ACADEMIC REGULATIONS

COURSE STRUCTURE

AND

DETAILED SYLLABUS

COMPUTER SCIENCE AND ENGINEERING

For

CSE FOUR YEAR DEGREE COURSE

(Applicable for batches admitted from 2013-2014)

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
(Autonomous)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA

KAKINADA - 533 003, Andhra Pradesh, India

ACADEMIC REGULATIONS R13 FOR B. TECH. (REGULAR)

Applicable for the students of B. Tech. (Regular) from the Academic Year 2013-14 onwards

1. Award of B. Tech. Degree

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

1.1 A student shall be declared eligible for the award of the B. Tech Degree, if he pursues a course of study in not less than four and not more than eight academic years

1.2 The candidate shall register for 180 credits and secure all the 180 credits.

2. Courses of study

The following courses of study are offered at present as specializations for the B. Tech. Course:

S. No	Branch
01	Electronics and Communication Engineering
02	Electrical and Electronics Engineering
03	Civil Engineering
04	Mechanical Engineering
05	Computer Science and Engineering
06	Petro Chemical Engineering
07	Information Technology
08	Chemical Engineering
09	Electronics and Instrumentation Engineering
10	Bio-Medical Engineering
11	Aeronautical Engineering
12	Automobile Engineering
13	Bio Technology
14	Electronics and Computer Engineering
15	Mining Engineering
16	Petroleum Engineering
17	Metallurgical Engineering
18	Agricultural Engineering

3. Distribution and Weightage of Marks

(i) The performance of a student in each semester shall be evaluated subject – wise with a maximum of 100 marks for theory and 75 marks for practical subject. The project work shall be evaluated for 200 marks.

(ii) For theory subjects the distribution shall be 30 marks for Internal Evaluation and 70 marks for the End - Examinations.

(iii) Out of 30 internal marks – 20 marks are assigned for subjective (**Theory, Design, Analysis, Simulation, Algorithms, Drawing, etc.**) examination 10 marks for objective examination.

(iv) For theory subjects, during the semester there shall be 2 tests. The weightage of Internal marks for 30 consists of Descriptive – 15, Assignment - 05 (Theory, Design, Analysis, Simulation, Algorithms, Drawing, etc. as the case may be) Objective -10 (Conducted at College level with 20 Multiple choice question with a weightage of ½ Mark each). The objective examination is for 20 minutes duration. The subjective examination is for 120 minutes duration conducted for 40 marks. Each subjective type test question paper shall contain **4 questions** and all questions need to be answered. The Objective examination marks scaled for 10 and subjective examination marks scaled for 15 are to be added to the assignment marks of 5 for getting internal marks for 30. The better of the two tests will be taken for internal marks. As the syllabus is framed for 6 units, the 1st mid examination (both Objective and Subjective) is conducted in 1-3 units and second test in 4-6 units of each subject in a semester.

(v) The end semester examination is conducted covering the topics of all Units for 70 marks. Part – A contains a mandatory question (Brainstorming / Thought provoking / case study) for 22 marks. Part – B has 6 questions (One from each Unit). The student has to answer 3 out of 6 questions in Part – B and carries a weightage of 16 marks each.

(vi) For practical subjects there shall be continuous evaluation during the semester for 25 internal marks and 50 semester end examination marks. Of the 25 marks for internal, 15 marks shall be awarded as follows: day to day work 10 and Record-5, and 10 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted by the teacher concerned and external examiner.

(vii) For the subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 30 marks for internal evaluation (20 marks for day – to – day work, and 10 marks for internal tests) and 70 marks for end examination. There shall be two internal tests in a Semester and the better of the two shall be considered for the award of marks for internal tests.

(viii) For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department, which shall be evaluated by the Departmental committee consisting of Head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for seminar.

(ix) Out of a total of 200 marks for the project work, 60 marks shall be for Internal Evaluation and 140 marks for the End Semester Examination. The End Semester Examination (Viva – Voce) shall be conducted by the committee. The committee consists 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 IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project and evaluated by an internal committee.

(x) Laboratory marks and the internal marks awarded by the College are not final. The marks are subject to scrutiny and scaling by the University wherever felt desirable. The internal and laboratory marks awarded by the College will be referred to a Committee. The Committee shall arrive at scaling factor and the marks will be scaled as per the scaling factor. The recommendations of the Committee are final and binding. The laboratory records and internal test papers shall be preserved in the respective departments as per the University norms and shall be produced to the Committees of the University as and when they ask for.

4. Attendance Requirements

4.1 A student is eligible to write the University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

4.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee

4.3 Shortage of Attendance below 65% in aggregate shall not be condoned.

4.4 A student who is short of attendance in semester may seek re-admission into that semester when offered within 4 weeks from the date of the commencement of class work.

4.5 Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class.

4.6 A stipulated fee shall be payable towards condonation of shortage of attendance.

4.7 A student will be promoted to the next semester if he satisfies the attendance requirement of the present semester.

4.8 If any candidate fulfills the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.

5. **Minimum Academic Requirements**

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.4.

5.1 A student is deemed to have satisfied the minimum academic requirements if he has **earned the credits allotted to each theory/practical design/drawing subject/project and secures not less than 35% of marks in the end semester exam, and minimum 40% of marks in the sum total of the internal marks and end semester examination marks.**

5.2 A student shall be promoted from first year to second year if he fulfills the minimum attendance requirement.

5.3 A student will be **promoted from II year to III year** if he fulfills the academic requirement **of 40% of the credits up to II year I semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in II year II semester.**

5.4 A student shall be **promoted from III year to IV year** only if he fulfils the academic requirements of **40% of the credits up to III year I semester from all the examinations, whether or not the candidate takes the examinations and secures prescribed minimum attendance in III year II semester.**

5.5 A student shall register and put up minimum attendance in all 180 credits and earn all 180 credits. **Marks obtained in the all 180 credits shall be considered for the calculation of percentage of marks.**

5.6 **Students who fail to earn 180 credits as indicated in the course structure within ten academic years (8 years of study + 2 years additionally for**

appearing for exams only) from the year of their admission, shall forfeit their seat in B.Tech. course and their admission stands cancelled.

6 Course pattern

6.1 The entire course of study is for four academic years, all the years on semester pattern.

6.2 **A student is eligible to appear for the end semester examination in a subject, but absent from it or has failed in the end semester examination, may write the exam in that subject when conducted next.**

6.3 **When a student is detained for lack of credits/shortage of attendance, he may be re-admitted into the same semester / year in which he has been detained. However, the academic regulations under which he was first admitted, shall continues to be applicable to him.**

7 Award of Class

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree, he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured	
First Class with Distinction	70% and above	**From the aggregate marks secured from 180 Credits.**
First Class	Below 70 but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

The marks obtained in internal evaluation and end semester examination shall be shown separately in the memorandum of marks.

8 **Minimum Instruction Days**

The minimum instruction days for each semester shall be 90 working days.

9 There shall be no branch transfers after the completion of the admission process.

10 **There shall be no transfer from one college/stream to another within the Constituent Colleges and Units of Jawaharlal Nehru Technological University Kakinada.**

11 WITHHOLDING OF RESULTS

If the student has not paid the dues, if any, to the university or if any case of indiscipline is pending against him, the result of the student will be withheld and he will not be allowed into the next semester. His degree will be withheld in such cases.

12. **TRANSITORY REGULATIONS**

12.1 Discontinued, detained, or failed candidates are eligible for readmission as and when next offered.

12.2 After the revision of the regulations, the students of the previous batches will be given two chances for passing in their failed subjects, one supplementary and the other regular. If the students cannot clear the subjects in the given two chances, they shall be given equivalent subjects as per the revised regulations which they have to pass in order to obtain the required number of credits.

12.3 In case of transferred students from other Universities, the credits shall be transferred to JNTUK as per the academic regulations and course structure of the JNTUK**.**

13. General

13.1 Wherever the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.

13.2 The academic regulation should be read as a whole for the purpose of any interpretation.

13.3 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.

13.4 The University may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the University.

13.5 The students seeking transfer to colleges affiliated to JNTUK from various other Universities/ Institutions have to pass the failed subjects which are equivalent to the subjects of JNTUK, and also pass the subjects of JNTUK on their own without the right to sessional marks which the candidates have not studied at the earlier Institution.

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ACADEMIC REGULATIONS R13 FOR B. TECH. (LATERAL ENTRY SCHEME)

Applicable for the students admitted into II year B. Tech. (LES) from the Academic Year 2013-14 and onwards

1 **Award of B. Tech. Degree (LES)**

A student will be declared eligible for the award of B. Tech. Degree (LES) if he fulfils the following academic regulations:

1.1 A student shall be declared eligible for the award of the B. Tech Degree (LES), if he pursues a course of study in not less than three academic years and not more than six academic years.

1.2 The candidate shall register for 132 credits and secure all the 132 credits.

2. The students, who fail to fulfil the requirement for the award of the degree in 8 consecutive academic years (6 years of study + 2 years additionally for appearing exams only) from the year of admission, shall forfeit their seats.

3. The attendance regulations of B. Tech. (Regular) shall be applicable to B.Tech. (LES).

4. **Promotion Rule**

A student shall be promoted from second year to third year if he fulfills the minimum attendance requirement.

A student shall be promoted from III year to IV year only if he fulfils the academic requirements of **40% of the credits up to III year I semester from all the examinations. Whether or not the candidate takes the examinations and secures prescribed minimum attendance in III year II semester.**

5. **Award of Class**

After a student has satisfied the requirement prescribed for the completion of the program and is eligible for the award of B. Tech. Degree, he shall be placed in one of the following four classes:

Class Awarded	% of marks to be secured	
First Class with Distinction	70% and above	**From the aggregate marks secured from 132 Credits from II year to IV year.**
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

The marks obtained in the internal evaluation and the end semester examination shall be shown separately in the marks memorandum.

6. All the other regulations as applicable to **B. Tech. 4-year degree course (Regular) will hold good for B. Tech. (Lateral Entry Scheme)**.

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / 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 candidate 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/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
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 examinations of the remaining subjects of that semester/year. 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 imposter 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 additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the 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/year. 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 the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, 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 or any of his relations, or indulges in any other act of misconduct or mischief which result 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.	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/year. 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.

7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the 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/year. 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.
8.	Possess any lethal weapon or firearm in 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/year. The candidate is also debarred and forfeits the seat.
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.	Student of the colleges 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/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be 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/year.
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/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

1. Punishments to the candidates as per the above guidelines.
2. Punishment for institutions : (if the squad reports that the college is also involved in encouraging malpractices)
   (i) A show cause notice shall be issued to the college.
   (ii) Impose a suitable fine on the college.
   (iii) Shifting the examination centre from the college to another college for a specific period of not less than one year.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA

KAKINADA - 533 003, Andhra Pradesh, India

For Constituent Colleges and Affiliated Colleges of JNTUK

Ragging

Prohibition of ragging in educational institutions Act 26 of 1997

Salient Features

⇨ Ragging within or outside any educational institution is prohibited.

⇨ Ragging means doing an act which causes or is likely to cause Insult or Annoyance of Fear or Apprehension or Threat or Intimidation or outrage of modesty or Injury to a student

	Imprisonment upto		Fine Upto
Teasing, Embarrassing and Humiliation	6 Months	+	Rs. 1,000/-
Assaulting or Using Criminal force or Criminal intimidation	1 Year	+	Rs. 2,000/-
Wrongfully restraining or confining or causing hurt	2 Years	+	Rs. 5,000/-
Causing grievous hurt, kidnapping or Abducts or rape or committing unnatural offence	5 Years	+	Rs. 10,000/-
Causing death or abetting suicide	10 Months	+	Rs. 50,000/-

In Case of Emergency CALL TOLL FREE NO. : 1800 - 425 - 1288

LET US MAKE JNTUK A RAGGING FREE UNIVERSITY

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India

For Constituent Colleges and Affiliated Colleges of JNTUK

Ragging

ABSOLUTELY NO TO RAGGING

1. Ragging is prohibited as per Act 26 of A.P. Legislative Assembly, 1997.

2. Ragging entails heavy fines and/or imprisonment.

3. Ragging invokes suspension and dismissal from the College.

4. Outsiders are prohibited from entering the College and Hostel without permission.

5. Girl students must be in their hostel rooms by 7.00 p.m.

6. All the students must carry their Identity Cards and show them when demanded

7. The Principal and the Wardens may visit the Hostels and inspect the rooms any time.

Jawaharlal Nehru Technological University Kakinada

For Constituent Colleges and Affiliated Colleges of JNTUK

In Case of Emergency CALL TOLL FREE NO. : 1800 - 425 - 1288

LET US MAKE JNTUK A RAGGING FREE UNIVERSITY

COURSE STRUCTURE

I YEAR **I SEMESTER**

S. No	Subject Code	Subject	T	P	Credits
1	CS111	English – I	3+1	--	3
2	CS112	Mathematics – I	3+1	--	3
3	CS113	Engineering Physics	3+1	--	3
4	CS114	Mathematics – II (Mathematical Methods)	3+1	--	3
5	CS115	Professional Ethics and Human Values	3+1	--	3
6	CS116	Engineering Drawing	3+1	--	3
7	CS117	Engineering Physics Lab	--	3	2
8	CS118	English – Communication Skills Lab – I	--	3	2
9		Engineering Physics-Virtual Labs - Assignments	--	2	--
10	CS119	Engineering Workshop & IT Workshop	--	3	2
		Total			**24**

I YEAR **II SEMESTER**

S. No	Subject Code	Subject	T	P	Credits
1	CS121	English – II	3+1	--	3
2	CS122	Mathematics – III (Mathematical Methods)	3+1	--	3
3	CS123	Engineering Chemistry	3+1	--	3
4	CS124	Computer Programming	3+1	--	3
5	CS125	Environmental Studies	3+1	--	3
6	CS126	Engineering Mechanics	3+1	--	3
7	CS127	Engineering Chemistry Lab	--	3	2
8	CS128	English – Communication Lab – II	--	3	2
9	CS129	Computer Programming Lab	--	3	2
		Total			**24**

II YEAR **I SEMESTER**

S. No	Subject Code	Subject	T	P	Credits
1	CS211	Managerial Economics and Financial Analysis	4	-	3
2	CS212	Object Oriented Programming through C++	4	-	3
3	CS213	Mathematical Foundations of Computer Science	4	-	3
4	CS214	Digital Logic Design	4	-	3
5	CS215	Data Structures	4	-	3
6	CS216	Object Oriented Programming Lab	-	3	2
7	CS217	Data Structures Lab	-	3	2
8	CS218	Digital Logic Design Lab	-	3	2
9	CS219	Seminar	-	-	1
		Total			**22**

II YEAR **II SEMESTER**

S. No	Subject Code	Subject	T	P	Credits
1		Probability and statistics	4	-	3
2		Java Programming	4	-	3
3		Advanced Data Structures	4	-	3
4		Computer Organization	4	-	3
5		Formal Languages and Automata Theory	4	-	3
6		Advanced Data Structures Lab	-	3	2
7		Java Programming Lab	-	3	2
8		Free Open Source Software(FOSS) Lab	-	3	2
		Total			**21**

III YEAR **I SEMESTER**

S. No	Subject Code	Subject	T	P	Credits
1		Compiler Design	4	-	3
2		Data Communications	4	-	3
3		Principles of Programming Languages	4	-	3
4		Database Management Systems	4	-	3
5		Operating Systems	4	-	3
6		Compiler Design Lab	-	3	2
7		Operating System Lab	-	3	2
8		Database Management Systems Lab		3	2
9		Linux Programming Lab	-	3	2
10		IPR & Patents	2	-	-
11		Seminar	-	-	1
		Total			**24**

III YEAR **II SEMESTER**

S. No.	Subject Code	Subject	T	P	Credits
1		Computer Networks	4	-	3
2		Data Ware housing and Mining	4	-	3
3		Design and Analysis of Algorithms	4	-	3
4		Software Engineering	4	-	3
5		Web Technologies	4	-	3
6		Computer Networks & Network Programming Lab	-	3	2
7		Software Engineering Lab	-	3	2
8		Web Technologies Lab	-	3	2
		Total			**21**

IV YEAR **I SEMESTER**

S. No	Subject Code	Subject	T	P	Credits
1		Cryptography and Network Security	4	-	3
2		UML & Design Patterns	4	-	3
3		Mobile Computing	4	-	3
4		**Open Elective** i) Simulation Modeling ii) Digital Forensics iii) Human Computer Interaction iv) Microprocessors and Multicore Systems v) Digital Image Processing	4	-	3
5		**Elective –1:** i) Software Testing Methodologies ii) Artificial Intelligence iii) Multimedia Computing iv) Big Data Analytics v) Software Project Management vi) Information Retrieval System	4	-	3
6		UML & Design Patterns Lab	-	3	2
7		Mobile Application Development Lab	-	3	2
8		Software Testing Lab	-	3	2
9		Hadoop & BigData Lab	-	3	2
		Total			**23**

IV YEAR **II SEMESTER**

S. No	Subject Code	Subject	T	P	Credits
1		Distributed Systems	4	-	3
2		**Elective –II** i) High Performance Computing ii) Machine Learning iii) Advanced Databases iv) Advanced Operating Systems v) Pattern Recognition	4	-	3
3		**Elective –III** i) Mobile Adhoc & Sensor Networks ii) Embedded and Real Time Systems iii) Neural Networks & Soft Computing iv) Social Networks and the Semantic Web v) Cloud Computing	4	-	3
4		Management Science	4	-	3
5		Project	-	-	09
		Total			**21**

SYLLABUS

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
I Year B. Tech Computer Science & Engineering – I Semester

T	P	C
3+1	0	3

ENGLISH –I
(Common to All Branches)

DETAILED TEXT-I English Essentials: Recommended Topics :

1. **IN LONDON: M.K.GANDHI**
   OBJECTIVE: To apprise the learner how Gandhi spent a period of three years in London as a student.
   OUTCOME: The learner will understand how Gandhi grew in introspection and maturity.
2. **THE KNOWLEDGE SOCIETY- APJ KALAM**
   OBJECTIVE: To make the learners rediscover India as a land of Knowledge.
   OUTCOME: The learners will achieve a higher quality of life, strength and sovereignty of a developed nation.
3. **THE SCIENTIFIC POINT OF VIEW- J.B.S. HALDANE**
   OBJECTIVE: This essay discusses how scientific point of view seeks to arrive at the truth without being biased by emotion.
   OUTCOME: This develops in the student the scientific attitude to solve many problems which we find difficult to tackle.
4. **PRINCIPLES OF GOOD WRITING:**
   OBJECTIVE: To inform the learners how to write clearly and logically.
   OUTCOME: The learner will be able to think clearly and logically and write clearly and logically.
5. **MAN'S PERIL**
   OBJECTIVE: To inform the learner that all men are in peril.
   OUTCOME: The learner will understand that all men can come together and avert the peril.
6. **THE DYING SUN—SIR JAMES JEANS**
   OBJECTIVE: This excerpt from the book "The Mysterious Universe" presents the mysterious nature of the Universe and the stars which present numerous problems to the scientific mind. Sir James Jeans uses a poetic approach to discuss the scientific phenomena.
   OUTCOME: This provides the students to think about the scientific phenomena from a different angle and also exposes the readers to poetic expressions.
7. **LUCK—MARK TWAIN**
   OBJECTIVE: This is a short story about a man's public image and his true nature. The theme of the story is that luck can be a factor of life, so that even if one is incompetent but lucky, one can still succeed.
   OUTCOME: The story is humourous in that it contains a lot of irony. Thus this develops in the learner understand humourous texts and use of words for irony.

Text Book: 'English Essentials' by Ravindra Publications

NON-DETAILED TEXT:

(From Modern Trailblazers of Orient Blackswan)
(Common single Text book for two semesters)
(Semester I (1 to 4 lessons)/ Semester II (5 to 8 lessons)

1. **G.D.Naidu**
   OBJECTIVE: To inspire the learners by G.D.Naidu's example of inventions and contributions.
   OUTCOME: The learner will be in a position to emulate G.D.Naidu and take to practical applications.
2. **G.R.Gopinath**
   OBJECTIVE: To inspire the learners by his example of inventions.
   OUTCOME: Like G.R.Gopinath, the learners will be able to achieve much at a low cost and help the common man.
3. **Sudhamurthy**
   OBJECTIVE: To inspire the learners by the unique interests and contributions of Sudha Murthy.
   OUTCOME: The learner will take interest in multiple fields of knowledge and make life worthwhile through social service.
4. **Vijay Bhatkar**
   OBJECTIVE: To inspire the learner by his work and studies in different fields of engineering and science.
   OUTCOME: The learner will emulate him and produce memorable things.

Text Book: 'Trail Blazers' by Orient Black Swan Pvt. Ltd. Publishers

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
I Year B. Tech Computer Science & Engineering – I Semester

	T	P	C
MATHEMATICS – I (DIFFERENTIAL EQUATIONS)	**3+1**	**0**	**3**
(Common to All Branches)			

Course Learning Objectives:

The objectives of the course is to make the student understand how to

- formulate and solve both ordinary and partial differential equations
- identify and analyze the applications of differential equations in Engineering and real world Problems
- become competent enough to work on multidisciplinary teams and design systems to meet desired needs with in economic, social, ethical, safety manufacturability and sustainability and optimal constraints.

UNIT I: Differential equations of first order and first degree:

Linear – Bernoulli – Exact - Reducible to exact.

Applications: Newton's Law of cooling-Law of natural growth and decay-orthogonal trajectories.

UNIT II: Linear differential equations of higher order:

Non-homogeneous linear equations of higher order with constant coefficients with RHS term of the type e^{ax}, Sin ax, cos ax, polynomials in x, e^{ax} V(x), xV(x).

Applications: LCR circuit, Simple Harmonic motion

UNIT III Laplace transforms:

Laplace transforms of standard functions-Shifting Theorems, Transforms of derivatives and integrals – Unit step function –Dirac's delta function- Inverse Laplace transforms– Convolution theorem (without proof).

Application: Solutions of ordinary differential equations using Laplace transforms.

UNIT IV Partial differentiation:

Introduction- Total derivative-Chain rule-Generalized Mean Value theorem for single variable (without proof)-Taylors and Mc Laurent's series for two variables– Functional dependence- Jacobian.

Applications: Maxima and Minima of functions of two variables without constraints. Three variables – with constraints – reducible to two variables form and Lagrange's method of undetermined multipliers.

UNIT V First order Partial differential equations:

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions –solutions of first order linear equation (Lagrange) and nonlinear (standard type) equations

UNIT VI Higher order Partial differential equations:

Solutions of Linear Partial differential equations with constant coefficients- Method of separation of Variables

Applications: One- dimensional Wave, Heat equations - two-dimensional Laplace Equation.

Books:

1. **B.S.GREWAL,** Higher Engineering Mathematics, 42nd Edition, Khanna Publishers
2. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, 9th Edition, Wiley-India
3. **GREENBERG,** Advanced Engineering Mathematics, 2nd edition, Pearson edn
4. **DEAN G. DUFFY,** Advanced engineering mathematics with MATLAB, CRC Press
5. **PETER O'NEIL,** advanced Engineering Mathematics, Cengage Learning.

Course out comes:

After completion of the course student could be able to

- Formulate and solve both ordinary and partial differential equations
- Identify and analyze the applications of differential equations in engineering and real world problems
- Find the conditions for the maxima and minima of function of two variables
- Solve differential equations using laplace transforms and the importance of laplace transforms in engineering problems

Subject Category	ABET Learning Objectives	ABET Internal Assessments	JNTUK External Evaluation	Remarks
Theory Design Analysis Algorithms Drawing Others	a) Apply knowledge of math, science, & engineering b) Design & conduct experiments, analyze & interpret data c) Design a system/process to meet desired needs within economic, social, political, ethical, health/safety, manufacturability, & sustainability constraints d) Function on multidisciplinary teams e) Identify, formulate, & solve engineering problems f) Understand professional & ethical responsibilities g) Communicate effectively h) Understand impact of engineering solutions in global, economic, environmental, & societal context i) Recognize need for & be able to engage in lifelong learning j) Know contemporary issues k) Use techniques, skills, modern tools for engineering practices	1. Objective tests 2. Essay questions tests 3. Peer tutoring based 4. Simulation based 5. Design oriented 6. Problem based 7. Experiential (project based) based 8. Lab work or field work based 9. Presentation based 10. Case Studies based 11. Role-play based 12. Portfolio based	A. Questions should have: B. Definitions, Principle of operation or philosophy of concept. C. Mathematical treatment, derivations, analysis, synthesis, numerical problems with inference. D. Design oriented problems E. Trouble shooting type of questions F. Applications related questions G. Brain storming questions	

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ENGINEERING PHYSICS

UNIT-I
PHYSICAL OPTICS FOR INSTRUMENTS
"Objective Designing an instrument and enhancing the resolution for its operation would be effective as achieved through study of applicational aspects of physical Optics"
INTERFACE : Introduction – Interference in thin films by reflection – Newton's rings.
DIFFRACTION : Introduction – Fraunhofer diffraction - Fraunhofer diffraction at double slit (qualitative) – Diffraction grating – Grating spectrum – Resolving power of a grating – Rayleigh's criterion for resolving power.
POLARIZATION : Introduction – Types of Polarization – Double refraction – Quarter wave plate ad Half Wave plate.

UNIT-II
COHERENT OPTICS – COMMUNICATIONS AND STRUCTURE OF MATERIALS
Objectives while lasers are trusted Non-linear coherent sources established for the fitness of instrumentation, establishing a structure property relationship for materials requires allotment of an equivalent footing in convening the physics knowledge base.
LASERS: Introduction – coherent sources – Characteristics of lasers – Spontaneous and Stimulated emission of radiation – Einstein's coefficients – Population inversion – Three and Four level pumping schemes – Ruby laser – Helium Neon laser.
FIBER OPTICS : Introduction – Principle of Optical Fiber – Acceptance angle and acceptance cone – Numerical aperture.
CRYSTALLOGRAPHY : Introduction – Space lattice – Basis – Unit Cell – Lattice parameters – Bravais lattices – Crystal systems – Structures and packing fractions of SC,BCC and FCC
X-RAY DIFFRACTION TECHNIQUES : Directions and planes in crystals – Miller indices – Separation between successive [h k l] planes – Bragg's law.

UNIT-III
MAGNETIC, ELECTRIC FIELD RESPONSE OF MATERIALS & SUPERCONDUCTIVITY
"Objective many of the Electrical or Electronic gadgets are designed basing on the response of naturally abundant and artificially made materials, while their response to E- or H- fields controls their performance.
MAGNETIC PROPERTIES : Magnetic permeability – Magnetization – Organ or magnetic moment – Classification of Magnetic materials – Dir, para, Ferro, anti ferro and ferri-magnetism – Hysteresis curve
DIELECTRIC PROPERTIES : Introduction – Dielectric constant – Electronic, ionic and orientational polarization – internal fields – Clausius – Mossotti equation – Dielectric loss, Breakdown and Strength.
SUPERCONDUCTIVITY : General properties – Meissner effect – Type I and Type II superconductors – BCS Theory Flux quantization London's equations – Penetration depth – DC and AC Josephson effects – SQUIDS.

UNIT – IV
ACOUSTICS AND EM – FIELDS:
Objective: The utility and nuances of ever pervading SHM and its consequences would be the first hand-on to as it clearly conveyed through the detailed studies of Acoustics of Buildings, while vectorial concepts of EM fields paves the student to gear – up for a deeper understanding.

ACOUSTICS: Sound absorption, absorption coefficient and its measurements, Reverberations time – Sabine's formula, Eyring's formula.
ELECTRO-MAGNETIC FIELDS: Gauss and stokes theorems (qualitative) – Fundamental laws of electromagnetism – Maxwell's Electromagnetic Equations (Calculus approach).

UNIT – V
QUANTUM MECHANICS FOR ELECTRONIC TRANSPORT
Objective: The discrepancy between classical estimates and laboratory observations of physical properties exhibited by materials would be lifted out through the understanding quantum picture of sub-atomic world dominated by electron and its presence.
QUANTUM MECHANICS: Introduction to matter waves – Schrodinger Time Independent and Time Dependent wave equations – Particle in a box.
FREE ELECTRON THEORY: Classical free electron theory – electrical conductivity – Mean free path – Relaxation time and drifty velocity – Quantum free electron theory – Fermi – Dirac (analytical) and its dependence on temperature – Fermi energy – density of states – derivations for current density.
BAND THEORY OF SOLIDS: Bloch theorem (qualitative) – Kronig – Penney model – Origin of energy band formation in solids – Classification of materials into conductors, semi – conductors & insulators – Concepts of effective mass of electron - concept of hole.

UNIT – VI
SEMICONDUCTOR PHYSICS:
Objective: In the wake of ever increasing demand for the space and power the watch word "small is beautiful", understanding the physics of electronic transport as underlying mechanism for appliances would provide a knowledge base.
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 – Electronic transport Mechanism for LEDs, Photo conductors and solar cells.

