publications.
3. Lo. C.P.and A.K.W.Yeung (2002). Concepts and Techniques of Geographic Information Systems. Prentice-Hall of India Pvt. Ltd., New Delhi. Pp:492.
4. Peter A.Burrough, Rachael A.McDonnell (2000). Principles of GIS. Oxford University Press.
5. Ian Heywood (2000). An Introduction to GIS. Pearson Education Asia

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Open Elective - I

ELEMENTS OF CIVIL ENGINEERING (Other than CE)

III Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To understand different methods of surveying for various applications.
- To familiarize with various types of building materials, structures and transport systems.

Learning Outcomes:

Students will be able to

- carry out simple land survey and prepare maps showing the existing details.
- find out area of irregular shaped plane areas.
- understand building plan, elevation and section.
- get acquainted with construction materials and transportation systems

UNIT – I: Introduction

Introduction, history of the civil engineering, sub – disciplines of civil engineering.

UNIT – II: Surveying

Introduction, divisions of surveying, classification of surveying, principles of surveying. Linear measurements and errors–introduction, methods of linear measurements, chaining instruments, types of error and correction. Compass surveying – introduction, angular measurement using compass, whole circle bearing and reduced bearing, fore bearing and back bearing. Traverse surveying – introduction, chain and compass traversing, closing error and adjustments. Leveling – introduction, types of leveling instruments, dumpy level, adjustment of level, leveling staff.

UNIT – III: Building Materials and Construction

Materials: Introduction to construction materials like ferrous and non ferrous metals, alloys, Stones, Bricks, Lime, Cement, Timber, Sand, Aggregates, Mortar, Concrete and bitumen. **Construction:** Types of building, different loads considered in building design, types of foundation in building, other developments and constructions of buildings.

UNIT – IV: Fire and Earthquake Protection in Building

Introduction, fire protection in building, structural and architectural safety requirements of resistive structures, fire resistive properties of building materials,

fire exit requirements, force and acceleration on building due to earthquake, building response characteristics, building drift.

UNIT – V: Water Supply, Sanitary and Electrical Works in Building

Introduction, water supply system, water supply layout of a building, house drainage, traps, electrical works in building.

UNIT – VI: Highway Engineering

Introduction, historical background of road or highway, classification of roads, pavements and roads, traffic control mechanism.

Text Books:

1. Elements of Civil Engineering Author: Mimi Das Saikia, Bhargab Mohan Das and Madan Mohan Das Publisher: PHI Learning Private Limited New Delhi.
2. Elements of Civil Engineering Author: Dr. R.K. Jain and Dr. P.P. Lodha Publisher: McGraw Hill Education, India Pvt. Ltd.
3. Surveying Vol. I Author: Dr. B. C. Punmia, Ashokkumar Jain, Arunkumar Jain 16th Edition Publisher: Laxmi Publication Delhi.
4. Building drawing Author: M.G.Shah, C.M.Kale and S.Y.Patki Publisher: Tata McGraw Hill.

Reference Books:

1. Surveying Theory and Practice (7th Edition) Author: James M Anderson and Edward M Mikhail Publisher: McGraw Hill Education, India Pvt. Ltd.
2. Surveying and Leveling Author: R. Subramanian Publisher: Oxford University.
3. Building drawing Author: M.G.Shah, C.M.Kale and S.Y.Patki Publisher: Tata McGraw Hill.
4. Civil Engg. Drawing Author: S. C. Rangwala Publisher: Charotar Pub. House Anand.

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Open Elective - I

MODELING AND SIMULATION OF ENGINEERING SYSTEMS

III Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To Familiarize with programming skills in Equation Solving Software.
- To build Graphic user interface.

Learning Outcomes:

Students will be able to

- develop a Model of a Physical System.
- develop a systematic method to simulate engineering system and assess its performance.

UNIT – I: Variables, scripts, and operations

Getting Started, Scripts, Making Variables, Manipulating Variables, Basic Plotting

UNIT – II: Visualization and programming

Functions, Flow Control, Line Plots, Image/Surface Plots, Vectorization

UNIT – III: Solving equations and curve fitting

Linear Algebra, Polynomials, Optimization, Differentiation/Integration, Differential Equations

UNIT – IV: Advanced methods

Probability and Statistics, Data Structures, Images and Animation, Debugging, Online Resources

UNIT – V: Symbolics, SimulinkR, file I/O, building GUIs

Symbolic Math, Simulink, File I/O, Graphical User Interfaces

UNIT – VI:

Examples on statistics, optimization, plots

Text Books:

1. “Getting started with MATLAB” by Rudra pratap, Oxford University, 2002.
2. MATLAB and SIMULINK for Engineers by Agam Kumar Tyagi, OUP 2011

Reference Books:

1. Spencer, R.L. and Ware, M (2008), Introduction to MAT Lab, Brigham Young University, available online, accessed, 7, 2008.
2. David F.Griffiths, October (2012) “An introduction to MAT Lab” the University of Dundee, available online, Accessed, October 2012..

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Open Elective - I

RENEWABLE ENERGY SOURCES

III Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To study various types of non-conventional sources of energy and techniques used in exploiting solar, wind, tidal and geothermal sources of energy and bio-fuels.

Learning Outcomes:

Students will be able to

- analyze the significance of renewable energy.
- understand the principles of solar radiation and design the solar collectors.
- know the functioning of basic components of wind energy and understand the utilization of biomass in power generation.
- understand the working principles of geothermal, ocean, tidal and wave energy techniques.
- know the functioning of direct energy conversion techniques.

UNIT – I:

Introduction: Energy Sources and their availability, Role and potential of renewable source.

Principles of Solar Radiation: The solar constant, Solar Radiation outside the Earth's atmosphere, Solar Radiation at the Earth's surface, instruments for measuring solar radiation and sun shine, solar radiation data, solar radiation Geometry, solar radiation on tilted surfaces with numerical problems.

UNIT – II:

Solar Energy Storage and Applications: Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications-solar heating/cooling technique, solar distillation, drying, photovoltaic energy conversion. Solar central power tower concept and solar Chimney

UNIT – III:

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

Bio-Mass: Bio fuels, Methods for obtaining energy from Biomass, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C.Engine operation and economic aspects. Thermal gasification of Biomass.

UNIT – IV:

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India.

Ocean Energy: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles.

Tidal and wave energy: Potential and conversion techniques, Mini-hydel power plants and their economics.

UNIT – V:

Direct Energy Conversion: Need for DEC, limitations, principles of DEC. Thermo-electric Power – See-beck, Peltier, joule, Thomson effects, Thermo-electric Power generators, Figure of merit, Selection of materials, applications.

UNIT – VI:

MHD power Generation: Principles, dissociation and ionization, Hall Effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects.

Fuel cells: Principles, faraday's law's, thermodynamic aspects, selection of fuels and operating conditions.

Text Books:

1. Tiwari and Ghosal, "Renewable energy resources", Narosa.
2. G.D. Rai, "Non-Conventional Energy Sources", Dhanpat Rai and Sons

Reference Books:

1. Twidell & Weir, "Renewable Energy Sources "
2. Sukhatme, "Solar Energy", Tata McGraw-Hill Education.
3. B.S Magal Frank Kreith & J.F Kreith, "Solar Power Engineering "
4. Frank Krieth & John F Kreider, "Principles of Solar Energy"

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Open Elective - I

ELEMENTS OF MECHANICAL ENGINEERING (Other than ME)

III Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objective:

- To familiarize with the basic principles of Mechanical Engineering required in various fields of engineering.

Learning Outcomes:

Students will be able to

- understand the fundamentals of mechanical systems.
- understand and appreciate significance of mechanical engineering in different fields of engineering.

UNIT – I: Simple stress and strains

Elasticity and plasticity – Types of stresses & strains–Hooke’s law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson’s ratio & volumetric strain – Elastic Moduli & the relationship between them.

UNIT – II: Power Transmission Devices

Introduction to power transmission, belt, rope, chain and gear drives, couplings, clutches (Theoretical treatment only)

Power Transmission through Shafts: Introduction, Torsion of Circular Shafts, Torsion equation, Hollow Circular Shafts, Torsional Rigidity, Power Transmitted by the Shaft (simple Problems).

UNIT – III: Basic Manufacturing Methods

Principles of casting , green sand moulds , Advantages and applications of casting ; Principles of gas welding and arc welding, Soldering and Brazing ; Hot working – hot rolling , Cold working – cold rolling ;

UNIT – IV: Basics of Machine Tools and Engineering Materials

Basics of Machine Tools: Description of basic machine tools- Lathe – operations – turning, threading, taper turning and drilling ;

Engineering Materials : Classification of engineering material, Composition of cast iron and carbon steels on Iron-Carbon diagram and their mechanical properties. Alloy steels and their application

UNIT – V: IC Engines

Introduction , Main components of IC engines , working of 4-stroke petrol engine and diesel engine , working of 2- stroke petrol engine and diesel engine , differences between petrol and diesel engines, differences between 4- stroke and 2- stroke engines. (Theoretical treatment only)

Steam Boilers: Function, classification, differences between water and fire tube boilers, mountings and accessories with their functions, construction and working of cochran, vertical, Lancashire and Babcock & Wilcox boiler (Theoretical treatment only).

UNIT – VI:

Power Plants: Introduction, working principle of steam and gas turbine power plant, working of hydraulic turbines and pumps (Theoretical treatment only).

Refrigeration & Air conditioning: Definition – COP, Unit of Refrigeration, Applications of refrigeration system, vapour compression refrigeration system , simple layout of summer and winter air conditioning system (Theoretical treatment only).

Text Books:

1. Elements of Mechanical Engineering – R.K.Rajput, Lakmi Pub., Delhi.
2. Elements of Mechanical Engineering – D.S.Kumar, S.K. Kataria and Sons

Reference Books:

1. Elements of Mechanical Engineering – K.R.Golala Krishnan, S.Gopala Krishnana, S.C.Sharma, Subhas Stores.
2. Elements of Mechanical Engineering – S.Tryambaka Murthy, I.K. International publishing house pvt. Ltd.

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Open Elective - I

COMPUTER NETWORKS (Other than CSE & IT) III Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To familiarize with different transmission media.
- To gain knowledge of various protocols used for efficient transmission of data over network.

Learning Outcomes:

Students will be able to

- understand basic network topologies.
- choose appropriate transmission media for establishing a network.
- differentiate various data link layer protocols.
- choose appropriate routing algorithm suitable for the network for an organization.
- differentiate various transport layer protocols.
- analyze the type of network used in an organization.

UNIT – I: Introduction

OSI, TCP/IP, Examples of Networks: Novel Networks, Arpanet, Internet, Network Topologies, Classification of networks: LAN, MAN, WAN.

UNIT – II: Physical Layer

Transmission media- copper, twisted pair, wireless, switching and encoding asynchronous communications, Narrow band, broad band ISDN.

UNIT – III: Data link layer & Medium Access sub layer

Data link layer: Design issues, framing, error detection and correction, CRC, Elementary Protocol-stop and wait, Sliding Window, Data link layer in HDLC, Slip, and PPP.

Medium Access sub layer: ALOHA, Carrier sense multiple access. IEEE 802.x Standards, wireless LANs. Bridges

UNIT – IV: Network Layer

Virtual circuit and Datagram subnets, Routing algorithms- shortest path routing, Flooding, Hierarchical routing, Broad cast, Multi cast, distance vector routing, congestion control algorithms.

UNIT –V: Transport Layer

Transport Services, TCP, SCTP and UDP protocols.

UNIT – VI: Application Layer

Domain name system, SNMP, Electronic Mail, WWW

Text Books:

1. Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education/ PHI
2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

Reference Books:

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson.

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Open Elective - I

OBJECT ORIENTED PROGRAMMING (Other than CSE & IT)

III Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To get acquainted with the concepts of object-oriented programming.
- To create GUI using AWT components

Learning Outcomes:

Students will be able to

- understand the programming constructs of JAVA.
- apply concepts of inheritance.
- implement interfaces and packages through JAVA.
- simulate the concept of multi threading.
- handle run time errors.
- design and implement an effective GUI for various applications.

UNIT – I: Fundamentals of OOP and Java

Need of OOP, Principles of OOP Languages, Procedural Languages vs OOP, Applications of OOP, History of JAVA, Java Virtual Machine, Java Features.

Java Programming constructs: variables, primitive data types, identifiers, keywords, literals, operators, arrays, type conversion and casting,

UNIT – II: Class Fundamentals and Inheritance

Class fundamentals, declaring objects, methods, constructors, this keyword, garbage collection, overloading methods and constructors, argument passing, recursion, access control.

Inheritance- Basics, types, using super keyword, method overriding, dynamic method dispatch, abstract classes, using final with inheritance, object class, string class.

UNIT – III: Interfaces and Packages

Interfaces: Defining an interface, implementing interfaces, nested interfaces, applying interfaces, variables in interfaces and extending interfaces.

Packages: Defining, creating and accessing a package.

UNIT – IV: Exception Handling and Multithreading

Exception Handling- exception-handling fundamentals, exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, java's built-in exceptions, user-defined exception sub classes.

MultiThreading- differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

UNIT – V: Applets and Event Handling

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

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

UNIT – VI: AWT

The AWT class hierarchy, user interface components- label, button, checkbox, checkboxgroup, choice, list, scrollbar, menubar, layout managers –Flow, Border, Grid, Card, GridBag.

Text Books:

1. Herbert schildt, Java The complete reference, TMH, 7th edition.
2. Sachin Malhotra, Saurabh choudhary, Programming in JAVA, Oxford.

Reference Books:

1. Joyce Farrel, Ankit R.Bhavsar, JAVA for Beginners, Cengage Learning, 4th edition.
2. Y.Daniel Liang, Introduction to Java Programming, Pearson, 7th edition.
3. P.Radha Krishna, Object Oriented Programming Through Java, Universities Press.

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Open Elective - I

DATA STRUCTURES USING C (Other than EEE, ECE, CSE & IT)

III Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To gain knowledge of linear and non-linear data structures.
- To familiarize with different sorting and searching techniques.

Learning Outcomes:

Students will be able to

- implement single, circular and double linked list.
- implement stacks and queues using arrays and linked lists.
- implement various operations on binary trees.
- apply appropriate sorting and searching techniques for the given data.
- implement various operations on Graphs.

UNIT – I: Linked lists

Introduction- Concept of data structures, overview of data structures, implementation of data structures.

Linked Lists- Single linked list, Circular linked list, Double linked list, Circular double linked list.

UNIT – II: Stacks

Representation using Arrays and Linked List, operations on stack, factorial calculation, evaluation of arithmetic expression.

UNIT – III: Queues

Representation using Arrays and Linked List, operations on queue, circular queue, queue using stack.

UNIT - IV: Trees

Binary Trees: Basic tree concepts, Properties, Representation of Binary Trees using Arrays and Linked List, Binary Tree Traversals, threaded binary tree.

Binary search trees: Basic concepts, BST operations: Search, insertion, deletion and traversals, Creation of binary search tree from in-order and pre (post)order traversals.

UNIT - V: Sorting and Searching

Searching: Linear Search, Binary Search, Fibonacci search.

Sorting (Internal): Basic concepts, Sorting by: insertion (Insertion sort), selection (selection sort), exchange (Bubble sort, quick sort), distribution (radix sort) and merging (merge sort).

UNIT - VI: Graphs

Basic concepts, representations of graphs, operations on graphs- vertex insertion, vertex deletion, find vertex, edge addition, edge deletion, graph traversals (BFS & DFS).

Text Books:

1. Debasis samanta, Classic Data Structures, PHI, 2nd edition, 2011.
2. Richard F, Gilberg , Forouzan, Data Structures, 2nd edition, , Cengage.

Reference Books:

1. Seymour Lipschutz, Data Structure with C, TMH.
2. G. A. V. Pai, Data Structures and Algorithms, TMH, 2008.
3. Horowitz, Sahni, Anderson Freed, Fundamentals of Data Structure in C, University Press, 2nd edition.

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Open Elective - I

CYBER LAWS

III Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To expose the need of cyber laws to prosecute cybercrimes in the society.
- To understand the IT ACT 2000 for Cyber Crime and Cyber Justice.
- To introduce the Criminal Activities based on Internet.
- To familiarize various Licensing Issues Authorities for Digital Signatures.

Learning Outcomes:

Student will be able to

- outline the pros and cons of Internet.
- operate on Confidential data in a precautionous manner.
- demonstrate about the Criminal Justice in India and its Implications.
- define the Cyber Consumers under the consumer Protection Act.
- devise the legal framework for Confidential Information.
- outline e-commerce issue for copyright protection and Defend Personal Data from being hacked.

UNIT – I: The IT Act, 2000- A Ccritique

Crimes in this Millennium, Section 80 of the IT Act, 2000 – A Weapon or a Farce?, Forgetting the Line between Cognizable and Non - Cognizable Officers, Arrest for “About to Commit” an Offence Under the IT Act, A Tribute to Darco, Arrest But No Punishment.

UNIT – II: Cyber Crime and Criminal Justice

Penalties, Adjudication and Appeals Under the IT Act, 2000: Concept of Cyber Crime and the IT Act, 2000, Hacking, Teenage Web Vandals, Cyber fraud and Cyber Cheating, Virus on Internet Deformation, Harassment and E- mail Abuse

UNIT – III: Cyber Pornography

Cyber Pornography, Other IT Offences, Monetary Penalties, Adjudication and Appeals Under IT Act 2000, Network Service Providers, Jurisdiction and Cyber Crimes, Nature of Cyber Criminality Strategies to Tackle Cyber Crime and Trends, Criminal Justice in India and Implications.

UNIT – IV: Digital Signatures, Certifying Authorities and e-Governance

Introduction to Digital Signatures, Certifying Authorities and Liability in the Event of Digital Signature compromise, E - Governance in the India. A Warming to

Babudom, Are Cyber Consumers Covered under the Consumer Protection, Goods and Services, Consumer Complaint Defect in Goods and Deficiency in Services Restrictive and Unfair Trade Practices

UNIT – V: Traditional Computer Crime

Early Hacker and Theft of Components Traditional problems, Recognizing and Defining Computer Crime, Phreakers: Yesterday's Hackers, Hacking, Computers as Commodities, Theft of intellectual Property

UNIT – VI: Web Based Criminal Activity

Interference with Lawful Use of Computers, Malware, DoS (Denial of Service) and DDoS (Distributed Denial of Service) Attacks, Spam ,Ransomware and Kidnapping of Information, Theft of Information, Data Manipulation, and Web Encroachment Online Gambling Online Fraud, Securities Fraud and stock Manipulation, Ancillary crimes

Text Books:

1. Vivek Sood, “Cyber Law Simplefied”, Tata McGraw Hill.
2. Marjie T. Britz, “Computer Forensics and Cyber Crime”, Pearson

Reference Book:

1. Cyber Laws Texts and Cases, Ferrera, CENGAGE.

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Open Elective - I

OPEN SOURCE SOFTWARE

III Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To understand the opportunities for open source software in the global market.
- To familiarize the different steps in implementing the open source.

Learning Outcomes:

Students will be able to

- analyze the open source software need and applications.
- explain LINUX operating systems concepts.
- work with MySQL database.
- design and develop a web application using PHP.

UNIT – I: Introduction

Introduction to Open sources – Need of Open Sources – Advantages of Open Sources–Application of Open Sources.

UNIT – II: LINUX

LINUX Introduction – General Overview – Kernel Mode and user mode , Process – Advanced Concepts – Scheduling – Personalities – Cloning – Signals – Development with Linux.

UNIT – III: Introduction to MySQL

MySQL: Introduction – Setting up account – Starting, terminating and writing your own SQL programs – Record selection Technology – Working with strings – Date and Time

UNIT – IV: Working with MySQL

Sorting Query Results – Generating Summary – Working with metadata – Using sequences – MySQL and Web.

UNIT – V: Open Source Programming Languages

PHP- Introduction – Programming in web environment – variables – constants – data types – operators – Statements – Functions – Arrays – OOP – String Manipulation and regular expression – File handling and data storage

UNIT – VI: PHP and SQL

PHP and SQL database –PHP and LDAP – PHP Connectivity – Sending and receiving E-mails –Debugging and error handling – Security – Templates.

Text Books:

1. Remy Card, Eric Dumas and Frank Mevel, “The Linux Kernel Book”, Wiley Publications,2003.
2. Steve Suchring, “MySQL Bible”, John Wiley, 2002

Reference Books:

1. Rasmus Lerdorf and Levin Tatroe, “Programming PHP”, O’Reilly, 2002.
1. Steven Holzner, “PHP: The Complete Reference”, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.
3. Vikram Vaswani, “MYSQL: The Complete Reference”, 2nd Edition, Tata McGraw –Hill Publishing Company Limited, Indian Reprint 2009.

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Open Elective - I

FUNDAMENTALS OF DATABASE MANAGEMENT SYSTEMS (Other than CSE & IT)

III Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives

- To introduce the database management systems and applications, Database System Architectures.
- To expose E- R Modeling and Design.
- To explain Relational Data Model and Relational Algebra.
- To demonstrate Structured Query Language and apply different operations on Database.
- To explain Transaction management.