TEXT BOOKS

1. Solid state Physics by A.J. Dekker (Mc Millan India Ltd)
2. A text book of Engineering Physics by M.N. Avadhanulu & P.G. Kshirasagar (S. Chand publications)
3. Engineering Physics b;y M.R. Srinivasan (New Age international publishers)

REFERENCE BOOKS

1. 'Introduction to solid state physics' by Charles Kittle (Willey India Pvt.Ltd)
2. 'Applied Physics' by T. Bhimasenkaram (BSP BH Publications)
3. 'Applied Physics' by M.Arumugam (Anuradha Agencies)
4. 'Engineering Physics' by Palanisamy (Scitech Publishers)
5. 'Engineering Physics' by D.K.Bhattacharya (Oxford University press)
6. 'Engineering Physics' by Mani Naidu S (Pearson Publications)
7. 'Engineering Physics' by Sanjay D Jain and Girish G Sahasrabudhe (University Press)
8. 'Engineering Physics' by B.K.Pandey & S. Chaturvedi (Cengage Learning)

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MATHEMATICS – II
(MATHEMATICAL METHODS)

(Common to All Branches)

Course Learning Objectives:

The objectives of the course is to make the student understand how to

- apply numerical methods to obtain the roots of equations
- appy iterative schemes to solve initial value problems associated with ordinary differential equations
- express a given data points as a polynomial and a periodic function as an infinite series of orthonormal functions
- become competent enough to apply mathematical concepts in the Theory of signals and systems

UNIT I: Solution of Algebraic and Transcendental Equations:
Introduction- Bisection Method – Method of False Position – Iteration Method – Newton – Raphson Method (One variable and Simultaneous Equations)

UNIT II: Interpolation:
Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences – Central differences – Symbolic relations and separation of symbols-Differences of a polynomial-Newton's formulae for interpolation – Interpolation with unevenly spaced points – Lagrange's Interpolation formula

UNIT III: Numerical solution of Ordinary Differential equations:
Solution by Taylor's series - Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods

UNIT IV Fourier Series:
Introduction- Determination of Fourier coefficients – even and odd functions – change of interval– Half-range sine and cosine series application: Amplitude, spectrum of a periodic function

UNIT V: Fourier Transforms:
Fourier integral theorem (only statement) – Fourier sine and cosine integrals - sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms

UNIT VI: Z-transform:
Introduction– properties – Damping rule – Shifting rule – Initial and final value theorems -Inverse z transform- -Convolution theorem – Solution of difference equation by Z -transforms.

BOOKS:

1. **B.S. GREWAL,** Higher Engineering Mathematics, 42nd Edition, Khanna Publishers
2. **DEAN G. DUFFY,** Advanced Engineering Mathematics with MATLAB, CRC Press
3. **S.S.SASTRY,** Introductory methods of numerical analysis, PHI Publications
4. **V.RAVINDRANATH and P. VIJAYALAXMI,** Mathematical Methods, Himalaya Publishing House
5. **ERWYN KREYSZIG,** Advanced Engineering Mathematics, 9th Edition, Wiley-India

Course outcomes:

After completion of the course student could be able to

- Apply numerical methods for root finding and understand the importance of these methods in high dimensional engineering problems
- find an interpolating polynomial fitting a given points
- understand the importance of Fourier analysis in the fields of Electrical, Electronics, Computer science, Thermal dynamics etc

Subject Category	ABET Learning Objectives	ABET Internal Assessments	JNTUK External Evaluation	Remarks
Theory Design Analysis Algorithms Drawing Others	a) Apply knowledge of math, science, & engineering b) Design & conduct experiments, analyze & interpret data c) Design a system/process to meet desired needs within economic, social, political, ethical, health/safety, manufacturability, & sustainability constraints d) Function on multidisciplinary teams e) Identify, formulate, & solve engineering problems f) Understand professional & ethical responsibilities g) Communicate effectively h) Understand impact of engineering solutions in global, economic, environmental, & societal context i) Recognize need for & be able to engage in lifelong learning j) Know contemporary issues k) Use techniques, skills, modern tools for engineering practices	1. Objective tests 2. Essay questions tests 3. Peer tutoring based 4. Simulation based 5. Design oriented 6. Problem based 7. Experiential (project based) based 8. Lab work or field work based 9. Presentation based 10. Case Studies based 11. Role-play based 12. Portfolio based	A. Questions should have: B. Definitions, Principle of operation or philosophy of concept. C. Mathematical treatment, derivations, analysis, synthesis, numerical problems with inference. D. Design oriented problems E. Trouble shooting type of questions F. Applications related questions G. Brain storming questions	

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Professional Ethics and Human Values

UNIT I : Human Values:
Morals, Values and Ethics – Integrity – Work Ethics – Service Learning – Civic Virtue – Respect for others – Living Peacefully – Caring – Sharing – Honesty –Courage – Value time – Co-operation – Commitment – Empathy – Self-confidence – Spirituality- Character.

UNIT II : Engineering Ethics:
The History of Ethics-Purposes for Engineering Ethics-Engineering Ethics-Consensus and Controversy –Professional and Professionalism –Professional Roles to be played by an Engineer –Self Interest, Customs and Religion-Uses of Ethical Theories-Professional Ethics-Types of Inquiry – Engineering and Ethics-Kohlberg's Theory – Gilligan's Argument – Heinz's Dilemma.

UNIT III : Engineering as Social Experimentation:
Comparison with Standard Experiments – Knowledge gained – Conscientiousness – Relevant Information – Learning from the Past – Engineers as Managers, Consultants, and Leaders – Accountability – Role of Codes – Codes and Experimental Nature of Engineering.

UNIT IV : Engineers' Responsibility for Safety and Risk:
Safety and Risk, Concept of Safety – Types of Risks – Voluntary v/s Involuntary Risk-Short term v/s Long term Consequences- Expected Probability- Reversible Effects-Threshold Levels for Risk- Delayed v/s Immediate Risk- Safety and the Engineer – Designing for Safety – Risk-Benefit Analysis-Accidents.

UNIT V : Engineers' Responsibilities and Rights:
Collegiality-Techniques for Achieving Collegiality –Two Senses of Loyalty-obligations of Loyalty-misguided Loyalty – professionalism and Loyalty- Professional Rights –Professional Responsibilities – confidential and proprietary information-Conflict of Interest-solving conflict problems – Self-interest, Customs and Religion- Ethical egoism-Collective bargaining-Confidentiality-Acceptance of Bribes/Gifts-when is a Gift and a Bribe-examples of Gifts v/s Bribes-problem solving-interests in other companies-Occupational Crimes-industrial espionage-price fixing-endangering lives- Whistle Blowing-types of whistle blowing-when should it be attempted-preventing whistle blowing.

UNIT VI : Global Issues:
Globalization- Cross-culture Issues-Environmental Ethics-Computer Ethics-computers as the instrument of Unethical behaviour-computers as the object of Unethical Acts-autonomous computers-computer codes of Ethics-Weapons Development-Ethics and Research-Analysing Ethical Problems in Research-Intellectual Property Rights.

Text Books:

1. "Engineering Ethics and Human Values" by M.Govindarajan, S.Natarajan and V.S.SenthilKumar-PHI Learning Pvt. Ltd-2009
2. "Professional Ethics and Morals" by Prof.A.R.Aryasri, Dharanikota Suyodhana-Maruthi Publications
3. "Professional Ethics and Human Values" by A.Alavudeen, R.Kalil Rahman and M.Jayakumaran- Laxmi Publications
4. "Professional Ethics and Human Values" by Prof.D.R.Kiran-
5. "Indian Culture, Values and Professional Ethics" by PSR Murthy-BS Publication
6. "Ethics in Engineering" by Mike W. Martin and Roland Schinzinger – Tata McGraw-Hill – 2003.
7. "Engineering Ethics" by Harris, Pritchard and Rabins, CENGAGE Learning, India Edition, 2009.

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ENGINEERING DRAWING

Objective: Engineering drawing being the principle method of communication for engineers, the objective to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

UNIT I
Objective: The objective is to introduce the use and the application of drawing instruments and to make the students construct the polygons, curves and various types of scales. The student will be able to understand the need to enlarge or reduce the size of objects in representing them.
Polygons, Construction of regular polygons using given length of a side; Ellipse, arcs of circles and Oblong methods; Scales – Vernier and Diagonal scales.

UNIT II
Objective: The objective is to introduce orthographic projections and to project the points and lines parallel to one plane and inclined to other.
Introduction to orthographic projections; projections of points; projections of straight lines parallel to both the planes; projections of straight lines – parallel to one plane and inclined to the other plane.

UNIT III
Objective: The objective is to make the students draw the projections of the lines inclined to both the planes.
Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclinations and traces.

UNIT IV
Objective: The objective is to make the students draw the projections of the plane inclined to both the planes.
Projections of planes: regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.

UNIT V
Objective: The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.
Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

UNIT VI
Objective: The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.

Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

TEXT BOOKS:

1. Engineering Drawing by N.D. Butt, Chariot Publications
2. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers.
3. Engineering Graphics by PI Varghese, McGrawHill Publishers

REFERENCE BOOKS:

1. Engineering Graphics for Degree by K.C. John, PHI Publishers
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers
3. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age

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ENGINEERING PHYSICS LAB

List of Experiments

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence
2. Newton's rings –Radius of Curvature of Plano_Convex Lens.
3. Determination of thickness of a thin object using parallel interference fringes.
4. Determination of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration- Compound Pendulum.
6. Melde's experiment – Transverse and Longitudinal modes.
7. Verification of laws of stretched string – Sonometer.
8. Determination of velocity of sound – Volume resonator.
9. L C R Senes Resonance Circuit
10. Study of I/V Characteristics of Semiconductor diode
11. I/V characteristics of Zener diode
12. Thermistor characteristics – Temperature Coefficient
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
14. Energy Band gap of a Semiconductor p.n junction.
15. Hall Effect for semiconductor.

REFERENCE:

1. Engineering Physics Lab Manual by Dr.Y. Aparna & Dr.K.Venkateswarao (V.G.S.Book links)
2. Physics practical manual, Lorven Publications.

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ENGLISH – COMMUNICATION SKILLS LAB – I

Suggested Lab Manuals:

OBJECTIVE: To impart to the learner the skills of grammar as well as communication through listening, speaking, reading, and writing including soft, that is life skills.

BASIC COMMUNICATION SKILLS

UNIT 1	A. Greeting and Introductions
	B. Pure Vowels
UNIT 2	A. Asking for information and Requests
	B. Diphthongs
UNIT 3	A. Invitations
	B. Consonants
UNIT 4	A. Commands and Instructions
	B. Accent and Rhythm
UNIT 5	A. Suggestions and Opinions
	B. Intonation

Text Book:

'Strengthen your Communication Skills' Part-A by Maruthi Publications

Reference Books:

1. INFOTECH English (Maruthi Publications)
2. Personality Development and Soft Skills (Oxford University Press, New Delhi)

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Engineering Physics
Virtual Labs - Assignments

List of Experiments

1. Hall Effect
2. Crystal Structure
3. Hysteresis
4. Brewster's angle
5. Magnetic Levitation / SQUID
6. Numerical Aperture of Optical fiber
7. Photoelectric Effect
8. Simple Harmonic Motion
9. Damped Harmonic Motion
10. LASER – Beam Divergence and Spot size

URL : WWW.vlab.co.in

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ENGINEERING WORKSHOP & IT WORKSHOP

ENGINEERING WORKSHOP:

Course Objective: To impart hands-on practice on basic engineering trades and skills.
Note: At least two exercises to be done from each trade.

Trade:

Carpentry	1. T-Lap Joint
	2. Cross Lap Joint
	3. Dovetail Joint
	4. Mortise and Tennon Joint
Fitting	1. Vee Fit
	2. Square Fit
	3. Half Round Fit
	4. Dovetail Fit
Black Smithy	1. Round rod to Square
	2. S-Hook
	3. Round Rod to Flat Ring
	4. Round Rod to Square headed bolt
House Wiring	1. Parallel / Series Connection of three bulbs
	2. Stair Case wiring
	3. Florescent Lamp Fitting
	4. Measurement of Earth Resistance
Tin Smithy	1. Taper Tray
	2. Square Box without lid
	3. Open Scoop
	4. Funnel

IT WORKSHOP:

Objectives:

Enabling the student to understand basic hardware and software tools through practical exposure

PC Hardware:

Identification of basic peripherals, assembling a PC, installation of system software like MS Windows, device drivers. Troubleshooting Hardware and software _ some tips and tricks.

Internet & World Wide Web:

Different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet, web browsers, email, newsgroups and discussion forums .Awareness of cyber hygiene(protecting the personal computer from getting infected with the viruses), worms and other cyber attacks .

Productivity tools Crafting professional word documents; excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools

(Note: Student should be thoroughly exposed to minimum of 12 Tasks)

PC Hardware

Task 1: Identification of the peripherals of a computer.

To prepare a report containing the block diagram of the CPU along with the configuration of each peripheral and its functions. Description of various I/O Devices

Task 2(Optional): A practice on disassembling the components of a PC and assembling them to back to working condition.

Task 3: Examples of Operating systems- DOS, MS Windows, Installation of MS windows on a PC.

Task 4: Introduction to Memory and Storage Devices, I/O Port, Device Drivers, Assemblers, Compilers, Interpreters, Linkers, Loaders.

Task 5:

Hardware Troubleshooting (Demonstration):

Identification of a problem and fixing a defective PC (improper assembly or defective peripherals).

Software Troubleshooting (Demonstration): Identification of a problem and fixing the PC for any software issues

Internet & Networking Infrastructure

Task 6: Demonstrating Importance of Networking, Transmission Media, Networking Devices- Gateway, Routers, Hub, Bridge, NIC, Bluetooth Technology, Wireless Technology, Modem, DSL, and Dialup Connection.

Orientation & Connectivity Boot Camp and web browsing: Students are trained to configure the network settings to connect to the Internet. They are trained to demonstrate the same through web browsing (including all tool bar options) and email access.

Task 7: **Search Engines & Netiquette:**

Students are enabled to use search engines for simple search, academic search and any other context based search (Bing, Google etc). Students are acquainted to the principles of micro-blogging, wiki, collaboration using social networks, participating in online technology forums

Task 8: Cyber Hygiene (Demonstration): Awareness of various threats on the internet. Importance of security patch updates and anti-virus solutions. Ethical Hacking, Firewalls, Multi-factor authentication techniques including Smartcard, Biometrics are also practiced

Word

Task 9: MS Word Orientation:

Accessing, overview of toolbars, saving files, Using help and resources, rulers, formatting ,Drop Cap , Applying Text effects, Using Character Spacing, OLE in Word, using templates, Borders and Colors, Inserting Header and Footer, Using Date and Time option, security features in word, converting documents while saving

Task 10: Creating project : Abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check , Track Changes, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs.

Excel

Task 11: Using spread sheet features of EXCEL including the macros, formulae, pivot tables, graphical representations

Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

LOOKUP/VLOOKUP

Task 12: Performance Analysis - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

Power Point

Task 13: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows, Hyperlinks, Inserting –Images, Clip Art, Tables and Charts in Powerpoint.

Task 14: Focusing on the power and potential of Microsoft power point. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides, OLE in PPT.

TEXT BOOK:

Faculty to consolidate the workshop manuals using the following references

1 Computer Fundamentals, Anita Goel, Pearson
2 Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson,2008
3 Information Technology Workshop, 3e, G Praveen Babu, M V Narayana BS Publications.
4 Comdex Information Technology, Vikas Gupta, dreamtech.

REFERENCE BOOK:

1. PC hardware Trouble shooting made easy, TMH
2. Essential Computer and IT Fundamentals for Engineering and Science Students, Dr. N.B. Venkateswarlu

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ENGLISH –II
(Common to All Branches)

DETAILED TEXT-II : Sure Outcomes: English for Engineers and Technologists
Recommended Topics :

1. **TECHNOLOGY WITH A HUMAN FACE**
   OBJECTIVE: To make the learner understand how modern life has been shaped by technology.
   OUTCOME: The proposed technology is people's technology. It serves the human person instead of making him the servant of machines.
2. **CLIMATE CHANGE AND HUMAN STRATEGY**
   OBJECTIVE: To make the learner understand how the unequal heating of earth's surface by the Sun, an atmospheric circulation pattern is developed and maintained.
   OUTCOME: The learner's understand that climate must be preserved.
3. **EMERGING TECHNOLOGIES**
   OBJECTIVE: To introduce the technologies of the 20^{th} century and 21^{st} centuries to the learners.
   OUTCOME: The learner will adopt the applications of modern technologies such as nanotechnology.
4. **WATER- THE ELIXIR OF LIFE**
   OBJECTIVE: To inform the learner of the various advantages and characteristics of water.
   OUTCOME: The learners will understand that water is the elixir of life.
5. **THE SECRET OF WORK**
   OBJECTIVE: In this lesson, Swami Vivekananda highlights the importance of work for any development.
   OUTCOME: The students will learn to work hard with devotion and dedication.
6. **WORK BRINGS SOLACE**
   OBJECTIVE: In this lesson Abdul Kalam highlights the advantage of work.
   OUTCOME: The students will understand the advantages of work. They will overcome their personal problems and address themselves to national and other problems.

Text Book: 'Sure Outcomes' by Orient Black Swan Pvt. Ltd. Publishers

NON-DETAILED TEXT:

(From Modern Trailblazers of Orient Blackswan)
(Common single Text book for two semesters)
(Semester I (1 to 4 lessons)/ Semester II (5 to 8 lessons)

5. **J.C. Bose**
   OBJECTIVE: To apprise of J.C.Bose's original contributions.
   OUTCOME: The learner will be inspired by Bose's achievements so that he may start his own original work.
6. **Homi Jehangir Bhaba**
   OBJECTIVE: To show Bhabha as the originator of nuclear experiments in India.

OUTCOME: The learner will be inspired by Bhabha's achievements so as to make his own experiments.

7. **Vikram Sarabhai**
   OBJECTIVE: To inform the learner of the pioneering experiments conducted by Sarabhai in nuclear energy and relevance of space programmes.
   OUTCOME: The learner will realize that development is impossible without scientific research.
8. **A Shadow- R.K.Narayan**
   OBJECTIVE: To expose the reader to the pleasure of the humorous story
   OUTCOME: The learner will be in a position to appreciate the art of writing a short story and try his hand at it.

Text Book: 'Trail Blazers' by Orient Black Swan Pvt. Ltd. Publishers

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MATHEMATICS – III
(LINEAR ALGEBRA & VECTOR CALCULUS)
(Common to All Branches)

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Course Learning Objectives:

The objectives of the course is to make the student understand the

- importance of matrix methods in high dimensional engineering problems (ex.: Electrical circuits) and finding the solutions of system of equations
- integral calculus over regions in plane and space and applications to area and volumes
- analyze and solve the engineering problems in mathematical aspect and interpret the solutions in terms of the actual problem

UNIT I: Linear systems of equations:

Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods- Gauss Elimination - Gauss Jordon and Gauss Seidal Methods.
Application: Finding the current in an electrical circuit.

UNIT II: Eigen values - Eigen vectors and Quadratic forms:

Eigen values - Eigen vectors– Properties – Iteration method to find largest eigen value and eigen vectors - Cayley-Hamilton Theorem - Inverse and powers of a matrix by using Cayley-Hamilton theorem Quadratic forms- Reduction of quadratic form to canonical form – Rank - Positive, negative definite - semi definite - index – signature.
Application: Free vibration of a two-mass system.

UNIT III: Multiple integrals:

Review concepts of Curve tracing (Cartesian - Polar and Parametric curves)- Applications of Integration to Lengths, and Surface areas of revolution in Cartesian and Polar Coordinates.
Multiple integrals - double and triple integrals – change of variables – Change of order of Integration
Application: Areas of surfaces and volumes of solids, Moments of inertia.

UNIT IV: Special functions:

Beta and Gamma functions- Properties - Relation between Beta and Gamma functions
Application: Evaluation of improper integrals

UNIT V: Vector Differentiation:

Gradient- Divergence- Curl - Laplacian and second order operators -Vector identities
Application: Equation of continuity, potential surfaces, irrotational fields, potential functions

UNIT VI Vector Integration:

Line integral – work done – Potential function – surface integral –area, volume integral-volume- Vector integral theorems: Greens, Stokes and Gauss Divergence Theorems (Without proof) and related problems.

Application: work done, Force

BOOKS:

1. **GREENBERG,** Advanced Engineering Mathematics, 9th Edition, Wiley-India
2. **B.V. RAMANA,** Higher Engineering Mathematics, Tata McGrawhill
3. **ERWIN KREYSZIG,** Advanced Engineering Mathematics, 9th Edition, Wiley-India
4. **PETER O'NEIL,** Advanced Engineering Mathematics, Cengage Learning
5. **D.W. JORDAN AND T. SMITH,** Mathematical Techniques, Oxford University Press

Course outcomes:

After completion of the course student could be able to

- apply numerical methods to find the solutions of system of equations
- find eigenvalues and eigen vectors
- evaluate multiple and triple integrals and apply the concepts to find the physical quantities like surface areas and volumes of solids
- understand the importance of vector differential and integral calculus and interpret the physical and engineering concepts (electromagnetic theory, circuit theory etc) in an elegant way
-

Subject Category	ABET Learning Objectives	ABET Internal Assessments	JNTUK External Evaluation	Remarks
Theory Design Analysis Algorithms Drawing Others	a) Apply knowledge of math, science, & engineering b) Design & conduct experiments, analyze & interpret data c) Design a system/process to meet desired needs within economic, social, political, ethical, health/safety, manufacturability, & sustainability constraints d) Function on multidisciplinary teams e) Identify, formulate, & solve engineering problems f) Understand professional & ethical responsibilities g) Communicate effectively h) Understand impact of engineering solutions in global, economic, environmental, & societal context i) Recognize need for & be able to engage in lifelong learning j) Know contemporary issues k) Use techniques, skills, modern tools for engineering practices	1. Objective tests 2. Essay questions tests 3. Peer tutoring based 4. Simulation based 5. Design oriented 6. Problem based 7. Experiential (project based) based 8. Lab work or field work based 9. Presentation based 10. Case Studies based 11. Role-play based 12. Portfolio based	A. Questions should have: B. Definitions, Principle of operation or philosophy of concept. C. Mathematical treatment, derivations, analysis, synthesis, numerical problems with inference. D. Design oriented problems E. Trouble shooting type of questions F. Applications related questions G. Brain storming questions	

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ENGINEERING CHEMISTRY

UNIT-I: WATER TECHNOLOGY

Hard Water – Estimation of hardness by EDTA method – Potable water- Sterilization and Disinfection – Boiler feed water – Boiler troubles – Priming and foaming , scale formation, corrosion, caustic embrittlement, turbine deposits – Softening of water – Lime soda, Zeolite processes – Reverse osmosis – Electro Dialysis, Ion exchange process

Objectives: For prospective engineers knowledge about water used in industries (boilers etc.) and for drinking purposes is useful; hence chemistry of hard water, boiler troubles and modern methods of softening hard water is introduced.

UNIT-II: ELECTROCHEMISTRY

Concept of Ionic conductance – Ionic Mobilities – Applications of Kohlrausch law – Conductometric titrations – Galvanic cells – Electrode potentials – Nernst equation – Electrochemical series – Potentiometric titrations – Concentration cells – Ion selective electrode –Glass electrodes – Fluoride electrode; Batteries and Fuel cells

Objectives: Knowledge of galvanic cells, electrode potentials, and concentration cells is necessary for engineers to understand corrosion problem and its control; also this knowledge helps in understanding modern bio-sensors, fuel cells and improve them.

UNIT-III: CORROSION

Causes and effects of corrosion – theories of corrosion (dry, chemical and electrochemical corrosion) – Factors affecting corrosion – Corrosion control methods – Cathodic protection – Sacrificial Anodic, Impressed current methods – Surface coatings – Methods of application on metals (Hot dipping, Galvanizing, tinning , Cladding, Electroplating, Electroless plating) – Organic surface coatings – Paints – Their constituents and their functions.

Objectives: the problems associated with corrosion are well known and the engineers must be aware of these problems and also how to counter them

UNIT-IV: HIGH POLYMERS

Types of Polymerization – Stereo regular Polymers – Physical and Mechanical properties of polymers – Plastics – Thermoplastics and thermo setting plastics – Compounding and Fabrication of plastics – Preparation and properties of Polyethylene, PVC and Bakelite – Elastomers – Rubber and Vulcanization – Synthetic rubbers – Styrene butadiene rubber – Thiokol – applications.

Objectives: Plastics are materials used very widely as engineering materials. An understanding of properties particularly physical and mechanical properties of polymers / plastics / elastomers helps in selecting suitable materials for different purposes.

UNIT-V: FUELS

Coal – Proximate and ultimate analysis – Numerical problems based on analysis – Calorific value – HCV and LCV – Problems based on calorific values; petroleum – Refining – Cracking – Petrol – Diesel knocking; Gaseous fuels – Natural gas – LPG, CNG – Combustion – Problems on air requirements.

Objectives: A board understanding of the more important fuels employed on a large scale is necessary for all engineer to understand energy – related problems and solve them.

UNIT-VI: CHEMISTRY OF ADVANCED MATERIALS

Nanometerials (Preparation of carbon nanotubes and fullerenes – Properties of nanomaterials – Engineering applications) – Liquid crystals (Types – Application in LCD and Engineering Applications) – Fiber reinforced plastics – Biodegradable polymers – Conducting polymers – Solar cells (Solar heaters – Photo voltaic cells – Solar reflectors – Green house concepts – Green chemistry (Methods for green synthesis and Applications) – Cement – Hardening and setting – Deterioration of cement concrete

Objectives: With the knowledge available now, future engineers should know at least some of the advanced materials that are becoming available. Hence some of them are introduced here.

TEXT BOOKSS

1. Jain and Jain (Latest Edition), Engineering Chemistry, Dhanpat Rai Publishing company Ltd,
2. N.Y.S.Murthy, V.Anuradha, KRamaRao "A Text Book of Engineering Chemistry", Maruthi Publications
3. C.Parameswara Murthy, C.V.Agarwal, Adhra Naidu (2006) Text Book of Engineering Chemistry, B.S.Publications
4. B.Sivasankar (2010), Engineering Chemistry, McGraw-Hill companies.
5. Ch.Venkata Ramana Reddy and Ramadevi (2013) , Engineering Chemistry, Cengage Learning

REFERENCES

1. S.S. Dara (2013) Text Book of Engineering Chemistry, S.Chand Technical Series
2. K.Sesha Maheswaramma and Mridula Chugh (2013), Engineering Chemistry, Pearson Publications.
3. R.Gopalan, D.Venkatappayya, Sulochana Nagarajan (2011), Text Book of Engineering Chemistry, Vikas Publications.
4. B.Viswanathan and M.Aulice Scibioh (2009), Fuel Cells, Principals and applications, University Press.

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Computer Programming in C

Objectives:

Formulating algorithmic solutions to problems and implementing algorithms in C

UNIT I:

Unit objective: Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs in Linux

Introduction: Computer systems, Hardware and Software Concepts**,**
Problem Solving: Algorithm / Pseudo code, flowchart, program development steps, computer languages: machine, symbolic and highlevel languages, Creating and Running Programs: Writing, Editing(vi/emacs editor), Compiling(gcc), Linking and Executing in under Linux.
BASICS OF C: Structure of a c program, identifiers, basic data types and sizes. Constants, Variables, Arthmetic , relational and logical operators, increment and decrement operators, conditional operator, assignment operator, expressions, type conversions, Conditional Expressions, precedence and order of evaluation, Sample Programs.

UNIT II:
Unit objective: understanding branching, iteration and data representation using arrays

SELECTION – MAKING DECISION: TWO WAY SELECTION: if-else, null else, nested if, examples, Multi-way selection: switch, else-if, examples**.**
ITERATIVE: loops- while, do-while and for statements , break, continue, initialization and updating, event and counter controlled loops, Looping applications: Summation, powers, smallest and largest.
ARRAYS: Arrays- concepts, declaration, definition, accessing elements, storing elements, Strings and String Manipulations, 1-D arrays, 2-D arrays and character arrays, string manipulations, Multidimensional arrays, array applications: Matrix operations, checking the symmetricity of a Matrix**.**
STRINGS: concepts, c strings.

UNIT III:
Objective: Modular programming and recursive solution formulation

FUNCTIONS- MODULAR PROGRAMMING: functions, basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for fibonacci series, towers of Hanoi, header files, C Preprocessor, example c programs, Passing 1-D arrays, 2-D arrays to functions.

UNIT IV:
Objective: Understanding pointers and dynamic memory allocation
POINTERS: pointers- concepts, initialization of pointer variables, pointers and function arguments, passing by address- dangling memory, address arithmetic, character pointers and functions, pointers to pointers, pointers and multi-dimensional arrays, dynamic memory management functions, command line arguments

UNIT V:
Objective: Understaning miscellaneous aspects of C
ENUMERATED, STRUCTURE AND UNION TYPES: Derived types- structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, program applications
BIT-WISE OPERATORS: logical, shift, rotation, masks.

UNIT VI:
Objective: Comprehension of file operations
FILEHANDLING: Input and output- concept of a file, textfiles and binary files, Formatted I/O, File I/O operations, example programs

Text Books:

1. Problem Solving and Program Design in C, Hanly, Koffman, 7th ed, PERSON
2. Programming in C, Second Edition Pradip Dey and Manas Ghosh, OXFORD Higher Education
3. Programming in C, A practical approach Ajay Mittal PEARSON
4. The C programming Language by Dennis Richie and Brian Kernighan
5. Programming in C , B L Juneja, Anita Seth, CENGAGE Leaning.

Reference Books and web links:

1. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE
2. Programming with C, Bichkar, Universities Press
3. Programming in C, Reema Thareja, OXFORD
4. C by Example, Noel Kalicharan, Cambridge

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ENVIRONMENTAL STUDIES

Course Learning Objectives:

The objectives of the course is to impart

1. Overall understanding of the natural resources
2. Basic understanding of the ecosystem and its diversity
3. Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities
4. An understanding of the environmental impact of developmental activities
5. Awareness on the social issues, environmental legislation and global treaties

Course Outcomes:

The student should have knowledge on

1. The natural resources and their importance for the sustenance of the life and recognise the need to conserve the natural resources
2. The concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in the food web
3. The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity
4. Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices
5. Social issues both rural and urban environment and the possible means to combat the challenges
6. The environmental legislations of India and the first global initiatives towards sustainable development.
7. About environmental assessment and the stages involved in EIA and the environmental audit

SYLLABUS:

UNIT - I

Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance – Sustainability: Stockholm and Rio Summit–Global Environmental Challenges: Global

warming and climate change, acid rains, ozone layer depletion, population growth and explosion, effects. Role of information Technology in Environment and human health.

Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.

UNIT - II

Natural Resources: Natural resources and associated problems

Forest resources – Use and over – exploitation, deforestation – Timber extraction – Mining, dams and other effects on forest and tribal people

Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems

Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources

Food resources: World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity

Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources.

Land resources: Land as a resource, land degradation, Wasteland reclamation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT - III

Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity-classification - Value of biodiversity: consumptive use, productive use, social-Biodiversity at national and local levels. India as a mega-diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: conservation of biodiversity.

UNIT - IV

Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies.

Solid Waste Management: Sources, classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products.

UNIT - V

Social Issues and the Environment: Urban problems related to energy -Water conservation, rain water harvesting-Resettlement and rehabilitation of people; its problems and concerns.

Environmental ethics: Issues and possible solutions. Environmental Protection Act -Air (Prevention and Control of Pollution) Act. –Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest Conservation Act-Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT - VI

Environmental Management: Impact Assessment and its significance various stages of EIA, preparation of EMP and EIS, Environmental audit. Ecotourism

The student should submit a report individually on any issues related to Environmental Studies course and make a power point presentation.

Text Books:

1. Environmental Studies by R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
2. A Textbook of Environmental Studies by Shaashi Chawla, TMH, New Delhi
3. Environmental Studies by P.N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

Reference:

1. Text Book of Environmental Studies by Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2. Environmental Studies by K.V.S.G. Murali Krishna, VGS Publishers, Vijayawada
3. Environmental Studies by Benny Joseph, Tata McGraw Hill Co, New Delhi
4. Environmental Studies by Piyush Malaviya, Pratibha Singh, Anoop singh: Acme Learning, New Delhi

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ENGINEERING MECHANICS

Objectives: The students completing this course are expected to understand the concepts of forces and its resolution in different planes, resultant of force system, Forces acting on a body, their free body diagrams using graphical methods. They are required to understand the concepts of centre of gravity and moments of inertia and their application, Analysis of frames and trusses, different types of motion, friction and application of work - energy method.

UNIT – I
Objectives: The students are to be exposed to the concepts of force and friction, direction and its application.
Introduction to Engg. Mechanics – Basic Concepts.
Systems of Forces: Coplanar Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems. Introduction**,** limiting friction and impending motion, coulomb's laws of dry friction, coefficient of friction, cone of friction
UNIT II
Objectives: The students are to be exposed to application of free body diagrams. Solution to problems using graphical methods and law of triangle of forces.
Equilibrium of Systems of Forces: Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, and Spatial Systems for concurrent forces. Lamis Theorm, Graphical method for the equilibrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition of equilibrium.
UNIT – III
Objectives: The students are to be exposed to concepts of centre of gravity.
Centroid: Centroids of simple figures (from basic principles) – Centroids of Composite Figures
Centre of Gravity: Centre of gravity of simple body (from basic principles), centre of gravity of composite bodies, pappus theorem.
UNIT IV
Objective: The students are to be exposed to concepts of moment of inertia and polar moment of inertia including transfer methods and their applications.
Area moments of Inertia : Definition – Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia. **Mass Moment of Inertia:** Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.
UNIT – V
Objectives: The students are to be exposed to motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion.
Kinematics: Rectilinear and Curvelinear motions – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion. **Kinetics:** Analysis as a Particle and Analysis as a Rigid Body in Translation – Central Force Motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies.

UNIT – VI

Objectives: The students are to be exposed to concepts of work, energy and particle motion

Work – Energy Method: Equations for Translation, Work-Energy Applications to Particle Motion, Connected System-Fixed Axis Rotation and Plane Motion. Impulse momentum method.

TEXT BOOKS:

1. Engg. Mechanics - S.Timoshenko & D.H.Young., 4th Edn - , Mc Graw Hill publications.
2. Engineering Mechanics: Statics and Dynamics 3rd edition, Andrew Pytel and Jaan Kiusalaas; Cengage Learning publishers.

REFERENCES:

1. Engineering Mechanics statics and dynamics – R.C.Hibbeler, 11th Edn – Pearson Publ.
2. Engineering Mechanics, statics – J.L.Meriam, 6th Edn – Wiley India Pvt Ltd.
3. Engineering Mechanics, dynamics – J.L.Meriam, 6th Edn – Wiley India Pvt Ltd.
4. Engineering Mechanics, statics and dynamics – I.H.Shames, – Pearson Publ.
5. Mechanics for Engineers, statics - F.P.Beer & E.R.Johnston – 5th Edn Mc Graw Hill Publ.
6. Mechanics for Engineers, dynamics - F.P.Beer & E.R.Johnston – 5th Edn Mc Graw Hill Publ.
7. Theory & Problems of engineering mechanics, statics & dynamics – E.W.Nelson, C.L.Best & W.G. McLean, 5th Edn – Schaum's outline series - Mc Graw Hill Publ.
8. Engineering Mechanics, Fedinand . L. Singer, Harper – Collins.
9. Engineering Mechanics statics and dynamics , A Nelson, Mc Graw Hill publications
10. Engineering Mechanics, Tayal. Umesh Publ.

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ENGINEERING CHEMISTRY LABORATORY

List of Experiments

1. Introduction to chemistry laboratory – Molarity, Normality, Primary, Secondary standard solutions, Volumetric titrations, Quantitative analysis, Quantitative analysis etc.,
2. Trial experiment – Estimation of HCI using standard Na_2co_3 solutions
3. Estimation of $KMnO_4$ using standard Oxalic acid solution.
4. Estimation of Ferric iron using standard $K_2Cr_2O_7$ solution.
5. Estimation of Copper using standard $K_2Cr_2O_7$ solution.
6. Estimation of Total Hardness water using standard EDTA solution.
7. Estimation of Copper using standard EDTA solution.
8. Estimation of Copper using Colorimeter
9. Estimation of pH of the given sample solution using pH meter.
10. Conductometric Titrations between strong acid and strong base
11. Conductometric Titrations between strong acid and Weak base
12. Potentiometric Titrations between strong acid and strong base
13. Potentiometric Titrations between strong acid and Weak base
14. Estimatinog of Zinc using standard potassium ferrocyanide solution
15. Estimation of Vitamin – C

TEXT BOOKSS

1. Dr.Jyotsna Cherukuis(2012)Laboratory Manual of Engineering Chemistry-II, VGS Techno Series
2. Chemistry Practical Manual, Lorven Publications
3. K. Mukkanti (2009) Practical Engineering Chemistry, B.S.Publication

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ENGLISH – COMMUNICATION SKILLS LAB – II

Suggested Lab Manuals:

OBJECTIVE: To impart to the learner the skills of grammar as well as communication through listening, speaking, reading, and writing including soft, that is life skills.

ADVANCED COMMUNICATION SKILLS

UNIT 6	Body language
UNIT 7	Dialogues
UNIT 8	Interviews and Telephonic Interviews
UNIT 9	Group Discussions
UNIT 10	Presentation Skills
UNIT 11	Debates

Text Book:

'Strengthen your Communication Skills' Part-B by Maruthi Publications

Reference Books:

1. INFOTECH English (Maruthi Publications)
2. Personality Development and Soft Skills (Oxford University Press, New Delhi)

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C Programming Lab

Exercise l

a) Write a C Program to 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) Write a C program to find the largest of three numbers using ternary operator.
c) Write a C Program to swap two numbers without using a temporary variable.

Exercise 2

a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
b) Write a C program to find the roots of a quadratic equation.
c) Write a C program, which takes two integer operands and one operator form the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Exercise 3

a) Write a C program to find the sum of individual digits of a positive integer and find the reverse of the given number.
b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Exercise 4

a) Write a C Program to print the multiplication table of a given number n up to a given value, where n is entered by the user.
b) Write a C Program to enter a decimal number, and calculate and display the binary equivalent of that number.
c) Write a C Program to check whether the given number is Armstrong number or not.

Exercise 5

a) Write a C program to interchange the largest and smallest numbers in the array.
b) Write a C program to implement a liner search.
c) Write a C program to implement binary search

Exercise 6

a) Write a C program to implement sorting of an array of elements .
b) Write a C program to input two m x n matrices, check the compatibility and perform addition and multiplication of them

Exercise 7

Write a C program that uses functions to perform the following operations:

i. To insert a sub-string in to given main string from a given position.
ii. To delete n Characters from a given position in a given string.
iii. To replace a character of string either from beginning or ending or at a specified location

Exercise 8

Write a C program that uses 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 9

Write C Programs for the following string operations without using the built in functions

- to concatenate two strings
- to append a string to another string
- to compare two strings

Exercise 10

Write C Programs for the following string operations without using the built in functions

- to find the length of a string
- to find whether a given string is palindrome or not

Exercise 11

a) Write a C functions to find both the largest and smallest number of an array of integers.
b) Write C programs illustrating call by value and call by reference cncepts.

Exercise 12

Write C programs that use 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 find Fibonacci sequence

Exercise 13

a) Write C Program to reverse a string using pointers
b) Write a C Program to compare two arrays using pointers

Exercise 14

a) Write a C program consisting of Pointer based function to exchange value of two integers using passing by address.
b) Write a C program to swap two numbers using pointers

Exercise 15

Examples which explores the use of structures, union and other user defined variables

Exercise 16

a) Write a C program which copies one file to another.
b) Write a C program to count the number of characters and number of lines in a file.
c) Write a C Program to merge two files into a third file. The names of the files must be entered using command line arguments.

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MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Unit – I: (*The Learning objective of this Unit is to understand the concept and nature of Managerial Economic s and its relationship with other disciplines, Concept of Demand and Demand forecasting)

Introduction to Managerial Economics and demand Analysis:

Definition of Managerial Economics and Scope-Managerial Economics and its relation with other subjects-Concepts of Demand-Types-Determents-Law of Demand its Exception-Elasticity of Demand-Types and Measurement-Demand forecasting and its Methods.

(**The Learner is equipped with the knowledge of estimating the Demand for a product and the relationship between Price and Demand)

Unit – II: (*The Learning objective of this Unit is to understand the concept of Production function, Input Output relationship, different Cost Concepts and Concept of Cost-Volume-Profit Analysis)

Production and Cost Analyses:

Production function-Isoquants and Isocosts-Law of Variable proportions-Cobb-Douglas Production function-Economics of Sale-Cost Concepts-Opportunity Cost-Fixed vs Variable Costs-Explicit Costs vs Implicit Costs-Out of Pocket Costs vs Imputed Costs-Cost Volume Profit analysis-Determination of Break-Even Point (Simple Problem)

(**One should understand the Cost Concepts for decision making and to estimate the least cost combination of inputs).

Unit – III: (*The Learning Objective of this Unit is t understand the Nature of Competition, Characteristics of Pricing in the different market structure and significance of various pricing methods)

Introduction to Markets, Theories of the Firm & Pricing Policies:

Market Structures: Perfect Competition, Monopoly and Monopolistic and Oligopoly – Features – Price, Output Determination – Managerial Theories of firm: Maris and Williamson's models – Methods of Pricing: Limit Pricing, Market Skimming Pricing, Internet Pricing: Flat Rate Pricing, Usage sensitive, Transaction based pricing, Priority Pricing.

(** One has to understand the nature of different markets and Price Output determination under various market conditions)

Unit – IV: (*The Learning objective of this Unit is to know the different forms of Business organization and their Merits and Demerits both public & private Enterprises and the concepts of Business Cycles)

Types of Business Organization and Business Cycles:

Features and Evaluation of Sole Trader – Partnership – Joint Stock Company – State/Public Enterprises and their forms – Business Cycles – Meaning and Features – Phases of Business Cycle.

(**One should equipped with the knowledge of different Business Units)

Unit – V: (*The Learning objective of this Unit is to understand the different Accounting Systems preparation of Financial Statements and uses of different tools for performance evaluation)

Introduction to Accounting & Financing Analysis:

Introduction to Double Entry Systems – Preparation of Financial Statements-Analysis and Interpretation of Financial Statements-Ratio Analysis – Preparation of Funds flow cash flow statements (Simple Problems)

(**The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis)

Unit – VI: (*The Learning objective of this Unit is to understand the concept of Capital, Capitalization, Capital Budgeting and to know the techniques used to evaluate Capital Budgeting proposals by using different methods)

Capital and Capital Budgeting: Capital Budgeting: Meaning of Capital-Capitalization-Meaning of Capital Budgeting-Need for Capital Budgeting-Techniques of Capital Budgeting-Traditional and Modern Methods.

(**The Learner is able to evaluate various investment project proposals with the help of capital budgeting techniques for decision making)

Note: *Learning Objective

** Learning Assessment

TEXT BOOKS

1. Dr. N. Appa Rao, Dr. P. Vijay Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi – 2011
2. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011
3. Prof. J.V.Prabhakara rao, Prof. P. Venkatarao. 'Managerial Economics and Financial Analysis', Ravindra Publication.

REFERENCES:

1. V. Maheswari: Managerial Economics, Sultan Chand.
2. Suma Damodaran: Managerial Economics, Oxford 2011.
3. Dr. B. Kuberudu and Dr. T. V. Ramana: Managerial Economics & Financial Analysis, Himalaya Publishing House 2011.
4. Vanitha Agarwal: Managerial Economics, Pearson Publications 2011.
5. Sanjay Dhameja: Financial Accounting for Managers, Pearson.
6. Maheswari: Financial Accounting, Vikas Publications.

S. A. Siddiqui & A. S. Siddiqui: Managerial Economics and Financial Analysis, New Age International Publishers,

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
II Year B. Tech Computer Science & Engineering – I Semester

OBJECT-ORIENTED PROGRAMMING THROUGH C++

Objectives: Expertise in object oriented principles and their implementation in C++

UNIT I :
Objectives: Exposure to basics of object oriented mode, C++ programming and I/O in C++

INTRODUCTION: *Differences Between C And C++, The Object Oriented Technology , Disadvantage of Conventional Programming, Concepts of Object Oriented Programming, Advantages of OOP Structure of A C++ Program, Header Files And Libraries*

INPUT AND OUTPUT IN C++:
Introduction, Streams In C++ And Stream Classes, Pre-Defined Streams, Stream Classes, Formatted And Unformatted Data, Unformatted Console I/O Operations, Member Functions Of Istream Class, Formatted Console I/O Operations, Bit Fields, Flags Without Bit Field, Manipulators, User Defined Manipulators

UNIT II :
Objectives: Focus on Basic concept in C++ programming, Operators, control structures, functions, overloading, recursion

Tokens In C++, Variable Declaration And Initialization, Data Types, Operators In C And C++, Scope Access Operator, Namespace, Memory Management Operators, Comma Operator, Revision Of Decision Statements, Control Loop Statements
FUNCTIONS IN C++ : Introduction, Structure Of Function, Passing Arguments, Lvalues

And Rvalues, Retrun By Reference, Returning More Values By Reference, Default

Arguments, Const Arguments, Inputting Default Arguments, Inline Functions,

Function Overloading, Principles Of Function Overloading, Recursion

UNIT III :
Objectives: Acquaintance with classes, objects and member functions

CLASSES AND OBJECTS : Introduction, Classes In C++, Declaring Objects, Access

Specifiers And Their Scope, Member Functions, Outside Member Function As Inline, Data

Hiding or Encapsulation, Classes, Objects and Memory, Static Member Variables, Static

Member Functions, Static Object, Array Of Objects, Objects As Function Arguments, Friend

Functions, The Const Member Functions, The Volatile Member Function, Recursive Member Function, Local Classes, Empty, Static and Const Classes, Member Function And Non-Member Function, Overloading Member Functions, Nested Class

UNIT IV:

Objectives: Focus on constructors, destructors, variants in them, operator overloading, type conversions

CONSTRUCTORS AND DESTRUCTORS : Introduction, Characteristic Of Constructors & Destructors, Applications With Constructors, Parameterized Constructor, Overloading Constructors (Multiple Constructors), Array Of Objects Using Constructors, Constructors With Default Arguments, Copy Constructors, The Const Objects, Destructors, Calling Constructors And Destructors, Qualifier And Nested Classes, Anonymous Objects, Private Constructors And Destructors, Dynamic Initialization Using Constructrs, Dynamic Operators and Constructors, Recursive Constructor, Constructor and Destructor With Static Members, Local Vs. Global Object

OPERATOR OVERLOADING AND TYPE CONVERSION : Introduction, Overloading Unary Operators, Constraint on Increment And Decrement Operators, Overloading Binary Operators, Overloading With Friend Function, Overloading Assignment Operator (=), Type Conversion, Rules For Overloading Operators, One Argument Constructor and Operator Function, Overloading Stream Operators

UNIT V:

Objective: Concentration on inheritance, types of inheritance, polymorphism, virtual functions

INHERITANCE : Introduction, Reusability, Access Specifiers and Simple Inheritance, Protected Data With Private Inheritance, Types of Inheritances(Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Multipath Inheritance), Virtual Base Classes, Constructors, Destructors, and Inheritance, Object as a

Class Member, Abstract Classes, Qualifier Classes and Inheritance, Constructor In Derived Class, Pointers and Inheritance, Overloading Member Function, Advantages of Inheritance, Disadvantages of Inheritance.

BINDING, POLYMORPHISM AND VIRTUAL FUNCTIONS: Introduction, Binding In C++, Static (Early) Binding, Dynamic (Late) Binding, Pointer To Base And Derived Class Objects, Virtual Functions, Rules For Virtual Functions, Array of Pointers, Pure Virtual Functions, Abstract Classes, Working of Virtual Functions, Virtual Functions In Derived Classes, Object Slicing, Constructors and Virtual Functions, Virtual Destructors, Destructor and Virtual Functions.

UNIT VI:

Objectives: Focus on Files, File operations, generic programming, templates, function templates, Exception handling

APPLICATIONS WITH FILES: *Introduction, File Stream Classes, File Opening Modes, File Pointers And Manipulators, Manipulators With Arguments, Sequential Access Files, Binary And ASCII Files, random Access Operation,*

GENERIC PROGRAMMING WITH TEMPLATES : Introduction, Need of Template, Definition of Class Template, Normal Function Template, Working of Function Templates, Class Template With More Parameters, Functions Templates With More Arguments, Overloading of Template Functions, Member Function Templates,Recursion With Template Function, Class Template With Overloaded Operators, Class Template Revisited, Class Templates and Inheritance, Container Classes , Types Of Containers, Container Adaptors, Iterators

EXCEPTION HANDLING : Introduction, Principles Of Exception Handling,The Keywords Try, Throw And Catch , Exception Handling Mechanism, Multiple Catch Statements, Catching Multiple Exceptions, Re-Throwing Exception, Specifying Exception, Exceptions In Constructor And Destructors, Controlling Uncaught Exceptions, Class Template With Exception Handling

TEXT BOOKS:

1. Programming in C++, Ashok N Kamthane. Pearson 2nd Edition.

2. Object Oriented Programming C++, Joyce Farrell, Cengage

3. Mastering C ++, Venugopal, Rajkumar, Ravi kumar TMH
4. Object Oriented Programming with C++, 2nd ed, Sourav Sahay, OXFORD

REFERENCE BOOKS:

1. The Complete Reference, C++, 4ed, Herbert Schildt, TMH

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
II Year B. Tech Computer Science & Engineering – I Semester

MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Objectives: Acquaintance with the basic mathematical implication for computer science, applications of mathematics in computer science

UNIT I:
Objective: Acquiring the relevance of statements, inferences and predicates in computer science

Mathematical Logic:
Propositional Calculus: Statements and Notations, Connectives, Truth Tables, Tautologies, Equivalence of Formulas, Duality law, Tautological Implications, Normal Forms, Theory of Inference for Statement Calculus, **Consistency of Premises, Indirect Method of Proof.**
Predicate calculus: Predicative Logic, Statement Functions, Variables and Quantifiers, Free & Bound Variables, Inference theory for predicate calculus.

UNIT II:
Objective: Overview of number theory, basic algorithms in number theory and mathematical induction

Number Theory & Induction:
Properties of integers, Division Theorem, The Greatest Common Divisor, Euclidean Algorithm, Least Common Multiple, Testing for Prime Numbers, The Fundamental Theorem of Arithmetic, Modular Arithmetic (Fermat's Theorem and Euler's Theorem)
Mathematical Induction: Principle of Mathematical Induction, exercises

UNIT III:
Objective: Focuses on sets and relations and their operations, relations and functions

Set Theory:
Introduction, Operations on Binary Sets, Principle of Inclusion and Exclusion
Relations: Properties of Binary Relations, Relation Matrix and Digraph, Operations on Relations, Partition and Covering, Transitive Closure, Equivalence, Compatibility and Partial Ordering Relations, Hasse Diagrams.
Functions: Bijective Functions, Composition of Functions, Inverse Functions, Permutation Functions, Recursive Functions

UNIT IV:
Objectives: Exposure of graphs, their representation, types, trees and tree variants

Graph Theory:
Basic Concepts of Graphs, Sub graphs, Matrix Representation of Graphs: Adjacency Matrices, Incidence Matrices, Isomorphic Graphs, Paths and Circuits, Eulerian and Hamiltonian Graphs, Multigraphs, (Problems and Theorems without proofs)

Planar Graphs, Euler's Formula, Graph Colouring and Covering, Chromatic Number,(Problems and Theorems without proofs)
Trees, Directed trees, Binary Trees, Decision Trees,
Spanning Trees: Properties, Algorithms for Spanning trees and Minimum Spanning Tree.

UNIT V:
Objective: Overview of algebraic structures, Group theory, Binomial theorem, permutations and combinations

Algebraic Structures: Lattice: Properties, Lattices as Algebraic Systems, Algebraic Systems with one Binary Operation,Properties of Binary operations, Semi groups and Monoids: Homomorphism of Semi groups and Monoids, Groups: Abelian Group, Cosets, Subgroups (Definitions and Examples of all Structures) Algebraic Systems with two Binary Operations: Rings
Combinatorics: Basic of Counting, Permutations, Derangements, Permutations with Repetition of Objects, Circular Permutations, Restricted Permutations, Combinations, Restricted Combinations, Pigeonhole Principle and its Application.
Binomial Theorem: Binomial and Multinomial Coefficients, Generating Functions of Permutations and Combinations, The Principles of Inclusion – Exclusion.

UNIT VI:
Objective: Overview of generating functions, recurrence relations and solving recurrence relations

Recurrence Relation:
Generating Function of Sequences, Partial Fractions, Calculating Coefficient of Generating Functions
Recurrence Relations, Formulation as Recurrence Relations, Solving linear homogeneous recurrence Relations by substitution, generating functions and The Method of Characteristic Roots.
Solving Inhomogeneous Recurrence Relations

TEXT BOOKS:

1. Discrete Mathematical Structures with Applications to Computer Science, Tremblay, Manohar, TMH
2. Discrete Mathematics for Computer Scientists & Mathematicians, 2/e, Mott, Kandel, Baker, PHI
3. Discrete Mathematics, Swapan Kumar chakrborthy, Bikash kanti sarkar, OXFORD
4. Discrete Mathematics and its Applications with combinatorics and graph theory, 7th ed, Rosen, TMH
5. Discrete Mathematics, Theory and Applications, Malik sen, Cengage
6. Discrete mathematics and Graph theory, 3rd ed, Biswal, PHI

REFERENCE BOOKS:

1. Discrete Mathematics, Proofs, Structures and applications, 3rd ed, CRC Press
2. Discrete Mathematics, S.Santha, Cengage
3. Discrete Mathematics with Applications, Thomas Koshy, Elsevier
4. Discrete Mathematics,2/e, JK Sharma ,Macmillan

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
II Year B. Tech Computer Science & Engineering – I Semester

DIGITAL LOGIC DESIGN

Unit I: Number Systems

Binary, Octal, Decimal, Hexadecimal Number Systems. Conversion of Numbers from One Radix to another Radix, r's Complement and (r-1)'s Complement Subtraction of Unsigned Numbers, Problems, Signed Binary Numbers, Weighted and Non weighted codes

Unit II:Logic Gates And Boolean Algebra

Basic Gates NOT, AND, OR, Boolean Theorms,Complement And Dual of Logical Expressions, Universal Gates, Ex-Or and Ex-Nor Gates, SOP,POS, Minimizations of Logic Functions Using Boolean Theorems, Two level Realization of Logic Functions Using Universal Gates

Gate Level Minimization: Karnaugh Map Method (K-Map): Minimization of Boolean Functions maximum upto Four Variables, POS and SOP, Simplifications with Don't Care Conditions Using K-Map.

Unit III: Combinational Logic Circuits

Design of Half Adder, Full Adder, Half Subtractor, Full Subtractor, Ripple Adders and Subtractors, Ripple Adder/Subtractor Using Ones and Twos Complement Method. Design of Decoders, Encoders, Multiplexers, Demultiplexers, Higher Order Demultiplexers and Multiplexers, Priority Encoder, Code Converters, Magnitude Comparator.

Unit IV: Introduction to Sequential Logic Circuits

Classification of Sequential Circuits, Basic Sequential Logic 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 V: Registers and Counters

Design of Registers, Buffer Register, Control Buffer Registers, Bidirectional Shift Registers, Universal Shift Register, Design of Ripple Counters, Synchronous Counters and Variable Modulus Counters, Ring Counter, Johnson Counter.

Unit VI: Introduction to Programmable Logic Devices (PLOs)

PLA, PAL, PROM. Realization of Switching Functions Using PROM, PAL and PLA. Comparison of PLA, PAL and PROM.

TEXT BOOKS:

1. Digital Design ,4/e, M.Morris Mano, Michael D Ciletti, PEA
2. Fundamentals of Logic Design, 5/e, Roth, Cengage

REFERENCE BOOKS:

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

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
II Year B. Tech Computer Science & Engineering – I Semester

DATA STRUCTURES

Objectives: Comprehensive knowledge of data structures and ability to implement the same in software applications

UNIT I:
Objective: exposure to algorithmic complexities, recursive algorithms, searching and sorting techniques

Preliminaries of algorithm, Algorithm analysis and complexity,
DATA STRUCTURE- Definition, types of data structures
Recursion: Definition, Design Methodology and Implementation of recursive algorithms, Linear and binary recursion, recursive algorithms for factorial function, GCD computation, Fibonacci sequence, Towers of Hanoi, Tail recursion
List Searches using Linear Search, Binary Search, *Fibonacci Search*
Sorting Techniques: Basic concepts, Sorting by : insertion (Insertion sort), selection (heap sort), exchange (bubble sort, quick sort), distribution (radix sort) and merging (merge sort) *Algorithms.*

UNIT II:
Objectives: Applying stack and queue techniques for logical operations

Stacks and Queues: Basic Stack Operations, Representation of a Stack using Arrays, Stack Applications: Reversing list, Factorial Calculation, Infix to postfix Transformation, Evaluating Arithmetic Expressions.
Queues: Basic Queues Operations, Representation of a Queue using array, Implementation of Queue Operations using Stack, Applications of Queues-Round robin Algorithm, Circular Queues, Priority Queues.

UNIT III:
Objectives: Exposure to list representation models in various types of applications

Linked Lists: Introduction, single linked list, representation of a linked list in memory, Operations on a single linked list, Reversing a single linked list, applications of single linked list to represent polynomial expressions and sparse matrix manipulation, Advantages and disadvantages of single linked list, Circular linked list, Double linked list

UNIT IV:
Objectives: Implementation of tree implementation in various forms

Trees: Basic tree concepts, Binary Trees: Properties, Representation of Binary Trees using arrays and linked lists, operations on a Binary tree , Binary Tree Traversals (recursive), Creation of binary tree from in, pre and post order traversals

UNIT-V:

Objectives: Advanced understanding of other variants of trees and their operations

Advanced concepts of Trees: Tree Travels using stack (non recursive), Threaded Binary Trees. Binary search tree, Basic concepts, BST operations: insertion, deletion, Balanced binary trees – need, basics and applications in computer science (No operations)

UNIT VI:

Objectives: orientation on graphs, representation of graphs, graph traversals, spanning trees

Graphs: Basic concepts, Representations of Graphs: using Linked list and adjacency matrix, Graph algorithms

Graph Traversals (BFS & DFS), applications: Dijkstra's shortest path, Transitive closure, Minimum Spanning Tree using Prim's Algorithm, warshall's Algorithm(**Algorithmic Concepts Only, No Programs required**).