Learning Outcomes:

Students will be able to

- develop Conceptual(ER- modeling) and Logical models specified requirements of data base.
- describe the basics of SQL. Can construct tables and answer queries using SQL.
- perform Schema refinement.
- interpret the basic issues of transaction processing.

UNIT – I: Introduction to Database

Purpose of Database Systems Vs File System, Data Models, Schema and instances, DBMS Architecture, E- R Model- Attributes and Keys, Relationship Types, Weak Entity set, Strong Entity Set.

(Practice: Execute DDL, DML, DCL and TCL Commands.)

UNIT – II: Enhanced E–R Modeling

Specialization and Generalization, Database design for Banking Enterprise, Relational model concepts, constraints.

(Practice:. Execute basic SELECT operations.)

UNIT – III:SQL

DDL, DML, DCL, Set operations, Aggregate Functions, Null values, Nested queries. Defining different constraints on a table, apply joins on tables, Creating Views and Indices.

(Practice: Execute a single line and group functions for a table, set operations on various Relations.)

UNIT – IV: Database Bottom Up Design

Functional Dependencies and Normalization for Relational Databases: Informal design guidelines for relation schemes, Functional dependencies, (Practice: Execute Orderby, Groupby clause on various Relations)

UNIT – V: Normal forms

First, second and third normal forms, Boyce- Cod normal form, Multi valued & Join Dependencies, 4th & 5th Normal forms.

(Practice: Implement the following Integrity Constraints

a. Primary Key b. Foreign Key c. Unique d. Not NULL and Check.)

UNIT – VI: Transaction Management

Transaction concept, ACID properties, Concurrent execution of transactions

(Practice: Execute Nested Queries)

Text Books

1. Korth & Sudarshan *Database system concept*, TMH.
2. Raghu Ramakrishnan, Johannes Gehrke *Database Management Systems*, TMH

Reference Books

1. Peter Rob & C Coronel *Database Systems design, Implementation, and Management*, 7th Edition.
2. Elmasri Navrate *Fundamentals of Database Systems*, Pearson Education.
3. C.J.Date *Introduction to Database Systems*, Pearson Education.

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FUZZY MATHEMATICS

III Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To know the fundamentals of fuzzy algebra.
- To know the basic definitions of fuzzy theory.
- To know the applications of fuzzy Technology.

Learning Outcomes:

Students will be able to

- understand the fundamentals of fuzzy algebra.
- apply fuzzy logic.

UNIT – I:

Introduction – Fuzzy subsets – Lattices and Boolean Algebras – L fuzzy sets.

UNIT – II:

Operations on fuzzy - α levels sets – properties of fuzzy subsets of a set. Sections 1.1-1.10.

UNIT – III:

Algebraic product and sum of two fuzzy subsets – properties satisfied by addition and product – Cartesian product of fuzzy subsets. Sections 1.11 -1.13.

UNIT – IV:

Introduction – Algebra of fuzzy relations – logic – connectives. Sections 2.1-2.4.

UNIT – V:

Some more connectives – introduction – fuzzy subgroup – homomorphic image and Pre-image of subgroupoid. Sections 2.5,3.1-3.3.

UNIT – VI:

Fuzzy invariant subgroups - fuzzy subrings. Section 3.4 and 3.5.

Text Books:

1. Recommended Text S.Nanda and N.R.Das “Fuzzy Mathematical concepts, Narosa Publishing House, New Delhi.

Reference Books:

1. Fuzzy Logic with Engineering Applications, Second Edition, Wiley Publications, Timothy J.Ross.
2. Fuzzy Set Theory and Its Applications, Fourth Edition, Yes Dee Publishing Pvt. Ltd., Springer, H.-J. Zimmermann.

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MICRO PROCESSORS AND INTERGACING LAB

III Year – I Semester

Practical : 3

Internal Marks : 25

Credits : 2

External Marks : 50

Course objectives:

- To understand the working procedure of TASM tool
- To learn construction of machine codes for instructions.
- To program debugging, using single step mode/ break point technique (or) introducing the interrupts
- To interfacing peripheral devices like A/D converter, D/A converter, stepper motor, and other I/O devices to the 8086 microprocessor.
- To utilization of interrupt services/ developing interrupt routines for various applications like key board control & monitor or display control etc.

Learning Outcomes:

Students will be able to

- programming skills Using assembly language.
- how to construct the machine codes for instructions.
- interfacing to the microprocessor devices like A/D converter, D/A converter, stepper motor, and other I/O devices.
- program debugging, using single step mode/ break point technique (or) introducing the interrupts.
- utilization of interrupt services/ developing interrupt routines for various applications like key board control & monitor or display control etc.
- student can develop an embedded system using microprocessor.

List of Experiments:

I. Microprocessor 8086:

1. Introduction to MASM/TASM.
2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
3. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
5. DOS/BIOS programming: Reading keyboard (Buffered with and without echo) – Display characters, Strings.

II. Interfacing:

1. 8255 – PPI: Write ALP to generate sinusoidal wave using PPI.
2. 8259 – Interrupt Controller: Generate an interrupt using 8259 timer.
3. 8279 – Keyboard Display: Write a small program to display a string of characters.
4. 8251 – USART: Write a program in ALP to establish Communication between two processors.

Equipment required for Laboratories:

1. 8086 iP Kits
2. Interfaces/peripheral subsystems
 - i) 8259 PIC
 - ii) 8279-KB/Display
 - iii) 8255 PPI
 - iv) 8251 USART
3. DAC Interface

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COMPUTER NETWORKS AND CASE TOOLS LAB

III Year – I Semester

Practical : 3

Internal Marks : 25

Credits : 2

External Marks : 50

Course Objectives:

- To develop bit stuffing and character stuffing programs.
- To implement routing and broadcast tree algorithms.
- To design UML diagrams based on real time applications.

Learning Outcomes:

Students will be able to

- Implement flow control methods.
- Implement various shortest path and routing algorithms.
- Plan and design UML diagrams for various real world applications
- Implement Auction application

List of Experiments:

Computer Networks Lab

Exercise 1: Implement the data link layer framing method of bit stuffing.

Exercise 2: Implement the data link layer framing method of character stuffing

Exercise 3: Implement CRC on a data stream with set of characters

Exercise 4: Implement Dijkstra's algorithm to compute the Shortest path through a graph

Exercise 5: Implement distance vector routing algorithm

Exercise 6: Implement hierarchical routing algorithm

Case Tools Lab

1. Online Bookshop Example

Following the model of amazon.com or ebay.com, design and implement an Online bookstore.

2. Airlines Reservation System

Simulate an Airlines Reservation system.

3. A Content Management System

The goal is to enable non-technical end users to easily publish, access, and share information over the web, while giving administrators and managers complete control over the presentation, style, security, and permissions.

4. Student Registration Model

Create a system which contains the details of the student who registers in college. Details should contain the department, course and other information about the student

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OPERATING SYSTEMS LAB

III Year – I Semester

Practical : 3

Internal Marks : 25

Credits : 2

External Marks : 50

Course objectives:

- To implement various CPU scheduling algorithms
- To implement various memory management and page replacement algorithms
- To implement file management and disk scheduling algorithms

Learning Outcomes:

Students will be able to

- implement the various types of CPU scheduling algorithms
- implement various types of page replacement algorithms
- implement various file allocation strategies.
- implement various disk scheduling algorithms.

List of Experiments:

Exercise 1: Implement the following CPU scheduling algorithms.

- a) First Come First Serve (FCFS)
- b) Round Robin(RR)

Exercise 2: Implement the following CPU scheduling algorithms

- a) Shortest Job First(SJF)
- b) Priority Scheduling

Exercise 3: Implement MVT(Multiprogramming Using Variable Number of Tasks)

Exercise 4: Implement MFT(Multiprogramming with Fixed Number of Tasks)

Exercise 5: Implement the Banker's algorithm for Dead Lock Prevention

Exercise 6: Implement the Banker's algorithm for Dead Lock Avoidance

Exercise 7: Implement the following page replacement algorithms.

- a) FIFO
- b) LRU
- c) LFU

Exercise 8: Implement Paging Technique of memory management.

Exercise 9: Implement various file allocation strategies

- a) Sequential
- b) Indexed

Exercise 10: Implement the following disk scheduling algorithms.

- a) FCFS
- b) SCAN
- c) LOOK

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COMPILER DESIGN

III Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To familiarize lexical analyzer and different parsers.
- To gain knowledge on various storage allocation strategies, code generation and code optimization techniques.

Learning Outcomes:

Students will be able to

- design Lexical analyzer for the given language.
- design an appropriate parser for a language.
- understand symbol table organization for the languages.
- apply appropriate code optimization techniques to optimize intermediate code or target code.
- generate code from syntax tree and DAG.

UNIT – I: Lexical analysis

Overview of language processing, preprocessors, compiler, assembler, interpreters, linkers & loaders, phases of a compiler.

Lexical Analysis- Role of lexical analysis, lexical analysis vs parsing, token, patterns and lexemes, lexical errors, transition diagram for recognition of tokens, reserved words and identifiers.

UNIT – II: Top-Down Parsing

Syntax analysis, role of a parser, classification of parsing techniques, top down parsing, First and Follow, LL(1) Grammars, non-Recursive predictive parsing.

UNIT – III: Bottom-up Parsing

Shift-Reduce parsing, operator precedence parsing, LR Parsers: construction of SLR, CLR (1), LALR Parsers.

UNIT – IV: Semantic Analysis and Runtime Environment

Semantic analysis, SDT, evaluation of semantic rules,

Symbol tables- Use of symbol tables, contents of symbol-table, operations on symbol tables, symbol table organization for block and non-block structured languages.

Runtime Environment- Storage organization- static, stack allocation, access to non-local data, heap management.

UNIT – V: Intermediate code generation

Intermediate code- Three address code, quadruples, triples, abstract syntax trees.
Machine independent code optimization- Common sub expression elimination, constant folding, copy propagation, dead code elimination, strength reduction, loop optimization, procedure inlining, basic blocks, DAG Construction and its applications, Control Flow Graph.

UNIT – VI: Code generation

Code Generation- Issues in code generation, generic code generation, code generation from DAG.

Machine dependent code optimization: Peephole optimization, register allocation, instruction scheduling, inter procedural optimization.

Text Books:

1. Alfred V Aho, Monical S Lam, Ravi Sethi, Jeffrey D. Ullman, Compilers, Principles Techniques and Tools, Pearson, 2nd edition, 2007.
2. V. Raghavan, Principles of compiler design, TMH, 2nd edition, 2011.

Reference Books:

1. Kenneth C Louden, Compiler construction, Principles and Practice, CENGAGE.
2. Yunlinsu, Implementations of Compiler, A new approach to Compilers including the algebraic methods, SPRINGER.
3. Jean-Paul Trembly, Paul G. Sorenson, The theory and practice of Compiler writing, McGraw-Hill.
4. Nandini Prasad, Principles of compiler design, 2nd edition, Elsevier.
5. <http://www.nptel.iitm.ac.in/downloads/106108052/>

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. NET TECHNOLOGIES

III Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives

- To understand the .NET Assemblies
- To learn C# language fundamentals, delegates and events
- To familiarize with late binding ,object serialization, ASP.NET and XML web services

Learning Outcomes:

Students will be able to

- describe .Net Assemblies and fundamentals
- discuss about callback, delegates and type reflections
- outline the form controls, data access and XML web services

UNIT – I: Introducing C#

Introducing C# and the .NET Platform, Understanding .NET Assemblies

UNIT – II: C# Programming Language

Object –Oriented Programming with C#, C# Language Fundamentals, Interfaces and Collections

UNIT – III: Call Backs and Delegates

Callback Interfaces, Delegates, and Events, Building c# applications

UNIT – IV: Types and Attributes

Type Reflection, Late Binding, and Attribute-Based Programming

UNIT – V: The .Net Libraries

Object Serialization and the .NET Remoting Layer; Data Access with ADO.NET, Programming with Windows Forms Controls.

UNIT – VI: Web Applications

System.IO Namespace, ASP.NET Web Pages, XML Web Services.

Text Books:

1. Andrew Troelsen , *C# and the .NET Platform*, Second Edition by ,Apress Publication
2. Jesse Liberty *Programming C#*, SPD-O'Reilly.

Reference Books:

1. Sestoft and Henrik I. Hansen, *C# Preciesely*, Peter Prentice Hall of India
2. Andrew Troelsen, *C# and the .NET Platform* , Apress Wiley-dreamtech, India Pvt . Ltd.

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ADVANCED JAVA AND WEB TECHNOLOGIES

III Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To develop real time web applications.
- To get acquainted with skills for creating websites and web apps through learning various technologies like HTML, CSS, JavaScript, XML, Servlets, JSP.

Learning Outcomes:

Students will be able to

- create sample java Bean and use swing components
- describe internet protocols, HTML tags and its usage in WWW.
- prepare different style sheets and apply javascript code to a sample web document
- describe an XML document structure, procedure to validate using DTD and XML schema, apply style sheet to an xml document
- differentiate Servlet and JSP and develop a sample JSP based application

UNIT – I: Swings and JavaBean

Origins of Swing, Limitations of AWT, MVC Connection, Components, Containers, Swing Packages, Introduction to JavaBean, Advantages, Introspection, Bound and Constrained Properties, a Bean Example.

UNIT – II: History of the Internet and World Wide Web

HTML 4 protocols – HTTP, SMTP, POP3, MIME, and IMAP.

HTML Common tags- List, Tables, images, forms, Frames, Links and Navigation, Image Maps

UNIT – III: CSS and Java Script

Introduction, CSS Properties, Controlling Fonts, Text Formatting, Pseudo classes, Selectors, CSS for Links, Lists, Tables. Java Script-Variables, operators, Functions, Control structures, XML, DTD, and XML Schema.

UNIT – IV: Web Servers and Servlets

Introduction to servlets, Life Cycle, A sample Servlet, The Servlet API, java servlet and java servlet http packages, Handling HTTP Request and Responses, Cookies, Session Tracking.

UNIT – V: JSP

JSP Processing, Generating Dynamic Content, Using Scripting element, JSP Objects, Conditional processing, displaying values, using expression to set an attribute, Declaring variables and methods, Sharing data between JSP Pages, Requests, Sharing sessions and application data.

UNIT – VI: Database Access

Database Programming using JDBC, Studying Javax.sql.* package, Accessing a Database from a JSP Page, Application – Specific Database Actions

Text Books:

1. Jim Keogh *The Complete Reference J2EE*, TMH
2. Uttam Roy *Web Technologies*, OXFORD University press

Reference Books:

1. Jon Duckett *Web programming with HTML, XHTML and CSS, 2e*, Wiley India
2. Bai, Michael Ekedahl *Web programming* CENAGE Learning, India edition.
3. Paul S.Wang, *An Introduction to Web Design + Programming*, India Edition
4. Dietel & Dietel *Internet & World Wide Web* Herbert Scheldt *The Java Complete Reference*, 8th Edition, , TMH.

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ADVANCED OPERATING SYSTEM

III Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To introduce the fundamentals of distributed systems
- To understand the concepts of synchronization and deadlocks
- To know the distributed file systems and distributed shared memory.

Learning Outcomes:

Students will be able to

- distinguish Distributed and Centralized systems
- describe the strategies of synchronization and deadlocks
- determine the concepts of threads and scheduling in distributed systems
- illustrate the distributed file system and shared memory

UNIT – I: Computer System and Operating System Overview

Overview of Computer System hardware - Instruction execution, Operating System Objectives and functions

UNIT – II: Introduction to Distributed systems

Goals of distributed system. hardware and software concepts, design issues.

Communication in Distributed systems: Layered protocols, ATM networks, the Client - Server model

UNIT – III: Synchronization in Distributed systems

Clock synchronization, Mutual exclusion, the Bully algorithm, a ring algorithm

Deadlocks- deadlock in distributed systems, distributed dead lock detection and Distributed deadlock prevention

UNIT – IV: Processes

Processes and Processors in distributed systems: Threads, system models, Scheduling in distributed system,

UNIT – V: Distributed file systems

Distributed file systems design, distributed file system implementation, trends in distributed file systems.

UNIT – VI: Distributed shared memory

What is shared memory, consistency models, page based distributed shared memory and object based DSM.

Text Books:

1. Andrew. S. Tanenbaum *Distributed Operating System* , PHI
2. W.Stallings *Operating Systems - Internal and Design Principles* . Fifth Edition-2005, Pearson education

Reference Books:

1. Abraham Silberchatz, Peter B. Galvin, Greg Gagne *Operating System Principles* - 7th Edition, John Wiley.
2. Andrew S Tanenbaum *Modern Operating Systems* - 2nd edition WI Pearson PHI.

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COMPUTER GRAPHICS

III Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To familiarize with the functionalities of various graphics systems.

Learning Outcomes:

Students will be able to

- attain a conceptual model understanding of the underlying mathematical model for determining the set of pixels to turn on for displaying an object
- explain the functionalities of various display devices and visible surface detection methods.
- analyze the performance of different algorithms to draw different shapes.
- perform different transformations on objects.
- design raster animations.

UNIT – I: Introduction

Application of Computer Graphics, raster scan systems, random scan systems, raster scan display processors.

Output primitives: Points and lines, line drawing algorithms.

UNIT – II: Filled Area Primitives

Inside and outside tests, boundary-fill and flood-fill algorithms, Scan line polygon fill algorithm.

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

UNIT – III: 2-D Viewing

The viewing pipeline, window to view-port coordinate transformation, viewing functions, Cohen-Sutherland line clipping algorithm, Sutherland –Hodgeman polygon clipping algorithm.

UNIT – IV: 3-D Geometric Transformations

Translation, rotation, scaling, reflection and shear transformations, composite transformations, 3D Viewing pipeline, clipping, projections (Parallel and Perspective).

UNIT – V: Visible Surface Detection Methods

Classification, back-face detection, depth-buffer, scan-line, depth sorting, BSP tree methods, area sub-division and octree methods.

UNIT – VI: Computer Animation

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

Text Books:

1. Donald Hearn, M.Pauline Baker, Computer Graphics C version, Pearson
2. Foley, VanDam, Feiner, Hughes, Computer Graphics Principles & practice, Pearson, 2nd edition.

Reference Books:

1. Rajesh K Maurya, Computer Graphics with Virtual Reality Systems, Wiley.
2. Peter, Shirley, Computer Graphics, CENGAGE.
3. Neuman , Sproul, Principles of Interactive Computer Graphics, TMH.
4. Frank Klawonn, Introduction to Computer Graphics, Using Java 2D and 3D, Springer.

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Elective - I

CRYPTOGRAPHY AND NETWORK SECURITY

III Year – II Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To introduce different types of security attacks and mechanisms
- To expose different cryptographic techniques and Algorithms
- To familiarize different Key exchange mechanisms in cryptography.
- To gain knowledge on Email, IP and Web Security

Learning Outcomes:

Student will be able to

- differentiate Security Attack, Security Services and Mechanisms.
- describe the encryption algorithms DES, Triple DES and AES
- summarize RSA and Diffie-Hellman key exchange Algorithm
- describe Cryptographic hash and MAC functions along with digital signatures
- summarize PGP ,IP and Web security

UNIT – I: Security Fundamentals

Security Attacks, Security Services, Security Mechanisms, A model for Network security, Session Hijacking and spoofing, software vulnerabilities - Phishing, Buffer Overflow, Format string Attacks, SQL Injection

UNIT – II: Basics of Cryptography

Symmetric cipher model, Block and Stream Ciphers, Data encryption standards (DES), Strength of DES, Block Cipher Design Principles and Models of operation, Triple DES, AES

UNIT – III: Public-Key Cryptography

Public Key Cryptography, Principles of public key crypto systems, RSA algorithms, Diffie-Hellman key exchange, Introduction to elliptic curve cryptography

UNIT – IV: Hash Functions and Digital Signatures

Cryptographic hash functions, Applications of cryptographic hash functions, secure hash algorithm, Digital signatures, Digital Signature schemes, Authentication of protocols

UNIT – V: IP Security

Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT – VI: Web Security

Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET), Firewall Design principles.

Text Books

1. William Stallings *Cryptography and Network security principles and practice* – 5th edition, Pearson education 2011.
2. Bernard Menezes *Network security and cryptography*, Cengage learning 2011.

Reference Books

1. Eric Maiwald *Fundamentals of Network Security*, Dreamtech press
2. Buchmann *Introduction to Cryptography*, Springer.

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COMPUTER ARCHITECTURE

III Year – II Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To Learn Computer Architecture Trends and Performance measurement
- To learn Instruction set Operations, control flow, Encoding.
- To familiarize ILP, and solving Branch conflicts, Data hazards.
- To familiar with interconnection networks

Learning Outcomes:

Students will be able to

- define Architecture and Trends
- classify Instruction set
- analyze ILP, VLIW and solving Branch conflicts, Data hazards.
- develop Knowledge on Improving system Performance By using Memory Hierarchy
- discuss practical issues in interconnecting networks

UNIT – I: Introduction

Computer architecture, Trends in Technology, Cost, measuring and reporting performance quantitative principles of computer design.