TEXT BOOKS:

1. Data Structure with C, Seymour Lipschutz, TMH
2. Data Structures using C,Reema Thareja, Oxford
3. Data Structures, 2/e, Richard F, Gilberg , Forouzan, Cengage
4. Data structures and algorithm analysis in C, 2nd ed, mark allen weiss, Pearson

REFERENCE BOOKS:

1. Data Structures and Algorithms, 2008,G.A.V.Pai, TMH
2. Classic Data Structures, 2/e, Debasis ,Samanta,PHI,2009
3. Fundamentals of Data Structure in C, 2/e, Horowitz,Sahni, Anderson Freed, University Prees

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
II Year B. Tech Computer Science & Engineering – I Semester

OBJECT ORIENTED PROGRAMMING LAB

1. Write a C++ program illustrating Variable Scope.

2. Write a C++ program illustrating Swap integer values by reference.

3. Write a C++ program illustrating Checking whether the number is even or odd using Ternary

operator.

4. Write a C++ program illustrating a program to find the roots of a quadratic equation .Use switch

statements to handle different values of the discriminant (b^2-4*a*c).

5. Write a C++ program illustrating interactive program to multiply 2 variables after checking the

compatibility.

6. Write a C++ program illustrating interactive program for computing the roots of a quadratic

equation by handling all possible cases. Use streams to perform I/O operations.

7. Write a C++ program illustrating to sort integer numbers.

8. Write a C++ program illustrating factorial using recursion.

9. Write a C++ program illustrating pass by value, pass by reference, pass by address.

10. Write a C++ program illustrating Function overloading.

11. Write a C++ program illustrating an interactive program for swapping integer, real, and character

type variables without using function overloading .Write the same program by using function

overloading features and compare the same with its C counterpart.

12. Write a C++ program illustrating inline functions.

13. Write a C++ program illustrating Friend function.

14. Write a C++ program illustrating Exception handling.

15. Write a C++ program illustrating Function template.

16. Write a C++ program illustrating Overloading increment, decrement, binary+&<< operator.

17. Write a C++ program illustrating Virtual function.

18. Write a C++ program illustrating an interactive program to process complex numbers .It has to

Perform addition, subtraction, multiplication, and division of complex numbers. print results in

x+iy form. Create a class for the complex number representation.

19. Write a C++ program illustrating user defined string processing functions using pointers (string

length, string copy, string concatenation)

20. Write a C++ program illustrating Constructor overloading (Both parameterised and default).

21. Write a C++ program illustrating Copy constructor.

22. Write a C++ program illustrating access data members & member functions using 'THIS' pointer.

23. Write a C++ program illustrating for overloading ++ operator to increment data.

24. Write a C++ program illustrating overloading of new and delete operator.

25. Write a C++ program illustrating Abstract classes.

26. Write a C++ program illustrating Inheritance (Multiple, Multilevel, Hybrid).

27. Write a C++ program illustrating Virtual classes & virtual functions.

28. Write a C++ program illustrating overloading function template.

29. Write a C++ program illustrating Class template.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
II Year B. Tech Computer Science & Engineering – I Semester

DATA STRUCTURES LAB

Exercise 1:
Write recursive program which computes the n^{th} Fibonacci number, for appropriate values of n.
Analyze behavior of the program obtain the frequency count of the statement for various values of n.

Exercise 2:
Write recursive program for the following

a) Write recursive and non recursive C program for calculation of Factorial of an integer
b) Write recursive and non recursive C program for calculation of GCD (n, m)
c) Write recursive and non recursive C program for Towers of Hanoi : N disks are to be transferred from peg S to peg D with Peg I as the intermediate peg.

Exercise 3:

a) Write C program that use both recursive and non recursive functions to perform Linear search for a Key value in a given list.
b) Write C program that use both recursive and non recursive functions to perform Binary search for a Key value in a given list.
c) Write C program that use both recursive and non recursive functions to perform Fibonacci search for a Key value in a given list.

Exercise 4:

a) Write C program that implement Bubble sort, to sort a given list of integers in ascending order
b) Write C program that implement Quick sort, to sort a given list of integers in ascending order
c) Write C program that implement Insertion sort,to sort a given list of integers in ascending order

Exercise 5:

a) Write C program that implement heap sort, to sort a given list of integers in ascending order
b) Write C program that implement radix sort, to sort a given list of integers in ascending order
c) Write C program that implement merge sort, to sort a given list of integers in ascending order

Exercise 6:

a) Write C program that implement stack (its operations) using arrays
b) Write C program that implement stack (its operations) using Linked list

Exercise 7:

a) Write a C program that uses Stack operations to Convert infix expression into postfix expression
a) Write C program that implement Queue (its operations) using arrays.
b) Write C program that implement Queue (its operations) using linked lists

Exercise 8:

a) Write a C program that uses functions to create a singly linked list
b) Write a C program that uses functions to perform insertion operation on a singly linked list
c) Write a C program that uses functions to perform deletion operation on a singly linked list

Exercise 9:

d) Adding two large integers which are represented in linked list fashion.
e) Write a C program to reverse elements of a single linked list.
f) Write a C program to store a polynomial expression in memory using linked list
g) Write a C program to representation the given Sparse matrix using arrays.
h) Write a C program to representation the given Sparse matrix using linked list

Exercise10:

a) Write a C program to Create a Binary Tree of integers
b) Write a recursive C program for Traversing a binary tree in preorder, in order and post order.
c) Write a non recursive C program for Traversing a binary tree in preorder, in order and post order.
d) Program to check balance property of a tree.

Exercise 11:

a) Write a C program to Create a BST
b) Write a C program to insert a node into a BST.
c) Write a C program to delete a node from a BST.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
II Year B. Tech Computer Science & Engineering – I Semester

DIGITAL LOGIC DESIGN LAB

List of Experiments:

1) Verification of Basic Logic Gates.
2) Implementing all individual gates with Universal Gates NAND & NOR.
3) Design a circuit for the given Canonical form, draw the circuit diagram and verify the De-Morgan laws.
4) Design a Combinational Logic circuit for 4x1 MUX and verify the truth table.
5) Design a Combinational Logic circuit for 1x4 De- MUX and verify the truth table.
6) Verify the ***data read*** and ***data write*** operations for the IC 74189.
7) Design a Gray code encoder and interface it to SRAM IC 74189 for write operation display on 7-segment.
8) Design a Gray code De-coder and interface it to SRAM IC 74189 for read operation display it on 7-segment.
9) Construct Half Adder and Full Adder using Half Adder and verify the truth table.
10) Verification of truth tables of the basic Flip- Flops with ***Synchronous*** and ***Asynchronous*** modes.
11) Implementation of Master Slave Flip-Flop with J-K Flip- Flop and verify the truth table for ***race around*** condition**.**
12) Design a Decade Counter and verify the truth table.
13) Design the Mod 6 counter using D-Flip -Flop.
14) Construct 4-bit ring counter with T-Flip –Flop and verify the truth table.
15) Design a 8 – bit right Shift Register using D-Flip -Flop and verify the truth table.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
II Year B. Tech Computer Science & Engineering – II Semester

Probability and Statistics

(Common to CE, CSE, IT, Chemical, PE, PCE, Civil Branches)

UNIT I Random variables and Distributions:

Introduction- Random variables- Distribution function- Discrete distributions (Review of Binomial and Poisson distributions)-

Continuous distributions: Normal, Normal approximation to Binomial distribution, Gamma and Weibull distributions

Subject Category
ABET Learning Objectives a b e k
ABET internal assessments 1 2 6
JNTUK External Evaluation A B E

UNIT II Moments and Generating functions:

Introduction-Mathematical expectation and properties - Moment generating function - Moments of standard distributions (Binomial, Poisson and Normal distributions) – Properties

Subject Category
ABET Learning Objectives a e
ABET internal assessments 1 2 6
JNTUK External Evaluation A B E

UNIT III Sampling Theory:

Introduction - Population and samples- Sampling distribution of mean for large and small samples (with known and unknown variance) - Proportion sums and differences of means - Sampling distribution of variance -Point and interval estimators for means and proportions

Subject Category
ABET Learning Objectives a e k
ABET internal assessments 1 2 6
JNTUK External Evaluation A B E

UNIT IV Tests of Hypothesis:

Introduction - Type I and Type II errors - Maximum error - One tail, two-tail tests- Tests concerning one mean and proportion, two means- Proportions and their differences using Z-test, Student's t-test - F-test and Chi -square test - ANOVA for one-way and two-way classified data

Subject Category
ABET Learning Objectives a b d e h k
ABET internal assessments 1 2 6 7 10
JNTUK External Evaluation A B D E F

UNIT V Curve fitting and Correlation:

Introduction - Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares.

Simple Correlation and Regression - Rank correlation - Multiple regression

Subject Category
ABET Learning Objectives a d e h k
ABET internal assessments 1 2 6 10
JNTUK External Evaluation A B E

UNIT VI Statistical Quality Control Methods:

Introduction - Methods for preparing control charts – Problems using x-bar, p, R charts and attribute charts

Subject Category
ABET Learning Objectives a e k
ABET internal assessments 1 2 6
JNTUK External Evaluation A B E F

Books:

1. Probability and Statistics for Engineers: Miller and John E. Freund, Prentice Hall of India
2. Probability and Statistics for Engineers and Scientists: Ronald E. Walpole, Sharon L. Mayers and Keying Ye: Pearson
3. Probability, Statistics and Random Processes, Murugesan, Anuradha Publishers, Chenai:

Subject Category	ABET Learning Objectives	ABET Internal Assessments	JNTUK External Evaluation	Remarks
Theory Design Analysis Algorithms Drawing Others	a) Apply knowledge of math, science, & engineering b) Design & conduct experiments, analyze & interpret data c) Design a system/process to meet desired needs within economic, social, political, ethical, health/safety, manufacturability, & sustainability constraints d) Function on multidisciplinary teams e) Identify, formulate, & solve engineering problems f) Understand professional & ethical responsibilities g) Communicate effectively h) Understand impact of engineering solutions in global, economic, environmental, & societal context i) Recognize need for & be able to engage in lifelong learning j) Know contemporary issues k) Use techniques, skills, modern tools for engineering practices	1. Objective tests 2. Essay questions tests 3. Peer tutoring based 4. Simulation based 5. Design oriented 6. Problem based 7. Experiential (project based) based 8. Lab work or field work based 9. Presentation based 10. Case Studies based 11. Role-play based 12. Portfolio based	A. Questions should have: B. Definitions, Principle of operation or philosophy of concept. C. Mathematical treatment, derivations, analysis, synthesis, numerical problems with inference. D. Design oriented problems E. Trouble shooting type of questions F. Applications related questions G. Brain storming questions	

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA

II Year B. Tech Computer Science & Engineering – II Semester

JAVA Programming

Objective: Implementing programs for user interface and application development using core java principles

UNIT I:
Objective: Focus on object oriented concepts and java program structure and its installation

Introduction to OOP
Introduction, Need of Object Oriented Programming, Principles of Object Oriented Languages, Procedural languages Vs OOP, Applications of OOP, History of JAVA, Java Virtual Machine, Java Features, Program structures, Installation of JDK1.6

UNIT II:
Objective: Comprehension of java programming constructs, control structures in Java

Programming Constructs
Variables , Primitive Datatypes, Identifiers- Naming Coventions, Keywords, Literals, Operators-Binary,Unary and ternary, Expressions, Precedence rules and Associativity, Primitive TypeConversion and Casting, Flow of control-Branching,Conditional, loops.,
Classes and Objects- classes, Objects, Creating Objects, Methods, constructors-Constructor overloading, cleaning up unused objects-Garbage collector, Class variable and Methods-Static keyword, this keyword, Arrays, Command line arguments

UNIT III:
Objective: Implementing Object oriented constructs such as various class hierarchies, interfaces and exception handling

Inheritance: Types of Inheritance, Deriving classes using extends keyword, Method overloading, super keyword, final keyword, Abstract class
Interfaces, Packages and Enumeration: Interface-Extending interface, Interface Vs Abstract classes, Packages-Creating packages , using Packages, Access protection, java.lang package
Exceptions & Assertions - Introduction, Exception handling techniques-try...catch, throw, throws, finally block, user defined exception, Exception Encapsulation and Enrichment, Assertions

UNIT IV:
Objective: Understanding of Thread concepts and I/O in Java

MultiThreading : java.lang.Thread, The main Thread, Creation of new threads, Thread priority, Multithreading- Using isAlive() and join(), Syncronization, suspending and Resuming threads, Communication between Threads
Input/Output: reading and writing data, java.io package

UNIT V:

Objective: Being able to build dynamic user interfaces using applets and Event handling in java

Applets- Applet class, Applet structure, An Example Applet Program, Applet Life Cycle, paint(),update() and repaint()

Event Handling -Introduction, Event Delegation Model, java.awt.event Description,Sources of Events, Event Listeners, Adapter classes, Inner classes

UNIT VI:

Objective: Understanding of various components of Java AWT and Swing and writing code snippets using them

Abstract Window Toolkit

Why AWT?, java.awt package, Components and Containers, Button, Label, Checkbox, Radio buttons, List boxes, Choice boxes, Text field and Text area, container classes, Layouts, Menu, Scroll bar

Swing:

Introduction , JFrame, JApplet, JPanel, Components in swings, Layout Managers, JList and JScroll Pane, Split Pane, JTabbedPane, Dialog Box

Pluggable Look and Feel

Text Books:

1. The Complete Refernce Java, 8ed, Herbert Schildt, TMH
2. Programming in JAVA, Sachin Malhotra, Saurabh choudhary, Oxford.
3. JAVA for Beginners, 4e, Joyce Farrell, Ankit R. Bhavsar, Cengage Learning.
4. Object oriented programming with JAVA, Essentials and Applications, Raj Kumar Bhuyya, Selvi, Chu TMH
5. Introduction to Java rogramming, 7th ed, Y Daniel Liang, Pearson

Reference Books:

1. JAVA Programming, K.Rajkumar.Pearson
2. Core JAVA, Black Book, Nageswara Rao, Wiley, Dream Tech
3. Core JAVA for Beginners, Rashmi Kanta Das, Vikas.
4. Object Oriented Programming through JAVA , P Radha Krishna , University Press.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
II Year B. Tech Computer Science & Engineering – II Semester

ADVANCED DATA STRUCTURES

(Note: C++ and Java implementation is not included in the syllabus)

Objectives: Exposed to hashing approaches, variants of trees, heaps, queues, implementation of graph algorithms, analysis of sorting algorithms with respect to bounds and file organizations and operations

Unit I :
Objectives: Comprehensive understanding of dictionaries, hashing mechanism which supports faster retrieval and skip lists

Dictionaries : Sets, Dictionaries, Hash Tables, Open Hashing, Closed Hashing (Rehashing Methods), Hashing Functions(Division Method, Multiplication Method, Universal Hashing), Skip Lists, Analysis of Skip Lists. (Reference 1)

Unit II :
Objectives: Illustartion of Balanced trees and their operations
AVL Trees: Maximum Height of AVL Tree, Insertions and Deletions. 2-3 Trees : Insertion, Deletion.

Unit III :
Objectives: Comprehension of heaps, queues and their operations
Priority Queues :
Binary Heaps : Implementation of Insert and Delete min, Creating Heap.
Binomial Queues : Binomial Queue Operations, Binomial Amortized Analysis, Lazy Binomial Queues

Unit IV :
Objectives: Detailed knowledge of nonlinear data structures and various algorithms using them

Graph algorithms : Minimum-Cost Spanning Trees- Prim's Algorithm, Kruskal's Algorithm Shortest Path Algorithms: Dijkstra's Algorithm, All Pairs Shortest Paths Problem: Floyd's Algorithm, Warshall's Algorithm,

Unit V :
Objectives: Analysis of complexities in various sorting techniques along with their lower bounds

Sorting Methods : Order Statistics: Lower Bound on Complexity for Sorting Methods: Lower Bound on Worst Case Complexity, Lower Bound on Average Case Complexity, Heap Sort, Quick Sort, Radix Sorting, Merge Sort.

Unit VI :

Objectives: Illustration of tries which share some properties of table look up, various issues related to the design of file structures

Pattern matching and Tries : Pattern matching algorithms- the Boyer –Moore algorithm, the Knuth-Morris-Pratt algorithm

Tries: Definitions and concepts of digital search tree, Binary trie, Patricia , Multi-way trie

File Structures: Fundamental File Processing Operations-opening files, closing files, Reading and Writing file contents, Special characters in files.

Fundamental File Structure Concepts- Field and record organization, Managing fixed-length, fixed-field buffers.

(Reference 5)

Text Books :

1. Data Structures, A Pseudocode Approach, Richard F Gilberg, Behrouz A Forouzan, Cengage.
2. Fundamentals of DATA STRUCTURES in C: 2nd ed, , Horowitz , Sahani, Anderson-freed, Universities Press
3. Data structures and Algorithm Analysis in C, 2nd edition, Mark Allen Weiss, Pearson

Reference Books:

1. Web : http://lcm.csa.iisc.ernet.in/dsa/dsa.html
2. http://utubersity.com/?page_id=878
3. http://freevideolectures.com/Course/2519/C-Programming-and-Data-Structures
4. http://freevideolectures.com/Course/2279/Data-Structures-And-Algorithms
5. File Structures :An Object oriented approach with C++, 3rd ed, Michel J Folk, Greg Riccardi, Bill Zoellick
6. C and Data Structures: A Snap Shot oriented Treatise with Live examples from Science and Engineering, NB Venkateswarlu & EV Prasad, S Chand, 2010.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
II Year B. Tech Computer Science & Engineering – II Semester

COMPUTER ORGANIZATION

Objectives: Comprehensive knowledge of computer system including the analysis and design of components of the system

UNIT I:
Objectives: Gives a view of computer system from user's perspective, representation of data

BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional unit, Basic Operational concepts, Bus structures,
Data Representation: Data types, Complements, Fixed Point Representation. Floating – Point Representation. Other Binary Codes, Error Detection codes.

UNIT II:
Objectives: Understanding RTL, Micro operations, ALU, Organization of stored program computer, types of instructions and design of basic components of the system

REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS: Register Transfer language. Register Transfer Bus and memory transfers, Arithmetic Micro operations, logic micro operations, shift micro operations, Arithmetic logic shift unit.
BASIC COMPUTER ORGANIZATION AND DESIGN: Instruction codes, Computer Register Computer instructions, Timing and control, Instruction cycle, Memory – Reference Instructions. Input – Output and Interrupt, Design of basic computer, Design of Accumulator Logic.

UNIT III:
Objectives: Illustration of data paths and control flow for sequencing in CPUs, Microprogramming of control unit of CPU

CENTRAL PROCESSING UNIT: General Register Organization, STACK organization. Instruction formats. Addressing modes. DATA Transfer and manipulation. Program control. Reduced Instruction set computer.
MICRO PROGRAMMED CONTROL: Control memory, Address sequencing, micro program example, design of control unit

UNIT IV:
Objectives: Illustration of algorithms for basic arithmetic operations using binary and decimal representation

COMPUTER ARITHMETIC: Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT V:

Objectives: Description of different parameters of a memory system, organization and mapping of various types of memories

THE MEMORY SYSTEM: Memory Hierarchy, Main memory, Auxiliary memory, Associative Memory, Cache Memory, Virtual Memory.

UNIT-VI

Objectives: Describes the means of interaction devices with CPU, their characteristics, modes and introduction multiprocessors.

INPUT-OUTPUT ORGANIZATION: Peripheral Devices, Input-Output Interface, Asynchronous data transfer, Modes of Transfer, Priority Interrupts, Direct memory Access.
MULTI PROCESSORS: Introduction, Characteristics or Multiprocessors, Interconnection Structures, Inter processor Arbitration.

TEXT BOOKS:

1. Computer System Architecture, M.Moris Mano, 3rd Edition, Pearson/PHI
2. Computer Organization, Carl Hamacher, Zvonks Vranesic, SafeaZaky, 5th Edition, McGraw Hill.
3. Computer Organization, a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier

REFERENCES:

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
II Year B. Tech Computer Science & Engineering – II Semester

Formal Languages and Automata Theory

Objectives: Understanding of programming language construct, how input is converted into output from the machine hardware level

UNIT I:
Objectives: Analysis of Finite state machine, its representation and automata

Fundamentals of Automata- Computation, Finite State Machine, Components of Finite State Automata, Elements of Finite State System ,Mathematical representation of Finite State Machine, Automata Classification, Automata in Real World

UNIT II:
Objectives: Delineation of various components of formal languages and grammars.

Formal Language Theory- Symbols, Alphabets and Strings, Operations on Strings, Formal Languages, Operations on Languages,
Formal Languages/ Grammar Hierarchy: Formal Languages, Regular Language, Context-Free Language, Context-Sensitive Language, Recursive Language, Recursively Enumerable Language, Other Forms of Formal Languages, Relationship between Grammars and Languages

UNIT III:
Objectives: Description of finite automata, variants in it and their equivalence

Finite Automata: Introduction, Deterministic Finite Automata(DFA), Design of DFAs, Non Deterministic Finite Automata(NFA), Non-Deterministic Automata with ε-moves , Design of NFA- ε s, Advantages of Non-Deterministic Finite Automata, NFA Versus DFA
Equivalent Automata: Equivalent Finite-State Automata, Equivalence of NFA/NFA- ε and DFA, Equivalence of NFA, with ε moves to NFA, without ε - moves.

UNIT IV:
Objectives: Minimization, optimization of finite automata, regular expressions and equivalence of finite automata and regular expressions.

Minimization/ Optimization of DFA: Optimum DFA, Minimal DFA, Two way DFA, DFA Vs 2DFA
Regular Expressions and Languages: Regular languages, Regular expressions, Components of Regular Expression, Properties of Regular Expressions, Uses of Regular Expressions**.**
Finite Automata and Regular Expressions: Properties of Regular Sets and Regular Languages, Arden's Theorem, Equivalence of Finite Automata and Regular Expressions, Equivalence of DFA and Regular Expression, Equivalence of NFA and Regular Expression

UNIT V:

Objectives: Illustration about grammars, classification and simplification of grammaers

Transducers: Moore Machine, Mealy Machine, Difference between Moore and Mealy Machines, Properties / Equivalence of Moore and Mealy Machines.

Context-Free Grammars and Context-Free Languages: Types of Grammar, Ambiguous and Unambiguous Grammars, Noam Chomsky's Classification of Grammar and Finite Automata, Relation between Regular Grammar and Finite Automata.

Simplification of Context – Free Grammar: Simplification of Context-Free Grammars, Elimination of ε- Productions, Elimination of Unit Productions, Normal Forms for Context Free Grammars, Chomsky Normal Form, Greibach Normal Form, Chomsky Vs. Greibach Normal Form, Application of Context- Free Grammars

UNIT VI:

Objectives: Delineation of turing machines

Turing Machine: Introduction, Components of Turing Machine, Description of Turing Machine, Elements of TM, Moves of a TM, Language accepted by a TM, Role of TM's , Design of TM's

TM Extensions and Languages: TM Languages, Undecidable Problem, P and NP Classes of Languages

Text Books:

1. A Text Book on Automata Theory, Nasir S.F.B, P.K. Srimani, Cambridge university Press
2. Introduction to Automata Theory, Formal languages and computation, Shamalendu kandar, Pearson
3. Elements of Theory of Compuation, Harry R Lewis, Papdimitriou, PHI
4. Introduction to theory of computation, 2nd ed, Michel sipser, CENGAGE

Reference Books:

1. Formal Languages and automata theory, C.K. Nagpal, OXFORD
2. Theory of Computation , aproblem solving approach, kavi Mahesh, Wiley
3. Automata, computability and complexity, Theory and applications, Elaine rich, PEARSON
4. Theory of Computation, Vivek kulkarni, OXFORD

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
II Year B. Tech Computer Science & Engineering – II Semester

ADVANCED DATA STRUCTURES LAB

1. To implement functions of Dictionary using Hashing (division method, Multiplication method, Universal hashing)
2. To perform various operations i.e, insertions and deletions on AVL trees
3. To perform various operations i.e., insertions and deletions on 2-3 trees.
4. To implement operations on binary heap.
5. To implement operations on graphs
   i) vertex insertion
   ii) Vertex deletion
   iii) finding vertex
   iv)Edge addition and deletion
6. To implement Depth First Search for a graph non recursively.
7. To implement Breadth First Search for a graph non recursively.
8. To implement Prim's algorithm to generate a min-cost spanning tree.
9. To implement Krushkal's algorithm to generate a min-cost spanning tree.
10. To implement Dijkstra's algorithm to find shortest path in the graph.
11. To implement pattern matching using Boyer-Moore algorithm.
12. To implement Knuth-Morris-Pratt algorithm for pattern matching.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
II Year B. Tech Computer Science & Engineering – II Semester

Java Programming Lab

1. Write a JAVA program to display default value of all primitive data types of JAVA
2. Write a JAVA program that displays the roots of a quadratic equation ax2+bx+c=0. Calculate the discriminent D and basing on the value of D, describe the nature of roots.
3. Write a JAVA program to display the Fibonacci sequence
4. Write a JAVA program give example for command line arguments.
5. Write a JAVA program to sort given list of numbers.
6. Write a JAVA program to search for an element in a given list of elements (linear search).
7. Write a JAVA program to search for an element in a given list of elements using binary search mechanism.
8. Write a JAVA program to determine the addition of two matrices.
9. Write a JAVA program to determine multiplication of two matrices.
10. Write a JAVA program to sort an array of strings
11. Write a JAVA program to check whether given string is palindrome or not.
12. Write a JAVA program for the following
    i. 1. Example for call by value. 2. Example for call by reference.
12. Write a JAVA program to give the example for ‘this’ operator. And also use the‘this’ keyword as return statement.
13. Write a JAVA program to demonstrate static variables, methods, and blocks.
14. Write a JAVA program to give the example for ‘super’ keyword.
15. Write a JAVA program that illustrates simple inheritance.
16. Write a JAVA program that illustrates multi-level inheritance
17. Write a JAVA program demonstrating the difference between method overloading and method overriding.
18. Write a JAVA program demonstrating the difference between method overloading and constructor overloading.
19. Write a JAVA program that describes exception handling mechanism.

20. Write a JAVA program for example of try and catch block. In this check whether the given array size is negative or not.
21. Write a JAVA program to illustrate sub class exception precedence over base class.
22. Write a JAVA program for creation of user defined exception.
23. Write a JAVA program to illustrate creation of threads using runnable class.(start method start each of the newly created thread. Inside the run method there is sleep() for suspend the thread for 500 milliseconds).
24. Write a JAVA program to create a class MyThread in this class a constructor, call the base class constructor, using super and starts the thread. The run method of the class starts after this. It can be observed that both main thread and created child thread are executed concurrently
25. Write a JAVA program illustrating multiple inheritance using interfaces.
26. Write a JAVA program to create a package named pl, and implement this package in ex1 class.
27. Write a JAVA program to create a package named mypack and import it in circle class.
28. Write a JAVA program to give a simple example for abstract class.
29. Write a JAVA program that describes the life cycle of an applet.
    - Write a JAVA program to create a dialogbox and menu.
    - Write a JAVA program to create a grid layout control.
30. Write a JAVA program to create a border layout control.
31. Write a JAVA program to create a padding layout control.
32. Write a JAVA program to create a simple calculator.
33. Write a JAVA program that displays the x and y position of the cursor movement using Mouse.
34. Write a JAVA program that displays number of characters, lines and words in a text file.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
II Year B. Tech Computer Science & Engineering – II Semester

FOSS LAB

Objectives:

- To teach students various unix utilities and shell scripting

Programs:

1.

Session-1

a)Log into the system

b)Use vi editor to create a file called myfile.txt which contains some text.

c)correct typing errors during creation.

d)Save the file

e)logout of the system

Session-2

a)Log into the system

b)open the file created in session 1

c)Add some text

d)Change some text

e)Delete some text

f)Save the Changes

g)Logout of the system

2.

a)Log into the system

b)Use the cat command to create a file containing the following data. Call it mytable use tabs to separate the fields.

1425	Ravi	15.65
4320	Ramu	26.27
6830	Sita	36.15
1450	Raju	21.86

c)Use the cat command to display the file, mytable.

d)Use the vi command to correct any errors in the file, mytable.

e)Use the sort command to sort the file mytable according to the first field. Call the sorted file my table (same name)

f)Print the file mytable

g)Use the cut and paste commands to swap fields 2 and 3 of mytable. Call it my table (same name)

h)Print the new file, mytable

i)Logout of the system.

3.