UNIT – II: Instruction Set

classifying instruction set- memory addressing- type and size of operands, operations in the instruction set, instructions for control flow- encoding an instruction set.-the role of compiler

UNIT – III: Parallelism

Instruction level parallelism (ILP), reducing branch costs, overcoming data hazards, Limitations of ILP, ILP software approach- compiler techniques- static branch protection – VLIW approach – H.W support for more ILP at compile time- H.W verses S.W Solutions

UNIT – IV: Memory

Memory. hierarchy design- cache performance- reducing cache misses penalty and miss rate – virtual memory- protection and examples of VM-distributed shared memory- Synchronization,

UNIT – V: Storage systems

Storage system Types – Buses – RAID- errors and failures- bench marking a storage device- designing a I/O system

UNIT – VI : Inter connection and networks

Introduction, Interconnection network media, Practical issues in interconnecting networks, Examples of inter connection, Cluster, Designing of clusters.

Text Book:

1. John L. Hennessy & David A. Patterson. *Computer Architecture A quantitative approach*, Morgan Kaufmann 3rd edition (An Imprint of Elsevier)

Reference Books:

1. Dezsó Szilard, Terence Fountain, Peter Kacsuk *Advanced Computer Architectures*, Pearson.
2. David E. Culler, Jaswinder Pal Singh with Anoop Gupta *Parallel Computer Architecture, A Hardware / Software Approach*, Elsevier

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Open Elective - II

DISASTER MANAGEMENT

III Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To learn about disaster occurrence, strategies and remedial measures.

Learning Outcomes:

Students will be able to

- explain the aspects of disaster management and adopt remedial measures.
- access the impact of hazards on structures.
- explain the vulnerability conditions.
- adopt the rehabilitation procedures.

UNIT – I: Introduction

Concept of Disaster Management. Types of Disasters. Disaster mitigating agencies and their organizational structure at different levels.

UNIT – II: Overview of Disaster Situations in India

Vulnerability of profile of India and Vulnerability mapping including disaster – prone areas, communities, places. Disaster preparedness – ways and means; skills and strategies; rescue, relief reconstruction. Case Studies: Lessons and Experiences from Various Important Disasters in India

UNIT – III: Flood and Drought Disaster

Raising flood damage, assessing flood risk, flood hazard assessment, flood impact assessment, flood risk reduction options. Drought and development, relief management and prevention, drought mitigation and management- integrating technology and people.

UNIT – IV: Landslide and Earthquake Disaster

Land slide hazards zonation mapping and geo environmental problems associated with the occurrence of landslides. The use of electrical resistivity method in the study of landslide. Studies in rock mass classification and land slide management in a part of Garwal-Himalaya, India. Causes and effects of earth quakes. Secondary effects. Criteria for earthquake resistant design.

UNIT – V: Cyclone and Fire Disaster

Cyclone occurrence and hazards. Cyclone resistant house for coastal areas. Disaster resistant construction role of insurance sector. Types of fire. Fire safety and fire fighting method, fire detectors , fire extinguishers.

UNIT – VI: Rehabilitation

Rehabilitation programmes, Management of Relief Camp, information systems & decision making tools

Text Books:

1. Disaster Management, RB Singh (Ed), Rawat Publications, 2000.
2. Disaster Management Future Challenges and Opportunities, jagbir singh, I.K international publishing house

Reference Books:

1. Natural Hazards in the Urban habitat by Iyengar, CBRI, Tata McGraw Hill
2. Natural Disaster management, Jon Ingleton (Ed), Tolor Rose, 1999
3. Anthropology of Disaster management, Sachindra Narayan, Gyan Publishing house, 2000.

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Open Elective - II

SOLID WASTE MANAGEMENT (Other than CE) III Year – II Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To learn about Solid Waste management
- To describe the collection, treatment and disposal methods of Solid waste

Learning Outcomes:

Students will able to

- identify the types and sources of solid waste, and its characteristics.
- employ the treatment and disposal methods of solid waste.
- apply the concepts of solid waste management.

UNIT – I: Introduction

Definition of solid waste, garbage, rubbish-Sources and Types of solid wastes- Municipal waste, industrial waste, plastic waste, electronic waste, bio-medical waste and hazardous waste - Characteristics of Solid Wastes: Physical, chemical and biological characteristics- Problems due to improper disposal of solid waste.

UNIT – II: Functional Elements of Solid Waste Management

Waste generation and handling at source-onsite storage-Collection of solid wastes- Collection methods and services-storage of solid waste- guidelines for collection route layout.

UNIT – III: Transfer and Transport of Wastes

Transfer station-types of vehicles used for transportation of solid waste-Processing and segregation of the solid waste- various methods of material segregation.

UNIT – IV: Processing and Transformation of Solid Wastes

Recycling and recovery principles of waste management- Composting: definition-methods of composting-advantages of composting- Incineration: definition-methods of incineration advantages and disadvantages of incineration.

UNIT – V: Treatment and Disposal of Solid Waste

Volume reduction, Open dumping, land filling techniques, Landfills: classification- Design and Operation of landfills, Land Farming, Deep well injection.

UNIT – VI: Waste Minimization

Introduction to waste minimization, waste minimization techniques-5R (refuse, reduce, reuse, recover, recycle), municipal waste minimization, industrial waste minimization.

Text Books:

1. Solid and hazardous waste management by M.N.Rao and Razia sultana, BS publications
2. Environmental Engineering by Howard S.Peavy, Donald R.Rowe and George Tchobanogous

Refence Books:

1. Integrated Solid Waste Management by Tchobanogous.
2. Environmental engineering by Y.Anjaneyulu, B.S publication.
3. Environmental Pollution Control Engineering by C.S. Rao; Wiley Eastern Ltd., New Delhi.
4. Environmental engineering by Gerad Kiley, Tata Mc Graw Hill

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Open Elective - II

ENERGY AUDIT, CONSERVATION AND MANAGEMENT

III Year – II Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To introduce the basic concepts of Energy Auditing and Management.
- To familiarize the various Techniques of Electrical Energy Conservation.

Learning Outcomes:

Students will be able to

- understand the Process of Energy Audit of Industries.
- apply the concepts of Energy management for Efficient Energy Utilization and Conservation.
- identify a suitable method for Energy Conservation of various electric devices.
- analyze the benefits of energy conservation from the Economic aspects.

UNIT – I: Basic Principles of Energy Audit

Energy audit- definitions, concept , types of audit, energy index, cost index ,pie charts, Sankey diagrams, load profiles, Energy conservation schemes- Energy audit of industries- energy saving potential, energy audit of process industry, thermal power station, building energy audit.

UNIT – II: Energy Management

Principles of energy management, organizing energy management program, initiating, planning,controlling, promoting, monitoring, reporting- Energy manger, Qualities and functions, language, Questionnaire – check list for top management.

UNIT – III: Energy Efficient Motors

Energy efficient motors , factors affecting efficiency, loss distribution , constructional details, characteristics - variable speed , variable duty cycle systems, RMS hp- voltage variation-voltage unbalance- over motoring- motor energy audit.

UNIT – IV: Power Factor Improvement

Power factor – methods of improvement, location of capacitors, Pf with non linear loads, effect of harmonics on power factor, power factor motor controllers

UNIT – V: Lighting and Energy Instruments

Good lighting system design andpractice, lighting control ,lighting energy audit – Energy. Instruments- wattmeter, data loggers, thermocouples, pyrometers, lux meters, tongue testers, application of PLC's.

UNIT – VI: Economic Aspects and Analysis

Economics Analysis-Depreciation Methods, time value of money, rate of return , present worth method , replacement analysis, life cycle costing analysis- Energy efficient motors- calculation of simple payback method, net present worth method- Power factor correction, lighting - Applications of life cycle costing analysis, return on investment .

Text Books:

1. Energy management by W.R. Murphy AND G. McKay Butter worth, Heinemann publications.
2. Energy management by Paul o' Callaghan, Mc-graw Hill Book company-1st edition, 1998

Reference Books:

1. Energy efficient electric motors by John .C. Andreas, Marcel Dekker Inc Ltd- 2nd edition, 1995.
2. Energy management hand book by W.C. Turner, John wiley and sons.
3. Energy management and good lighting practice: fuel efficiency- booklet12-EEO

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Open Elective - II

MATERIAL SCIENCE (Other than ME) III Year – II Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- Familiarise with the crystallography of materials and their properties i.e. Mechanical, Electrical and Optical and their field of applications.

Learning Outcomes:

Students will be able to

- understand of contemporary issues relevant to Crystal Structures.
- identify the defects in crystals and understand the mechanisms of plastic deformation.
- draw Equilibrium/phase diagrams.
- understand Mechanical, Electrical, Optical properties of Materials.

UNIT – I: Crystal Structure

Introduction, Space lattice, Unit cell, Lattice parameters, Bravais lattices, Structure and packing fractions of simple cubic, Body centred cubic, Face centred cubic crystals. Directions and planes in crystals, miller indices, Diffraction of X-rays by crystal planes, Bragg's law.

UNIT – II: Plastic Deformation

Plastic deformation of single crystals. Deformation by slip, CRSS for slip, Deformation of single crystal. Deformation by twinning, Stacking faults, hot working, and cold working. Recovery, recrystallization and grain growth. Grain size, Hall-Petch equation. Dislocations, types, Burgers' Vector, Dislocation movement by climb and cross slip.

UNIT – III: Equilibrium Diagrams and Phase Transformation

Solid solutions, Hume-Rothery's rules, Intermediate compounds, Phase diagrams, Gibb's phase rule, Equilibrium diagram of a binary system. Applications of phase transformations, Iron-carbon equilibrium diagram.

UNIT – IV: Mechanical properties

Tensile stress-strain diagrams, proof stress, yield stress diagrams, modulus of elasticity. Hardness Testing: -Rockwell, Brinell and Vickers. Impact, toughness, Charpy V-Notch, fracture, ductile, brittle, Griffith criteria for brittle failure, creep, creep mechanisms, fatigue-mechanism-factors to improve fatigue resistance.

UNIT – V: Electrical Properties of Materials

Electronic conductivity, free electron theory, Super conductivity, Magnetic properties, Dia, para, ferro, ferri magnetism. Soft and hard magnetic materials.

UNIT – VI: Optical Properties

Optical properties of materials. Reflection, Refraction, Absorption and transmission of electromagnetic radiation in solids Polymerization, classification of polymers. Uses of polymers.

Text Books:

1. Materials Science and Engineering by V.Raghavan, Prentice Hall of India, Fifth edition.
2. Mechanical Metallurgy – GE Dieter., Mechanical metallurgy, 1988, edition, McGraw-Hill.
3. Material science and Engineering an introduction William D. callister, David G. Rethwisch.

References Books:

1. Essentials of Material Science by A.G.Guy, McGraw-Hill(1976).
2. Material Science for Engineers – Schackelford.

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Open Elective - II

AUTOMOTIVE ELECTRONICS

III Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To familiarize with the electronic systems inside automotive vehicle.
- To know the advanced safety systems

Learning Outcomes

Students will be able to

- broad understanding of automotive technology
- knowledge in operating principles and performance of various subsystems of automotive systems.
- understand the operation of microcomputer systems.
- acquire knowledge in automotive sensors and control systems.
- develop communications & navigation/routing in automotive telematics

UNIT – I: Automotive Fundamentals

Use of electronics in the automobile, evolution of automotive electronics, the automobile physical configuration, evolution of electronics in the automobile, survey of major automotive systems, engine control or electronic control unit, ignition system

UNIT – II: Electronics Fundamentals

Semiconductor devices- diodes, rectifier circuit, transistors, field effect transistors; transistor amplifiers, use of feedback in op amps, summing mode amplifier, analog computers, digital circuits- binary number system, combinational- Basic logic gates, multiplexer (IC 74151), 3 to8 decoder (IC74138) , sequential- flip flops, decade counters(IC 7490).

UNIT – III: Automotive Micro-Computer System

Microcomputer fundamentals-digital versus analog computers, basic computer block diagram, microcomputer operations, CPU registers, accumulator registers, condition code register-branching; microprocessor architecture, memory-ROM, RAM; I/O parallel interface, digital to analog converter and analog to digital converters with block diagram, microcomputer application in automotive systems.

UNIT – IV: Basics of Electronics Engine Control

Motivation for electronic engine control, exhaust emissions, fuel economy, concept of an electronic engine control system, engine functions and control, electronic fuel control configuration, electronic ignition with sensors.

UNIT – V: Sensors and Actuators

Introduction; Basic sensor arrangement; Types of Sensors such as oxygen sensors, Crank angle position sensors, fuel Metering/vehicle speed sensors and detonation sensors, altitude sensors, flow Sensors, throttle position sensors, solenoids, stepper motors, relays. Actuators – Fuel Metering Actuator, Fuel Injector, Ignition Actuator

UNIT – VI: Future Automotive Electronic Systems

Telematics, Safety: Collision Avoidance Radar warning System with block diagram, speech synthesis, sensor multiplexing, control signal multiplexing with block diagram, fiber optics inside the car, automotive internal navigation system, GPS navigation system, voice recognition cell phone dialling, advanced cruise control system.

Text Books:

1. William B. Ribbens, “Understanding Automotive Electronics”, 6th Edition, SAMS/Elsevier Publishing (UNIT I to VI).
2. Robert Bosch Gambh, “Automotive Electrics Automotive Electronics Systems and Components”, 5th edition, John Wiley & Sons Ltd., 2007.

Reference Books:

1. Ronald K Jurgen, “Automotive Electronics Handbook”, 2nd Edition, McGraw-Hill, 1999.
2. G. Meyer, J. Valldorf and W. Gessner, “Advanced Microsystems for Automotive Applications”, Springer, 2009.
3. Robert Bosch, “Automotive Hand Book” SAE, 5th Edition, 2000.

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Open Elective - II

INTRODUCTION TO MICROPROCESSORS AND MICROCONTROLLERS (Other than EEE, ECE, CSE & IT) III Year – II Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives

- To familiarize the students with architecture of 8086 microprocessor and 8051 microcontroller.
- To introduce the assembly language programming concepts of 8086 processor.
- To expose the students to various interfacing devices with 8086 using 8255.
- To introduce the concepts of interrupt mechanism and serial communication standards.

Learning Outcomes:

Students will be able to

- understand the architecture and instruction set of 8086 Microprocessor and 8051 micro controller.
- design and develop various interfacing circuits with 8086 using 8255.
- understand the concepts of interrupt mechanism and serial communication.
- develop 8051 based different kinds of applications.

UNIT – I: 8086 Microprocessor

Introduction 8086 Processor, Architecture-Functional diagram, Register Organization, Memory Segmentation, Physical memory organization, signal descriptions of 8086- common function signals, Minimum and Maximum mode signals, Timing diagrams.

UNIT – II: Instruction Set and Assembly Language Programming of 8086

Instruction formats, addressing modes, instruction set, assembler directives, macros, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.

UNIT – III: Basic Peripherals and Their Interfacing

8255 PPI various modes of operation and interfacing to 8086. Interfacing keyboard, display, stepper motor interfacing, D/A and A/D converter, Keyboard/Display Controller-8279,

Memory interfacing to 8086, Interfacing DMA controller 8257 to 8086

UNIT – IV: Interrupt Structure and Serial Communication

Interrupt structure of 8086, Vector interrupt table, Interrupt service routine, Interfacing Interrupt Controller 8259, Serial communication standards, Serial data transfer schemes, 8251 USART architecture and interfacing, RS-232, IEEE-485, Prototyping and trouble shooting.

UNIT – V: Introduction to 8051 Microcontroller

Overview of 8051 microcontroller, Architecture, I/O Ports, Memory organization, addressing modes and instruction set of 8051, Interrupts, timer/ Counter and serial communication.

UNIT – VI: Interfacing and Applications of 8051

Interfacing 8051 to LED's, Push button, Relays and latch Connections, Keyboard Interfacing, Interfacing Seven segment display, ADC and DAC Interfacing

Text Books:

1. D. V. Hall "Microprocessors and Interfacing", TMGH. 2nd edition 2006. (I to IV Units).
2. Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin D. McKinlay, "The 8051 Microcontrollers and Embedded Systems", Pearson, 2nd Ed. (IV to VI Units)

Reference Books:

1. Barry B. Brey, "The Intel Microprocessors", PHI, 7th Edition 2006.
2. Liu and GA Gibson, "Micro Computer System 8086/8088 Family Architecture. Programming and Design", PHI, 2nd Ed.,
3. Kenneth. J. Ayala, "The 8051 Microcontroller", 3rd Edition, Cengage Learning, 2010.

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Open Elective - II

CLOUD COMPUTING (Other than CSE & IT) III Year – II Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To understand Virtualization, Virtual Machine and different models of VM.
- To familiarize Cloud computing architecture and its security aspects.

Learning Outcomes

Students will be able to

- know about basics of cloud computing.
- cloud computing and its services available today.
- distinguish Virtualization and Virtual Machine and its need, Types of Virtualization.
- understand how to provide security for the cloud .
- understand disaster recovery and disaster management.
- design a Cloud for an Enterprise.

UNIT – I: Cloud computing

Introduction, what it is and what it isn't, from collaborations to cloud- a short history of cloud computing, the network is the computer- How cloud computing works, companies in the cloud- Cloud computing today.

UNIT – II: Ready for Computing in the cloud

The pros and cons of Cloud Computing, Developing Cloud Services- Why Develop Web-Based Applications?, The Pros and Cons of Cloud Service Development, Types of Cloud Service Development, Discovering Cloud Services Development services and Tools.

UNIT – III: Virtualization

Virtualization for cloud, Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization –System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

UNIT – IV: Security

Data Security, Data Control Encrypt Everything, Regulatory and Standards compliances, Network Security, Firewall rules, Network Intrusion detection, Host Security, System Hardening, Antivirus Protection, Host Intrusion detection, Data segmentation, Credential Management.

UNIT – V: Disaster

What is Disaster, Disaster Recovery Planning, The Recovery Point objective, The Recovery Time Objective, Disasters in the Cloud, Backups and data retention, Geographic redundancy, Organizational redundancy, Disaster Management, Monitoring, Load Balancer Recovery, Application server recovery, Database Recovery.

UNIT – VI: Defining Clouds for the Enterprise

Storage-as-a-Service, Database-as-a-Service, Information-as-a-Service, Process-as-a-Service, Application-as-a-Service, Platform-as-a-Service, Integration-as-a-Service, Security-as-a-Service, Management/Governance-as-a-Service, Testing-as-a-Service Infrastructure-as-a-Service.

Text Books:

1. Michael Miller, Cloud Computing – Web Based Applications That change the way you work and Collaborate Online –Person Education.
2. George Reese Cloud Application Architectures, 1st Edition O'Reilly Media.

Reference Books:

1. David S. Linthicum, Cloud Computing and SOA Convergence in your Enterprise : A Step-by-Step Guide- Addison-Wesley Professional.
2. Kai Hwang, Geoffery C.Fox, Jack J, Dongarra, Distributed & Cloud Computing From Parallel Processing to the Internet of Things.

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Open Elective - II

WEB TECHNOLOGIES (Other than CSE & IT) III Year – II Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To develop real time web applications.
- To get acquainted with skills for creating websites and web apps through learning various technologies like HTML, CSS, JavaScript, XML, Servlets, JSP and JDBC.

Learning Outcomes:

Students will be able to

- develop UI for web applications using markup languages.
- build dynamic web pages using Java Script .
- build web pages using XML.
- design and implement one or more Java servlets; test and debug the servlets; deploy the servlets.
- design and implement one or more Java Server Pages; test and debug the JSPs; deploy the JSPs.
- update and retrieve the data from the databases using JDBC-ODBC.

UNIT – I: HTML & CSS

HTML- Basic HTML Tags, Working with Lists, Tables, Forms, Frames, Images and Image maps.

Cascading Style sheets- CSS rules, Selectors, Types of CSS, CSS Properties for Styling Backgrounds, Text, Fonts, Links, Lists, Tables and Positioning.

UNIT – II: Java Script

Introduction to Java Script, Variables, Data types, Functions, Operators, Control flow statements, Objects in Java Script, Event Handling. DHTML with Java Script

UNIT – III: XML

Basic building blocks, Validating XML Documents using DTD and XML Schemas, XML DOM, XML Parsers- DOM and SAX, XSLT, using CSS with XML.

UNIT – IV: Web Servers and Servlets

Tomcat web server, Introduction to Servlets, Lifecycle of a Servlet, JSDK, The Servlet API, The javax.servlet Package, Reading Servlet parameters, Reading Initialization parameters, The javax.servlet HTTP package, Using Cookies-Session Tracking.

UNIT – V: JSP

The Problem with Servlet. The Anatomy of a JSP Page, Generating Dynamic Content, Using Scripting Elements, Implicit JSP Objects, Declaring Variables and Methods, Passing Control and Data between Pages, Sharing Session and Application Data.

UNIT – VI: Database Access

JDBC Drivers, Database Programming using JDBC, Studying Javax.sql.* package, accessing a database from a JSP Page and a Servlet page, introduction to struts.

Text Books:

1. Web Technologies, “Black book”, Kogent Learning Solutions, Dreamtech press.
2. Chris Bates, “Web Programming: building internet applications”, WILEY Dreamtech, 2nd edition.

Reference Books:

1. Uttam K Roy, “Web Technologies”, Oxford.
2. John Duckett, “Beginning Web Programming”.
3. Wang Thomson, “An Introduction to web design and Programming”.
4. Robert W Sebesta, “Programming the World Wide Web”, Pearson publications, Fourth edition.

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Open Elective - II

VIRTUAL REALITY

III Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To Understand key elements of virtual Reality with the components in VR systems.
- To gain knowledge of various input and output devices required for interacting in virtual world along with rendering and modeling.

Learning Outcomes:

Students will be able to

- identify basic elements of virtual Reality with the components in VR systems
- describe various input and output devices required for interacting in virtual world along with rendering and modeling.
- differentiate various types of modeling,
- apply the concepts of Virtual Reality for an application.

UNIT – I: Introduction

The three I's of virtual reality, commercial VR technology and the five classic components of a VR system

UNIT – II: Input Devices

Trackers, Navigation, and Gesture Interfaces- Three-dimensional position trackers, Navigation and manipulation, interfaces and gesture interfaces.

UNIT – III: Output Devices

Graphics displays, sound displays & haptic feedback.

UNIT – IV: Modeling

Geometric modeling, kinematics modeling, physical modeling, behavior modeling, model Management.

UNIT – V: Human Factors

Methodology and terminology, user performance studies, VR health and safety issues.

UNIT – VI: Applications

Medical applications, military applications, robotics applications.

Text Books:

1. Virtual Reality Systems, John Vince, Pearson Education.
2. Virtual Reality Technology, Second Edition, Gregory C. Burdea & Philippe Coiffet, John Wiley & Sons, Inc.,

Reference Books:

1. Understanding Virtual Reality, interface, Application and Design, William R.Sherman, Alan Craig, Elsevier (Morgan Kaufmann).

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Open Elective - II

SCRIPTING LANGUAGES

III Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To gain knowledge of various scripting languages.
- To familiar with development of web application using scripting languages.

Learning Outcomes:

Students will be able to

- employ JavaScript as a general purpose web-based client-side scripting language.
- utilize both XML and PHP to develop interactive web applications.
- describe and apply files concepts in traditional web applications.
- utilize PERL to solve a wide range of text processing problems.

UNIT – I: Advanced Java Script

Java Script Events, Objects, DHTML, DOM and Forms, Introduction to AJAX

UNIT – II: XML

XML Introduction and Overview, XML Syntax, XML Namespaces, Document Type Definitions (DTDs), XML Schemas, Parsing XML, X Path and XML Transformation

UNIT – III: Python

Syntax and Style – Python Objects – Numbers – Sequences – Strings – Lists and Tuples – Dictionaries – Conditionals and Loops

UNIT – IV: Files

Files – Input and Output – Errors and Exceptions – Functions – Modules – Classes and OOP – Execution Environment.

UNIT – V: Introduction to PERL

Perl backgrounder – Perl overview – Perl parsing rules – Variables and Data – Statements and Control structures – Subroutines

UNIT – VI: Working with PERL

Packages and Modules- Working with Files – Data Manipulation.

Text Books:

1. Web Technologies , Uttam Roy, OXFORD University press.
2. Remy Card, Eric Dumas and Frank Mevel, “The Linux Kernel Book”, Wiley Publications, 2003.

Reference Books:

1. Wesley J. Chun, “Core Python Programming”, Prentice Hall, 2001.
2. Martin C. Brown, “Perl: The Complete Reference”, 2nd Edition, Tata McGraw-Hill Publishing Company Limited, Indian Reprint 2009.

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Open Elective - II

BIG DATA **(Other than CSE & IT)** III Year – II Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To familiarize the fundamental concepts of cloud for laying a strong foundation of Apache Hadoop (Big data framework).
- To gain knowledge of HDFS file system, MapReduce frameworks and relevant tools.

Learning Outcomes:

StudentS will be able to

- describe the fundamentals of Bigdata and cloud architectures.
- utilize HDFS file structure and MapReduce frameworks to solve complex problems.
- know how to analyze data using UNIX tools and Hadoop.
- understand how to develop environment for analyzing Bigdata.
- understand how to use mapper and reducer functions

UNIT – I: Introduction to Big Data

What is Big Data, Why Big Data is Important, Meet Hadoop- data, Data Storage and Analysis, Comparison with other systems, Grid Computing, a brief history of Hadoop, Apache Hadoop and the Hadoop Eco System.

UNIT – II: MapReduce

Analyzing data with unix tools, Analyzing data with hadoop, Java MapReduce classes (new API), Data flow, combiner functions, Running a distributed MapReduce Job.

UNIT – III: Hadoop Distributed File System

HDFS concepts, Command line interface to HDFS, Hadoop File systems, Interfaces, Java Interface to Hadoop, Anatomy of a file read, and write, Replica placement and Coherency Model

UNIT – IV: Developing a MapReduce Application

Setting up the development environment, Managing configuration, Writing a unit test with MRUnit, Running a job in local job runner, Running on a cluster, Launching a job.

UNIT – V: MapReduce Working-I

Classic MapReduce, Job submission, Job Initialization, Task Assignment, Task execution, Progress and status updates

UNIT – VI: MapReduce Working-II

Job Completion, Shuffle and sort on Map and reducer side, Configuration tuning, MapReduce Types, Input formats, Output formats .

Text Books:

1. Tom White, Hadoop, "The Definitive Guide", 3rd Edition, O'Reilly Publications, 2012.
2. Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch, "Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data", 1st Edition, TMH, 2012.

Reference Book:

1. Frank J.Ohlhorst, "Big Data Analytics: Turning Big Data Into Big Money", 2nd Edition, TMH, 2012.

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Open Elective - II

MULTI-VARIATE ANALYSIS AND SPECIAL FUNCTIONS

III Year – II Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To understand the multivariate analysis concepts.
- To know special functions.

Learning Outcomes:

Students will be able to

- to analyze the multivariate data using dependence techniques.
- to apply interdependence techniques.

UNIT – I: Introduction

Nature of multivariate analysis – classifying multivariate techniques - Analysis of dependence.

UNIT – II: Analysis

Analysis of inter dependence - influence of measurement scales.

UNIT – III: Analysis of Dependence

Multiple regression analysis – Discriminant analysis – Multivariate Analysis of variance (MANOVA)

UNIT – IV: Analysis of inter Dependence

Factor Analysis – Cluster analysis – Multidimensional scaling.

UNIT – V: Legendre Functions

Legendre Polynomials. Properties, Rodrigue's formula, Recurrence Relations and orthogonality.

UNIT – VI: Bessel Functions

Solution of Bessel's equation, Properties, Recurrence Relations, orthogonality.

Text Books:

1. Richard Arnold Johnson, Dean W. Wichern, Applied Multivariate Statistical Analysis, Pearson Prentice Hall, 2007.
2. William G.Zikmund, Business Research Methods 7th Edition, Cengage Learning.
3. Tabachnick B., Fidell, L using multivariate statistics, 5th Edition, Pearson Education, Inc 2007.
4. J.N.Sharma, R.K.Gupta, Special Functions, Krishna Prakashan Media (p) Ltd., Meerut.

Reference Books:

1. Yang, K, Trewn, J. Multivariate Statistical Methods in Quality Management Mc Graw-Hill.
2. Larry C. Andrew, Special Functions of Mathematics for Engineers, SPIE Press, 1992.

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NET TECHNOLOGIES LAB

III Year – II Semester

Practical : 3

Internal Marks : 25

Credits : 2

External Marks : 50

Course Objectives

- To learn .NET Assemblies construction and use it in application
- To practice with windows and web services implementation
- To use SMTP mail class and string builder

Learning Outcomes:

Students will be able to

- implement assemblies and use it in application
- create windows and web services for simple tasks
- use SMTP mail class and string builder for application

List of Experiments:

1. Working with callbacks and delegates in C#

Demonstrates the use of delegates, callbacks, and synchronous and asynchronous method invocation, including how Microsoft .NET Framework classes provide explicit asynchronous support using the BeginXXXX and EndXXXX naming conventions and how you can make use of this support in your own code.

2. Code access security with C#

Demonstrates the use of .NET Framework Code Access Security, in which code can have permissions independent of the person executing the code.

3. Creating a Windows Service with C#

Demonstrates how to create a Microsoft Windows Service that uses a File System Watcher object to monitor a specific directory for changes in files.

4. Read and Write Images to a SQL Server Database with C#

Demonstrates how to upload images into SQL Server by using standard HTML upload methods and then insert each image as a byte array into SQL Server.

5. Interacting with a Windows Service with C#

Develop a sample application that launches a Windows Form to allow the user to interact and manipulate the IIS Admin service on the local machine. The application should work by placing an icon in the System Tray.

6. Partitioning an Application into Multiple Assemblies with C#

Understand why it can be beneficial to create separate modules for an application download, and then demonstrates how to do so with C#.

7. Using System Printing in C# Applications

Develop a sample application that shows how to print a formatted report from sample data stored in an XML file using the PrintDocument class in the System.Drawing.Printing namespace. Also illustrates the user selection of a destination printer and multiple print fonts.

8. Using Reflection in C#

Demonstrate how to gather information on various types included in any assembly by using the System.Reflection namespace and some main .NET base classes.

9. Sending Mail with SMTP Mail and C#

Uses a simple Web form to demonstrate how to use the SMTP Mail class in the .NET Framework.

10. Perform String Manipulation with the String Builder and String Classes and C#

Demonstrates some basic string manipulation using both the String Builder and String classes.

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ADVANCED JAVA AND WEB TECHNOLOGIES LAB

III Year – II Semester

Practical : 3

Internal Marks : 25

Credits : 2

External Marks : 50

Course Objectives:

- To design standard web pages and perform validation
- To familiarize in developing dynamic web pages and visual beans
- To understand the procedure of servlet and JSP creation

Learning Outcomes:

Students will be able to

- design sample web pages with style sheets
- apply validation to web and xml documents
- design a Java Visual Bean
- develop a servlet based web application
- create a JSP based web application

List of Experiments

Exercise 1: Create a web page with the following using HTML

- To embed an image map in a web page
- To fix the hot spots
- Show all the related information when the hot spots are clicked.

Exercise 2: Design the following static web pages required for online book store.

- Home page: - the static home page must contains three pages
- Top frame: - logo and college name and links to homepage, login page, registration Page, catalogue page and cart page
- Left frame: - at least four links for navigation which will display the catalogue of Respective links
- Right frame: - the pages to links in the left frame must be loaded here initially it Contains the description of the website
- Registration page and
- Cart page

Exercise 3: Design a web page using CSS which includes the following:

- Use different font styles
- Set background image for both the page and single elements on page.
- Control the repetition of image with background-repeat property
- Define style for links as a:link, a:active, a:hover, a:visited
- Add customized cursors for links.
- Work with layers

- Exercise 4:** Write a java script to validate the following fields in a registration page
- i) Name (should contains alphabets and the length should not be less than 6 characters)
 - ii) Password (should not be less than 6 characters).
 - iii) E-mail (should not contain invalid addresses).
- Exercise 5:** Write an XML file which displays the book details that includes the following:
- i) Title of book ii) Author name iii) Edition
 - iv) Price Write a DTD to validate the above XML file and display the details in a table (to do this use XSL).
- Exercise 6:** VISUAL BEANS: Create a simple visual bean with a area filled with a color. The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false. The color of the area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the property window.
- Exercise 7:** User Authentication: Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following. 1. Create a Cookie and add these four user ids and passwords to this Cookie. 2. Read the user id and passwords entered in the Login form (exp.2) and authenticate with the values (user id and passwords) available in the cookies. If he is a valid user (i.e., user-name and password match) you should welcome him by name (user-name) else you should display "You are not an authenticated user ". Use init-parameters to do this. Store the user-names and passwords in the webinf.xml and access them in the servlet by using the get Init Parameters () method.
- Exercise 8:** Install a database (Mysql or Oracle): Create a table which should contain at least the following fields: name, password, email-id, phone number (these should hold the data from the registration form). Practice 'JDBC' connectivity.
- Exercise 9:** Write a java program/servlet/JSP to connect to that database and extract data from the tables and display them. Experiment with various SQL queries. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration.
- Exercise 10:** Write a JSP which does the following job: Insert the details of the 3 or 4 users who register with the web site by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to exp.7 instead of cookies).

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DATA WAREHOUSING AND DATA MINING

IV Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To understand the concepts of data mining, data warehouse, OLAP and OLTP
- To know preprocessing techniques, Mining Association Rules for various types such as single, multi-level and multi-dimensional etc.,
- To understand the types of data and various methods for classification, clustering.

Learning Outcomes:

Students will be able to

- explain the role, fundamentals, and functionalities of data mining systems.
- illustrate the major issues of multi-dimensional data models.
- describe different data preprocessing technique.
- list the rules of single, multi-level and multi-dimensional association rules from transactional databases
- describe various classification methods
- summarize various types of clustering techniques

UNIT – I: Introduction

Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining.

UNIT – II: Data Warehouse and OLAP

Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology

UNIT – III: Data Preprocessing

Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

UNIT – IV: Mining Association Rules in Large Databases

Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses

UNIT – V: Classification and Prediction

Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Other Classification Methods, Prediction, Classifier Accuracy.

UNIT – VI: Cluster Analysis Introduction

Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods,

Text Books

1. JIAWEI HAN & MICHELINE KAMBER *Data Mining Concepts and Techniques*, Harcourt India.
2. Pang-Ning tan, Michael Steinbach, Vipin Kumar *Introduction to Data Mining*, Pearson

Reference Books

1. MARGARET H DUNHAM *Data Mining Introductory and advanced topics*, Pearson Education
2. SAM ANAHORY & DENNIS MURRAY *Data Warehousing in the Real World*, Pearson Education, Asia.
3. PAULRAJ PONNAIAH *Data Warehousing Fundamentals* WILEY STUDENT EDITION.

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MULTIMEDIA APPLICATION DEVELOPMENT

IV Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To introduce the basic concepts of Multimedia and different File Formats and color models
- To identify the fundamental concepts in Video, Digital Audio and Action Script features
- To understand OOP Applications using Action Script and different compression Techniques

Learning Outcomes:

Students will be able to

- outline the fundamentals in text and Images.
- discuss about various Video and Audio file formats
- describe MIDI and ActionScript features
- apply ActionScriptMovieClip Subclasses to develop an application
- apply different encoding techniques in compressing an image or video

UNIT – I: Fundamentals

Fundamental concepts in Text and Image: Multimedia and hypermedia, World Wide Web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

UNIT – II: Video and Audio

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, MIDI

UNIT – III: ActionScript I

ActionScript Features, Object-Oriented ActionScript, Data types and Type Checking, Classes, Authoring an Action Script Class

UNIT – IV: ActionScript II

Inheritance, Authoring an ActionScript 3.0 Subclass, Interfaces, Packages, Exceptions.

UNIT – V: Application Development

An OOP Application Framework, Using Components with ActionScriptMovieClip Subclasses.

UNIT – VI: Multimedia data compression

Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding.

Text Books

1. Ze-Nian Li and Mark S. Drew *Fundamentals of Multimedia* , PHI/Pearson Education.
2. Rich Shupe and Zevan Rosser *Learning ActionScript 3.0: A Beginner's Guide* Adobe Developer Library

Reference Books

1. Nigel chapman and jenny chapman *Digital Multimedia* , Wiley-Dreamtech
2. *Macromedia Flash MX Professional 2004 Unleashed*, Pearson
3. Steve Heath *Multimedia and communications Technology*, Elsevier (FocalPress)
4. Steinmetz, Nahrstedt *Multimedia Applications*, Springer
5. Weixel *Multimedia Basics* Thomson.
6. David Hilman *Multimedia Technology and Applications*, Galgotia.

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DISTRIBUTED DATABASES

IV Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To understand the concepts of Distributed and Centralized Databases
- To learn about various Query transformation and Optimization techniques
- To gain the knowledge about transaction management, deadlocks and reliability

Learning Outcomes:

Students will be able to

- distinguish Distributed and Centralized Databases
- evaluate Distributed Grouping , Aggregate Function and Optimization of Access Strategies
- describe the strategies of query transformation and optimization
- describe the Distributed Deadlocks and distributed concurrency control
- evaluate the Non-blocking Commitment Protocols

UNIT – I : Introduction

Features of Distributed versus Centralized Databases, Principles of Distributed Databases, Reference Architecture for Distributed Databases, Types of data fragmentation

UNIT – II: Translation of Global Queries to Fragment Queries

Equivalence Transformations for Queries, Transforming Global Queries into Fragment Queries, Distributed Grouping and Aggregate Function Evaluation

UNIT – III : Query Optimization

Optimization of Access Strategies, A Framework for Query Optimization, Join Queries, General Queries.

UNIT – IV: The Management of Distributed Transactions

A frame work for transaction management, Supporting atomicity of transactions, Concurrency Control for Distributed Transactions.

UNIT – V: Concurrency control

Distributed Deadlocks, Concurrency Control based on Timestamps, optimistic methods for Distributed Concurrency Control

UNIT – VI: Reliability

Basic Concepts, Non-blocking Commitment Protocols, Reliability and concurrency Control, Detection and Resolution of Inconsistency

Text Book

1. Stefano Ceri, Giuseppe Pelagatti Distributed Database Principles & Systems, McGraw-Hill International Editions
2. M.Tamer Ozsu,– Pearson Patrick Principles of Distributed Database Systems, Valduriez Education

Reference Books

1. Chhanda Ray Distributed Database Systems, Pearson Publications
2. Andrew s.Tanenbaum and Maarten Van Steen Distributed Systems Principles and Paradigms (2nd edition) (Handcover-Oct 12,2006)
3. Jean Dollimore, Tim Kindberg and George Coulouris Distributed Systems Concepts and Design (4th Edition) (International Computer Science Series) .

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HUMAN COMPUTER INTERACTION

IV Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To demonstrate an understanding of guidelines, principles, and theories influencing human computer interaction.
- To recognize the range of approaches, techniques, tools and methods available to them when designing useful and usable technology.

Learning Outcomes:

Students will be able to

- explain the human and computer components functions regarding interaction with computer
- discuss about Interaction between the human and computer components.
- evaluate user interface designs by performing usability studies (observations) with human subjects
- select an effective style for a specific application.
- choose appropriate widgets, tools and windows for a GUI.
- solve certain interface design problems.

UNIT – I: Introduction

Importance of user Interface – definition, importance of good design, Benefits of good design, a brief history of Screen design.

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT – II: Design Process

Human interaction with computers, importance of human characteristics human consideration, Human interaction speeds, understanding business junctions.

UNIT – III: Screen Designing

Design goals, organizing screen elements, ordering of screen data and content, Visually pleasing composition, focus and emphasis , Presentation information , information retrieval on web – statistical graphics, Technological consideration in interface design.

UNIT – IV: Windows

Navigation schemes, selection of devices based and screen based controls.

UNIT – V: Components

Text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.

UNIT – VI: Software Tools

Specification methods, interface – Building Tools. Interaction Devices – speech recognition digitization and generation – image and video displays – drivers.

Text Books:

1. Wilbert O Galitz ,The essential guide to user interface design, , Wiley DreamaTech.
2. Ben Shneidermann, Designing the user interface. 3rd Edition, Pearson Education Asia.

Reference Books:

1. Alan Dix, Janet Fincay, Gre Goryd, Abowd, Russell Bealg, ,Human – Computer Interaction, Pearson.
2. Rogers, Sharps, Prece, Interaction Design , Wiley Dreamtech.
3. Soren Lauesen, User Interface Design, Pearson Education.

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BIO-METRICS

IV Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To understand various verification , identification technologies and matching measures of Biometrics
- To observe the differences among various scan technologies.

Learning Outcomes:

Students will be able to

- list the Benefits of Biometric Security and Matching
- discuss about Accuracy, False Match Rate, False Non match rate etc.
- identify the Features, Components, Technologies, Strengths and Weaknesses of Finger Scan, Facial Scan, Iris Scan, Voice Scan etc.
- analyze the Statistical Measures and Transactions Of Biometrics

UNIT – I: 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.

UNIT – II: Finger scan

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

UNIT – III: Facial Scan

Features – Components – Operation (Steps) – Competing facial Scan technologies – Strength and weakness

UNIT – IV: Iris Scan and Voice Scan

Features – Components – Operation (Steps) – Competing iris Scan technologies – Strength and weakness.