1) a)Login to the system

b)Use the appropriate command to determine your login shell

c)Use the /etc/passwd file to verify the result of step b.

d)Use the who command and redirect the result to a file called myfile1. Use the more command to see the contents of myfile1.

e)Use the date and who commands in sequence (in one line) such that the output of date will display on the screen and the output of who will be redirected to a file called myfile2. Use the more command to check the contents of myfile2.

2) a)Write a sed command that deletes the first character in each line in a file.

b)Write a sed command that deletes the character before the last character in each line in a file.

c)Write a sed command that swaps the first and second words in each line in a file.

4. a)Pipe your /etc/passwd file to awk, and print out the home directory of each user.

b)Develop an interactive grep script that asks for a word and a file name and then tells how many lines contain that word.

c)Repeat

d)Part using awk

5. a)Write a shell script that takes a command –line argument and reports on whether it is directory, a file, or something else.

b)Write a shell script that accepts one or more file name as arguments and converts all of them to uppercase, provided they exist in the current directory.
c)Write a shell script that determines the period for which a specified user is working on the system.

6. a)Write a shell script that accepts a file name starting and ending line numbers as arguments and displays all the lines between the given line numbers.
b)Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

7. a)Write a shell script that computes the gross salary of a employee according to the following rules:

i)If basic salary is < 1500 then HRA =10% of the basic and DA =90% of the basic.

ii)If basic salary is >=1500 then HRA =Rs500 and DA=98% of the basic

The basic salary is entered interactively through the key board.
b)Write a shell script that accepts two integers as its arguments and computers the value of first number raised to the power of the second number.

8. a)Write an interactive file-handling shell program. Let it offer the user the choice of copying, removing, renaming, or linking files. Once the user has made a choice, have the program ask the user for the necessary information, such as the file name, new name and so on.
b)Write shell script that takes a login name as command – line argument and reports when that person logs in
c)Write a shell script which receives two file names as arguments. It should check whether the two file contents are same or not. If they are same then second file should be deleted.

9. a)Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.
b)Develop an interactive script that ask for a word and a file name and then tells how many times that word occurred in the file.
c)Write a shell script to perform the following string operations:

i)To extract a sub-string from a given string.

ii)To find the length of a given string.

10 . Write a C program that takes one or more file or directory names as command line input and reports the following information on the file:

i)File type ii)Number of links iii)Read, write and execute permissions

iv)Time of last access

(Note : Use stat/fstat system calls)

11. Write C programs that simulate the following unix commands:

a)mv b)cp (Use system calls)

12. Write a C program that simulates ls Command

(Use system calls / directory API)

13. Do the following Shell programs also

1) Write a shell script to check whether a particular user has logged in or not. If he has logged in, also check whether he has eligibility to receive a message or not

2) Write a shell script to accept the name of the file from standard input and perform the following tests on it

a) File executable b) File readable c) File writable d) Both readable & writable

3) Write a shell script which will display the username and terminal name who login recently in to the unix system

4) Write a shell script to find no. of files in a directory

5) Write a shell script to check whether a given number is perfect or not

6) Write a menu driven shell script to copy, edit, rename and delete a file

7) Write a shell script for concatenation of two strings

3) Write a shell script which will display Fibonacci series up to a given number of argument

9) Write a shell script to accept student number, name, marks in 5 subjects. Find total, average and grade. Display the result of student and store in a file called stu.dat

Rules: avg>=80 then grade A

Avg<80&&Avg>=70 then grade B

Avg<70&&Avg>=60 then grade C

Avg<60&&Avg>=50 then grade D

Avg<50&&Avg>=40 then grade E

Else grade F

10) Write a shell script to accept empno,empname,basic. Find DA,HRA,TA,PF using following rules. Display empno, empname, basic, DA,HRA,PF,TA,GROSS SAL and NETSAL. Also store all details in a file called emp.dat

Rules: HRA is 18% of basic if basic > 5000 otherwise 550

DA is 35% of basic

PF is 13% of basic

IT is 14% of basic

TA is 10% of basic

11) Write a shell script to demonstrate break and continue statements

12) Write a shell script to satisfy the following menu options

a. Display current directory path b. Display todays date

c. Display users who are connected to the unix system d. Quit

13) Write a shell script to delete all files whose size is zero bytes from current directory

14) Write a shell script to display string palindrome from given arguments

15) Write a shell script which will display Armstrong numbers from given arguments

16) Write a shell script to display reverse numbers from given argument list

17) Write a shell script to display factorial value from given argument list

18) Write a shell script which will find maximum file size in the given argument list

19) Write a shell script which will greet you “Good Morning”, ”Good Afternoon”, “Good Evening’ and “Good Night” according to current time

20) Write a shell script to sort the elements in a array using bubble sort technique

21) Write a shell script to find largest element in a array

22) Write an awk program to print sum, avg of students marks list

23) Write an awk program to display students pass/fail report

24) Write an awk program to count the no. of vowels in a given file

25) Write an awk program which will find maximum word and its length in the given input File

26) Write a shell script to generate the mathematical tables.

27) Write a shell script to sort elements of given array by using selection sort.

28) Write a shell script to search given number using binary search.

29) Write a shell script to find number of vowels, consonants, numbers, white spaces and special characters in a given string.

30) Write a shell script to lock the terminal.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – I Semester

Compiler Design

Learning Objectives

- Students will understand the phases of the compilation process and be able to describe the purpose and implementation approach of each phase.
- Give students practical exposure to aspects of theoretical computer science including Languages, Grammars, and Machines.
- Exercise and reinforce prior programming knowledge with a non-trivial programming project to construct a compiler. Lexical analysis, parsing, and intermediate code-generation will be completed.

Unit–I:
Overview of language processing – pre-processors – compiler – assembler – interpreters, pre-processors, – linkers & loaders - structure of a compiler – phases of a compiler (TEXT BOOK 2). Lexical Analysis – Role of Lexical Analysis – Lexical Analysis Vs. Parsing – Token, patterns and Lexemes – Lexical Errors – Regular Expressions – Regular definitions for the language constructs – Strings, Sequences, Comments – Transition diagram for recognition of tokens, Reserved words and identifiers, Examples.

Unit–II:
Syntax Analysis – discussion on CFG, LMD,RMD, parse trees, Role of a parser – classification of parsing techniques – Brute force approach, left recursion, left factoring, Top down parsing – First and Follow- LL(1) Grammars, Non-Recursive predictive parsing – Error recovery in predictive parsing.

Unit–III:
What is bottom up parsing approach, Types of Bottom up approaches; Introduction to simple LR – Why LR Parsers – Model of an LR Parsers – Operator Precedence- Shift Reduce Parsing – Difference between LR and LL Parsers, Construction of SLR Tables.
More powerful LR parses, construction of CLR (1), LALR Parsing tables, Dangling ELSE Ambiguity, Error recovery in LR Parsing. Comparison of all bottoms up approaches with all top down approaches

Unit–IV:
Semantic analysis, SDT Schemes, evaluation of semantic rules. Intermediate code, three address code, quadruples, triples, abstract syntax trees. Types and declarations, type Checking.

Unit–V:
Symbol tables: use and need of symbol tables. Runtime Environment: storage organization, stack allocation, access to non-local data, heap management, parameter passing mechanisms, introduction to garbage collection. Reference counting garbage collectors.
Code generation: Issues, target language, Basic blocks & flow graphs, Simple code generator, Peephole optimization, Register allocation and assignment.

Unit–VI:

Machine independent code optimization – semantic preserving transformations, global common sub expression elimination, copy propagation, dead code elimination, constant folding, strength reduction, loop optimization. Instruction scheduling, inter procedural optimization.

TEXT BOOKS:

1. Compilers, Principles Techniques and Tools- Alfred V Aho, Monica S Lam, Ravi Sethi, Jeffrey D. Ullman,2nd ed, Pearson,2007.
2. Compiler construction, Principles and Practice, Kenneth C Louden, CENGAGE

REFERENCE BOOKS:

1. Compiler Design, K. Muneeswaran, Oxford.
2. Engineering a compiler, 2nd edition, Keith D.Cooper & Linda Torczon, Morgan Kaufman.
3. http://www.nptel.iitm.ac.in/downloads/106108052/
4. Principles of compiler design, V. Raghavan, 2nd ed, TMH, 2011.
5. Implementations of Compiler, A new approach to Compilers including the algebraic methods, Yunlinsu, SPRINGER

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – I Semester

Data Communications

Learning Objectives

- Introduce students to the evolution of computer networks and the concepts data communication
- Introduce students the general principles of network design and compare the different network topologies
- Introduce students to the digital and analogue representations and channels
- describe the mechanism and techniques of encoding
- Introduce students to the general principles of circuit and packet switching
- Introduce students to the wireless Local Area Networks provide students with in - depth knowledge of data link layer fundamental such as error detection, correction and flow control techniques multiple access control techniques

Unit I:
INTRODUCTION TO DATA COMMUNICATIONS AND NETWORKING: Standards Organizations for Data Communications, Layered Network Architecture, Open Systems Interconnection, Data Communications Circuits, Serial and parallel Data Transmission, Data communications Networks, Alternate Protocol Suites.
SIGNALS, NOISE, MODULATION, AND DEMODULATION:Signal Analysis, Electrical Noise and Signal-to-Noise Ratio, Analog Modulation Systems, Information Capacity, Bits, Bit Rate, Baud, and *M*-ary Encoding, Digital Modulation.

Unit II :
METALLIC CABLE TRANSMISSION MEDIA: Metallic Transmission Lines, Transverse Electromagnetic Waves, Characteristics of Electromagnetic Waves
OPTICAL FIBER TRANSMISSION MEDIA: Advantages of Optical Fiber cables, Disadvantages of Optical Fiber Cables, Electromagnetic spectrum, Optical Fiber Communications System Block Diagram, Optical Fiber construction, Propagation of Light Through an Optical fiber Cable, Optical Fiber Modes and Classifications, Optical Fiber Comparison, Losses in Optical Fiber Cables, Light sources, Light Detectors, Lasers.

Unit III :
DIGITAL TRANSMISSION: Pulse Modulation, Pulse code Modulation, Dynamic Range, Signal Voltage –to-Quantization Noise Voltage Ratio, Linear Versus Nonlinear PCM Codes, Companding, PCM Line Speed, Delta Modulation PCM and Differential PCM.
MULTIPLEXING AND T CARRIERS: Time- Division Multiplexing, T1 Digital Carrier System, Digital Line Encoding, T Carrier systems, Frequency- Division Multiplexing, Wavelength- Division Multiplexing, Synchronous Optical Network

Unit IV:
WIRELESS COMMUNICATIONS SYSTEMS: Electromagnetic Polarization, Electromagnetic Radiation, Optical Properties of Radio Waves, Terrestrial Propagation of Electromagnetic Waves, Skip Distance, Free-Space Path Loss, Microwave Communications Systems, Satellite Communications Systems.

Unit V:

TELEPHONE INSTRUMENTS AND SIGNALS: The Subscriber Loop, Standard Telephone Set, Basic Telephone Call Procedures, Call Progress Tones and Signals, Cordless Telephones, Caller ID, Electronic Telephones, Paging systems.

CELLULAR TELEPHONE SYSTEMS: First- Generation Analog Cellular Telephone, Personal Communications system, Second-Generation Cellular Telephone Systems, N-AMPS, Digital Cellular Telephone, Interim Standard, Global system for Mobile Communications.

Unit VI:

DATA COMMUNICATIONS CODES, ERROR CONTROL, AND DATA FORMATS:

Data Communications Character Codes, Bar Codes, Error Control, Error Detection and Correction, Character Synchronization.

DATA COMMUNICATIONS EQUIPMENT: Digital Service Unit and Channel Service Unit, Voice- Band Data Communication Modems, Bell Systems-Compatible Voice- Band Modems, Voice- Band Modem Block Diagram, Voice- Band Modem Classifications, Asynchronous Voice-Band Modems, Synchronous Voice-Band Modems, Modem Synchronization, 56K Modems, Modem Control: The AT Command Set, Cable Modems.

TEXT BOOKS:

1.Introduction to Data Communications and Networking, Wayne Tomasi, Pearson Education.

Reference Books :

1. Data Communications and Networking, Behrouz A Forouzan, Fourth Edition.TMH.
2. Data and Computer communications, 8/e, William Stallings, PHI.
3. Computer Communications and Networking Technologies, Gallow, Second Edition Thomson
4. Computer Networking and Internet, Fred Halsll, Lingana Gouda Kulkarni, Fifth Edition, Pearson Education

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – I Semester

Principles of Programming Languages

Learning Objectives

- To examine fundamental issues underlying the design decisions of different programming languages.
- To extend students' view of programming and programming languages beyond that encountered at stage 1.
- To provide a basis for the comparative evaluation of programming languages.

UNIT I :
SYNTAX AND SEMANTICS: Evolution of programming languages, describing syntax, context,free grammars, attribute grammars, describing semantics, lexical analysis, parsing, recursive - decent bottom - up parsing

UNIT II:
DATA, DATA TYPES, AND BASIC STATEMENTS: Names, variables, binding, type checking, scope, scope rules, lifetime and garbage collection, primitive data types, strings, array types, associative arrays, record types, union types, pointers and references, Arithmetic expressions, overloaded operators, type conversions, relational and boolean expressions , assignment statements , mixed mode assignments, control structures – selection, iterations, branching, guarded Statements

UNIT III:
SUBPROGRAMS AND IMPLEMENTATIONS: Subprograms, design issues, local referencing, parameter passing, overloaded methods, generic methods, design issues for functions, semantics of call and return, implementing simple subprograms, stack and dynamic local variables, nested subprograms, blocks, dynamic scoping

UNIT IV:
OBJECT- ORIENTATION, CONCURRENCY, AND EVENT HANDLING: Object – orientation, design issues for OOP languages, implementation of object, oriented constructs, concurrency, semaphores, Monitors, message passing, threads, statement level concurrency, exception handling, event handling

UNIT V :
FUNCTIONAL PROGRAMMING LANGUAGES: Introduction to lambda calculus, fundamentals of functional programming languages, Programming with Scheme, – Programming with ML,

UNIT VI :
LOGIC PROGRAMMING LANGUAGES: Introduction to logic and logic programming, – Programming with Prolog, multi - paradigm languages

TEXT BOOKS:

1. Robert W. Sebesta, "Concepts of Programming Languages", Tenth Edition, Addison Wesley, 2012.
2. Programming Langugaes, Principles & Paradigms, 2ed, Allen B Tucker, Robert E Noonan, TMH

REFERENCES:

1. R. Kent Dybvig, "The Scheme programming language", Fourth Edition, MIT Press, 2009.
2. Jeffrey D. Ullman, "Elements of ML programming", Second Edition, Prentice Hall, 1998.
3. Richard A. O'Keefe, "The craft of Prolog", MIT Press, 2009.
4. W. F. Clocksin and C. S. Mellish, "Programming in Prolog: Using the ISO Standard", Fifth Edition, Springer, 2003

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – I Semester

Database Management Systems

Learning Objectives

- To understand that is involved in the design of a database.
- To get the knowledge and understanding of the models used for structuring data in database systems.
- To be able to implement a database and report on the process.
- To be able to query a database.

Unit – I:
INTRODUCTION
Database system, Characteristics (Database Vs File System), Database Users (Actors on Scene, Workers behind the scene), Advantages of Data base systems, and Database applications.
Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schema architecture for data independence; Database system structure, environment, Centralized and Client Server architecture for the database.

Unit – II:
RELATIONAL MODEL: Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrity constraints) and their importance
BASIC SQL: Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update), basic SQL querying (select and project) using where clause, arithmetic & logical operations, SQL functions(Date and Time, Numeric, String conversion).

Unit – III:
Entity Relationship Model: Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, sub classes, super class, inheritance, specialization, generalization using ER Diagrams.
SQL : Creating tables with relationship, implementation of key and integrity constraints, nested queries, sub queries, grouping, aggregation, ordering, implementation of different types of joins, view(updatable and non-updatable), relational set operations.

Unit – IV:
SCHEMA REFINEMENT (NORMALIZATION) : Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependency(1NF, 2NF and 3 NF), concept of surrogate key, Boyce-codd normal form(BCNF), Lossless join and dependency preserving decomposition, Fourth normal form(4NF).

Unit – V:

TRANSACTION MANAGEMENT AND CONCURRENCY CONTROL: Transaction, properties of transactions, transaction log, and transaction management with SQL using commit rollback and savepoint.

Concurrency control for lost updates, uncommitted data, inconsistent retrievals and the Scheduler. Concurrency control with locking methods: lock granularity, lock types, two phase locking for ensuring serializability, deadlocks, Concurrency

control with time stamp ordering : Wait/Die and Wound/Wait Schemes, Database Recovery management : Transaction recovery.

SQL constructs that grant access or revoke access from user or user groups. Basic PL/SQL procedures, functions and triggers.

UNIT – VI:

STORAGE AND INDEXING : Database file organization, file organization on disk, heap files and sorted files, hashing, single and multi-level indexes, dynamic multilevel indexing using B-Tree and B+ tree, index on multiple keys.

Text Books:

1. Database Management Systems, 3/e Raghuram Krishnan, Johannes Gehrke, TMH
2. Database Management System, 6/e Ramez Elmasri, Shamkant B. Navathe, PEA
3. Database Principles Fundamentals of Design Implementation and Management, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning.

Reference Books:

1. Database System Concepts. 5/e Silberschatz, Korth, TMH
2. Introduction to Database Systems, 8/e C J Date, PEA
3. The Database book principles & practice using Oracle/MySql Narain Gehani, University Press.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – I Semester

Operating Systems

Learning Objectives

- Types of operating systems and differences among them
- Processes, threads, and the differences between the two
- Interrupts, synchronization, waiting, and atomic behavior
- Virtual memory, paging, and memory allocation
- Caching principles and quantitative estimation of cache behavior
- Paging performance and page replacement
- Files and storage of persistent information
- Types of files and file access
- Input, output, and types of I/O devices

UNIT-I:
Computer System and Operating System Overview: Overview of computer operating systems, operating systems functions, operating systems structures and systems calls, Evaluation of Operating Systems.

UNIT-II: Process Management – Process concept- process scheduling, operations, Inter process communication. Multi Thread programming models. Process scheduling criteria and algorithms, and their evaluation.

UNIT-III:
Concurrency: Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples

UNIT-IV:
Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation
Virtual Memory Management: virtual memory, demand paging, page-Replacement, algorithms, Allocation of Frames, Thrashing

UNIT-V:
Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock,

UNIT-VI:
File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.
File System implementation- File system structure, allocation methods, free-space management
Mass-storage structure overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling
Introduction to Storage Area Networks (SAN), Introduction to Network Attached Storage.

TEXT BOOKS:

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Operating Systems' – Internal and Design Principles Stallings, Sixth Edition–2005, Pearson education

REFERENCE BOOKS:

1. http://nptel.iitm.ac.in/courses/Webcourse-contents/IISc-BANG/Operating%20Systems/New_index1.html
2. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, TMH
3. Operating System A Design Approach-Crowley, TMH.
4. Modern Operating Systems, Andrew S Tanenbaum 3rd edition PHI.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – I Semester

Compiler Design Lab

Lab Experiments:

1. Design a lexical analyzer for given language and the lexical analyzer should ignore redundant spaces, tabs and new lines
2. Simulate First and Follow of a Grammar**.**
3. Develop an operator precedence parser for a given language.
4. Construct a recursive descent parser for an expression.
5. Construct a LL(1) parser for an expression
6. Design predictive parser for the given language
7. Implementation of shift reduce parsing algorithm.
8. Design a LALR bottom up parser for the given language.
9. Implement the lexical analyzer using JLex, flex or lex or other lexical analyzer generating tools
10. Write a program to perform loop unrolling.
11. Convert the BNF rules into YACC form and write code to generate abstract syntax tree.
12. Write a program for constant propagation.

Programs on Lex:

1. Program to recognize a valid arithmetic expression and identify theidentifiers and operators present. Print them separately.
2. Program to recognize and count the number of identifiers in a given input file.

Programs on Yacc:

1. Program to test the validity of a simple expression involving operators +, -, * and /
2. Program to recognize nested IF control statements and display the levels of nesting.
3. Program to recognize a valid variable, which starts with a letter, followed by any number of letters or digits.
4. Program to recognize strings ‘aaab’, ‘abbb’, ‘ab’ and ‘a’ using grammar ($a^n n^b$, n>=0)
5. Program to recognize the grammar ($a^n b$, n>=10)

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – I Semester

Operating System Lab

Lab Experiments:

1. Simulate the following CPU scheduling algorithms
   a) Round Robin b) SJF c) FCFS d) Priority

2. Loading executable programs into memory and execute System Call implementation-read(), write(), open () and close()

3. . Multiprogramming-Memory management- Implementation of Fork(), Wait(), Exec() and Exit() System calls

4. Simulate all File allocation strategies a) Sequenced b) Indexed c) Linked

5. Simulate MVT and MFT

6. Simulate all File Organization Techniques
   a) Single level directory b) Two level c) Hierarchical d) DAG

7. Simulate Bankers Algorithm for Dead Lock Avoidance

8. Simulate Bankers Algorithm for Dead Lock Prevention.

9. Simulate all page replacement algorithms.
   a) FIFO b) LRU c) LFU etc….

10. Simulate Paging Technique of memory management.

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III Year B. Tech Computer Science & Engineering – I Semester

Database Management Systems Lab

PROGRAMS LIST:

1) Creation, altering and droping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.

2) Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.

Example:- Select the roll number and name of the student who secured fourth rank in the class.

3) Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

4) Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)

5)
i)Creation of simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)
ii)Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.

6) Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.

7) Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE-APPLICATION ERROR.

8) Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.

9) Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.

10) Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.

11) Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.

12) Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers

TEXT BOOKS :

1) ORACLE PL/SQL by example. Benjamin Rosenzweig, Elena Silvestrova, Pearson Education 3rd Edition
2) ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, Tata Mc-Graw Hill.
3) SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S. Deshpande.

4) Data Base Management System, Oracle SQL and PL/SQL, Pranab kumar Das Gupta, P Radha Krishna, PHI

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – I Semester

Linux Programming Lab

PROGRAMS LIST:

1. Write C programs that uses open, read, write system calls.
2. Write C programs that differentiates FILE *(file stream pointers in C standard library) and file descriptors by using functions such as fdopen, fileno.
3. Write a C program which displays a given files meta data by using stat system call and st_mode structure.
4. Write a C program which lists all the files of current working directory whose size is more than given number of data blocks.
5. Write a C program which lists all the files of current working directory which contains hard link files.
6. Write a C program to emulates file system checking utility (fsck command) using system calls.
7. Example C program which supports that child process inherits environment variables, command line arguments, opened' files.
8. Simple C programs to have process trees and process chains.
9. Simple C program that demonstrates the failure of fork system call because of crossing system limits.
10. Simple C programs to demonstrate the use of pipe system call for inter process communication and also emulating piping in shell.
11. Simple C programs to demonstrate the use of popen standard library function call for inter process communication and also emulating piping in shell.
12. Simple C program to use named pipes for inter process communication.
13. Simple C programs to illustrate the use of exec family of functions.
14. Write a C program which emulates simple shell.
15. Write C program to create a thread using pthreads library and let it run its function.
16. Write a C program to illustrate concurrent execution of threads using pthreads library.
17. Write a C program to simulate ptrhead_create function failure by repeatedly calling the same.
18. Write a C program which creates a thread using pthread and passes arguments to the thread function.
19. Write C programs which uses sigset, sifillset, sigprocmask, related system calls and structures.
20. Write a C program to simulate memory segment violation run time error and implement a signal handler (both reliable and unreliable) which handles situation.
21. Write a C program to illustrate the use of sbrk system call.

22. Write a C program to illustrate inter process communication via message queues.
23. Write a C program to illustrate inter process communication via shared memory.
24. Write a C program to simulate producer and consumer problem using semaphores, shared memory, and fork.
25. Write a C program to simulate producer and consumer problem using semaphores, shared memory, and pthread_create.
26. Write a C program to simulate producer and consumer problem using muexes, shared memory, and threads.
27. Write socket Programs in C for Echo/Ping/Talk Commands.
28. Create a Socket (TCP) between two computers and enable file transfer between them.
29. Write a Program to implement Remote Command Execution.
30. Write a code simulating ARP/RARP.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – I Semester

IPR & PATENTS

Unit I

Introduction to Intellectual Property Law – Evolutionary past – Intellectual Property Law Basics - Types of Intellectual Property - Innovations and Inventions of Trade related Intellectual Property Rights – Agencies Responsible for Intellectual Property Registration – Infringement - Regulatory – Over use or Misuse of Intellectual Property Rights - Compliance and Liability Issues.

Unit II

Introduction to Copyrights – Principles of Copyright – Subject Matters of Copyright – Rights Afforded by Copyright Law –Copyright Ownership – Transfer and Duration – Right to Prepare Derivative Works –Rights of Distribution – Rights of performers **–** Copyright Formalities and Registration – Limitations – Infringement of Copyright – International Copyright Law- Semiconductor Chip Protection Act.

Unit III

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent Requirements – Ownership and Transfer – Patent Application Process and Granting of Patent – Patent Infringement and Litigation – International Patent Law – Double Patenting – Patent Searching – Patent Cooperation Treaty – New developments in Patent Law- Invention Developers and Promoters.

Unit IV

Introduction to Trade Mark – Trade Mark Registration Process – Post registration procedures – Trade Mark maintenance – Transfer of rights – Inter parties Proceedings – Infringement – Dilution of Ownership of Trade Mark – Likelihood of confusion – Trade Mark claims – Trade Marks Litigation – International Trade Mark Law

Unit V

Introduction to Trade Secrets – Maintaining Trade Secret – Physical Security – Employee Access Limitation – Employee Confidentiality Agreement – Trade Secret Law – Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law.

Unit VI

Introduction to Cyber Law – Information Technology Act - Cyber Crime and E-commerce – Data Security – Confidentiality – Privacy - International aspects of Computer and Online Crime.

REFERENCE BOOKS:

1. Deborah E.Bouchoux: “Intellectual Property”. Cengage learning , New Delhi
2. Kompal Bansal & Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications (Press)
3. Cyber Law. Texts & Cases, South-Western’s Special Topics Collections
4. Prabhuddha Ganguli: ‘ Intellectual Property Rights” Tata Mc-Graw – Hill, New Delhi
5. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
6. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi.
7. M.Ashok Kumar and Mohd.Iqbal Ali: “Intellectual Property Right” Serials Pub.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – II Semester

Computer Networks

Learning Objectives

- Independently understand basic computer network technology.
- Understand and explain Data Communications System and its components.
- Identify the different types of network topologies and protocols.
- Enumerate the layers of the OSI model and TCP/IP. Explain the function(s) of each layer.
- Identify the different types of network devices and their functions within a network
- Understand and building the skills of subnetting and routing mechanisms.
- Familiarity with the basic protocols of computer networks, and how they can be used
- to assist in network design and implementation.

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**: fixed size framing, variable size framing, flow control, error control, error detection and correction, CRC, Checksum: idea, one's complement internet 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: configuration and transfer modes, frames, control field, point to point protocol (PPP): framing transition phase, multiplexing, multi-link 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).

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

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:

Transport Layer: Process to Process Delivery, UDP, TCP, Congestion, Congestion Control, QOS, and Techniques to improve QOS

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 Message Format, HTTP Response Message Format

The wireless web: WAP—The Wireless Application Protocol

TEXT BOOKS:

1. Data Communications and Networks – Behrouz A. Forouzan.Third Edition TMH.
2. Computer Networks, 5ed, David Patterson, Elsevier
3. Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson Education/PHI
4. Computer Networks, Mayank Dave, CENGAGE

REFERENCES:

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

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – II Semester

Data Ware housing and Mining

Learning Objectives

- Understand data mining principles and techniques
- Describing and demonstrating basic data mining algorithms, methods, and tools
- Develop and apply critical thinking, problem-solving, and decision-making skills.

UNIT –I:
Introduction : What Motivated Data Mining? Why Is It Important, Data Mining—On What Kind of Data, Data Mining Functionalities—What Kinds of Patterns Can Be Mined? Are All of the Patterns Interesting? Classification of Data Mining Systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or Data Warehouse System, Major Issues in Data Mining. **(Han & Kamber)**

UNIT –II:
Data Pre-processing : Why Pre-process the Data? Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation. **(Han & Kamber)**

UNIT –III:
Data Warehouse and OLAP Technology: An Overview : What Is a Data Warehouse? A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining. **(Han & Kamber)**

UNIT –IV:
Classification : Basic Concepts, General Approach to solving a classification problem, Decision Tree Induction: Working of Decision Tree, building a decision tree, methods for expressing an attribute test conditions, measures for selecting the best split, Algorithm for decision tree induction. **Model Over fitting:** Due to presence of noise, due to lack of representation samples, evaluating the performance of classifier: holdout method, random sub sampling, cross-validation, bootstrap. **(Tan & Vipin)**

UNIT –V:
Association Analysis: Basic Concepts and Algorithms : Introduction, Frequent Item Set generation, Rule generation, compact representation of frequent item sets, FP-Growth Algorithm. **(Tan & Vipin)**

UNIT –VI:
Cluster Analysis: Basic Concepts and Algorithms : What Is Cluster Analysis? Different Types of Clustering, Different Types of Clusters, K-means, The Basic K-means Algorithm, K-means: Additional Issues, Bisecting K-means, K-means and Different Types of Clusters,

Strengths and Weaknesses, K-means as an Optimization Problem, Agglomerative Hierarchical Clustering, Basic Agglomerative Hierarchical Clustering Algorithm, Specific Techniques, DBSCAN, Traditional Density: Center-Based Approach, The DBSCAN Algorithm, Strengths and Weaknesses. **(Tan & Vipin)**

Text Books :

1. Introduction to Data Mining : Pang-Ning Tan & Michael Steinbach, Vipin Kumar, Pearson.
2. Data Mining concepts and Techniques, 3/e, Jiawei Han, Michel Kamber, Elsevier.