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

UNIT – V: Other physiological biometrics

Hand scan – Retina scan – AFIS (Automatic Finger Print Identification Systems)
– Behavioral Biometrics – Signature scan - keystroke scan

UNIT – VI: Biometrics for Network Security

Biometrics for Network Security, Statistical measures of Biometrics Biometric Transactions

Text Books

1. Biometrics – Identity Verification in a Networked World – Samir Nanavati, Michael Thieme, Raj Nanavati, WILEY- Dream Tech
2. Biometrics for Network Security- Paul Reid, Pearson Education.

Reference Book

1. Biometrics- The Ultimate Reference- John D. Woodward, Jr. Wiley Dreamtech.

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Elective - II

SOFTWARE TESTING METHODOLOGIES (Common to CSE & IT) IV Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
- To provide knowledge on different software testing methodologies and show how these methods detect bugs in the software.

Learning Outcomes:

Students will be able to

- gain knowledge on purpose of testing, taxonomy of bugs and consequence of bugs.
- apply path testing on any given program and uncover bugs present in the program.
- understand the need for transaction flow testing and study various transaction flow testing techniques.
- understand the need for data flow testing and study different data flow testing strategies.
- gain knowledge on domain and interface testing and able to differentiate between nice and ugly domains.
- gain knowledge on path products, regular expressions, reduction procedure and its applications and learn how regular expressions can be used for flow anomaly detection.
- understand decision tables and KV charts and learn how these help in specification testing.

UNIT – I: Introduction

Purpose of testing, Dichotomies, model for testing. Consequences of bugs, taxonomy of bugs

UNIT – II: Flow graphs and Path testing

Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT – III: Transaction and data flow testing

Transaction Flow Testing: Transaction flows, transaction flow testing techniques.
Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, applications of dataflow testing.

UNIT – IV: Domain Testing

Domains and paths, Nice & ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability

UNIT – V: Paths, Path products and Regular expressions

Path products & path expression, reduction procedure, applications, regular expressions & flow anomaly detection.

UNIT – VI: Logic Based Testing

Overview, decision tables, path expressions, kv charts, specifications.

Text Books :

1. Baris Beizer, Dreamtech, Software testing techniques - second edition.
2. Dr.K.V.K.K.Prasad, Software Testing Tools, Dreamtech.

Reference Books :

1. Brian Marick, The craft of software testing - Pearson Education.
2. Software Testing Techniques – SPD (Oreille)
3. Edward Kit, Software Testing in the Real World , Pearson.
4. Perry, John Wiley, Effective methods of Software Testing.
5. Meyers, John Wiley, Art of Software Testing.

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INFORMATION RETRIEVAL SYSTEMS

IV Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To learn different information retrieval techniques in various application areas.
- To Understand IR principles to locate relevant information large collections of data.
- To know the performance of retrieval systems when dealing with unmanaged data sources.
- To familiarize retrieval systems and different Information visualization technologies.
- To gain knowledge about Software text search algorithms.

Learning Outcomes:

Students will be able to

- produce different information retrieval techniques in different areas
- describe IR principles to identify relevant information on large collections of data
- analyze performance of IRS while observing different types of data
- interrelate IRS for Internet and hypertext
- describe Information visualization technologies on various data sources
- evaluate and measured Software text search algorithms

UNIT – I: Introduction

Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses, Information Retrieval System Capabilities -Search, Browse, Miscellaneous.

UNIT – II: Cataloging and Indexing

Objectives, Indexing Process, Automatic Indexing, Information Extraction Data Structures- Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT data structure, Signature file structure, Hypertext data structure.

UNIT – III: Automatic Indexing

Classes of automatic indexing, Statistical indexing, Natural language, Concept indexing, Hypertext linkages.

Document and Term Clustering- Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

UNIT – IV: User Search Techniques

Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems, Searching the Internet and hypertext.

UNIT – V: Information Visualization

Introduction, Cognition and perception, Information visualization technologies.

UNIT – VI: Text Search Algorithms

Introduction, Software text search algorithms, Hardware text search systems.

Information System Evaluation- Introduction, Measures used in system evaluation, Measurement example – TREC results.

Text Books:

1. Kowalski, Gerald, Mark T Maybury Kluwer Information Storage and Retrieval Systems: Theory and Implementation Academic Press, 2000.
2. Ricardo Baeza-Yates Modern Information Retrieval , Pearson Education, 2007.

Reference Books:

1. William B Frakes, Ricardo Baeza-Yates Information Retrieval Data Structures and Algorithms , Pearson Education, 1992.
2. David A Grossman and Ophir Frieder Information Retrieval: Algorithms and Heuristics 2nd Edition, Springer International Edition, 2004.
3. Robert Korfhage Information Storage & Retrieval John Wiley & Sons.
4. Christopher D. Manning and Prabhakar Raghavan Introduction to Information Retrieval Cambridge University Press, 2008.

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Elective - III

DIGITAL IMAGE PROCESSING (Common to CSE & IT) IV Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To gain the knowledge in various image processing techniques.

Learning Outcomes:

Students will be able to

- understand the fundamentals of image processing
- use appropriate image enhancement technique to improve the quality of an image.
- Select an appropriate color model for an application.
- Apply suitable image segmentation technique for an application.
- Analyze various image compression techniques.
- Apply morphological operations to modify the structure of an image.

UNIT - I: Introduction

Digital image processing, Examples of fields that use digital image processing, fundamental steps in digital image processing, components of image processing system, Image sensing and Acquisition, sampling and quantization, basic relationships between pixels.

UNIT - II: Image enhancement in the spatial domain

Introduction, Basic gray-level transformations, histogram processing, enhancement using arithmetic and logic operators, Basics of spatial filtering, smoothing and sharpening spatial filters, combining the spatial enhancement methods.

UNIT - III: Color Image Processing

Introduction, Color fundamentals, color models, pseudo color image processing, basics of full color image processing, color transformations, color image smoothing and sharpening, color segmentation.

UNIT - IV: Image Compression

Fundamentals, image compression models, error-free compression, lossy predictive coding.

UNIT - V: Morphological Image Processing

Preliminaries, dilation, erosion, open and closing, hit or miss transformation, basic morphologic algorithms.

UNIT - VI: Image Segmentation

Detection of discontinuous, edge linking and boundary detection, thresholding, region-based segmentation.

Text Book:

1. Rafael C.Gonzalez, Richard E.Woods, Digital Image Processing, Second Edition, Pearson Education/PHI.

Reference Books:

1. Milan Sonka, Vaclav Hlavac and Roger Boyle, Image Processing, Analysis, and Machine Vision, Thomson Learning, Second Edition,.
2. Adrian Low, Computer Vision and Image Processing, B.S.Publications, Second Edition
3. William K. Prat, Digital Image Processing, Wily Third Edition
- 4.. B. Chanda, D. Datta Majumder, Digital Image Processing and Analysis, Prentice Hall of India, 2003.

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MOBILE COMPUTING

IV Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To acquire solid knowledge on mobile networks
- To understand mobile networks Technology
- To Asses Different protocols in mobile networks.
- To distinguish different mobile computing techniques

Learning Outcomes:

Students will be able to

- understand the basics of Wireless Communication.
- describe about various mobile device features
- differentiate various mobile system networks
- apply advanced data communicating methods and networking protocols for wireless
- describe the features of wireless and mobile networks.

Unit – I: Introduction to Mobile Communications

An Overview- Mobile Communication-guided transmission, unguided transmission, modulation methods and standards for data and voice communication, mobile computing- novel applications and limitations, mobile computing architecture, mobile system networks.

Unit – II: Mobile devices and systems

Cellular networks and frequency reuse, mobile smart phones, smart mobiles and systems, handheld pocket computers, handheld devices, smart systems, Limitations of mobile devices.

GSM and other 2G architectures:

GSM-services and system architecture, radio interfaces of GSM, protocols of GSM, Localization, Call Handling, GPRS system architecture.

Unit – III: Wireless medium access control,CDMA,3G and 4G communication

Multiplexing, Controlling the medium access, speed spectrum, coding methods, IMT-2000 3G wireless, WCDMA 3G, CDMA 3G communication standards, broadband wireless access, 4G networks.

Unit – IV: Mobile IP Network layer

IP and mobile IP network layers-OSI layer functions, TCP/IP and Internet Protocol, Mobile IP; Packet delivery and handover management; Location Management, Mobile TCP.

Unit – V: Mobile Ad hoc and Wireless Sensor Networks

Introduction to the Mobile Ad hoc Networks- Fixed infrastructure architecture, MANET infrastructure architecture; MANET- properties ,spectrum, applications; security in Ad-hoc network; Wireless sensor networks; sensor network applications.

Unit – VI: Mobile wireless short Range Networks and Mobile Internet

Wireless networking and wireless LAN, Wireless LAN (WLAN) architecture, IEEE 802.11 protocol layers; WAP 1.1 architecture, WDP, WTLS, Wireless transaction and session layers, Wireless application environment.

Text Book:

1. RAJ KAMAL, “Mobile Computing”, second edition, Oxford University Press.

Reference Books:

1. UWE Hansmann,Lothar Merk,Martin S.Nocklous,Thomas Stober, “Principles of Mobile Computing “ Second editon.Springer.
2. Jochen Schiller, “Mobile Communications”, Second edition,Pearson pub.
3. Asoke k Talukder,hasan ahmed,roopa r yavagal, “Mobile computing, Technology Applications and Service Creation “Second Edition,Mc Graw Hill.

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SOFTWARE PROJECT MANAGEMENT

IV Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To plan and manage projects at each stage of the software development life cycle (SDLC).
- To design effective software projects that support organization's strategic goals.

Learning Outcomes:

Students will be able to

- identify the basic concepts and issues of software project management.
- prepare project plans that address real time management challenges.
- identify important risks facing a new project.
- design effective software development model to meet organizational needs.
- apply appropriate methodologies to develop a project schedule.
- apply appropriate techniques to assess ongoing project performance.

UNIT – I: Introduction

Conventional Software Management- The waterfall model, conventional software Management performance. Evolution of Software Economics- Software Economics, pragmatic software cost estimation. Improving Software Economics- Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

UNIT – II: Software Architectures

The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

UNIT – III: Model based software architectures

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

A Management perspective and technical perspective.

Work Flows of the process- Software process workflows, Iteration workflows.

UNIT – IV: Software Project Planning

Checkpoints of the process- Major mile stones, Minor Milestones, Periodic status assessments.

Iterative Process Planning- Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

UNIT – V: Project Organizations and Responsibilities

Line-of-Business Organizations, Project Organizations, evolution of Organizations. Process Automation- Automation Building blocks, The Project Environment.

UNIT – VI: Project Control and Process instrumentation

The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation, tailoring the Process- Process discriminants.

Text Book:

1. Walker Royce, Software Project Management, Pearson Education, 2005.

Reference Books:

1. Bob Hughes and Mike Cotterell, Software Project Management, Tata McGraw-Hill Edition.
2. Joel Henry, Software Project Management, Pearson Education.
3. Pankaj Jalote, Software Project Management in practice, Pearson Education.2005.

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Open Elective - III

BUILDING SERVICES (Other than CE) IV Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To introduce the concepts of basic services and its applications.
- To equip students with the required information and technologies of building services.
- Application of this knowledge in architectural design project.
- Evolving understanding in students to choose appropriate systems and integrate the same in their design projects.

Learning Outcomes:

Students will be able to

- understand the measures to be taken while planning for sanitation and installation of various sanitary units.
- identify the minimizing and disposal techniques of waste and garbage.
- evaluate the illumination strategies by consuming less energy resources.
- acquaint with distribution of electricity to all units of the project.
- provide fire protection units at service points.

UNIT – I: Water Supply

Tapping of water, Storage and distribution of water in premises, Pipes, piping network, specials, materials, joinery, installation of network both open and concealed, all appurtenances required for installations e.g. taps, faucets, mixing units, valves, flushing cisterns, flushing valves and other fittings.

UNIT – II: Drainage and Sanitation

Study of sanitary fittings with reference to use, materials and functions, traps and their uses, classification of traps as per use and shape, pipes and piping systems, specials, vent and anti-siphonage systems, jointing and installations, storm water and roof drainage systems and their installations, underground drainage systems with application of ventilation, self cleansing velocity, laying of drains to required gradients and testing of drains, disposal of sewage within the premises using septic tanks, effluent treatment plants, their function and layouts.

UNIT – III: Room Acoustics

Key terms & Concepts, Introduction, Acoustic principles, Sound power and pressure levels, Sound pressure level, absorption of sound, Reverberation time,

Transmission of sound. Sound pressure level in a plant room, out door sound pressure level, Sound pressure level in intermediate space, noise rating, Data requirement, output data.

UNIT – IV: Lighting and Ventilation

Indoor lighting- natural and artificial, systems of lighting such as direct, indirect, diffused, applications of lighting systems with reference to levels of illumination for various uses and lumen method calculations, light fittings/ luminaries-All types of energy efficient lamps, optic fiber, led etc. Ventilation - Introduction, Ventilation requirements, Natural and Mechanical systems, Removal of heat gains Psychrometric cycles, Ventilation rate measurement, Material for ventilation duct work.

UNIT– V: Electrification

Introduction to generation and distribution of electric power in urban areas, substations for small schemes in industrial units, electrical system installations in a building from the supply mains to individual outlet points, including meter board, distribution board and layout of points with load calculations, electrical wiring systems for small and large installations including different material specification electrical control and safety devices- switches, fuse, circuit breakers, earthing, lightning conductors etc.

UNIT – VI: Fire Protection, Plant and Service Areas

Key terms and concepts, introduction, Fire classification, Portable existing gushers, Fixed – Fire fighting installation, fire detectors and alarus, smoke ventilation. Key terms and conditions, Introduction, Mains and services, Plant room space requirements, service ducts, pipe, duct and cable supports, plant connections, Co-ordinated service drawings boiler room ventilation.

Text Books:

1. S.C.Rangwala, Water supply and sanitary engineering, Charotar publishing house.
2. A. Kamala & DL Kanth Rao, Environmental Engineering, Tata McGraw – Hill publishing company Limited

Reference Books

1. Technical teachers Training Institute (Madras), Environmental Engineering, Tata McGraw Hill publishing Company Limited.
2. M.David Egan, Concepts in Building Fire Safety.28
3. V.K.Jain, Fire Safety in Building.
4. E.G.Butcher, Smoke control in Fire-safety Design.
5. National Building Code 2005.

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Open Elective - III

MODERN OPTIMIZATION TECHNIQUES

IV Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To familiarize the students with the concepts of evolutionary optimization
- To develop an understanding of Genetic Algorithm
- To expose students to Particle Swarm Optimization
- To introduce the principles of Differential Evolution
- To gain knowledge on Ant Colony Optimization

Learning Outcomes:

Students will be able to

- analyze the pros and cons of different optimization techniques.
- describe the concepts of various techniques.
- develop suitable algorithms for the implementation of above techniques.
- apply these techniques to solve various engineering optimization problems .
- compare the performance of various techniques.
- select a suitable technique to optimize a given problem.

UNIT – I: Definition-Classification of optimization problems

Unconstrained and Constrained optimization-Optimality conditions, Evolution in nature-Fundamentals of Evolutionary algorithms- Evolutionary Strategy and Evolutionary Programming.

UNIT – II: Genetic Algorithm

Basic concepts- search space- working principle -encoding-fitness function - Genetic Operators-Selection: Roulette-wheel, Boltzmann, Tournament, Rank and Steadystate-Elitism- Crossover: single-point, two-point, multi-point, uniform, matrix and cross over rate.

UNIT – III: Mutation

Mutation, mutation rate. Variations of GA: Adaptive GA and Real coded GA - Issues in GA implementation-Particle Swarm Optimization: Introduction-Fundamental principles of Particle Swarm Optimization-Velocity Updating-Advanced operators-Parameter selection.

UNIT – IV:

Binary, discrete and combinatorial PSO-Implementation issues-Convergence issues, Multi-objective PSO (Dynamic neighbourhood PSO-Vector evaluated PSO)-Variations of PSO: weighted, repulsive, stretched, comprehensive learning, combined effect PSO and clonal PSO.

UNIT – V: Differential Evolution

Introduction-Fundamental principles of Differential Evolution- different strategies of differential evolution-function optimization formulation-mutation and crossover operators-estimation and selection-Discrete Differential Evolution.

UNIT – VI: Ant Colony Optimization

Introduction-Fundamental principles of Ant colony optimization-Ant foraging behaviour-initialization-transition strategy-pheromone update rule- applications.

Text Books:

1. Kalyanmoy Deb, “Multi objective optimization using Evolutionary Algorithms”, John Wiley and Sons, 2008.
2. E. Goldberg, Genetic Algorithms in search, Optimization and machine learning, 1989
3. Particle Swarm Optimization, An overview by Riccardo Poli, James Kennedy, Tim Blackwell, Springer
4. Differential Evolution, A Practical Approach to Global Optimization, Authors: Price, Kenneth, Storn, Rainer M., Lampinen, Jouni A. , Springer
5. Ant Colony Optimization by Marco Dorigo, Thomas Stutzle, MIT Press.

Reference Books:

1. Soliman Abdel Hady, Abdel Aal Hassan Mantawy, “Modern optimization techniques with applications in Electric Power Systems”, Springer,2012.
2. M. Mitchell, ‘Introduction to Genetic Algorithms”, Indian reprint, MIT press Cambridge, 2nd edition, 2002.
3. R.C. Eberhart, Y.Sai and J. Kennedy, Swarm Intelligence , The Morgan Kaufmann Series in Artificial Intelligence, 2001.
4. K.M. Passino, Biomimicry for optimization, control and automation, Springer-Verlag, London, UK, 2005.
5. G. C. Onwubolu, & B. V. Babu, New Optimization Techniques in Engineering, Springer- Verlag Publication, Germany, 2003.

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Open Elective - III

ELECTRICAL POWER UTILIZATION

(Other than EEE)

IV Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To familiarize the students with the mechanics of train movement.
- To gain knowledge on selection of appropriate heating method.
- To introduce the laws of illumination.
- To develop an understanding of refrigeration and air-conditioning.
- To expose students to the process of electrolysis.

Learning Outcomes:

Students will be able to

- analyze the appropriate type of traction system.
- select a suitable method of heating for a given application.
- design an illumination system.
- calculate the required tonnage capacity for a given air-conditioning system.
- select a suitable charging method.
- evaluate domestic wiring connection and debug any faults occurred.

UNIT – I: Electrical Traction

Features of an Ideal Traction System, Systems of Electrical Traction, Traction Supply System, Mechanism of Train Movement, Speed- Time Curve, Traction Motors, Tractive Effort and Horse Power, Speed Control Schemes, Electric Braking, Recent Trends in Traction.

UNIT – II: Electric Heating

Classification, Heating Element, Losses in Oven and Efficiency, Resistance Furnace, Radiant Heating, Induction Heating, High Frequency Eddy Current Heating, Dielectric Heating, Arc Furnace, Heating of Furnace, Electric Welding, Methods and Equipments.

UNIT – III: Illumination

Radiant Energy, Terms and Definitions, Laws of Illumination, Polar Curves, Photometry, MSCP, Integrating Sphere, Luminous Efficacy, Electrical Lamps, Design of Interior and Exterior Lighting Systems, Illumination Levels for Various Purposes, Light Fittings, Factory Lighting, Flood Lighting, Street Lighting, Energy Conservation in Lighting.

UNIT – IV: Air Conditioning and Refrigeration

Control of Temperature, Protection of Motors, Simple Heat-Load and Motor Calculations, Various Types of Air Conditioning, Functioning of Complete Air Conditioning System, Type of Compressor Motor, Cool Storage, Estimation of Tonnage Capacity and Motor Power.

UNIT – V: Electro-Chemical Processes

Electrolysis – Electroplating – Electro deposition – Extraction of metals current, Efficiency - Batteries – types – Charging Methods.

UNIT – VI: Basics of Domestic Electrical Wiring

Types of Cables, Flexible Wires Sizes and Current Capacity, Use of Fuse, MCB and MCCB (Working and Construction), Idea about Megger, Earthling – Domestic and Industrial.

Text Books:

1. Garg and Girdhar, “Utilisation of Electric Energy” 1982, Khanna Publisher.
2. Pratab H., “Art and Science of Utilization of Electrical Energy”, Second Edition, Dhanpat Rai and Sons, New Delhi.

Reference Books:

1. Wadhwa C.L., “Generation, Distribution and Utilization of Electrical Energy”, 1993, Wiley Eastern Limited,
2. S.C.Tripathy, “Electric Energy Utilization and Conservation”, 1993, Tata McGraw Hill.
3. R.K. Rajaput, . “Utilization of Electric Power”, Laxmi Publications, 1st Edition, 2007.
4. N.V.Suryanarayana, “Utilization of Electric Power”, New Age International, 2005
5. C.L.Wadhwa, “Generation, Distribution and Utilization of Electrical Energy, New Age International, 4th Edition, 2011.
6. M. Prasad, Refrigeration and Air-conditioning, Wiley Eastern Ltd., 1995 .
7. Taylor E. Openshaw, “Utilization of Electrical Energy”, 1968, Orient Longman.
8. Gupta J. B., “Utilization of Electric Power and Electric Traction”, 2002, S. K. Kataria and Sons.

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Open Elective - III

ROBOTICS **(Other than ME)** IV Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To familiarize the students with anatomy, kinematics, sensors and dynamics of a programmable machine, robot.

Learning Outcomes:

Students will be able to

- distinguish between fixed automation and programmable automation.
- identify various components of robot.
- select appropriate type of actuator for a joint.
- illustrate robot applications in manufacturing.
- analyze kinematics of a robot.
- derive equations of motion of a manipulator for a particular application.
- write a programme to control a robot for execution of a work cycle.

UNIT – I: Introduction

Automation and Robotics, Components of Robot – Mechanical manipulator-control system and end effectors-Types of end effectors — Requirements and challenges of end effectors classification of robots by coordinate system and control system. Control resolution, accuracy, repeatability and work volume of robot.

UNIT – II: Robot actuators and Feed back components

Actuators: Pneumatic, Hydraulic actuators, electric & stepper motors.

Feedback components: position sensors – potentiometers, resolvers, encoders – Velocitysensors.

UNIT – III: Robot Application in Manufacturing

Material Transfer - Material handling, loading and unloading- Processing - spot and continuous arc welding & spray painting - Assembly and Inspection.

Future applications of robots.

UNIT – IV: Motion Analysis

Homogeneous transformations as applicable to rotation and translation – problems.

Manipulator Kinematics: Specifications of matrices, D-H notation joint coordinates and world coordinates Forward and inverse kinematics – problems.

UNIT – V:

Differential transformation and manipulators, Jacobians – problems. Dynamics: Lagrange – Euler and Newton – Euler formations – Problems.

UNIT – VI:

Trajectory planning and avoidance of obstacles, path planning, Slew motion, joint integrated motion – straight line motion – Robot programming, languages and software packages.

Text Books:

1. Industrial Robotics / Groover M P / Pearson Edu.
2. Robotics and Control / Mittal R K & Nagrath I J / TMH.

Reference Books:

1. Robotics / Fu K S/ McGraw Hill.
2. An Introduction to Robot Technology, / P. Coiffet and M. Chaironze / Kogam Page Ltd. 1983 London.
3. Robotic Engineering / Richard D. Klafter, Prentice Hall.
4. Robot Analysis and Intelligence / Asada and Slow time / Wiley Inter-Science.
5. Introduction to Robotics / John J Craig / Pearson Edu.
6. Robot Dynamics & Control – Mark W. Spong and M. Vidyasagar / John Wiley & Sons (ASIA) Pte Ltd.

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ASSISTIVE TECHNOLOGIES

IV Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- Understand the laws that govern the use of assistive technology in higher education.
- Evaluate appropriate pieces of technology according to a student's specific disability and academic needs.

Learning Outcomes:

Students will be able to

- identify the legislative policies connected with assistive
- discuss Universal design principles in the context of general education environments and curriculum materials.
- explore the process for finding the right technology and the right applications, and determine how to pay for it.
- explore and discuss how to establish a technology team with an assistive technology representative, perform a school wide assessment of all student needs and develop a school and/or classroom tech plan.

UNIT – I: Introduction to Assistive Technology (AT) Devices and Services

Assistive Technology Defined. Historical Overview of Assistive Technology. Multidisciplinary Nature of at Service Provision.

UNIT – II: Adaptations Framework for Considering Assistive Technology

Introduction to the Adaptations Framework, Setting-Specific Demands, Person-Specific Characteristics, Adaptations, Evaluation of Effectiveness of Adaptations.

UNIT – III: Assistive Technology Assessments

Overview of Assessment Issues, Overview of General Assessments , Assistive Technology Assessments, Assessment Components.

UNIT – IV: Enhance Speech Communication

Nature of Spoken Language, Introduction to Augmentative and Alternative Communication Systems, Selection Techniques for Aided Communication Systems, Overview of Nonelectronic Systems and Electronic Devices.

UNIT – V: Mobility & Access to Information

Introduction to Mobility Adaptations, Basic Design Considerations, Seating and Positioning Issues. Introduction to Information Access, Computer Access, Telecommunication, Listening and Print Access.

UNIT – VI: Enhance Independent Living

Introduction to Independent Living, Devices for Daily Life, Switches and Scanning. Environmental Control Units, Access to Management Devices.

Text Books:

1. Diane P edrotty Bryant, Brian R. Bryant, Allyn and Bacon “Assistive Technology for People with Disabilities”, 2nd edition ***Psycho-Educational Services***
2. Amy G.Dell, Deborah A.Newton, Jerry G.Petroff, “Assistive Technology in the class room Enhancing the school experiences of students with disabilities”, Pearson Publications

Reference Books:

1. Marion A.Hersh, Michael A.Johnson , “ Assistive Technology for the Hearing-impaired, Deaf and Deafblind”, Springer Publications
2. Meeko Mitsuko K.Oishi, Ian M.Mitchell, H.F. Machiel vanderloss, “Design and use of Assistive Technology, Springer Publications.
3. Eckehard Fozzy Moritz, “Assistive Technologies for the Interaction of the Elderly”, Springer Publications.

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Open Elective - III

INTRODUCTION TO EMBEDDED SYSTEMS

(Other than ECE, CSE & IT)

IV Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To gain knowledge on basic quantitative principles of embedded system design and performance measurements.
- To study about different embedded firmware and RTOS concepts

Learning Outcomes:

Students will be able to

- know the design concepts of different embedded systems.
- know the embedded system components and firmware.
- learn about the techniques of the task communication and RTOS concepts
- design principles of RTOS Based Embedded System Design

UNIT – I: Introduction to Embedded Systems

Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT – II: Typical Embedded System

Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory selection for Embedded Systems, Processor selection for embedded system.

UNIT – III: Embedded System Components and Firmware

Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware design approaches and Development languages.

UNIT – IV: Embedded communication interface

Communication Interface: Onboard and External Communication Interfaces, Serial/ Parallel Communication – Serial communication protocols -RS232 standard – RS485 –Serial Peripheral Interface (SPI) – Inter Integrated Circuits (I2C).

UNIT – V: RTOS Based Embedded System Design

Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT – VI: Task Communication

Task Synchronization, Task communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

Text Books:

1. Shibu K.V, "Introduction to Embedded Systems ",Mc Graw Hill. (I to VI Units)
2. Raj Kamal,"Embedded Systems", TMH. (IV Unit)

Reference Books:

1. Frank Vahid, Tony Givargis,"Embedded System Design", John Wiley.
2. Lyla, "Embedded Systems", Pearson, 2013
3. David E. Simon, "An Embedded Software Primer", Pearson Education.

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SOCIAL NETWORKS

IV Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To provide basic concepts of Social networks and make them learn the psychological foundations of Social networks.
- To Know about Network Influence and diffusion

Learning Outcomes:

Students will be able to

- describe Social network concepts.
- categorize segmentation and Characteristics.
- analyze psychological foundation of Social networks.
- evaluation of various organizations of networks.
- define Network Influence and diffusion.
- design social network systems in different areas.

UNIT – I:

Basic social network concepts-Distributions- Multiplexity-Roles and positions-Embedded of the informal within instituted or named networks.

UNIT – II:

Network segmentation-Named and Unnamed Network segments-segmenting groups on the basis of cohesion-structural similarity and structural equivalence.

UNIT – III:

Psychological foundations of social networks-safety-effectiveness-Status-Limits on individual networks

UNIT – IV:

Organizations and networks Information-Driven organizations-Bridging the gaps: Network size, diversion and social cohesion

UNIT – V:

Networks, Influence and diffusion – influence and decision making-epidemiology and network diffusion.

UNIT – VI:

Network as social capital –Individual level social capital-social capital as an attribute of social systems.

Text Books:

1. Understanding Social Networks: Theories, Concepts, and Findings By Charles Kadushin.

Reference Books:

1. Social Networks and the Semantic Web By Peter Mika.
1. **Social Network Analysis: Methods and Applications** By Stanley Wasserman, Katherine Faust

Open Elective - III

MOBILE APPLICATION DEVELOPMENT

(Other than CSE & IT)

IV Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course objectives:

- To prepare students with skills and knowledge of Mobile application development using J2ME Technology.
- Understand the Android OS architecture and able to develop the applications for mobile devices

Learning Outcomes:

Students will be able to

- configure a J2ME environment for development.
- plan and design of J2ME applications.
- access and work with database under the J2ME.
- reproduce the installation of the Android Eclipse SKD.
- implement the user interface for android applications.
- use best design practices for mobile development, designing applications for performance and responsiveness and also implement communication between the mobile devices.

UNIT – I: J2ME Overview

Inside J2ME, How J2ME Is Organized, J2ME and Wireless Devices, What J2ME Isn't, Other Java Platforms for Small Computing Devices.

J2ME Architecture and Development Environment : J2ME Architecture ,Small Computing Device Requirements, Run-Time Environment, MIDlet Programming .Java Language for J2ME ,J2ME Software Development Kits ,Hello World J2ME Style Multiple MIDlets in a MIDlet Suite ,J2ME Wireless Toolkit.

UNIT – II:

Commands, Items, and Event Processing: J2ME User Interfaces ,Display Class ,The Palm OS Emulator ,Command Class ,Item Class ,Exception Handling .High-Level Display: Screens :Screen Class , Alert Class, Form Class ,Item Class ,List Class, Text Box Class, Ticker Class.

Canvas: The Canvas, User Interactions Graphics, Clipping Regions, Animation

UNIT – III:

Record Management System : Record Storage ,Writing and Reading Records, Writing and Reading Mixed Data Types ,Record Enumeration ,Sorting Records, Searching Records ,Record Listener .

J2ME Database Concepts: Data, Databases, Database Schema, Overview of the JDBC Process, Database Connection.

UNIT – IV:

Installation and configuration of android, starting an android application project: components, debugging with eclipse. Application design: the screen layout and Main.xml file, components ids, controls, creating and configuring android Emulator, communication with emulator.

UNIT – V:

controls and user interface: radio buttons, radio group ,the spinner, data picker, buttons, array adapter .

view class: combining graphics with a touch listener ,canvas, bitmap, paint ,motion event.

UNIT – VI:

working with images :display images ,using images stored on android devices ,image view, working with text files ,working with data tables, using sqlite ,using xml for data exchange, cursor, content values, XML PUL Parser, XML Resource parser.

Client -server applications: socket, server socket, HTTP URL connection, URL.

Text Books:

1. J2ME: The Complete Reference by James Keogh ,McGraw-Hill/Osborne.
2. Android Application development for java programmers by James C Sheusi, Cengage Learning

Reference Books

1. **Core J2ME Technology by John W. Muchow, Prentice Hall PTR; 1st edition.**
2. **Enterprise J2ME : developing mobile java applications –Michael Juntao yuan,pearson Education ,2004.**
3. **Beginning java ME platform, Ray Richpater, Après, 2009.**
4. **Android apps for absolute Beginners by Wallace Jackson, Apress.**
5. **Begining android 4 application development, Wei-meng Lee, wiley**
Programming android, Ziguord Mednieks, Laired Dornin, G.Blake Meike & Masumi Nakameera, Orelly

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REAL - TIME SYSTEMS

IV Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To familiarize with the concepts of Real – Time systems.

Learning Outcomes:

Students will be able to

- understand the use of multi tasking techniques in real time systems.
- evaluate the performance of soft and hard real time systems.
- analyze multi task scheduling algorithms for periodic, aperiodic and sporadic tasks.
- design real time operating systems.

UNIT – I:

Real-Time systems, typical real-time applications, hard versus soft real-time systems, a reference model of real-time systems.

UNIT – II:

Commonly used approaches to hard real-time scheduling, clock-driven scheduling,

UNIT – III:

Priority-driven scheduling of periodic tasks, scheduling aperiodic and sporadic jobs in priority- driven systems.

UNIT – IV:

Resources and resource access control, multiprocessor scheduling and resource access control.

UNIT – V:

Scheduling flexible computations and tasks with temporal distance constraints.

UNIT – VI:

Real-Time Communications, Operating Systems.

Text Books:

1. Jane Liu, Real-Time Systems, Prentice Hall, 2000.
2. Philip.A.Laplante, Real Time System Design and Analysis, 3rd Edition, PHI, 2001.

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Open Elective - III

NETWORK MANAGEMENT SYSTEMS

IV Year – I Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To understand key elements of Network Management.
- To understand the various Network management tools.

Learning Outcomes:

Students will be able to

- analyze the key elements of Network Management.
- distinguish different types of SNMPs.
- apply the remote monitoring mechanism for an application.

UNIT – I: Data communications

Analogy of Telephone Network Management, Communications protocols and Standards, Challenges of Information Technology Managers

UNIT – II: Network Management

Goals, Organization, and Functions, Network and System Management, Network Management System Platform, Current Status and future of Network Management.

UNIT – III: 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 – IV: SNMPv1 Network Management

Communication and Functional Models, The SNMP Communication Model, Functional model

UNIT – V: SNMP Management

SNMPv2: Major Changes in SNMPv2, SNMPv2 System Architecture, SNMPv2 Structure of Management Information, the SNMPv2 Management Information Base, SNMPv2 Protocol, Compatibility with SNMPv1

UNIT – VI: SNMP Management

RMON: What is Remote Monitoring? , RMON SMI and MIB, RMON1, RMON2, ATM Remote Monitoring

Network Management Tools and Systems: Network Management Tools, Network Statistics Measurement Systems.

Text Book:

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

Reference Books:

1. Network management, Morris, Pearson Education.
2. Principles of Network System Administration, Mark Burges, Wiley Dreamtech.
- . Distributed Network Management, Paul, John Wiley.

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Open Elective - III

FUNDAMENTALS OF E-COMMERCE

(Other than CSE & IT)

IV Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To introduce the basic concepts of E-Commerce.
- To gain the knowledge on various Mercantile Process models.
- To identify the fundamental concepts in E-Payment systems like smart card, credit card..etc
- To expose to electronic data interchange (EDI) problems.

Learning Outcomes:

Students will be able to

- outline the fundamentals in E-Commerce.
- describe various Mercantile Process models.
- discuss about various E-Payment systems.
- identify electronic data interchange (EDI) problems.
- describe various Advertising techniques on internet

UNIT – I: Electronic Commerce-Frame work

Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

UNIT – II: Consumer Oriented Electronic commerce

Consumer Oriented Electronic commerce - Mercantile Process models.

UNIT – III: Electronic payment systems

Electronic payment systems - Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

UNIT – IV: Inter Organizational Commerce

Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

UNIT – V: Intra Organizational Commerce

Work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT – VI: Advertising and Marketing

Information based marketing, Advertising on Internet, on-line marketing process, market research

Text Book:

1. Kalakota, Whinston *Frontiers of electronic commerce*, Pearson.

Reference Books:

1. Hendry Chan, Raymond Lee, Tharam Dillon, Ellizabeth Chang *E-Commerce fundamentals and applications*, John Wiley.
2. S.Jaiswal – Galgotia *E-Commerce*.
3. Kenneth C.Taudon, Carol Guyerico Traver *E-Commerce – Business, Technology, Society*.

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Open Elective - III

STATISTICAL METHODS USING R SOFTWARE

IV Year – I Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To understand statistical concepts.
- To know R software.

Learning Outcomes:

Students will be able to

- examine the relationship between the variables and forecast.
- apply suitable range of statistical tests.
- use R for statistical programming, Computation, Graphics, and modeling.
- expand their knowledge of R on their own.

UNIT – I: Correlation-Regression

Simple correlation for ungrouped data , rank correlation and simple regression.

UNIT – II: Testing of Hypothesis

Introduction - population-sample-large sample and small sample. Testing of hypothesis - hypothesis - null hypothesis - alternative hypothesis - level of significance - degrees of freedom - one tailed and two tailed tests - procedure of testing of hypothesis.

UNIT – III: One Sample Significance Tests

One sample tests: Large sample - Test for single mean, single proportion, Small sample tests: t-test for single mean.

UNIT – IV: Two Sample Significance Tests

Two sample tests : Large sample - test for two means, two proportions, Small sample: t-test for two means, F-test.

UNIT – V: Introduction to R software

An introductory R session- R as a calculator- Getting help and loading packages- Data entry and exporting data.

Correlation and Regression using R: Calculating correlation coefficient- calculating rank correlation- finding regression lines- interpretations

UNIT – VI: One Sample and Two Sample Tests using R

Large sample: Calculating Z value for single and two means - interpretation -

Calculating Z value for single proportion and two proportions-interpretations

Small sample: Calculating t for single mean and two means- interpretations

Calculating F value -interpretations

Text Books:

1. S.C.Gupta and V.K.kapoor-Fundamentals of Mathematical Statistics-S.chand & co.
2. Probability and Statistics, Dr. T. K. V. Iyengar, Dr. B. Krishna Gandhi, S. Ranganatham and Dr. M.V. S. S. N. Prasad, S. Chand & Company Ltd.
3. Peter Dalgaard. Introductory Statistics with R (Paperback) 1st Edition Springer-Verlag New York, Inc. ISBN 0-387-95475-9
4. W. N. Venables and B. D. Ripley. 2002. Modern Applied Statistics with S. 4th Edition. Springer. ISBN 0-387-95457-0

Reference Books:

1. An Introduction to R. Online manual at the R website at <http://cran.r-project.org/manuals.html>
2. Andreas Krause, Melvin Olson. 2005. The Basics of S-PLUS. 4th edition. Springer-Verlag, New York. ISBN 0-387-26109-5.

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MOBILE APPLICATION LAB

IV Year – I Semester

Practical : 3

Internal Marks : 25

Credits : 2

External Marks : 50

Course Objectives:

- To gain knowledge about development of application software for Mobile
- To learn the development of android mobile application

Learning Outcomes:

Students will be able to

- implement J2ME applications that run on a mobile.
- implement J2ME applications that make SOCKET connection to the server.
- implement android mobile applications.

List of Experiments:

1. Write a J2ME program to show how to change the font size and color.
2. Write a J2ME program which creates the following kind of menu.
 - a. Cut
 - b. Copy
 - c. Paste
 - d. Delete
 - e. Select all
 - f. Unselect all
3. Create a J2ME menu which has the following options(Event Handling):
 - a. Cut – can be on / off
 - b. Copy – can be on / off
 - c. Paste – can be on / off
 - d. Delete – can be on / off
 - e. Select all – put all 4 options on
 - f. Unselect all - put all 4 options off
4. Create a MIDP application, which draws a bar graph to the display. Data values can be given at int[] array. You can enter four data(integer) values to the input text field.
5. Create a MIDP application which examine, that a phone number, which a user has entered is in the given format(Input checking):
 - a. Area code should be one of the following: 040, 041, 050, 0400, 044
 - b. There should be 6-8 numbers in telephone number (+area code)
6. Write a sample program to show how to make a SOCKET connection from J2ME phone. This J2ME sample program shows how to make a SOCKET connection from a J2ME phone. Many a times there is a need to connect backend HTTP server from the J2ME application. Show how to make a SOCKET connection from the phone to port 80.

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MULTIMEDIA APPLICATION DEVELOPMENT LAB

IV Year – I Semester

Practical : 3

Internal Marks : 25

Credits : 2

External Marks : 50

Course Objectives:

- To gain knowledge on creating basic multimedia applications
- To use Action script to create basic multimedia programs
- To create simple animations.

Learning Outcomes:

Students will be able to

- create basic multimedia programs
- use Action script to create programs
- write code for Sorting or Reversing an array

List of Experiments:

1. Assigning Actions to an Object and a Button
2. Drawing shapes like circle, rectangle. Apply colors to them.
3. Fill the shapes with gradient
4. Calculate distance between the points.
5. Conversion between units of measurement and currencies
6. Implement a action script program using keyboard events and mouse events
7. Create a program to give different movements like velocity, acceleration, easing, friction to an object on stage.
8. Create a flash program using ActionScriptMovieClip subclass
9. Create a program to detect collision.
 - a. Collision with objects
 - b. Collision with points
 - c. Collision with on stage boundaries
10. Create program to use sound file in flash program with various option like play, pause, stop, volume increase and decrease

All the above programs are to be done in Adobe Flash CS3 or higher.

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FREE AND OPEN SOURCE SOFTWARE LAB

IV Year – I Semester

Practical : 3

Internal Marks : 25

Credits : 2

External Marks : 50

Course Objectives:

- To practice python program environment
- To familiarize with MySQL database
- To learn perl and CGI scripting
- To learn NS2 simulator

Learning Outcomes:

Students will be able to

- implement sample python programs
- prepare MySQL database with PHP
- write perl and CGI scripting for web pages
- practice NS2 simulator for local area network

List of Experiments:

1. Write a python program to perform the following
 - a. String Concatenation
 - b. function in Lists
2. Write a python program to perform the following
 - a) Prime Number using Python.
 - b) The Range () and Len() in Python
3. Write a python program to perform the following
 - a. Fibonacci Series using Python
 - b. Set operations in Python
4. Write program for Employee Management System using in python.
5. Study about the MySQL connectivity with PHP to create a student database and add values into it using the connectivity.
6. Create a login page and validate that login page by using PHP.
7. Create a program in Perl to find the palindrome using simple subroutine and recursion function.
8. Study the Perl and CGI connectivity to create a database and add the details into the database dynamically using the browser.
9. Study in detail about the installation of the NS2 simulator using the open source environment.
10. Write a program for NS2 Simulation in single processing using TCP.