Reference Books :

1. Data Mining Techniques and Applications: An Introduction, Hongbo Du, Cengage Learning.
2. Data Mining : Introductory and Advanced topics : Dunham, Pearson.
3. Data Warehousing Data Mining & OLAP, Alex Berson, Stephen Smith, TMH.
4. Data Mining Techniques, Arun K Pujari, Universities Press.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – II Semester

Design and Analysis of Algorithms

Learning Objectives

- Explain the basic concepts of time and space complexity,divide-and-conquer strategy , dynamic programming, greedy and approximate algorithms , amortized analysis and computational geometry
- Describe the methodologies of how to analyze an algorithm
- Describe the data structures of red - black tree, B – tree , binomial heap and disjoint sets

UNIT-I:
Introduction: Algorithm, Psuedo code for expressing algorithms, performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, probabilistic analysis, Amortized analysis.

UNIT-II:
Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort

UNIT-III:
Greedy method: General method, applications-Job sequencing with deadlines, knapsack problem, spanning trees, Minimum cost spanning trees, Single source shortest path problem.

UNIT-IV:
Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

UNIT-V:
Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

UNIT-VI:
Branch and Bound: General method, applications - Travelling sales person problem,0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

TEXT BOOKS:

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Universities Press.
2. Design and Analysis of Algorithms, Parag Himanshu Dave, Himansu Balachandra Dave, 2ed,Pearson Education.
3. Design and Analysis of Algorithms , S Sridhar, Oxford

REFERENCE BOOKS:

1. Design and Analysis of algorithms, Aho, Ullman and Hopcroft,Pearson education.
2. Introduction to the Design and Analysis of Algorithms, Anany Levitin, PEA
3. Introduction to Algorithms, second edition, T.H.Cormen, C.E.Leiserson, R.L.Rivest and C.Stein,PHI Pvt. Ltd.
4. Algorithm Design, Foundation, Analysis and internet Examples, Michel T Goodrich, Roberto Tamassia, Wiley

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – II Semester

Software Engineering

Learning Objectives

- To elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project.
- To understand the what software life cycle is, how software projects are planned and managed, types of resources involved in software development projects, risks are identified and assessed, predictions and assessments are made.
- To identify, formulate, and solve software engineering problems, including the specification, design, implementation, and testing of software systems that meet specification, performance, maintenance and quality requirements.

UNIT I:
Introduction to Software Engineering: Software, Software Crisis, Software Engineering definition, Evolution of Software Engineering Methodologies, Software Engineering Challenges. **Software Processes:** Software Process, Process Classification, Phased development life cycle, Software Development Process Models- Process, use, applicability and Advantages/limitations

UNIT II:
Requirements Engineering: Software Requirements, Requirements engineering Process, Requirements elicitation, Requirements Analysis, Structured Analysis, Data Oriented Analysis, Object oriented Analysis, Prototyping Analysis, Requirements Specification, Requirements Validation, requirement Management.

UNIT III: Software Design: Software Design Process, Characteristics of Good Software Design, Design Principles, Modular Design, Design Methodologies, Structured Design, Structured Design Methodology, Transform Vs Transaction Analysis.
Object-Oriented Design: Object oriented Analysis and Design Principles

UNIT IV:
Implementation: Coding Principles, Coding Process, Code verification, Code documentation. **Software Testing:** Testing Fundamentals, Test Planning, Black Box Testing, White Box Testing, Levels of Testing, Usability Testing, Regression testing, Debugging approaches

UNIT V:
Software Project Management: Project Management Essentials, What is Project management, Software Configuration Management. **Project Planning and Estimation**: Project Planning activities, Software Metrics and measurements, Project Size Estimation, Effort Estimation Techniques.

UNIT VI: Software Quality: Software Quality Factors, Verification & Validation, Software Quality Assurance, The Capability Maturity Model. **Software Maintenance:** Software

maintenance, Maintenance Process Models, Maintenance Cost, Reengineering, Reengineering activities, Software Reuse.

TEXT BOOKS:

1. Software Engineering, concepts and practices, Ugrasen Suman, Cengage learning
2. Software Engineering, 8/e, Sommerville, Pearson.
3. Software Engineering, 7/e , Roger S.Pressman , TMH

REFERENCE BOOKS:

1. Software Engineering, A Precise approach, Pankaj Jalote, Wiley
2. Software Engineering principles and practice, W S Jawadekar, TMH
3. Software Engineering concepts, R Fairley, TMH

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – II Semester

Web Technologies

Learning Objectives

- Analyze a web page and identify its elements and attributes.
- Create web pages using XHTML and Cascading Styles sheets.
- Build dynamic web pages using JavaScript (client side programming).
- Build web applications using PHP.
- Create XML documents & Schema.
- Learn about PERL, Ruby, PYTHON

UNIT-I:
HTML tags, Lists, Tables, Images, forms, Frames. Cascading style sheets. Introduction to Java script. Objects in Java Script. Dynamic HTML with Java Script, HTML 5 Introduction.

UNIT-II:
Working with XML: Document type Definition, XML schemas, Document object model, XSLT, DOM and SAX.

UNIT-III:
AJAX A New Approach: Introduction to AJAX, Integrating PHP and AJAX. Consuming WEB services in AJAX**:** (SOAP, WSDL,UDDI)

UNIT-IV:
PHP Programming: Introducing PHP: Creating PHP script, Running PHP script.
Working with variables and constants: Using variables,Using constants,Data types,Operators.**Controlling program flow:** Conditional statements,Control statements,Arrays,functions.Working with forms and Databases such as mySql, Oracle, SQL Sever.

UNIT-V:
Introduction to PERL, Perl language elements, Interface with CGI- A form to mail program, Simple page search

UNIT-VI:
Introduction to Ruby, variables, types, simple I/O, Control, Arrays, Hashes, Methods, Classes, Iterators, Pattern Matching, Practical Web Applications
Introduction to PYTHON, An Example PYTHON code to connect to database.

Text Books:

1. Programming the World Wide Web, Robet W Sebesta, 7ed, Pearson.
2. Web Technologies, Uttam K Roy, Oxford
3. The Web Warrior Guide to Web Programming, Bai, Ekedahl, Farrelll, Gosselin, Zak, Karparhi, Maclntyre, Morrissey, Cengage

Reference Books:

1. Ruby on Rails Up and Running, Lightning fast Web development, Bruce Tate, Curt Hibbs, Oreilly (2006)
2. Programming Perl, 4ed, Tom Christiansen, Jonathan Orwant, Oreilly (2012)
3. Web Technologies, HTML< JavaScript, PHP, Java, JSP, XML and AJAX, Black book, Dream Tech.
4. An Introduction to Web Design, Programming, Paul S Wang, Sanda S Katila, Cengage

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
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Computer Networks & Network Programming Lab

PART – A

1. **I**mplement the data link layer framing methods such as character stuffing and bit stuffing.
2. Implement on a data set of characters the three CRC polynomials – CRC 12, CRC 16 and CRC CCIP.
3. Implement Dijkstra‘s algorithm to compute the Shortest path through a graph.
4. Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table art each node using distance vector routing algorithm
5. Take an example subnet of hosts. Obtain broadcast tree for it.
6. Simulate Link State routing protocol using NS2.
7. Simulate Distance Vector routing protocol using NS2.
8. Simulate TCP and UDP packets using NS2.
9. Write a tcl script to create fixed wireless nodes.
10. Write a tcl script to generate graph taking more than two parameter files as input.

PART – B

1. Implement the following forms of IPC.
   a)Pipes b)FIFO
2. Implement file transfer using Message Queue form of IPC
3. Write a programme to create an integer variable using shared memory concept and increment the variable simultaneously by two processes. Use semaphores to avoid race conditions
4. Design TCP iterative Client and server application to reverse the given input sentence
5. Design TCP client and server application to transfer file
6. Design a TCP concurrent server to convert a given text into upper case using multiplexing system call “select”
7. Design a TCP concurrent server to echo given set of sentences using poll functions
8. Design UDP Client and server application to reverse the given input sentence
9. Design UDP Client server to transfer a file
10. Design using poll client server application to multiplex TCP and UDP requests for converting a given text into upper case.
11. Design a RPC application to add and subtract a given pair of integers
12. An Example program which illustrates use of setopt() system call.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – II Semester

Software Engineering Lab

Experiments:

Take any real time problem and do the following experiments

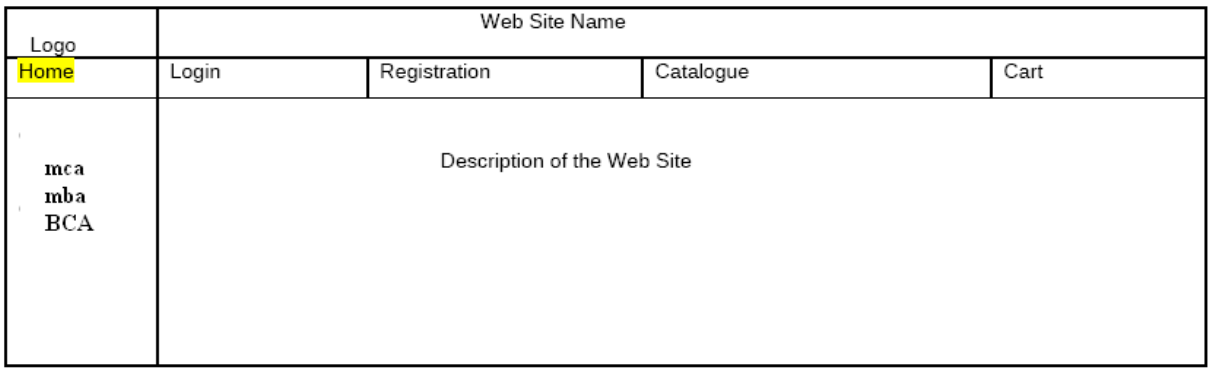
1. Do the Requirement Analysis and Prepare SRS
2. Using COCOMO model estimate effort.
3. Calculate effort using FP oriented estimation model.
4. Analyze the Risk related to the project and prepare RMMM plan.
5. Develop Time-line chart and project table using PERT or CPM project scheduling methods.
6. Draw E-R diagrams, DFD, CFD and structured charts for the project.
7. Design of Test cases based on requirements and design.
8. Prepare FTR
9. Prepare Version control and change control for software configuration items.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
III Year B. Tech Computer Science & Engineering – II Semester

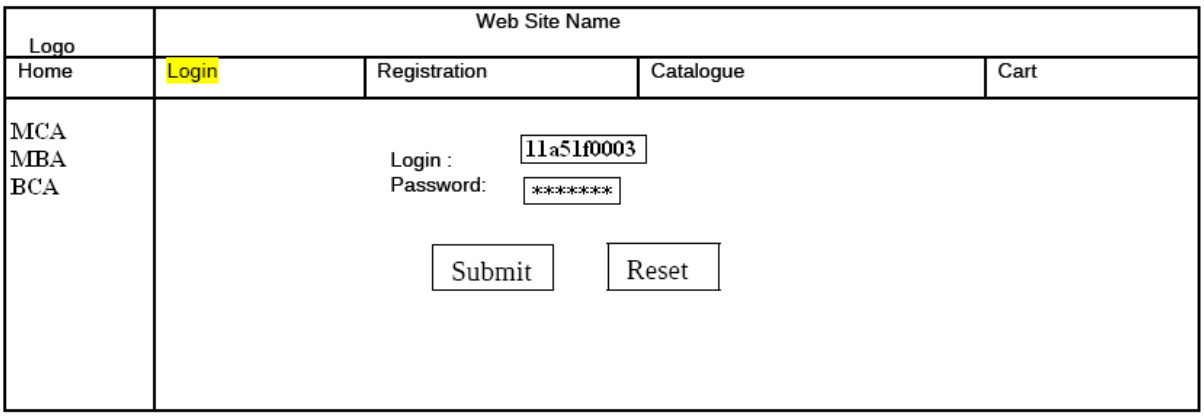
Web Technologies Lab

1. Design the following static web pages required for an online book store web site.

1) **HOME PAGE:**
The static home page must contain three **frames**.
Top frame : Logo and the college name and links to Home page, Login page, Registration page, Catalogue page and Cart page (the description of these pages will be given below).
Left frame : At least four links for navigation, which will display the catalogue of respective links.
For e.g.: When you click the link **"MCA"** the catalogue for MCA Books should be displayed in the Right frame.
Right frame: The *pages to the links in the left frame must be loaded here*. Initially this page contains description of the web site.

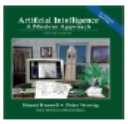


2) **login page**



3) **CATOLOGUE PAGE:**
The catalogue page should contain the details of all the books available in the web site in a table.
The details should contain the following:
1. Snap shot of Cover Page.
2. Author Name.

3. Publisher.
4. Price.
5. Add to cart button.

<table>
<tr><td>Logo</td><td colspan="4">Web Site Name</td></tr>
<tr><td>Home</td><td>Login</td><td>Registration</td><td>Catalogue</td><td>Cart</td></tr>
<tr><td>MCA
MBA</td><td>  </td><td>Book : XML Bible
Author : Winston
Publication : Wiely</td><td>$ 40.5</td><td>Add to cart</td></tr>
<tr><td>BCA</td><td>  </td><td>Book : AI
Author : S.Russel
Publication : Princeton hall</td><td>$ 63</td><td>Add to cart</td></tr>
<tr><td></td><td>  </td><td>Book : Java 2
Author : Watson
Publication : BPB publications</td><td>$ 35.5</td><td>Add to cart</td></tr>
<tr><td></td><td>  </td><td>Book : HTML in 24 hours
Author : Sam Peter
Publication : Sam</td><td>$ 50</td><td>Add to cart</td></tr>
</table>

4. **REGISTRATION PAGE:**
Create a "*registration form* "with the following fields
1) Name (Text field)
2) Password (password field)
3) E-mail id (text field)
4) Phone number (text field)
5) Sex (radio button)
6) Date of birth (3 select boxes)
7) Languages known (check boxes – English, Telugu, Hindi, Tamil)
8) Address (text area)

5. Design a web page using **CSS (C**ascading **S**tyle **S**heets**)** which includes the following:
1) Use different font, styles:
In the style definition you define how each selector should work (font, color etc.).
Then, in the body of your pages, you refer to these selectors to activate the styles

6. Write an XML file which will display the Book information which includes the following:
1) Title of the book 2) Author Name 3) ISBN number
4) Publisher name 5) Edition 6) Price
Write a Document Type Definition (DTD) to validate the above XML file.

7. Write Ruby program reads a number and calculates the factorial value of it and prints the same.

8. Write a Ruby program which counts number of lines in a text file using its regular expressions facility.

9. Write a Ruby program that uses iterator to find out the length of a string.

10. Write simple Ruby programs that uses arrays in Ruby.

11. Write programs which uses associative arrays concept of Ruby.

12. Write Ruby program which uses Math module to find area of a triangle.

13. Write Ruby program which uses tk module to display a window

14. Define complex class in Ruby and do write methods to carry operations on complex objects.

15. Write a program which illustrates the use of associative arrays in perl.

16. Write perl program takes a set names along the command line and prints whether they are regular files or special files

17. Write a perl program to implement UNIX `passwd' program

18. An example perl program to connect to a MySQl database table and executing simple commands.

19. Example PHP program for cotactus page.

20. User Authentication :
Assume four users user1,user2,user3 and user4 having the passwords pwd1,pwd2,pwd3 and pwd4 respectively. Write a PHP for doing the following.
1. Create a Cookie and add these four user id's and passwords to this Cookie.
2. Read the user id and passwords entered in the Login form (week1) 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.

21. Example PHP program for registering users of a website and login.

22. 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).
Write a PHP program 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 page (week2).

23. Write a PHP which does the following job:
Insert the details of the 3 or 4 users who register with the web site (week9) by using registration form. Authenticate the user when he submits the login form using the user name and password from the database (similar to week8 instead of cookies).

24. Create tables in the database which contain the details of items (books in our case like Book name , Price, Quantity, Amount) of each category. Modify your catalogue page (week 2)in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP

25. HTTP is a stateless protocol. Session is required to maintain the state.
The user may add some items to cart from the catalog page. He can check the cart page for the selected items. He may visit the catalogue again and select some more items. Here our interest is the selected items should be added to the old cart rather than a new cart. Multiple users can do the same thing at a time(i.e., from different systems in the LAN using the ip-address instead of localhost). This can be achieved through the use of sessions. Every user will have his own session which will be created after his successful login to the website. When the user logs out his session should get invalidated (by using the method session.invalidate()).
Modify your catalogue and cart PHP pages to achieve the above mentioned functionality using sessions.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
IV Year B. Tech Computer Science & Engineering – I Semester

Cryptography and Network Security

Learning Objectives

- To introduce cryptography theories, algorithms, and systems.
- learn threats to computer networks and protection mechanisms and methods need to thwart these threats.
- understand the theory of fundamental cryptography, encryption, and decryption algorithms
- To learn the necessary approaches and techniques to build protection mechanisms in order to secure computer networks
- comprehend secure identity management (authentication), message authentication, and digital signature techniques.

UNIT I :
Classical Encryption Techniques Introduction: Security attacks, services & mechanisms, Symmetric Cipher Model, Substitution Techniques, Transportation Techniques, Cyber threats and their defense(Phishing Defensive measures, web based attacks, SQL injection & Defense techniques)(TEXT BOOK 2), Buffer overflow & format string vulnerabilities, TCP session hijacking(ARP attacks, route table modification) UDP hijacking (man-in-the-middle attacks)(TEXT BOOK 3).

UNIT II:
Block Ciphers & Symmetric Key Cryptography: Traditional Block Cipher Structure, DES, Block Cipher Design Principles, AES-Structure, Transformation functions, Key Expansion, Blowfish, CAST-128, IDEA, Block Cipher Modes of Operations

UNIT III:
Number Theory & Asymmetric Key Cryptography: Number Theory: Prime and Relatively Prime Numbers, Modular Arithmetic, Fermat's and Euler's Theorems, The Chinese Remainder theorem, Discrete logarithms.
Public Key Cryptography: Principles, public key cryptography algorithms, RSA Algorithms, Diffie Hellman Key Exchange, Elliptic Curve Cryptography.

UNIT IV :
Cryptographic Hash Functions & Digital Signatures : Application of Cryptographic hash Functions, Requirements & Security, Secure Hash Algorithm, Message Authentication Functions, Requirements & Security, HMAC & CMAC. Digital Signatures, NIST Digital Signature Algorithm. Key management & distribution.

UNIT V:
User Authentication, Transport Layer Security & Email Security : User Authentication: Remote user authentication principles, Kerberos
Transport Level Security: Web Security Requirements, Secure Socket Layer (SSL)

and Transport Layer Security (TLS), Secure Shell(SSH)
Electronic Mail Security: Pretty Good Privacy (PGP) and S/MIME.

UNIT VI:
IP Security & Intrusion Detection Systems: IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.
FireWalls: Characteristics, Types of Firewalls, Placement of Firewalls, Firewall Configuration, Trusted systems.

TEXT BOOKS:

1. Cryptography & Network Security: Principles and Practices, William Stallings, PEA, Sixth edition.
2. Introduction to Computer Networks & Cyber Security, Chwan Hwa Wu, J.David Irwin, CRC press
3. Hack Proofing your Network, Russell, Kaminsky, Forest Puppy, Wiley Dreamtech.

REFERENCE BOOKS:

1.Everyday Cryptography, Fundamental Principles & Applications, Keith Martin, Oxford
2. Network Security & Cryptography, Bernard Menezes, Cengage,2010

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
IV Year B. Tech Computer Science & Engineering – I Semester

UML & Design Patterns

Learning Objectives:

- Design the Structural aspects of the System.
- Design the Behavioral aspects of the System.
- Understand and be able to apply incremental/iterative development
- Understand common design patterns
- Be able to identify appropriate patterns for design problems
- Be able to evaluate the quality software source code
- Be able to refactor badly designed program properly using patterns

Syllabus:

Unit I:

Introduction : Introduction to OOAD; typical activities / workflows / disciplines in OOAD, Introduction to iterative development and the Unified Process, Introduction to UML; mapping disciplines to UML artifacts, Introduction to Design Patterns - goals of a good design, Introducing a case study & MVC architecture

Unit II:

Inception: Artifacts in inception, Understanding requirements - the FURPS model, Understanding Use case model - introduction, use case types and formats, Writing use cases - goals and scope of a use case, elements / sections of a use case, Use case diagrams, Use cases in the UP context and UP artifacts, Identifying additional requirements, Writing requirements for the case study in the use case model

Unit III:

Elaboration: System sequence diagrams for use case model, Domain model : identifying concepts, adding associations, adding attributes, Interaction Diagrams, Introduction to GRASP design Patterns ,Design Model: Use case realizations with GRASP patterns, Design Class diagrams in each MVC layer
Mapping Design to Code, Design class diagrams for case study and skeleton code

Unit IV:

More Design Patterns: Fabrication, Indirection, Singleton, Factory, Facade, Publish-Subscribe

Unit V:

More UML diagrams : State-Chart diagrams, Activity diagrams, Component Diagrams, Deployment diagrams, Object diagrams

Unit VI:

Advanced concepts in OOAD : Use case relationships, Generalizations
Domain Model refinements, Architecture, Packaging model elements

Textbooks:

1. 'Applying UML and patterns' by Craig Larman, Pearson
2. Object-Oriented Analysis & Design with the Unified Process by Satzinger, Jackson & Burd Cengage Learning
3. 'UML distilled' by Martin Fowler , Addison Wesley, 2003

Reference:

1. O'reilly ' s 'Head-First Design Patterns' by Eric Freeman et al, Oreillly
2. UML 2 Toolkit, by Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: WILE\'-Dreamtech lndia Pvt. Lid.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
IV Year B. Tech Computer Science & Engineering – I Semester

Mobile Computing

Learning Objectives

- Describe the basic concepts and principles in mobile computing
- Understand the concept of Wireless LANs,PAN, Mobile Networks , and Sensor Networks
- Explain the structure and components for Mobile IP and Mobility Management
- Understand positioning techniques and location -based services and applications.
- Routing algorithms of MANETS

UNIT I :
Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.
GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

UNIT –II :
(Wireless) Medium Access Control (MAC) : Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)

UNIT –III :
Mobile Network Layer : IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT –IV :
Mobile Transport Layer : Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks.
Database Issues : Database Hoarding & Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT V :
Data Dissemination and Synchronization : Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization – Introduction, Software, and Protocols.

UNIT VI :
Mobile Ad hoc Networks (MANETs) : Introduction, Applications & Challenges of a MANET, Routing, Classification of
Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , Mobile Agents, Service Discovery.
Protocols and Platforms for Mobile Computing : WAP, Bluetooth, XML, J2ME, JavaCard, PalmOS, Windows CE, SymbianOS, Linux for Mobile Devices,Android.

Text Books:

1. Jochen Schiller, “Mobile Communications”, Addison-Wesley, Second Edition, 2009.
2. Raj Kamal, “Mobile Computing”, Oxford University Press, 2007, ISBN: 0195686772

Reference Book:

1. ASOKE K TALUKDER, HASAN AHMED, ROOPA R YAVAGAL, “Mobile Computing, Technology Applications and Service Creation” Second Edition, Mc Graw Hill.
2. UWE Hansmann, Lother Merk, Martin S. Nocklous, Thomas Stober, “Principles of Mobile Computing,” Second Edition, Springer.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
IV Year B. Tech Computer Science & Engineering – I Semester

Simulation Modeling

Learning Objectives

- The Essentials of Probability
- Monte Carlo Techniques
- Discrete Event Stochastic Models
- Markov Models with Applications to Data Networks
- Queuing Models

UNIT-I:

System models: Concepts, continuous and discrete systems, System modeling, types of models, subsystems, system study.

UNIT-II:

System Simulation: Techniques, comparison of simulation and analytical methods, types of simulation, Distributed log models, cobweb models.

UNIT-III:

Continuous system Simulation: Numerical solution of differential equations, Analog Computers, Hybrid Computers, continuous system simulation languages CSMP, system dynamic growth models, logistic curves.

UNIT-IV:

Probability concepts in simulation: Monte Carlo techniques, stochastic variables, probability functions, Random Number generation algorithms.

UNIT-V:

Queuing Theory: Arrival pattern distributions, servicing times, queuing disciplines, measure of queues, mathematical solutions to queuing problems.

Discrete System Simulation: Events, generation of arrival patterns, simulation programming tasks, analysis of simulation output.

UNIT-VI:

GPSS & SIMSCRIPT: general description of GPSS and SIMSCRIPT, programming in GPSS & SIMSCRIPT, Data structures, Implementation of activities, events and queues, Event scanning, simulation algorithms in GPSS and SIMSCRIPT.

TEXT BOOKS

1. Geoffrey Gordon, "System Simulation", 2nd Edition, Prentice Hall, India, 2002.
2. Narsingh Deo, "System Simulation with Digital Computer, "Prentice Hall, India, 2001.

REFERENCES:

1. Jerry Banks and John S.Carson, Barry L. Nelson, David M.Nicol, "Discrete Event System Simulation", 3rd Edition, Prentice Hall, India, 2002.
2. Shannon, R.E. Systems simulation, The art and science, Prentice Hall, 1975.
3. Thomas J. Schriber, Simulation using GPSS, John Wiley, 1991

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
IV Year B. Tech Computer Science & Engineering – I Semester

Digital Forensics

Learning Objectives

- Collect, analyze and evaluate evidence data using industry-standard computer forensic software and hardware
- Retrieve and recover files on various types of storage devices, using different operating systems and network systems
- Communicate clearly, accurately and effectively, both verbally and in writing

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,
Investor's Office and Laboratory: Understanding Forensics Lab Certification Requirements, Determining the Physical Requirements for a Computer Forensics Lab, Selecting a Basic Forensic Workstation

Unit-II:
Data Acquisition: Understanding Storage Formats for Digital Evidence, Determining the Best Acquisition Method, Contingency Planning for Image Acquisitions, Using Acquisition Tools, Validating Data Acquisition, Performing RAID Data Acquisition, Using Remote Network Acquisition Tools, Using Other Forensics Acquisition Tools

Unit-III:
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 Scene, Sizing Digital evidence at the Scene, Storing Digital evidence, obtaining a Digital Hash.

Unit-IV:
Current Computer Forensics **Tools:** Evaluating Computer Forensics Toll Needs, Computer Forensics Software Tools, Computer Forensics Hardware Tools, Validating and Testing Forensics Software
Computer Forensics Analysis and Validation: Determining What Data to Collect and Anlyze, Validating Forensic Data, Addressing Data-Hiding Techniques, Performing Remote Acquisition

Unit-V:

Recovering Graphics and Network Forensics: Recognizing a Graphics File, Understanding Data Compression, Locating and Recovering Graphics Files, Understanding Copyright Issues with Graphics, Network Forensic, Developing Standard Procedure for Network Forensics, Using Network Tools, Examining Hiney Project

Unit-VI:

E-mail Investigations Cell Phone and Mobile Device Forensics: Exploring the Role of E-mail in Investigations, Exploring the Role of Client and Server in E-mail, Investigating E-mail Crimes and Violations, Understanding E-mail Servers, Using Specialized E-mail Forensics Tools, Understanding Mobile Device Forensics, Understanding Acquisition Procedure for Cell Phones and Mobile Devoices

TEXT BOOK:

1. Nelson, Phillips Enfinger,Steuart, " Computer Forensics and Investigations, Cengage Learning

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
IV Year B. Tech Computer Science & Engineering – I Semester

Human Computer Interaction

Learning Objectives

- Know the impact of HCI on society, the economy and culture
- Understand the fundamental principles of interface design
- Be able to design and implement user interfaces

UNIT I:
Managing Design Processes: Introduction, Organizational design to support usability, Four pillars of design, development methodologies, Ethnographic observation, Participatory design, Scenario Development, Social impact statement for early design review, legal issues, Usability Testing and Laboratories

UNIT II:
Menu Selection, Form Fill-In and Dialog Boxes: Introduction, Task- Related Menu Organization, Single menus, Combinations of Multiple Menus, Content Organization, Fast Movement Through Menus, Data entry with Menus: Form Fill-in, dialog Boxes, and alternatives, Audio Menus and menus for Small Displays

UNIT III:
Command and Natural Languages: Introduction, Command organization Functionality, Strategies and Structure, Naming and Abbreviations, Natural Language in Computing. **Interaction Devices:** Introduction, Keyboards and Keypads, Pointing Devices, Speech and Auditory Interfaces, Displays- Small and large

UNIT IV:
Quality of Service: Introduction, Models of Response-Time impacts, Expectations and attitudes, User Productivity, Variability in Response Time, Frustrating Experiences. **Balancing Function and Fashion:** Introduction, Error Messages, Nonanthropomorphic Design, Display Design, Web Page Design, Window Design, Color

UNIT V:
User Documentation and Online Help: Introduction, Online Vs Paper Documentation, Reading from paper Vs from Displays, Shaping the content of the Documentation, Accessing the Documentation, Online tutorials and animated documentation, Online communities for User Assistance, The Development Process

UNIT VI:
Information Search: Introduction, Searching in Textual Documents and Database Querying, Multimedia Document Searches, Advanced Filtering and Searching Interfaces. **Information Visualization:** Introduction, Data Type by Task Taxonomy, Challenges for Information Visualization

Text Books:

1. Designing the User Interface, Strategies for Effective Human Computer Interaction, 5ed, Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven M Jacobs, Pearson
2. The Essential guide to user interface design,2/e, Wilbert O Galitz, Wiley DreamaTech.