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Elective - IV

E-COMMERCE

IV Year – II Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives

- To introduce the basic concepts of E-Commerce
- To gain the knowledge on various Mercantile Process models
- To identify the fundamental concepts in E-Payment systems like smart card, credit card etc
- To expose to electronic data interchange (EDI) problems

Learning Outcomes:

Students will be able to

- outline the fundamentals in E-Commerce
- describe various Mercantile Process models
- discuss about various E-Payment systems
- identify electronic data interchange (EDI) problems
- describe various work flow managements

UNIT – I: Electronic Commerce-Frame work

Electronic Commerce-Frame work, anatomy of E-Commerce applications, E-Commerce Consumer applications, E-Commerce organization applications.

UNIT – II: Consumer Oriented Electronic commerce

Consumer Oriented Electronic commerce - Mercantile Process models.

UNIT – III: Electronic payment systems

Digital Token-Based, Smart Cards, Credit Cards, Risks in Electronic Payment systems.

UNIT-IV: Inter Organizational Commerce

Inter Organizational Commerce - EDI, EDI Implementation, Value added networks.

UNIT – V: Intra Organizational Commerce

Work Flow, Automation Customization and internal Commerce, Supply chain Management.

UNIT – VI: Corporate Digital Library

Document Library, digital Document types, corporate Data Warehouses. Advertising and Marketing - Information based marketing, Advertising on Internet, on-line marketing process, market research.

Text Book:

1. Kalakota, Whinston *Frontiers of electronic commerce* , Pearson.

Reference Books:

1. Hendry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang E-Commerce fundamentals and applications, John Wiley.
2. S.Jaiswal – Galgotia E-Commerce
3. Kenneth C.Taudon, Carol Guyerico Traver E-Commerce – Business, Technology, Society.

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Elective - IV

PATTERN RECOGNITION (Common to CSE & IT) IV Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To introduce various pattern recognition and dimensionality reduction techniques

Learning Outcomes:

Students will be able to

- understand how the pattern recognition system works.
- classify the patterns using Bayesian decision theory.
- model the pattern recognition problem with normal density.
- apply maximum likelihood technique to recognize the patterns.
- work with k-means clustering in categorizing the patterns.
- reduce the dimensionality of the data using PCA, NLCA.

UNIT – I: Introduction

Machine perception, pattern recognition example, pattern recognition systems, the design cycle, learning and adaptation

UNIT – II: Bayesian Decision Theory

Introduction, continuous features – two categories classifications, minimum error-rate classification, zero–one loss function, classifiers, discriminant functions, and decision surfaces

UNIT – III: Normal density

Univariate and multivariate density, discriminant functions for the normal density-different cases, Bayes decision theory – discrete features, compound Bayesian decision theory and context

UNIT – IV: Maximum likelihood and Bayesian parameter estimation

Introduction, maximum likelihood estimation, Bayesian estimation, Bayesian parameter estimation–Gaussian case

UNIT – V: Un-supervised learning and clustering

Introduction, K-means clustering, Data description and clustering – similarity measures, training and testing with continuous HMMs, types of HMMs, Introduction to Discrete Hidden Markov Models.

UNIT – VI: Component analysis

Principal component analysis, non-linear component analysis, Low dimensional representations and multi dimensional scaling.

Text Books:

1. Richard O. Duda, Peter E. Hart, David G. Stroke, Pattern classifications, Wiley student edition, Second Edition.
2. Lawrence Rabiner, Biing – Hwang Juang, Fundamentals of speech Recognition, Pearson education.

Reference Books:

1. Earl Gose, Richard John Baugh, Steve Jost, Pattern Recognition and Image Analysis –PHI 2004.
2. Richard O. Duda, Peter E. Hart, David G. Stroke, Pattern classifications, Wiley student edition.

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Elective - IV

CLOUD COMPUTING (Common to CSE & IT) IV Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To understand Virtualization, Virtual Machine and different models of VM.
- To familiarize Cloud computing architecture and its security aspects.

Learning Outcomes

Students will be able to

- know about basics of cloud computing.
- learn about Cloud computing and its services available today.
- distinguish Virtualization and Virtual Machine and its need, Types of Virtualization
- understand how to provide security for the cloud, disaster recovery and disaster management.
- design a Cloud for an Enterprise.

UNIT – I: Cloud computing

Introduction, what it is and what it isn't, from collaborations to cloud- a short history of cloud computing, the network is the computer- How cloud computing works, companies in the cloud- Cloud computing today.

UNIT – II: Ready for Computing in the cloud

The pros and cons of Cloud Computing, Developing Cloud Services- Why Develop Web-Based Applications?, The Pros and Cons of Cloud Service Development, Types of Cloud Service Development, Discovering Cloud Services Development services and Tools.

UNIT – III: Virtualization

Virtualization for cloud, Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization –System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

UNIT – IV: Security

Data Security, Data Control Encrypt Everything, Regulatory and Standards compliances, Network Security, Firewall rules, Network Intrusion detection, Host Security, System Hardening, Antivirus Protection, Host Intrusion detection, Data segmentation, Credential Management.

UNIT – V: Disaster

What is Disaster, Disaster Recovery Planning, The Recovery Point objective, The Recovery Time Objective, Disasters in the Cloud, Backups and data retention, Geographic redundancy, Organizational redundancy, Disaster Management, Monitoring, Load Balancer Recovery, Application server recovery, Database Recovery.

UNIT – VI: Defining Clouds for the Enterprise

Storage-as-a-Service, Database-as-a- Service, Information-as-a-Service, Process-as-a-Service, Application-as-a- Service, Platform-as-a-Service, Integration-as-a-Service, Security-as-a-Service, Management/Governance-as-a-Service, Testing-as-a-Service Infrastructure-as- a-Service.

Text Books:

1. Michael Miller, Cloud Computing – Web Based Applications That change the way you work and Collaborate Online –Person Education.
2. George Reese Cloud Application Architectures, 1st Edition O'Reilly Media.

Reference Books:

1. David S. Linthicum, Cloud Computing and SOA Convergence in your Enterprise: A Step-by-Step Guide- Addison-Wesley Professional.
2. Kai Hwang, Geoffery C.Fox, Jack J, Dongarra, Distributed & Cloud Computing From Parallel Processing to the Internet of Things.

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BUSINESS INTELLIGENCE

IV Year – II Semester

Lecture	: 3 +1*	Internal Marks	: 40
Credits	: 3	External Marks	: 60

Course Objectives:

- To learn OLTP, OLAP, BI and Framework Concepts
- To know the BI Process, technology, role and responsibilities
- To understand the data integrations approaches
- To learn the data quality concepts and multi dimensional data modeling
- To know the basics of enterprise reporting practices

Learning Outcomes:

Students will be able to

- define OLTP, OLAP, BI and Framework Concepts
- explain the BI Process, technology, role and responsibilities
- describe the data integrations approaches
- distinguish various the data quality concepts and multi dimensional data modeling
- discuss the basics of enterprise reporting practices

UNIT – I: Introduction to Business Intelligence

Introduction to digital data and its types – structured, semi-structured and unstructured, Introduction to OLTP and OLAP (MOLAP, ROLAP, HOLAP), BI Definitions & Concepts, BI Framework, Data Warehousing concepts and its role.

UNIT – II: Aspects of Business Intelligence

BI Infrastructure Components – BI Process, BI Technology, BI Roles & Responsibilities, Business Applications of BI, BI best practices.

UNIT – III: Basics of Data Integration

Concepts of data integration, needs and advantages of using data integration, introduction to common data integration approaches, Meta data – types and sources,

UNIT – IV: Data Quality

Introduction to data quality, data profiling concepts and applications, introduction to ETL using Pentaho data Integration (formerly Kettle).

UNIT – V: Introduction to Multi-Dimensional Data Modeling

Introduction to data and dimension modeling, multidimensional data model, ER Modeling vs. multi dimensional modeling, concepts of dimensions, facts, cubes,

attribute, hierarchies, star and snowflake schema, introduction to business metrics and KPIs, creating cubes using Microsoft Excel.

UNIT – VI: Basics of Enterprise Reporting

A typical enterprise, Malcolm Baldrige – quality performance framework, balanced scorecard, enterprise dashboard, balanced scorecard vs. enterprise dashboard, enterprise reporting using MS Access / MS Excel, best practices in the design of enterprise dashboards.

Text Books:

1. Daniel J. Power (2002), Decision Support Systems: Concepts and Resources for Managers, Greenwood Publishing Group, Inc, USA.
2. Roland Bouman, Jos van Dongen(2009), Pentaho Solutions - Business Intelligence and Data warehousing With Pentaho and MySQL, Wiley Publishing, Inc, Indiana.

Reference Books:

1. Jerzy Surma (2011), Business Intelligence: Making Decisions through Data Analytics, Business Expert Press, New Delhi, India.
2. William H. Inmon(2005), Building the Data Warehouse, 4th edition, Wiley-India Private Limited, New Delhi.
3. Solomon Negash (2004), Communications of the Association for Information Systems, Volume13, USA.
4. Jiawei Han, Micheline Kamber, Jian Pei (2012), Data Mining: Concepts and Techniques, 3rd edition, Elsevier, United States of America.

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BIG DATA
(Common to CSE & IT)
IV Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To familiarize the fundamental concepts of cloud for laying a strong foundation of Apache Hadoop (Big data framework).
- To gain knowledge of HDFS file system, MapReduce frameworks and relevant tools.

Learning Outcomes:

Students will be able to

- describe the fundamentals of Big cloud and data architectures.
- use HDFS file structure and Map reduce frameworks to solve complex problems.
- know how to analyze data using unix tools and hadoop.
- understand how to develop environment for analyzing Bigdata.
- understand how to use mapper and reducer functions
- access the data base in a Hadoop environment using Hive.

UNIT – I: Introduction to Big Data

What is Big Data, Why Big Data is Important, Meet Hadoop- data, Data Storage and Analysis, Comparison with other systems, Grid Computing, a brief history of Hadoop, Apache Hadoop and the Hadoop Eco System.

UNIT – II: MapReduce

Analyzing data with unix tools, Analyzing data with hadoop, Java MapReduce classes (new API), Data flow, combiner functions, Running a distributed MapReduce Job.

UNIT – III: Hadoop Distributed File System

HDFS concepts, Command line interface to HDFS, Hadoop File systems, Interfaces, Java Interface to Hadoop, Anatomy of a file read, Anatomy of a file write, Replica placement and Coherency Model, Parallel copying with distcp, Keeping an HDFS cluster balanced.

UNIT – IV: Developing a MapReduce Application

Setting up the development environment, Managing configuration, Writing a unit test with MRUnit, Running a job in local job runner, Running on a cluster, Launching a job, The MapReduce WebUI.

UNIT – V: MapReduce Working

Classic MapReduce, Job submission, Job Initialization, Task Assignment, Task execution, Progress and status updates, Job Completion, Shuffle and sort on Map and reducer side, Configuration tuning, MapReduce Types, Input formats, Output formats .

UNIT – VI: Hive

The Hive Shell, Hive services, Hive clients, The meta store, Comparison with traditional databases, Hive QL , Tables, Querying data, User-Defined Functions.

Text Books:

1. Tom White, Hadoop, "The Definitive Guide", 3rd Edition, O'Reilly Publications, 2012.
2. Dirk deRoos, Chris Eaton, George Lapis, Paul Zikopoulos, Tom Deutsch "Understanding Big Data Analytics for Enterprise Class Hadoop and Streaming Data", 1st Edition, TMH,2012.

Reference Book:

1. Frank J.Ohlorst, "Big Data Analytics: Turning Big Data Into Big Money", 2nd Edition, TMH,2012.

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SOFT COMPUTING

IV Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To emphasize on learning the design, implementation and application of soft computing methodologies.
- To give a detailed understanding of how to obtain the solution of cross-disciplinary problems quickly.

Learning Outcomes:

Students will be able to

- gain knowledge of Soft Computing
- describe the Fuzzy Logic and Genetic Algorithms and its Hybrid Applications.
- apply hybrid nature of Soft Computing techniques to real world problems.
- define Associative Memory Networks and algorithms.
- implementing the unsupervised networks in different areas.
- evaluate concepts of fuzzy logic and genetic algorithms.

UNIT – I: Introduction Neural Networks, Application Scope of Neural Network, Fuzzy Logic, Genetic Algorithm, Hybrid Systems, Soft Computing. (Text Book1)

UNIT – II: Artificial Neural Network

Fundamental Concept, Evolution of Neural Networks, Basic Models of Artificial Neural Network, Important Terminologies of ANNs, McCulloch -Pitts Neuron, Linear Separability, Hebb Network. (Text Book1)

UNIT – III: Supervised Learning Network

Introduction, Perception Networks, Back-Propagation Network, Radial Basis Function Network and Time Delay Neural Network.(Text Book1)

UNIT – IV: Associative Memory Networks

Introduction, Training Algorithm of Pattern Association, Auto associative Memory Network, Hetero associative Memory Network, Bidirectional Associative Memory, Hopfield Networks (Discrete Only) (Text Book1)

UNIT – V: Unsupervised Learning Networks

Introduction, Fixed Weight Competitive Nets, Kohonen Self-Organizing Motor Maps, Adaptive Resonance Theory Network . (Text Book1)

UNIT – VI : Fuzzy Set Theory, Systems and Logic Control Systems

Fuzzy versus Crisp, Crisp Sets, Fuzzy Sets, Crisp Relations, Fuzzy Relation, crisp Logic, Fuzzy Logic, Fuzzy Rule Based System, De-fuzzification Methods, Applications, Genetic Algorithms.(Text Book2)

Text Books:

1. S.N. Sivanandam and S.N. Deepa, “Principles of Soft Computing”, Wiley India (P) Ltd.
2. S. Rajasekaran and G.A. Vijayalakshmi Pai, “Neural Networks, Fuzzy Logic, and Genetic Algorithms (Synthesis and Applications)”, PHI Education.

Reference Books:

1. S.N. Shivanandam, Principle of soft computing, Wiley. ISBN13: 9788126527410 (2011)
2. Jyh-Shing Roger Jang, Chuen -Tsai Sun, Eiji Mizutani, “Neuro-Fuzzy and Soft Computing”, Prentice-Hall of India, 2003.

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COMPUTER FORENSICS

IV Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives:

- To introduce the concept of computer forensics and their investigations
- To understand the Process of computer forensics analysis and its validation

Learning Outcomes:

Students will be able to

- carry out simple computer investigations using computer forensics tools
- evaluate high-tech investigations
- identify and store the digital evidence from crime scenes
- analyze and validate Computer Forensics data

UNIT – I: Computer forensics and investigations

Understanding computer forensics, preparing for computer investigations, taking a systematic approach, procedure for corporate high-tech investigations, understanding data recovery workstations and software.

UNIT – II: Investor’s office and laboratory

Understanding forensics lab certifications requirements, determining Physical requirements for a computer forensics lab, selecting a basic Forensic workstation.

UNIT – III: Data acquisition

Understanding storage formats for digital evidence, determining the best acquisition method, contingency planning for image acquisition, using acquisition tools, validating data acquisition, performing RAID data acquisition, using remote network acquisition tools, using other forensics acquisition tools

UNIT – IV: Processing crime and incident scenes

Identifying digital evidence, collecting the evidence in private sector incident scenes, Processing law enforcement crime scenes, preparing for a search, securing a computer incident or crime scenes, seizing digital evidence at the scenes, Storing digital evidence, obtaining a digital hash

UNIT – V: Current computer Forensics tools

Evaluating computer forensic tool needs, computer forensic Software tools, Computer forensics Hardware tools, validating and testing Forensics Software.

UNIT – IV : Computer Forensics analysis and validation

Determining what data to collect and analyze, validating forensics data, addressing data hiding Techniques, performing Remote acquisition.

Text Books:

1. Nelson, Philips N. Finger, Steuart, “Computer Forensics and investigations, Cengage Learning.
2. Marjie T Britz, Computer Forensics and Cyber Crime, Second edition , Pearson Education

Reference Books:

1. **Nelson, Guide to Computer Forensics and Investigations, Cengage.**
2. David Cowen, Computer Forensics: A Beginners Guide, TMH

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SOFTWARE QUALITY ASSURANCE

IV Year – II Semester

Lecture : 3 +1*

Internal Marks : 40

Credits : 3

External Marks : 60

Course Objectives

- To learn fundamentals of SQA
- To understand Software quality management
- To know the software quality metrics
- To familiarize with SQA standards

Learning Outcomes:

Students will be able to

- describe fundamentals of SQA
- discuss Software quality management
- identify the software quality metrics
- describe SQA standards

UNIT – I: Fundamentals Of Software Quality Assurance

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

UNIT – II: Managing Software Quality

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

UNIT – III: Software Quality Assurance Metrics

Software Quality – Total Quality Management (TQM) – Quality Metrics – Software Quality Metrics Analysis

UNIT – IV: Software Quality Program

Software Quality Program Concepts – Establishment of a Software Quality Program
Software Quality Assurance Planning – An Overview – Purpose & Scope.

UNIT – V: Software Quality Assurance Standardization

Software Standards – ISO 9000 Quality System Standards - Capability Maturity Model and the Role of SQA in Software Development Maturity

UNIT – VI: SEI CMM

SEI CMM Level 5 – Comparison of ISO 9000 Model with SEI's CMM

Text Books:

1. Mordechai Ben-Menachem / Garry S Marliss, Software Quality, Vikas Publishing House, Pvt, Ltd., New Delhi.(UNIT III to V).
2. Watts S Humphrey Managing the Software Process, Pearson Education Inc.(UNIT I and II)

Reference Books:

1. Gordon G Schulmeyer, Handbook of Software Quality Assurance, Third Edition, Artech House Publishers 2007.
2. Nina S Godbole, Software Quality Assurance: Principles and Practice, Alpha Science International, Ltd, 2004.

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GLOBAL POSITIONING SYSTEMS

IV Year – II Semester

Lecture	: -	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- To understand the concept and usage of GPS for various applications.

Learning Outcomes:

Students will be able to

- explain the GPS components.
- choose a specific GPS receiver and GPS survey method.
- interpret the navigational message and signals received by the GPS satellite
- identify location of features and map the geospatial features.

UNIT – I: Overview and Observables of GPS

Basic concept. Space segment- constellation, satellites, operational capabilities, denial of accuracy and access. Control segment- master control station, monitor stations, ground control stations. User segment- user categories, receiver types, information services.

Observables:

Data acquisition- code pseudorange, phase pseudorange, Doppler data, biases and noise. Data combinations- linear phase combinations, code, pseudorange smoothing. Atmospheric effects- phase and group velocity, ionospheric refraction, tropospheric refraction, atmospheric monitoring.

UNIT – II: Surveying with GPS

Introduction- terminology definitions, observation techniques, field equipment. Planning a GPS survey- General remarks, Pre survey planning, field reconnaissance, monumentation, organizational design. Surveying Procedure- preobservation, observation, postobservation, ties to control monuments. In Situ data Processing- data transfer, data processing, trouble shooting and quality control, datum transformations, computation of plane coordinates. Survey report.

UNIT – III: Methods of Processing GPS Data

Data processing- data handling, cycle slip detection and repair. Ambiguity resolutions- general aspects, basic approaches, search techniques, ambiguity validation. Adjustment, filtering and smoothing- least squares adjustments, Kalman filtering, smoothing. Network adjustment- single base line solution,

multipoint solution, single base line versus multi point solution, least squares adjustment of base lines. Dilution of precision. Accuracy measures- introduction, chi-square distribution, specifications.

UNIT – IV: Applications and Future of GPS

General Uses of GPS- global uses, regional uses, local uses. Attitude determination- theoretical and practical considerations. Air borne GPS for photo control. Interoperability of GPS- GPS and inertial navigation systems, GPS and GLONASS, GPS and other sensors.

Future of GPS:

New application aspects. GPS modernization- future GPS satellites, augmented signal structure. GPS augmentation- ground based and satellite based augmentation. GNSS - GNSS development, GNSS/Loran-C integration.

Text Books:

1. B. Hofmann- Wellnhoff, H.Lichtenegger and J. Collins: GPS theory and practice, fifth edition, Springer Wien, Newyork.
2. Bradford W. Parkinson, James Spilker, Global Positioning System: Theory and Applications, Vol. I, 1996.

Reference Books:

1. Gunter Seeber, Satellite Geodesy Foundations, Methods and Applications, Walter de Gruyter Pub., 2003.
2. Hofmann W.B, Lichtenegger, H, Collins, J Global Positioning System – Theory and Practice, Springer-VerlagWein, 2001.

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INTERIOR DESIGN

IV Year – II Semester

Lecture	: -	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- To understand concepts, principles, procedures and components of communication; interpret reasons of communication failure and source respective remedies.
- To classify communication and select appropriate media; draft business letters and reports pertinent to interior designing profession.
- To work in groups and teams; demonstrate leadership quality; make use of group skills to achieve goals.

Learning Outcomes:

Students will able to

- implement the key features that can enhance architectural view.
- understand the need of designing construction projects.
- identify the paints and materials for specific interior design.

UNIT – I: Interior Design and Decoration, Decoration and Tools

Importance of design - Optimization, Economics, Time, Maintainability, Multiplicity, Role of Interior Designer-Interest of user with respect to economy, comfort, safety, security, etc, Limitations on design due to existing constraints

Aesthetical tools

- a. Principles of Design - Balance, Emphasis, Rhythm, Harmony, Scale and Proportion
- b. Elements of design - Point, Line, Shape, Form, colour and colour theory, Texture and Pattern
- c. Aesthetical design consideration - Physical such as touch, smell, hearing, Social such as interactive, status symbols, Psychological such as derivable pleasure from use, emotional comfort, Ideological such as environmental, patriotic, socialistic conditions .

Functional tools

- a. Ergonomics- Its study - Postures, Anthropometrics, Biomechanics.
- b. Zoning, Grids, Modulation of space within and without, enveloping space within the room and furniture.

UNIT – II: Design Notions

Concepts - Manifestation of realization through contemplative germination, Period & Styles - Historical & Cultural approach with stress on ability to identify Occidental

Periods and Oriental styles and with special focus on Contemporary Indian period and styles.

- a. Occidental - Classical, Medieval, 19th Century AD, Contemporary
- b. Oriental - Japanese, Chinese, Thai, and Indian Themes - The common thread that binds the entire design in a story line on Beach and Mela.

UNIT – III: Planning Process

Understanding process of design (Need-Design brief-Information collection-Developing Alternatives-Analysis-Solution) Planning Process of Interior Design

- a. Design Brief - simple and clear description about what is to be designed.
- b. Relevant Data collection such as location & condition of site, Client profile & requirements, Materials, etc.
- c. Data Analysis - analyzing and forming alternative schemes based on personal interpretations of design brief and relevant data using design tools and design concepts.
- d. Selection- finalizing the best scheme through personal justifications.
- e. Presentation- representing the final scheme in graphical manner.

UNIT – IV: Materials, Paints, Varinishes and Coatings for Interior Design

Cement, Lime, Sand and Gypsum: Types & Properties of Cement, Lime, Fine and Course Aggregates Types & Applications of Concretes, Mortars and Plasters Properties & Applications of Gypsum & its products.

Paints, varnishes and coatings:

Constituents (Pigment, Thinner, etc.), Classification (Water, Oil, acrylic based), Types (lime wash, distempers, acrylic emulsion, metallic, textured, etc.), Textural quality (Matt, Gloss, Satin, Lustre, etc) and Properties Process of painting (preparation of surface, primer coat, etc.) & application of paint with brush, roller, spray, etc. including applications of paints on different surfaces. Constituents, Types & uses of Varnishes, Polishes & Coatings.

Text Books:

1. Joseph De Chaira Jullius Panero Martin Zelnik Time Saver Standard for Interior Design & Space Planning Mcgraw Hill New York.
2. John Pile Interior Design Harry N. Adry Publishers.

Reference Books:

1. Jullius Panero Martin Zelnik Human Dimensions and Interior Spaces Whitney Library New York.
2. Phillis Sleen Allen Beginning of Interior Environment New York.
3. Shirish Bapat Basic Design of Anthropometry Bela books Publishers.
4. Shirish Bapat Living Area (Interior Space) Bela books Publishers.

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Self Study Course

ELECTRICAL SAFETY MANAGEMENT

IV Year – II Semester

Lecture	: -	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- To provide a comprehensive exposure to electrical hazards, safety procedures.
- To familiarize the students with various grounding techniques.

Learning Outcomes:

Students will be able to

- describe electrical hazards and safety equipment.
- analyze and apply various grounding and bonding techniques.
- select appropriate safety method for low, medium and high voltage equipment.
- participate in a safety team.

UNIT – I:

Primary and secondary hazards- arc, blast, shocks-causes and effects-safety equipment- flash and thermal protection, head and eye protection-rubber insulating equipment, hot sticks, insulated tools, barriers and signs, safety tags, locking devices- electrician's safety kit.

UNIT – II:

The six step safety methods- pre job briefings- hot -work decision tree-safe switching of power system, safety equipment, procedure for low, medium and high voltage systems- the one minute safety audit.

UNIT – III:

General requirements for grounding and bonding- definitions- grounding of electrical equipment- bonding of electrically conducting materials and other equipment- connection of grounding and bonding equipment- system grounding- purpose of system grounding- grounding of low voltage and high voltage systems.

UNIT – IV:

Company safety team- safety policy- safety meetings- safety audit- accident prevention- first aid- rescue techniques-accident investigation- national electrical safety code- standard for electrical safety in work place- occupational safety and health administration standards.

Text Book:

1. *Dennis Neitzel*, Al Winfield, 'Electrical Safety Handbook', McGraw-Hill Education, 4th Edition, 2012.

Reference Books:

1. John Cadick, 'Electrical Safety Handbook', McGraw-Hill School Education Group, 1994.
2. Maxwell Adams.J, "Electrical safety- a guide to the causes and prevention of electric hazards", The Institution of Electric Engineers, 1994.
3. Ray A. Jones, Jane G. Jones, 'Electrical safety in the workplace', Jones & Bartlett Learning, 2000.

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Self Study Course

GREEN ENGINEERING

IV Year – II Semester

Lecture	: -	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- To impart knowledge, how engineering fundamentals can be applied to achieve sustainability and minimize environmental impacts in all engineering disciplines across life cycles.

Learning Outcomes:

Students will be able to

- To Create sustainable products, facilities, processes and infrastructure.
- To Design ecofriendly products.

UNIT – I: Introduction

Humanity and Technology, the Concept of Sustainability, Industrial Ecology and Sustainable Engineering Concepts. The Relevance of Biological Ecology to Industrial Ecology, Metabolic Analysis, Technology and Risk, the Social Dimensions of Industrial Ecology.

UNIT – II: Implementation

Sustainable Engineering, Technological Product Development, Design for Environment and Sustainability: Customer Products, Design for Environment and Sustainability: Buildings and Infrastructure.

UNIT – III: Life Cycle Assessment

An Introduction to Life Cycle Assessment, The LCA Impact and Interpretation Stages, Streamlining the LCA Process.

UNIT – IV: Analysis of Technological Systems

Systems Analysis, Industrial Ecosystems, Material Flow Analysis, Energy and Industrial Ecology, Water and Industrial Ecology, Urban Industrial Ecology, Modelling in Industrial Ecology.

Text Books:

1. T E Graedel, Braden R Allenby “Industrial ecology and sustainable engineering” Prentice Hall, ©2010.
2. David T. Allen, David R Shonnard “Sustainable Engineering Concepts, Design and Case Studies” Prentice Hall, 2011.

References Books:

1. Anastas, Paul T, Zimmerman, Julie B, “Innovations in Green Chemistry and Green Engineering”, Springer, First Edition, 2013.
2. Daniel A. Vallero, Chris Brasier, “Sustainable Design: The Science of Sustainability and Green Engineering”, Wiley, First Edition, 2008.

Self Study Course

MANAGING INNOVATION & ENTREPRENEURSHIP

IV Year – II Semester

Lecture	: -	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- Understand process of innovation and its exploitation.

Learning Outcomes:

Students will be able to

- explore opportunities to implement innovative ideas.
- assess the level of risk involved in realizing the innovative ideas as entrepreneur.

UNIT – I:

Innovation and entrepreneurship. A model for innovation and entrepreneurship, the challenge of innovation strategy.

UNIT – II:

The challenge of social entrepreneurship, the potential of “bottom of the pyramid”, challenges in managing social entrepreneurship.

UNIT – III:

Developing new products, services and ventures. The global business plan.

UNIT – IV:

International Opportunities for Innovation and Entrepreneurship. The Future Impact on Innovation on Consumers, Business and Government

Text books:

1. John Bessant, Joe Tidd, “Innovation and Entrepreneurship”, John Wiley and sons Ltd, second edition, 2011.
2. Robert D Hisrich Claudine Kearney “Managing Innovation and Entrepreneurship” SAGE publications, 2014.

Reference Books:

1. Joe Tidd , John Bessant, “Managing Innovation: Integrating technological, market and organizational change” Wiley, Fifth edition, 2013.
2. Joe Tidd , John Bessant, “Strategic Innovation Management”, Wiley, First edition, 2014.
3. Richard Owen , John Bessant , Maggy Heintz , “Responsible Innovation: Managing the Responsible Emergence of Science and Innovation in Society”, Wiley, First edition, 2013.

INTERNET OF THINGS

IV Year – II Semester

Lecture	: -	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- To familiarize with IOT levels and Protocols.
- To provide an insight on specific IoT domain.

Learning Outcomes:

Students will be able to

- integrate Internet services and physical objects.
- analyze prototypes of Internet-connected products using appropriate tools.
- apply adequate patterns for user-interaction with connected-objects

UNIT – I: Introduction to Internet of Things

Introduction, History , Objects and things, The identifier, Enabling technology , The internet.

UNIT – II: RFID

Introduction and principles , Components- Active, Passive, Semi-active, and Semi-passive; Future of RFID, RFID application scenarios-case study

UNIT – III: Wireless Sensor Network

Overview , History, The node, Connecting Nodes, Networking Nodes. Securing communication- standards.

UNIT – IV: Internet of Things Protocols

An Introduction to M2M area network physical layers , Applications, Introduction to Legacy M2M protocols for sensor networks, Examples (Mod Bus, Zig Bee). Introduction to next generation Internet of Things Protocols-IP based protocols.

Text Books

1. **Hakima Chaouchi, “The Internet of Things: Connecting Objects”, John Wiley and sons, ISTE, Briton. (I to III Units).**
2. **Olivier Hersent, David Boswarthick, Omar Elloumi, “The Internet of Things: Key Applications and Protocols”, johnwiley and sons. (IV unit).**

Reference Books:

1. Sergei Evdokimov, Benjamin Fabian, Oliver Gunther, Lenka Ivantysynova, Holger Ziekow, “RFID and the Internet of Things: Technology, Applications, and Security challenges”, Now Publishers Inc, 2011.
2. Lu Yan, Yan Zhang, Laurence T. Yang, Huansheng Ning, “The Internet of Things: From RFID to the Next-Generation Pervasive Networked systems”, Auerbach Publications, CRC Press.

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CONSUMER ELECTRONICS

IV Year – II Semester

Lecture	: -	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- To understand working principles of various electronic gadgets and consumer products.
- To study the various technical specifications and facilities of the consumer products.

Learning Outcomes:

Students will be able to

- how to work with latest electronic gadgets.
- understand audio and video processing.
- keen learn with home appliances.
- should able to differentiate old and latest developments in electronic world

UNIT – I: Audio Systems

PA system – Microphone, Amplifier, Loudspeakers, Radio receivers – AM/FM, Audio recording and reproduction – Cassettes, CD and MP3.

UNIT – II: Video Systems

Video system VCR/VCD/DVD players, MP4 players, Set Top box, CATV and Dish TV, LCD, Plasma & LED TV, Projectors – DLP, Home Theatres, Remote Controls.

UNIT – III: Landline and Mobile Telephony

Basic landline equipment – CLI, Cordless Intercom/ EPABX system, Mobile phones – GPRS & Bluetooth GPS Navigation system.

UNIT – IV: Electronic Gadgets

Scanners – Barcode / Flat bed, Printers, Xerox, Multifunction units (Print, Scan, fax, and copy) Digital clock, Digital camera, Handicam, Home security system, CCTV.

Text Books:

1. S. P. Bali ,”Consumer Electronics”, Pearson Education ,2008.
2. R. G. Gupta “Audio and Video systems: Principles, Maintenance and Troubleshooting”, Tata McGraw Hill (2004).

Reference Books:

1. Ronald K.Jurgen, “Digital Consumer Electronics Handbook”, McGraw Hill Professional Publishing, 1997.
2. R.R Gulati, “Colour Television-principles and practice”, Wiley Eastern Limited, New Delhi.
3. B.R. Gupta, Vandana singhal, ”Consumer Electronics”, S.K. Kataria and sons, 2006.

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e-WASTE MANAGEMENT

IV Year – II Semester

Lecture	: -	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- To familiarize the concepts of e-Waste management.
- To gain knowledge in recycling technologies for e-Waste.

Learning Outcomes:

Students will be able to

- analyze the recycling techniques of e-Waste management.
- analyze various toxic releases and health complications due to e-Waste.
- apply various reuse techniques for e-Waste.
- acquire knowledge for handling and management of e-Waste.
- apply waste disposal strategy for e-Waste.

UNIT – I: Introduction to e-Waste Management in India

Global e-waste growth, Dark shadows of digitization on Indian horizon, e-waste generation, migration, Present practice and systems, disposal methods, Present processing practices, Initiatives to manage e-waste, Strengths and weaknesses of the current system.

UNIT – II: WEEE (waste electrical and electronic equipment) - toxicity and health

Hazardous substances in waste electrical and electronic equipment-toxicity and release, Occupational and environmental health perspectives of e-waste recycling.

UNIT – III: Options and Scenarios for e-Waste Management

Actions to be considered to achieve goals of e-waste management, Collection/ take back system, Closing the Plastic loop: Turning the supply chain into a supply cycle by mining plastics from end-of-life electronics and other durable goods.

UNIT – IV: Recycling technologies for e-waste

Recycling of e-scrap in a global environment-opportunities and challenges, Technologies for recovery of resources from e-waste.

Reuse: A Bridge from Unsustainable e-waste to sustainable e-resources.

Text Books:

1. Rakesh Johri, E-waste: Implications, regulations, and management in India and current global best practices .
2. Klaus Hieronymi, Ramzy Kahhat, Eric Williams, E-Waste Management: from Waste to Resource

Reference Books:

1. Satish Sinha, Priti Mahesh, Waste Electrical and Electronic Equipment The EU and India.
2. By Ronald E. Hester, Roy M. Harrison , Electronic Waste Management .

MANAGEMENT INFORMATION SYSTEMS

IV Year – II Semester

Lecture	: -	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- To understand the scope of information systems and strategies.
- To know the types of information systems and their functionalities in an enterprise.
- To know the applications of information systems in various business areas
- To analyze and develop the system.

Learning Outcomes

Students will be able to

- define the basic concepts, strategies and challenges of MIS.
- describe the nature of the information system in the business process.
- analyze the applications of information system in various functional business areas.
- compare various information system design and analysis.

UNIT – I: Introduction to Information Systems

International Information Systems Meaning, Scope of Information Systems, Concepts of system and organization, strategic uses, Evolution of MIS, Challenges and New opportunities. Growth of international information systems; Managing global information Systems.

UNIT – II: Information System in the Enterprise

Major types of Systems in the organization; Systems from a functional perspective; Enterprise e application–Enterprise systems, Business Process Reengineering and Information Technology.

UNIT – III: Application of Information Systems to Functional Business Areas

Significance of Information systems; Application of Operational Information System to Business;

UNIT – IV: Systems Analysis and Design

Systems analysis; Structured systems analysis and design; Alternative application development and evaluation, IT Act 2000

Text Books:

1. Kenneth C Laudon & Jane P Laudon, Management Information Systems, 8th Edition, PHI–2003.
2. Robert Schultheis & Mary Sumner, Management Information Systems–The Managers View 20th reprint, TMH –2010.

Reference Books:

1. V.M.Prasad, Management Information Systems, 9th Edition, PearsonEducation–2005.
2. Robert G Murdick, Joel E Ross & James R Claggett , Information Systems for Modern Management, 3rd Edition, PHI - 2007.

Self Study Course

INFORMATION & COMMUNICATION TECHNOLOGY

IV Year – II Semester

Lecture	: -	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- To explore the use of internet to access remote information, communicate and collaborate with others.
- To familiarize with social, economic, security and ethical issues associated with the use of ICT.

Learning Outcomes:

Students will be able to

- understand the basic concepts of networking.
- explore internet for learning.
- understand social, economic and security issues associated with the use of ICT.
- apply the concepts of ICT for their professional growth.

UNIT – I: Computer Networks & Internet

Concept, Types & Functions of Computer Networks, Internet and its Applications, Web Browsers & Search Engines, Legal & Ethical Issues.

UNIT – II: E-Learning & Web Based Learning

E-Learning, Web Based Learning, Virtual Classroom- concept, elements, advantages and limitations, EDUSAT

UNIT – III: Effects of using ICT

Software Copyright, Hacking, Viruses & its Management, Employment Patterns, IT in the home, Information from the Internet, Health and Safety.

UNIT – IV: ICT for Professional Development

ICT for Personal & Professional Development: Tools & Opportunities.

Open Education Resources: Concept & Significance.

Text Books:

1. Roger Crawford, Heinemann IGCSE ICT, Pearson Education Limited

Reference Books:

1. Agarwal J.P. (2013): Modern Educational Technology. Black Prints, Delhi.
2. Barton, R. (2004). Teaching Secondary Science with ICT. McGraw Hill International
3. Bhaskar Rao (2013): Samachara Prasara Sankethika vidya Shastramu, Masterminds, Guntur.
4. Cambridge, D. (2010). E-Portfolios for Lifelong Learning and Assessment. John Wiley and Sons

Self Study Course

ORGANIZATIONAL BEHAVIOUR

IV Year – II Semester

Lecture	: -	Internal Marks	: 25
Credits	: 2	External Marks	: 50

Course Objectives:

- To provide a basic knowledge of main ideas and key theories relating to organizational behavior.
- To understand basic concepts, theories and techniques in the field of human behaviour at the individual, group and organizational levels in the changing global scenario.
- To increase managerial effectiveness through understanding of self and others.
- To develop an interest in, an appreciation of, and a positive attitude toward the many aspects of the subject matter of management.

Learning Outcomes:

Students will be able to

- demonstrate clear understanding of a number of established theorists, theories and studies relating to Organizational Behavior.
- explain and evaluate the key assumptions on which behaviour in organizations is currently managed and assess the effect of these ideas on employee attitudes and actions.
- apply problem solving and critical thinking abilities to analyze the kinds of choices available for developing alternative Organizational Behaviour approaches in the workplace.
- form an appreciation of the complexities and uncertainties of Organizational Behaviour by examining your own role in the light of experience of real-time problem settings.

UNIT – I: Introduction

Nature, scope & Importance – linkages with other social sciences – Individual Roles and Organizational Goals - Perspectives of Human Behavior, Approach to Organizational behavior - models of organizational behavior (Autocratic, Custodial, Supportive, Collegial & SOBC).

UNIT – II: Perceptual Management

Nature, importance - Process – selection, organization and interpretation – Influencing factors -Motivation – Concepts - Needs and Motives and theories (Maslow & Herzberg) Leadership and Motivating people - Leadership Theories. Attitudes and Values: formation - types – changes and behavior modification techniques.

UNIT – III: Personality Development

Nature - Stages, Factors, Determinants of Personality, Theories of personality - Johari Window - Transactional Analysis, Learning Processes - theories, Creativity and Creative Thinking. Leadership – nature – skills. Decision Making Process: Behavioral Dimensions, Groups and their formation - Group Dynamics, Informal Organizations, Group versus Individual Interaction.

UNIT – IV: Inter- Personal Communication

Listening, Feedback, Collaborative Processes in Work Groups, Team Building, Team Decision Making, Conflict Resolution in Groups and Problem Solving Techniques.

Taxonomy, Elements of Structure, Determinants of Structure, Functional Aspects of Structure, Role Impingement, Stress in Organization. Principles Underlying the Design of Organizations, Organizational Culture, Power and Authority. Organizational Development: Goals, processes, change – resistance to change – Nature of OD - interventions, OD techniques and OD applications.

Text Books:

1. Steven L McShane, Mary Ann Von Glinow, Radha R Sharma: "Organizational Behavior", Tata McGraw Hill Education, New Delhi, 2008.
2. K.Aswathappa: "Organizational Behavior-Text, Cases and Games", Himalaya Publishing House, New Delhi,

Reference Books:

1. Jerald Greenberg and Robert A Baron: "**Behavior in Organizations**", PHI Learning Private Limited, New Delhi, 2009.
2. Pareek Udai: "**Understanding Organizational Behavior**", Oxford University Press, New Delhi, 2007.
3. Jai B.P.Sinha: "**Culture and Organizational Behavior**", Sage Publication India Private Limited, New Delhi, 2008.
4. Sharma VS, Veluri: "**Organizational Behavior**", JAICO Publishing House, New Delhi, 2009.
5. Slocum, n Helireigel: "**Fundamentals of Organizational Behavior**", Cengage Learning India, New Delhi, 2009.

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