Reference Books:

1. Human Computer, Interaction Dan R.Olsan, Cengage ,2010.
2. Designing the user interface. 4/e, Ben Shneidermann , PEA.
3. User Interface Design, Soren Lauesen , PEA.
4. Interaction Design PRECE, ROGERS, SHARPS, Wiley.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
IV Year B. Tech Computer Science & Engineering – I Semester

Microprocessors and Multicore systems

Learning Objectives

- learn the internal organization of some popular microprocessors
- learn hardware and software interaction and integration.
- learn the design of microprocessors/microcontrollers-based systems.

UNIT-I:
overview of microcomputer structure and operation., execution of a three instruction program, microprocessor evolution and types, the 8086 micro processor family , 8086 internal architecture , introduction to programming the 8086,
8086 family assembly language programming : Program development steps , constructing the machine codes for 8086 instructions, writing programs for use with an assembler, assembly language program development tools. (Text Book 1)

UNIT-II:
Implementing standard program structures in 8086 assembly language : Simple sequence programs, jumps, flags and conditional jumps, if-then, if-then-else and multiple if-then-else programs, while-do programs, repeat-until programs, instruction timing and delay loops. (Text Book 1)

UNIT-III:
Strings, procedures and macros: The 8086 string instructions, writing and using procedures, writing and using assembler macros.
8086 instruction descriptions and assembler directives : Instruction descriptions, assembler directives , DB, DD, DQ, DT, DW, end-program, endp, ends, equ ,even-align on even memory address, extrn , global, public / extrn, group, include, label, length- not implemented IBM MASM, name – off set, ORG, proc, ptr, segment, short, type
(Text Book 1)

UNIT-IV:
8086: 8086 interrupts and interrupt applications : 8086 interrupts and interrupt responses, hardware interrupt applications, Software Interrupts, priority of interrupts, software interrupt applications, programming.
8086 assembly language programmes - Bit & Logic operations, strings, procedures, Macros, Number Format, Conversions, ASCII operations, signed Numbers Arithmetic, Programming using High level language constructs. (Text Book 1)

UNIT-V:
CPU: architecture of Intel 80286 CPU, Intel 80386, and 32-bit CPU- 80486-Microprocessor(No instruction set).(Text Book 2)

UNIT-VI:

The Pentium Family and Core 2 Microprocessors: Introduction to the Pentium Processor, Pentium II Microprocessor, Pentium III, Pentium IV and Core2 Processors.(Text Book 2)

TEXT BOOKS:

1. Microprocessors and Interfacing, Douglas V Hall, Revised 2nd ed, TMH
2. The Intel Microprocessors, Architecture, programming and interfacing, 8ed, Barry Bray, Pearson
3. The X86 Microprocessors, architecture, Programming and Interfacing(8086 to Pentium), Lyla B Das, PEA

REFERENCE BOOKS:

1. The 8088 and 8086 Microprocessors, Programming, Interfacing, Hardware and Applications, Walter A Triebel, Avtar Singh, 4 ed, Pearson

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
IV Year B. Tech Computer Science & Engineering – I Semester

Digital Image Processing

Learning Objectives:

- Understand the concepts of digital image processing fundamentals: hardware and software, digitization, enhancement.
- Ability to apply image processing techniques in both the spatial and frequency
- Finally one can produce a lossless enhanced image in specified format
- Student will become good expertise in applying mathematical concepts to digital image processing.

UNIT I:
Introduction: Applications of Computer Graphics and Image Processing, Fundamentals on Pixel concepts, effect of Aliasing and Jaggles, Advantages of high resolution systems
DDA line algorithms: Bresenhams line and circle derivations and algorithms

UNIT II: 2-D Transformations: Translations, Scaling, rotation, reflection and shear transformations, Homogeneous coordinates, **Composite Transformations**- Reflection about an arbitrary line; Windowing and clipping, viewing transformations, Cohen- Sutherland clipping algorithm

UNIT III:
Digital Image Properties: Metric and topological properties of Digital Images, Histogram, entropy, Visual Perception, Image Quality, Color perceived by humans, Color Spaces, Palette Images, color Constancy
Color Images: Pixel brightness transformations, Local Preprocessing, image smoothing, Edge detectors, Robert Operators, Laplace, Prewitt, Sobel, Fri-chen, Canny Edge detection

UNIT IV:
Mathematical Morphology: Basic Mathematical Concepts, Binary dilation and Erosion, Opening and closing, Gray Scale dilation and erosion, Skeleton, Thinning , Thickening Ultimate erosion, Geodesic transformations, Morphology and reconstruction, Morphological Segmentation

UNIT V: SEGMENTATION: Threshold detection methods, Optimal Thresholding, Edge based Segmentation-Edge image thresholding, Edge relaxation, Border tracing, Hough Transforms, Region based segmentation: Region Mergingm Region Splitting, Splitting and Merging, Watershed Segmentation.

UNIT VI: Image Data Compression: Image data Properties, Discrete Image Transformations in data compression, Discrete Cosine and Wavelet Transforms, Types of DWT and merits; Predicative Compression methods, Hierarchical and Progressive Compression methods, Comparison of Compression methods, JPEG- MPEG Image Compression methods.
Text Books:

1. Computer Graphics C Version, Donald Hearn, M Paulli Baker , Pearson (Uniit I and Unit II)
2. Image Processing, Analysis and Machine Vision, Millan Sonka, Vaclov Halvoc, Roger Boyle, Cengage Learning, 3ed, (Unit III, Unit IV, Unit V and Unit VI)

References:

1. Computer & Machine Vision, Theory , Algorithms , Practicles, E R Davies, Elsevier, 4ed
2. Digital Image Processing with MATLAB and LABVIEW, Vipul Singh, Elsevier
3. Digital Image Processing, R C Gonzalez &R E woods, Addison Pearson, 3ed.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
IV Year B. Tech Computer Science & Engineering – I Semester

Software Testing Methodologies

Learning Objectives:

- learn to test software effectively
- learn practical ways to design high quality tests during all phases of software development.
- learn the theory behind criteria-based test design and to apply that theory in practice. Topics include test design, test automation, test coverage criteria, and how to test software in cutting-edge software development environments.

UNIT I:
Software Testing: Introduction, Evolution, Myths & Facts, Goals, Psychology, Definition, Model for testing, Effective Vs Exhaustive Software Testing.
Software Testing Terminology and Methodology: Software Testing Terminology, Software Testing Life Cycle, relating test life cycle to developmentlife cycle Software Testing Methodology.

UNIT II:
Verification and Validation: Verification & Validation Activities, Verification, Verification of Requirements, High level and low level designs, How to verify code, Validation
Dynamic Testing I: Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect Graphing based testing, Error guessing

UNIT III:
Dynamic Testing II: White-Box Testing: need, Logic coverage criteria, Basis path testing, Graph matrices, Loop testing, data flow testing, mutation testing
Static Testing: inspections, Structured Walkthroughs, Technical reviews

UNIT IV:
Validation activities: Unit testing, Integration Testing,. Function testing, system testing, acceptance testing
Regression testing: Progressives Vs regressive testing, Regression testability, Objectives of regression testing, When regression testing done?, Regression testing types, Regression testing techniques

UNIT V:
Efficient Test Suite Management: Test case deisgnWhy does a test suite grow, Minimizing the test suite and its benefits, test suite prioritization, Types of test case prioritization, prioritization techniques, measuring the effectiveness of a prioritized test suite
Software Quality Management: Software Quality metrics, SQA models
Debugging: process, techniques, correcting bugs, Basics of testing management tools, test link and Jira

UNIT VI:

Automation and Testing Tools: need for automation, categorization of testing tools, selection of testing tools, Cost incurred, Guidelines for automated testing, overview of some commercial testing tools.

Testing Object Oriented Software: basics, Object oriented testing

Testing Web based Systems: Challenges in testing for web based software, quality aspects, web engineering, testing of web based systems, Testing mobile systems

Text Books:

1. Software Testing, Principles and Practices, Naresh Chauhan, Oxford
2. Foundations of Software testing, Aditya P Mathur, 2ed, Pearson
3. Software Testing- Yogesh Singh, CAMBRIDGE

Reference books:

1. Software testing techniques - Baris Beizer, International Thomson computer press, second edition.
2. Software Testing, Principles, techniques and Tools, M G Limaye, TMH
3. Effective Methods for Software testing, Willian E Perry, 3ed, Wiley

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
IV Year B. Tech Computer Science & Engineering – I Semester

Artificial Intelligence

Learning Objectives:

The student will be able to

- Know the methodology of Problem solving
- Implement basic AI algorithms
- Design and carry out an empirical evolution of different algorithms on a problem formalization

UNIT-I:
Introduction to artificial intelligence: Introduction ,history, intelligent systems, foundations of AI, applications, tic-tac-tie game playing, development of ai languages, current trends in AI
Problem solving: state-space search and control strategies: Introduction, general problem solving, characteristics of problem

UNIT-II:
Search Strategies: exhaustive searches, heuristic search techniques, iterative-deepening a*, constraint satisfaction
Problem reduction and game playing: Introduction, problem reduction, game playing, alpha-beta pruning, two-player perfect information games

UNIT-III:
Logic concepts: Introduction, propositional calculus, proportional logic, natural deduction system, axiomatic system, semantic tableau system in proportional logic, resolution refutation in proportional logic, predicate logic

UNIT-IV:
Knowledge representation: Introduction, approaches to knowledge representation, knowledge representation using semantic network, extended semantic networks for KR, knowledge representation using frames **advanced knowledge representation techniques:** Introduction, conceptual dependency theory, script structure, cyc theory

UNIT-V:
Expert system and applications: Introduction phases in building expert systems, expert system versus traditional systems, rule-based expert systems blackboard systems truth maintenance systems, application of expert systems, list of shells and tools

UNIT-VI:
Uncertainty measure: probability theory: Introduction, probability theory, Bayesian belief networks, certainty factor theory, dempster-shafer theory
Fuzzy sets and fuzzy logic: Introduction, fuzzy sets, fuzzy set operations, types of membership functions, multi valued logic, fuzzy logic, linguistic variables and hedges, fuzzy propositions, inference rules for fuzzy propositions, fuzzy systems.

TEXT BOOKS:

1. Artificial Intelligence- Saroj Kaushik, CENGAGE Learning,
2. Artificial intelligence, A modern Approach , 2nd ed, Stuart Russel, Peter Norvig, PEA
3. Artificial Intelligence- Rich, Kevin Knight, Shiv Shankar B Nair, 3rd ed, TMH
4. Introduction to Artificial Intelligence, Patterson, PHI

REFERNCE BOOKS:

1. Atificial intelligence, structures and Strategies for Complex problem solving, -George F Lugar, 5th ed, PEA
2. Introduction to Artificial Intelligence, Ertel, Wolf Gang, Springer
3. Artificial Intelligence, A new Synthesis, Nils J Nilsson, Elsevier

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Multimedia Computing

Learning Objectives:

- able to learn multimedia data representation, color models, data compression techniques, developing multimedia applications .
- The students will eventually use them in certain practical applications particularly related to computer science.
- Sustained learner to bring out creative and innovative ideas by addressing the research issues in digital image processing.

UNIT–I:
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:
Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

UNIT–III:
Multimedia data compression I: Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression,

UNIT–IV:
Multimedia data compression II: Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, Embedded Zerotree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

UNIT–V:
Basic Video Compression Techniques: Introduction to video compression, video compression based on motion compensation, search for motion vectors, MPEG, Basic Audio Compression Techniques.

UNIT–VI:
Multimedia Networks: Basics of Multimedia Networks, Multimedia Network Communications and Applications: Quality of Multimedia Data Transmission, Multimedia over IP, Multimedia over ATM Networks, Transport of MPEG-4, Media-on-Demand (MOD).

TEXT BOOKS:
1. Fudamentals of Multimedia by Ze-Nian Li and Mark S. Drew Pearson Education.

REFERENCE BOOKS:

1. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech
2. Macromedia Flash MX Professional 2004 Unleashed, Pearson.
3. Multimedia and communications Technology, Steve Heath, Elsevier (Focal Press).
4. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
5. Multimedia Basics by Weixel Thomson
6. Multimedia Technology and Applications, David Hilman , Galgotia

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Big Data Analytics

Learning Objectives:

- Master the concepts of Hadoop Distributed File System and MapReduce framework
- Understand Hadoop Architecture -- HDFS Federation, NameNode High Availability
- Setup a Hadoop Cluster
- Program in MapReduce
- Learn to write Complex MapReduce programs
- Perform Data Analytics using Pig and Hive
- Implement HBase, MapReduce Integration, Advanced Usage and Advanced Indexing
- Implement best Practices for Hadoop Development

Unit 1:

Introduction to Big Data: Big Data-definition, Characteristics of Big Data (Volume, Variety, Velocity), Data in the Warehouse and Data in Hadoop, Why is Big Data Important? Patterns for Big Data Development

Unit 2:

Introduction to Hadoop: Hadoop- definition, Understanding distributed systems and Hadoop, Comparing SQL databases and Hadoop, Understanding MapReduce, Counting words with Hadoop—running your first program, History of Hadoop

Starting Hadoop - The building blocks of Hadoop, NameNode, DataNode, Secondary NameNode, JobTracker and Task Tracker

MapReduce -A Weather Dataset, Analyzing the Data with Unix Tools, Analyzing the Data with Hadoop, Scaling Out, Hadoop Streaming, Hadoop Pipes.

Developing a MapReduce Application -The Configuration API, Configuring the Development Environment, Running Locally on Test Data, Running on a Cluster, Tuning a Job, MapReduce Workflows

Unit 3:

HDFS: Components of Hadoop -Working with files in HDFS, Anatomy of a MapReduce program, Reading and writing

The Hadoop Distributed Filesystem -The Design of HDFS, HDFS Concepts, The Command-Line Interface, Hadoop Filesystem, The Java Interface, Data Flow, Parallel Copying with distcp, Hadoop Archives

Unit 4:

MapReduce Advanced Programming: Writing basic MapReduce programs - Getting the patent data set, constructing the basic template of a MapReduce program, Counting things, Adapting for Hadoop's API changes, Streaming in Hadoop, Improving performance with combiners

Advanced MapReduce - Chaining MapReduce jobs, joining data from different sources, creating a Bloom filter

Passing job-specific parameters to your tasks, probing for task-specific information, Partitioning into multiple output files, Inputting from and outputting to a database, keeping all output in sorted order

Unit 5:

Graph Representation in MapReduce: Modeling data and solving problems with graphs, Shortest Path Algorithm, Friends-of-Friends Algorithm, PageRank Algorithm

Bloom Filter, Parallelized Bloom filter creation in MapReduce, Map-Reduce semi-join with Bloom filters

Unit 6:

Pig & Hive: Pig- Installing and Running Pig, An Example, Comparison with Databases, Pig Latin, User-Defined Functions, Data Processing Operators, Pig in Practice

Hive- Installing Hive, An Example, Running Hive, Comparison with Traditional Databases, HiveQL, Tables, Querying Data, User-Defined Functions

Text Books:

1. 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.
2. Hadoop: The Definitive Guide by Tom White, 3rd Edition, O'reilly
3. Hadoop in Action by Chuck Lam, MANNING Publ.
4. Hadoop in Practice by Alex Holmes, MANNING Publ.

Reference Books:

1. Data Divination: Big Data Strategies, 1st Edition, Pam Baker, Bob Gourley, Cengage

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
IV Year B. Tech Computer Science & Engineering – I Semester

Software Project Management

Learning Objectives:

- *learn about a systematic approach to initiate, plan, execute, control and close a software project*
- *to equip students with understanding of the best practices, and techniques used in project management process*
- *to enable students to gain a working knowledge of ISO 9000 and CMMI, and process improvement techniques, Software life cycle models, Risk management, Defect analysis and prevention methods.*
- *Recognize the importance of evaluating emerging technology in technology project management, Closure analysis report, Modern project profile, Modern process Transitions*

Unit I:
Introduction: Project, Management, Software Project Management activities, Challenges in software projects, Stakeholders, Objectives & goals
Project Planning: Step-wise planning, Project Scope, Project Products & deliverables, Project activities, Effort estimation, Infrastructure

Unit II:
Project Approach: Lifecycle models, Choosing Technology, Protoyping
Iterative & incremental Process Framework: Lifecycle phases, Process Artifacts, Process workflows (Book 2)

Unit III:
Effort estimation & activity Planning: Estimation techniques, Function Point analysis, SLOC, COCOMO, Usecase-based estimation , Activity Identification Approaches, Network planning models, Critical path analysis

Unit IV:
Risk Management: Risk categories, Identification, Assessment, Planning and management, PERT technique, Monte Carlo approach

Unit V:
Project Monitoring & Control , Resource Allocation : Creating a framework for monitoring & control, Progress monitoring, Cost monitoring, Earned value Analysis, Defects Tracking, Issues Tracking, Status reports, Types of Resources, Identifying resource requirements, Resource scheduling

Unit VI:

Software Quality: Planning Quality, Defining Quality - ISO 9016, Quality Measures, Quantitative Quality Management Planning, Product Quality & Process Quality Metrics, Statistical Process Control Capability Maturity Model, Enhancing software Quality (Book3)

Text Books:

1. Software Project Management, Bob Hughes & Mike Cotterell, TATA Mcgraw-Hill
2. Software Project Management, Walker Royce: Pearson Education, 2005.
3. Software Project Management in practice, Pankaj Jalote, Pearson.

Reference Book:

1. Software Project Management, Joel Henry, Pearson Education.

UNIVERSITY COLLEGE OF ENGINEERING KAKINADA
IV Year B. Tech Computer Science & Engineering – I Semester

Information Retrieval Systems

Learning Objectives:

- Students came to know about importance of information system
- Students came to know about representation of information system in various formats like Inverted Files and Signature Files.
- Student will get ability to deal with various types of string matching algorithms for getting substring in a given text
- Student will become good expertise in implementing mathematical algorithms for String searching.

Unit I:
Introduction to Information Storage and Retrieval System: Introduction, Domain Analysis of IR systems and other types of Information Systems, IR System Evaluation. Introduction to Data Structures and Algorithms related to Information Retrieval: Basic Concepts, Data structures, Algorithms

Unit II:
Inverted files: Introduction, Structures used in Inverted Files, Building Inverted file using a sorted array, Modifications to Basic Techniques.

Unit III:
Signature Files: Introduction, Concepts of Signature Files, Compression, Vertical Partitioning, Horizontal Partitioning.

Unit IV:
New Indices for Text: PAT Trees and PAT Arrays: Introduction, PAT Tree structure, algorithms on the PAT Trees, Building PAT trees as PATRICA Trees, PAT representation as arrays.

Unit V:
Stemming Algorithms: Introduction, Types of Stemming Algorithms, Experimental Evaluations of Stemming to Compress Inverted Files

Unit VI:
Thesaurus Construction: Introduction, Features of Thesauri, Thesaurus Construction, Thesaurus construction from Texts, Merging existing Thesauri

TEXT BOOK :
1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.
2. Modern Information Retrival By Yates Pearson Education.
3. Information Storage & Retieval By Robert Korfhage – John Wiley & Sons.

REFERENCES :

1. Kowalski, Gerald, Mark T Maybury: Information Retrieval Systems: Theory and Implementation, Kluwer Academic Press, 1997.
2. Information retrieval Algorithms and Heuristics, 2ed, Springer

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IV Year B. Tech Computer Science & Engineering – I Semester

UML & Design Patterns Lab

(Textbook no.2 i.e. Object-Oriented Analysis & Design with the Unified Process by Satzinger, Jackson & Burd Cengage Learning will be the primary source for finding templates for developing different artifacts / diagrams)

Take three case studies:

- **Customer Support System (in the** Object-Oriented Analysis & Design with the Unified Process by Satzinger, Jackson & Burd Cengage Learning)
- **Point-Of-Sale Terminal (in Larman textbook)**
- **Library Management System (in the reference book no. 2 i.e. UML toolkit)**

Week 1:

Familiarization with Rational Rose or Umbrello

For each case study:

Week 2, 3 & 4:
For each case study:
a) Identify and analyze events
b) Identify Use cases
c) Develop event table
d) Identify & analyze domain classes
e) Represent use cases and a domain class diagram using Rational Rose

Week 5 & 6:
For each case study:
a) Develop Use case diagrams
b) Develop elaborate Use case descriptions & scenarios
c) Develop prototypes (without functionality)
d) Develop system sequence diagrams

Week 7, 8, 9 & 10:
For each case study:
a) Develop high-level sequence diagrams for each use case
b) Develop Detailed Sequence Diagrams / Communication diagrams for each use case showing interactions among all the three-layer objects
c) Develop detailed design class model (use GRASP patterns for responsibility assignment)
d) Develop three-layer package diagrams for each case study

Week 11 & 12:

For each case study:

a) Develop Use case Packages

b) Develop component diagrams

c) Identify relationships between use cases and represent them

Week 13 onwards:

For each case study:

a) Develop sample diagrams for other UML diagrams - state chart diagrams, activity diagrams and deployment diagrams

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Mobile Application Development Lab

1. Write a J2ME program to show how to change the font size and colour.
2. Write a J2ME program which creates the following kind of menu.
    * cut
    * copy
    * past
    * delete
    * select all
    * unselect all
3. Create a J2ME menu which has the following options (Event Handling):
    - cut - can be on/off
    - copy - can be on/off
    - paste - can be on/off
    - delete - can be on/off
    - select all - put all 4 options on
    - unselect all - put all

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 an MIDP application which examine, that a phone number, which a user has entered is in the given format (Input checking):
* Area code should be one of the following: 040, 041, 050, 0400, 044
* There should 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 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.

7. Login to HTTP Server from a J2ME Program. This J2ME sample program shows how to display a simple LOGIN SCREEN on the J2ME phone and how to authenticate to a HTTP server. Many J2ME applications for security reasons require the authentication of the user. This free J2ME sample program, shows how a J2ME application can do authentication to the backend server. Note: Use Apache Tomcat Server as Web Server and MySQL as Database Server.

8. The following should be carried out with respect to the given set of application domains: (Assume that the Server is connected to the well-maintained database of the given domain. Mobile Client is to be connected to the Server and fetch the required data value/information)
• Students Marks Enquiry
• Town/City Movie Enquiry
• Railway/Road/Air (For example PNR) Enquiry/Status
• Sports (say, Cricket) Update

• Town/City Weather Update
• Public Exams (say Intermediate or SSC)/ Entrance (Say EAMCET) Results Enquiry
Divide Student into Batches and suggest them to design database according to their domains and render information according the requests.

9. Write an Android application program that displays Hello World using Terminal.

10. Write an Android application program that displays Hello World using Eclipse.

11. Write an Android application program that accepts a name from the user and displays the hello name to the user in response as output using Eclipse.

12. Write an Android application program that demonstrates the following:
(i) LinearLayout
(ii) RelativeLayout
(iii) TableLayout
(iv) GridView layout

13. Write an Android application program that converts the temperature in Celsius to Fahrenheit.

14. Write an Android application program that demonstrates intent in mobile application development.

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Software Testing Lab

Lab Assignments

Problem Statement 01

Consider an automated banking application. The user can dial the bank from a personal computer, provide a six-digit password, and follow with a series of keyword commands that activate the banking function. The software for the application accepts data in the following form:

Area Code	Blank or three-digit number
Prefix	Three-digit number, not beginning with 0 or 1
Suffix	Four-digit number
Password	Six-character alphanumeric
Commands	"Check status", "Deposit", "Withdrawal"

Design adhoc test cases to test the system

Problem Statement 02

Consider an automated banking application. The user can dial the bank from a personal computer, provide a six-digit password, and follow with a series of keyword commands that activate the banking function. The software for the application accepts data in the following form:

Area Code	Blank or three-digit number
Prefix	Three-digit number, not beginning with 0 or 1
Suffix	Four-digit number
Password	Six-character alphanumeric
Commands	"Check status", "Deposit", "Withdrawal"

Design the test cases to test the system using following Black Box testing technique:
BVA, Worst BVA, Robust BVA, Robust Worst BVA
Equivalence class testing (Input/Output domain)

Problem Statement 03

Consider an application that is required to validate a number according to the following simple rules:

1. A number can start with an optional sign.
2. The optional sign can be followed by any number of digits.
3. The digits can be optionally followed by a decimal point, represented by a period.

4. If there is a decimal point, then there should be two digits after the decimal.
5. Any number-whether or not it has a decimal point, should be terminated a blank.
6. A number can start with an optional sign.
7. The optional sign can be followed by any number of digits.
8. The digits can be optionally followed by a decimal point, represented by a period.
9. If there is a decimal point, then there should be two digits after the decimal.
10. Any number-whether or not it has a decimal point, should be terminated a blank. Generate test cases to test valid and invalid numbers.

(HINT) Use Decision table and cause-effect graph to generate test cases.

Problem Statement 04

Generate test cases using Black box testing technique to Calculate Standard Deduction on Taxable Income. The standard deduction is higher for tax payers who are 65 or older or blind. Use the method given below to calculate tax.

1. The first factor that determines the standard deduction is the filing status. The basic standard deduction for the various filing status are:

Single	$4,750
Married, filing a joint return	$9,500
Married, filing a separate return	$7,000

2. If a married couple is filing separate returns and one spouse is not taking standard Deduction, the other spouse also is not eligible for standard deduction.

3. An additional $1,000 is allowed as standard deduction, if either the filer is 65 yrs or the spouse is 65 yrs or older (the latter case applicable when the filing status is “Married” and filing “joint”).

4. An additional $1,000 is allowed as standard deduction, if either the filer is blind or the spouse is blind (the latter case applicable when the filing status is “married” and filing “joint”).

(HINT):

From the above description, it is clear that the calculation of standard deduction depends on the following 3 factors:

1. Status of filing of the filer
2. Age of the filer
3. Whether the filer is blind or not

In addition, in certain cases, the following additional factors also come into play in calculating the standard deduction.

1. Whether spouse has claimed standard deduction
2. Whether spouse is blind
3. Whether the spouse is more than 65 years old

Problem Statement 05

Consider the following program segment:

```
1. int max (int i, int j, int k)
2. {
3. int max;
4. if (i>j) then
5. if (i>k) then max=i;
6. else max=k;
7. else if (j > k) max=j
8. else max=k
9. return (max);
10. }
```

a) Draw the control flow graph for this program segment
b) Determine the cyclomatic complexity for this program
c) Determine the independent paths

Problem Statement 06

Source code of simple insertion sort implementation using array in ascending order in c programming language

```
#include<stdio.h>
int main(){
int i,j,s,temp,a[20];
Printf ("Enter total elements: "); Scanf ("%d",&s);
printf("Enter %d elements: ",s); for(i=0;i<s;i++) scanf("%d",&a[i]); for(i=1;i<s;i++){
temp=a[i]; j=i-1; while((temp<a[j])&&(j>=0)){ a[j+1]=a[j];
j=j-1;
}
a[j+1]=temp;
}
printf("After sorting: ");
for(i=0;i<s;i++)
printf(" %d",a[i]);
return 0;
}
```

HINT: for loop is represented as while loop

a) Draw the program graph for given program segment b) Determine the DD path graph
c) Determine the independent paths
d) Generate the test cases for each independent path

Problem Statement 07

Consider a system having an FSM for a stack having the following states and transitions:

States

Initial: Before creation
Empty: Number of elements = 0
Holding: Number of elements > 0, but less than the maximum capacity

Full: Number elements = maximum
Final: After destruction
Initial to Empty: Create
Empty to Holding, Empty to Full, Holding to Holding, Holding to Full: Add
Empty to Final, Full to Final, Holding to Final: Destroy
Holding to Empty, Full to Holding, Full to Empty: Delete

Design test cases for this FSM using state table-based testing.

Problem Statement 08
Given the following fragment of code, how many tests are required for 100% decision coverage? Give the test cases**.**

if width > length
then biggest_dimension = width if height > width
then biggest dimension = height end_if
else if biggest dimension = length then if height > length
then biggest_dimension = height end_if
end_if end_if

Hint 04 test cases

Problem Statement 09
Given the following code, how much minimum number of test cases is required for full statement and branch coverage?

read p read q
if p+q> 100
then print "Large" endif
if p > 50
then print "p Large" endif

Hint 1 test for statement coverage, 2 for branch coverage

Problem Statement 10
Consider a program to input two numbers and print them in ascending order given below. Find all du paths and identify those du-paths that are not feasible. Also find all dc paths and generate the test cases for all paths (dc paths and non dc paths).

#include<stdio.h>
#include<conio.h>
1. void main ()
2. {
3 int a, b, t;
4. Clrscr ();
5. Printf (“Enter first number”);
6. scanf (“%d”,&a);

```
7. printf(“Enter second number”);
8. scanf(“%d”,&b);
9. if (a<b){
10. t=a;
11a=b;
12 b=t;
13}
14. printf (“%d %d”, a, b);
15 getch ();
}
```

Problem Statement 11
Consider the above program and generate possible program slices for all variables. Design at least one test case from every slice.

Problem Statement 12
Consider the code to arrange the nos. in ascending order. Generate the test cases for relational coverage, loop coverage and path testing. Check the adequacy of the test cases through mutation testing and also compute the mutation score for each.

```
i = 0;
n=4; //N-Number of nodes present in the graph
While (i<n-1) do j = i + 1;
While (j<n) do
if A[i]<A[j] then swap (A[i], A[j]); end do;
i=i+1;
end do
```

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Hadoop & Big Data Lab

Week 1, 2:

1. (i)Perform setting up and Installing Hadoop in its three operating modes: Standalone, Pseudo distributed, Fully distributed
(ii)Use web based tools to monitor your Hadoop setup.

Week 3:

2. Implement the following file management tasks in Hadoop:
    - Adding files and directories
    - Retrieving files
    - Deleting files

Hint: A typical Hadoop workflow creates data files (such as log files) elsewhere and copies them into HDFS using one of the above command line utilities.

Week 4:

3. Run a basic Word Count MapReduce program to understand MapReduce Paradigm**.**

Week 5:

4. Write a mapreduce program that mines weather data.

Weather sensors collecting data every hour at many locations across the globe gather a large volume of log data, which is a good candidate for analysis with MapReduce, since it is semi structured and record-oriented.

Week 6:

5. Use MapReduce to find the shortest path between two people in a social graph.

Hint: Use an adjacency list to model a graph, and for each node store the distance from the original node, as well as a backpointer to the original node. Use the mappers to propagate the distance to the original node, and the reducer to restore the state of the graph. Iterate until the target node has been reached.

Week 7:

6. Implement Friends-of-friends algorithm in MapReduce.

Hint: Two MapReduce jobs are required to calculate the FoFs for each user in a social network .The first job calculates the common friends for each user, and the second job sorts the common friends by the number of connections to your friends.

Week 8:

7. Implement an iterative PageRank graph algorithm in MapReduce.

Hint: PageRank can be implemented by iterating a MapReduce job until the graph has converged. The mappers are responsible for propagating node PageRank values to their adjacent nodes, and the reducers are responsible for calculating new PageRank values for each node, and for re-creating the original graph with the updated PageRank values.

Week 9:

8. Create a Bloom filter in MapReduce.

Hint: Write a MapReduce job to create and output a Bloom filter using the Hadoop built-in BloomFilter class. The mappers are responsible for creating intermediary Bloom filters, and the single reducer combines them together to output a combined Bloom filter.

Week 10:

9. Perform an efficient semi-join in MapReduce.

Hint: Perform a semi-join by having the mappers load a Bloom filter from the Distributed Cache, and then filter results from the actual MapReduce data source by performing membership queries against the Bloom filter to determine which data source records should be emitted to the reducers.

Week 11:

10. Install and Run Pig then write Pig Latin scripts to sort, group, join, project, and filter your data.

Week 12:

11. Install and Run Hive then use Hive to create, alter, and drop databases, tables, views, functions, and indexes

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Distributed Systems

Learning Objectives:

- present the principles underlying the function of distributed systems
- create an awareness of the fundamental technical challenges in advanced distributed systems design and implementation
- expose students to current technology used to build architectures to enhance distributed computing infrastructures with various computing principles and paradigms
- provide experience in analyzing a distributed computing model and implementing typical algorithms used in distributed systems

UNIT-I:

Characterization of Distributed Systems: Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges.

System Models: Introduction, Architectural Models- Software Layers, System Architecture, Variations, Interface and Objects, Design Requirements for Distributed Architectures, Fundamental Models- Interaction Model, Failure Model, Security Model.

UNIT-II:

Interprocess Communication: Introduction, The API for the Internet Protocols- The Characteristics of Interprocess communication, Sockets, UDP Datagram Communication, TCP Stream Communication; External Data Representation and Marshalling; Client Server Communication; Group Communication- IP Multicast- an implementation of group communication, Reliability and Ordering of Multicast.

UNIT-III:

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects- Object Model, Distributed Object Modal, Design Issues for RMI, Implementation of RMI, Distributed Garbage Collection; Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI

UNIT-IV:

Operating System Support: Introduction, The Operating System Layer, Protection, Processes and Threads –Address Space, Creation of a New Process, Threads.

UNIT-V:

Distributed File Systems: Introduction, File Service Architecture; Peer-to-Peer Systems: Introduction, Napster and its Legacy, Peer-to-Peer Middleware, Routing Overlays.

Coordination and Agreement: Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication.

UNIT-VI:

Transactions & Replications: Introduction, System Model and Group Communication, Concurrency Control in Distributed Transactions, Distributed Dead Locks, Transaction Recovery; Replication-Introduction, Passive (Primary) Replication, Active Replication.

TEXT BOOKS:

1. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems-Concepts and Design", Fourth Edition, Pearson Publication
2. Ajay D Kshemkalyani, Mukesh Sighal, "Distributed Computing, Principles, Algorithms and Systems", Cambridge

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High Performance Computing

Learning Objectives:

- Explain the Parallel computing offers the possibility of overcoming such physical limits by solving problems in parallel
- How to work on Parallel Programming Platforms
- Explains about Principles of Parallel Algorithm Design
- Analytical Modeling of Parallel Programs, Parallel Programming Paradigms and sorting techniques.

UNIT I:
Introduction to Parallel hardware and software, need for high performance systems and Parallel Programming, SISD, SIMD, MISD, MIMD models, Performance issues.

UNIT II:
Processors, PThreads, Thread Creation, Passing arguments to Thread function, Simple matrix multiplication using Pthreads, critical sections, mutexes, semaphores, barriers and conditional variables, locks, thread safety, simple programming assignments.

UNIT III:
OpenMP Programming: introduction, reduction clause, parallel for-loop scheduling, atomic directive, critical sections and locks, private directive, Programming assignments, n body solvers using openMP.

UNIT IV:
Introduction to MPI programming: MPI primitives such as MPI_Send, MPI-Recv, MPI_Init, MPI-Finalize, etc., Application of MPI to Trepizoidal rule, Collective Communication primitives in MPI, MPI derived datatypes, Performance evaluation of MPI programs, Parallel sorting algorithms, Tree search solved using MPI, Programming Assignments.

UNIT V:
Introduction to GPU computing, Graphics pipelines, GPGPU, Data Parallelism and CUDA C Programming, CUDA Threads Organization, Simple Matrix multiplication using CUDA, CUDA memories.

UNIT VI:
Bench Marking and Tools for High Performance Computing Environments, Numerical Linear Algebra Routines BLAS for Parallel Systems evaluation.

Text Books:

1. An Introduction to Parallel Programming, Peter S Pacheco, Elsevier, 2011
2. Programming Massively Parallel Processors, Kirk & Hwu, Elsevier, 2012

Reference Books:

1. CUDA by example: An introduction to General Purpose GPU Programming, Jason, Sanders, Edward Kandrit, Perason, 2011
2. CUDA Programming, Shame Cook, Elsevier
3. High Performance Heterogeneous Computing, Jack Dongarra, Alexey & Lastovetsky , Wiley
4. Parallel computing theory and practice, Michel J.Quinn, TMH

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Machine Learning

Learning Objectives:

- Familiarity with a set of well-known supervised, unsupervised and semi-supervised learning algorithms.
- The ability to implement some basic machine learning algorithms
- Understanding of how machine learning algorithms are evaluated
- The ability to comprehend a Machine Learning conference paper (NIPS, ICML)

UNIT I:
Introduction : Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning. Concept learning and the general to specific ordering – Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm, Remarks on version spaces and candidate elimination, Inductive bias.

UNIT II:
Linear Regression & Logistic Regression:
Predicting numeric values: regression - Finding the best fit lines with linear regression, Locally weighted linear regression, Shrinking Coefficients, The bias / Variance tradeoff.
Logistic Regression: Classification with logistic regression and the sigmoid function, Using optimization to find the best regression coefficients.

UNIT III:
Artificial Neural Networks: Introduction, Neural network representation, Appropriate problems for neural network learning, Perceptions, Multilayer networks and the back propagation algorithm, Remarks on the back propagation algorithm, An illustrative example face recognition, Advanced topics in artificial neural networks

UNIT IV:
Evaluation Hypotheses: Motivation, Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals, Difference in error of two hypotheses, Comparing learning algorithms.

UNIT V:
Support vector machines & Dimensionality Reduction techniques: Separating data with the maximum margin, finding the maximum margin, efficient optimization with SMO algorithm, speeding up optimization with full platt SMO, Using Kernels for more Complex data.

UNIT VI:
Dimensionality Reduction techniques: Principal Component analysis, Example

Instance-Based Learning- Introduction, k -Nearest Neighbor Learning, Locally Weighted Regression, Radial Basis Functions, Case-Based Reasoning, Remarks on Lazy and Eager Learning.

TEXT BOOKS:

1. Machine Learning ,Tom M. Mitchell, MGH
2. Machine Learning in Action, Peter Harington, 2012, Cengage.`

REFERENCE BOOKS:

1. Introduction to Machine Learning, Ethem Alpaydin, PHI, 2004

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Advanced Databases

Learning Objectives:

- understand the logical semantics of SQL queries, how SQL is a implementation of the relational algebra, and how SQL queries may be rewritten and executed in different operational ways whilst preserving their logic semantics.
- understand how to write SQL queries (and design DBMS schemas), and how to make SQL queries that run efficiently, and understand and tune the operation of DBMS systems.
- understand how distributed databases are implemented, and how applications can be designed for those distributed databases, scaling up to Big Data sized databases.
- understand how the relational algebra can be extended to handle new data modelling requirements.

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

UNIT –II:
Data base systems architecture and the system Catalog: System architectures for DBMSs, Catalogs for Relational DBMSs, System catalog information in oracle.
Practical database design and tuning: Physical Database Design in Relational Databases-an overview of Database Tuning in Relational systems.

UNIT – III:
Distributed DBMS Concepts and Design: Introduction-function and architecture of a Distributed DBMS-Distributed Relational Database Design-transparencies in a Distributed DBMS-Date's Twelve Rules for Distributed DBMS.
Distributed DBMS-Advanced Concepts: Distributed Transaction Management-Distributed Concurrency Control-Distributed Deadlock Management-Distributed Database Recovery-The X/Open Distributed Transaction processing model-Replication Servers.

UNIT – IV:
Introduction to Object DBMSs: Advanced Database Applications-Weaknesses of RDBMSs-Object oriented Concepts-Storing objects in a Relational Database-Next generation Database systems.
Object-Oriented DBMSs-Concepts and Design : Introduction to Object-Oriented Data Models and DBMSs-OODBMS perspectives-Persistence-Issues in OODBMSs-The object Oriented Database System Manifesto-Advantages and Disadvantages of OODBMSs-Object oriented Database Design.

UNIT V:

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

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

UNIT – VI :

Emerging database technologies and applications: Hadoop, BIg Data characteristics, NO SQL databases, BASE, Brewer's theorem, Relationship between CAP, ACID and No SQL databases, comparison with Relational databases, No SQL databases types, Comparative study of NoSQL products, Case studies using MangoDB and Cassandra

TEXT BOOK:

1. "Fundamentals of Database Systems", ElmasriNavate, 5/e, Pearson Education.
2. Principles of distributed databases S Ceri and Palgettgi TMH
3. Getting started with No SQL Databases , Gaurav Vaish

REFERENCES BOOKS:

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

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Advanced Operating Systems

Learning Objectives:

- learn concepts of OS
- gain enough understanding of distributed operating systems
- estimate the impact of different design choices, system features on distributed system principles underlying the functioning of distributed systems

UNIT–I:
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, remote procedure call and group communication.

UNIT–II:
Synchronization in Distributed systems: Clock synchronization, Mutual exclusion, E-tech algorithms, the Bully algorithm, a ring algorithm, atomic transactions,

UNIT-III:
Deadlocks: deadlock in distributed systems, Distributed deadlock prevention, and distributed dead lock detection.

UNIT–IV:
Processes: *Processes and Processors in distributed systems: Threads, system models, Processor allocation, Scheduling in distributed system, Fault tolerance and real time distributed systems.*

UNIT-V:
Distributed file systems: *Distributed file systems design, distributed file system implementation, trends in distributed file systems***.**
Distributed shared memory : What is shared memory, consistency models, page based distributed shared memory, shared variable distributed shared memory, object based DSM.

UNIT-VI:
Case study MACH : Introduction to MACH, process management in MACH, memory management in MACH, communication in MACH, UNIX emulation in MACH. Case study DCE : Introduction to DCE threads, RPC's, Time service, Directory service, security service, Distributed file system.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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Pattern Recognition

Learning Objectives:

- apply unsupervised and supervised learning techniques for pattern Recognition
- clear sound knowledge about representation of digital image in memory and various operations to get a clear enhanced image
- become expertise in applying mathematical concepts and techniques

UNIT-I:
Introduction: Machine perception, pattern recognition example, pattern recognition systems, the Design cycle, learning and adaptation
Bayesian Decision Theory: Introduction, continuous features – two categories classifications, minimum error-rate classification-zero–one loss function, classifiers, discriminant functions, and decision surfaces

UNIT-II:
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-III :
Maximum likelihood and Bayesian parameter estimation: Introduction, maximum likelihood Estimation, Bayesian estimation, Bayesian parameter estimation–Gaussian case

UNIT-IV :
Un-supervised learning and clustering: Introduction, mixture densities and identifiability, maximum likelihood estimates, application to normal mixtures, K-means clustering. Date description and clustering – similarity measures, criteria function for clustering

UNIT-V :
Pattern recognition using discrete hidden Markov models: Discrete-time Markov process, Extensions to hidden Markov models, three basic problems of HMMs, types of HMMs

UNIT-VI :
Continuous hidden Markov models :
Continuous observation densities, multiple mixtures per state, speech recognition applications.

Text Books:
1. Pattern classifications, Richard O. Duda, Peter E. Hart, David G. Stroke. Wiley student edition, Second Edition.
2. Pattern Recognition, An Introduction, V Susheela Devi, M Narsimha Murthy, Universiy Press

Reference Books:

1. R.C Gonzalez and R.E. Woods, “Digital Image Processing”, Addison Wesley, 1992.
2.Pattern Recognition and Image Analysis – Earl Gose, Richard John baugh, Steve Jost PHI 2004
3. Fundamentals of speech Recognition, Lawerence Rabiner, Biing – Hwang Juang Pearson education.
4. Pattern Recognition, Sergios Theodoridis, Konstantinos Koutroumbas, Academic Press, Elsevier, 4ed,

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Mobile Adhoc & Sensor Networks

Learning Objectives:

- understanding of the principles of mobile ad hoc networks (MANETs) and what distinguishes them from infrastructure-based networks.
- Understand how proactive routing protocols function and their implications on data transmission delay and bandwidth consumption.
- to design and implement a basic mobile ad hoc or wireless sensor network via simulations or programming of PDAs.

UNIT I :
Introduction to Ad Hoc Networks: Characteristics of MANETs, applications of MANETs, and challenges of MANETs.
Routing in MANETs: Criteria for classification, Taxonomy of MANET routing algorithms, Topology based routing algorithms, Position based routing algorithms,

UNIT II:
Data Transmission: Broadcast storm problem, Broadcasting, Multicasting and Geocasting

UNIT III:
TCP over Ad Hoc: TCP protocol overview, TCP and MANETs, and Solutions for TCP over Ad hoc

UNIT IV:
Basics of Wireless Sensors and Applications: Applications, Classification of sensor networks, Architecture of sensor networks, Physical layer, MAC layer, Link layer

UNIT V :
Data Retrieval in Sensor Networks: Routing layer, Transport layer, High-level application layer support, Adapting to the inherent dynamic nature of WSNs, and Sensor Networks and mobile robots.

UNIT VI :
Security: Security in ad hoc networks, Key management, Secure routing, Cooperation in MANETs, and Intrusion detection systems.
Sensor Network Platforms and Tools: Sensor Network Hardware, Berkeley motes, Sensor Network Programming Challenges, Node-Level Software Platforms, TinyOS, NS-2 and TOSSIM.

Textbook:

1. *Ad hoc and Sensor Networks* - Theory and Applications, by Carlos Cordeiro and Dharma P. Agrawal, World Scientific Publications, March 2006, ISBN 981-256-681-3.
2. Wireless Sensor Networks: An Information Processing Approach, Feng Zhao, Leonidas Guibas, Elsevier Science ISBN: 978-1-55860-914-3,
(Morgan Kauffman)

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Embedded and Real Time Systems

Learning Objectives:

- to understand and to apply design methodologies for embedded systems
- to appreciate the considerations of embedded systems design – specification; technological choice; the development process; technical, economic, environmental and manufacturing constraints; reliability, security and safety issues, power and performance analysis
- to appreciate the fundamental building blocks of such systems (sensors, actuators, convertors, processors, intra- and inter-communication networks and interfaces, hardware and software co-design and related implementation and testing environments and techniques) and their inter-relationships
- to be familiar with modern hardware/software tools for building prototypes of embedded systems
- to demonstrate practical competence in these areas.

Unit-I:
Introduction to Embedded systems: What is an embedded system Vs. General computing system, history, classification, major application areas, and purpose of embedded systems. Core of embedded system, memory, sensors and actuators, communication interface, embedded firmware, other system components, PCB and passive components.

UNIT-II:
8—bit microcontrollers architecture: Characteristics, quality attributes application specific, domain specific, embedded systems. Factors to be considered in selecting a controller, 8051 architecture, memory organization, registers, oscillator unit, ports, source current, sinking current, design examples.

UNIT-III:
RTOS and Scheduling, Operating basics, types, RTOS, tasks, process and threads, multiprocessing and multitasking, types of multitasking, non preemptive, preemptive scheduling.

UNIT-IV:
Task communication of RTOS, Shared memory, pipes, memory mapped objects, message passing, message queue, mailbox, signaling, RPC and sockets, task communication/synchronization issues, racing, deadlock, live lock, the dining philosopher's problem.

UNIT-V:
The producer-consumer problem, Reader writers problem, Priority Inversion, Priority ceiling, Task Synchronization techniques, busy waiting, sleep and wakery, semaphore, mutex, critical

section objects, events, device, device drivers, how to clause an RTOS, Integration and testing of embedded hardware and fire ware.

UNIT-VI:
Simulators, emulators, Debuggers, Embedded Product Development life cycle (EDLC), Trends in embedded Industry, Introduction to ARM family of processor.

TEXT BOOK:
1. Introduction to embedded systems Shibu. K.V, TMH, 2009.

REFERENCE BOOKS:
1. Ayala & Gadre: The 8051 Microcontroller & Embedded Systems using Assembly and C, CENGAGE
2. Embedded Systems, Rajkamal, TMH, 2009.
3. Embedded Software Primer, David Simon, Pearson.
4. The 8051 Microcontroller and Embedded Systems, Mazidi, Mazidi, Pearson,.

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Neural Networks & Soft Computing

Learning Objectives:

- Identify and describe soft computing techniques and their roles in building intelligent machines
- Recognize the feasibility of applying a soft computing methodology for a particular problem
- Apply fuzzy logic and reasoning to handle uncertainty and solve engineering problems
- Apply genetic algorithms to combinatorial optimization problems
- Apply neural networks to pattern classification problems

UNIT I:
INTRODUCTION: what is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural

UNIT II:
LEARNING PROCESS: Error Correction learning, Memory based learning, Hebbian learning, Competitive, Boltzmann learning, Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process.

UNIT III:
CLASSICAL & FUZZY SETS: Introduction to classical sets – properties, operations and relations; Fuzzy sets – memberships, uncertainty, operations, properties, fuzzy relations, cardinalities, membership functions.

UNIT IV:
FUZZY LOGIC SYSTEM COMPONENTS: Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods

UNIT V:
CONCEPT LEARNING: Introduction, A concept learning task, Concept learning as search, Find-S: finding a maximally specific hypothesis, Version spaces and the candidate elimination algorithm
DECISION TREE LEARNING: Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning

UNIT VI:

GENETIC ALGORITHMS: Motivation, Genetic Algorithms, an Illustrative Example, Hypothesis Space Search, Genetic Programming, Models of Evolution and Learning, Parallelizing Genetic Algorithms

TEXT BOOKS:

1. Neural networks A comprehensive foundations, Simon Hhaykin, Pearson Education 2nd edition 2004
2. Neural Networks, Fuzzy Logic, Genetic Algorithms: Sysnthesis and Applications by Rajasekharan and Pai, PHI Publications
3. Machine Learning, Tom M. Mitchell, MGH

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Social Networks and the Semantic Web

Learning Objectives:

- Understand the concept structure of the semantic web technology and how this technology revolutionizes the World Wide Web and its uses.
- Understand the concepts of metadata, semantics of knowledge and resource, ontology, and their descriptions in XML-based syntax and web ontology language (OWL).
- Describe logic semantics and inference with OWL, use ontology engineering approaches in semantic applications, program semantic applications with Java API.

Syllabus:

UNIT-I: The Semantic web: Limitations of the current Web, The semantic solution, Development of the Semantic Web, The emergence of the social web.

UNIT-II: Social Network Analysis: What is network analysis?, Development of Social Network Analysis, Key concepts and measures in network analysis.
Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities, Web-based networks.

UNIT-III: Knowledge Representation on the Semantic Web: Ontologies and their role in the Semantic Web, Ontology languages for the semantic Web.

UNIT-IV: Modeling and Aggregating Social Network Data: State of the art in network data representation, Ontologicl representation of Social individuals, Ontological representation of social relationships, Aggregating and reasoning with social network data.

UNIT-V: Developing social semantic applications: Building Semantic Web applications with social network features, Flink- the social networks of the Semantic Web community, Open academia: distributed, semantic-based publication management.

UNIT-VI: Evaluation of Web-Based Social Network Extraction: Differences between survey methods and electronic data extraction, context of the empirical study, Data collection, Preparing the data, Optimizing goodness of fit, Comparison across methods and networks, Predicting the goodness of fit, Evaluation through analysis.

Text Book:

1. Social Networks and the Semantic Web ,Peter Mika,Springer,2007.
2. Semantic Web Technologies ,Trends and Research in OntologyBased Systems, J.Davies,Rudi Studer,Paul Warren,JohnWiley&Sons.

Reference Books:

1. Semantic Web and Semantic Web Services -Liyang Lu Chapman and Hall/CRC Publishers,(Taylor & Francis Group)
2. Information Sharing on the semantic Web - Heiner Stuckenschmidt; Frank Van Harmelen, Springer Publications

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Cloud Computing

Learning Objectives:

- How cloud is collaborated with the real world
- Implementing of cloud computing techniques
- Make familiar with different types of cloud, its services and privacy provided in cloud.

UNIT I:
Systems modeling, Clustering and virtualization: Scalable Computing over the Internet, Technologies for Network based systems, System models for Distributed and Cloud Computing, Software environments for distributed systems and clouds, Performance, Security And Energy Efficiency

UNIT II:
Virtual Machines and Virtualization of Clusters and Data Centers: Implementation Levels of Virtualization, Virtualization Structures/ Tools and mechanisms, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data Center Automation.

UNIT III:
Cloud Platform Architecture: Cloud Computing and service Models, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, Inter Cloud Resource Management, Cloud Security and Trust Management. Service Oriented Architecture, Message Oriented Middleware.

UNIT IV:
Cloud Programming and Software Environments: Features of Cloud and Grid Platforms, Parallel & Distributed Programming Paradigms, Programming Support of Google App Engine, Programming on Amazon AWS and Microsoft Azure, Emerging Cloud Software Environments.

UNIT V:
Cloud Resource Management and Scheduling: Policies and Mechanisms for Resource Management Applications of Control Theory to Task Scheduling on a Cloud, Stability of a Two Level Resource Allocation Architecture, Feedback Control Based on Dynamic Thresholds. Coordination of Specialized Autonomic Performance Managers, Resource Bundling, Scheduling Algorithms for Computing Clouds, Fair Queuing, Start Time Fair Queuing, Borrowed Virtual Time, Cloud Scheduling Subject to Deadlines, Scheduling MapReduce Applications Subject to Deadlines.

UNIT VI:
Storage Systems: Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system., Apache Hadoop, BigTable, Megastore, Amazon Simple Storage Service(S3)

TEXT BOOKS:

1. Distributed and Cloud Computing, Kai Hwang, Geoffry C. Fox, Jack J. Dongarra MK Elsevier.
2. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier.
3. Cloud Computing, A Hands on approach, Arshadeep Bahga, Vijay Madisetti, University Press

REFERNCE BOOK:

1. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH
2. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammarai selvi, TMH

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MANAGEMENT SCIENCE

UNIT – I:
(*The Learning objective of this Unit is to understand the concept and nature of Management, Evolution of Management theories, Motivation and leadership Styles).
Introduction to Management: Concept – Nature and Importance of Management, Functions-Evaluation of Management, Motivation Theories – Leadership Styles – Decision Making Process-designing Organization Structure – Principles and types of Organization.
(**The learner is able to understand the concept and functions of Management, and Theeories of Motivation, Styles of Leardership)
UNIT – II:
(The Learning objective of this Unit is to Equip with the concepts of Operations, project management and inventory control).
Operations and Project Management: Work-Study-Statistical Quality Control through Control Charts-Inventory Control-EOQ & ABC Analysis (Simple Problems) Project Management-PERT/CPM-Project Crashing (Simple Problem).
(**The learner is able to understand the main idea of Inspection and scrutinize the different methods of inspection, the concept of Inventory Management and Control and Inventory Pricing).
UNIT – III:
(* The Objective of this unit is to understand the main functional areas of organization i.e., Financial Management, Production Management, Marketing Management, Human Resource Management, and Product Life Cycles and Channels of Distribution).
Functional Management: Concept and Functions of Finance, HR, Production, Marketing Management and Services – Job Evolution and Merit Rating – Product Life Cycles – Channels of Distribution – Types/Methods of Production.
(**At the end of this chapter the learner is able to understand the different functional areas in an organization and their responsibilities – Product Life Cycle and Channels of Distribution.).
UNIT – IV:
(*The objective of this unit is to equip with the concept and practical issues relating to Strategic Management)
Strategic Management: Vision, Mission, Goals, Strategy – Corporate Planning Process – Environmental Scanning – SWOT analysis – Different Steps in Strategy Formulation, Implementation and Evaluation.
(**The learner is able to familiar with the meaning of Vision, Mission, Goals and Strategies of the Organization and to implement successfully).
UNIT – V:
(*The objective of this unit is to understand the need and importance of Business Ethics and Communication Skills in Contemporary situations).
Business Ethics & Communications: Ethics in Business and Management – Ethics in HRM, Finance & Marketing Management – Business Ethics & Law
(** The Learner is able to know the practical Issues of Business Ethics in various functional areas, to improve Report Writing skills and Understand the Communication Process)
UNIT – VI:
(*The Learning objective of this unit is to equip with the contemporary management practices, i.e., MIS, MRP, JIT and ERP etc,)

Contemporary Management Practices: Basic concepts of MIS, MRP, Just-In-Time (JIT) System, Total Quality Management (TQM), Six Sigma and Capability Maturity Models (CMM) Levies, Supply Chain Management, Enterprise Resource Planning (ERP), Performance Management, Business Process Outsourcing (BPO), Business Process Re-Engineering and Bench Marking, Balance Score Card.
(**The Learner is able to understand the various contemporary issues in Management Practices like TQM and BPO etc,)
Note: *Learning Objective
** Learning Assessment

TEXT BOOKS

1. Kumar/Rao/Chhalill 'Introduction to Management Science' Cengage, Delhi, 2012.
2. Dr. A. R. Aryasri, Management Science' TMH 2011.

REFERENCES

1. Koontz & Weihrich: 'Essentials of Management' TMH 2011
2. Seth & Rastogi: Global Management Systems, Cengage Learning, Delhi, 2011
3. Robbins: Organizational Behaviors, Pearson Publications, 2011
4. Kanishka Bedi: Production & Operational Management, Oxford Publications, 2011
5. Manjunath: Management Science, Pearson Publications, 2013
6. Biswajit Patnaik: Human Resource Management, PHI, 2011
7. Hitt and Vijaya Kumar: Strategic Management, Cengage Learning
8. Dr. PG. Ramanujam, BVR Naidu, PV Rama Sastry: Management Science Himalaya Publishing House, 2013
9. Management Shapers, Universities Press