

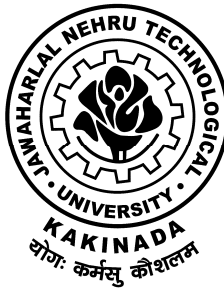
**ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS**

**MECHANICAL
ENGINEERING**

For

B.Tech., FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2013-14)



**JAWAHARLAL NEHRU TECHNOLOGICAL
UNIVERSITY KAKINADA**
KAKINADA – 533003, 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. 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.
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. Courses :

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 subject 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) 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 90 minutes duration conducted for 15 marks. Each subjective type test question paper shall contain **3 questions** and all questions need to be answered. The Objective examination conducted for 10 marks and subjective examination conducted for 15 marks are to be added to the assignment marks of 5 for finalizing internal marks for 30. The best 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.
- (iv) 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.
- (v) For practical subjects there shall be continuous evaluation during the semester for 25 internal marks and 50 end examination marks. The internal 25 marks shall be awarded as follows: day to day work - 10 marks, Record-5 marks and the remaining 10 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted by the teacher concerned and external examiner.
- (vi) 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.

- (vii) 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.
- (viii) 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.
- (ix) 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 a 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

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.
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
3. Shortage of Attendance below 65% in aggregate shall not be condoned.
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.
5. Students whose shortage of attendance is not condoned in any semester are not eligible to write their end semester examination of that class.

6. A stipulated fee shall be payable towards condonation of shortage of attendance.
7. A student will be promoted to the next semester if he satisfies the (i) attendance requirement of the present semester and (ii) credits.
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** if he fulfills 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 all the 180 credits shall be considered for the calculation of percentage of marks.**

6. Course pattern

1. The entire course of study is for four academic years, all the years are on semester pattern.
2. A student 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.

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 continue 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	From the aggregate marks secured from 180 Credits.
First Class with Distinction	70% and above	
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. His degree will be withheld in such cases.

12. **TRANSITORY REGULATIONS**

1. Discontinued or detained candidates are eligible for readmission as and when next offered.
2. 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**

1. Wherever the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.
2. The academic regulation should be read as a whole for the purpose of any interpretation.
3. In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.
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.
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. from the Academic Year 2014-15 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 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 attendance regulations of B. Tech. (Regular) shall be applicable to B.Tech.

3. **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 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.

4. **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	From the aggregate marks secured from 132 Credits from II year to IV year.
First Class with Distinction	70% and above	
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.

5. 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
	<i>If the candidate:</i>	
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	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

	<p>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.</p>	<p>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.</p>
7.	<p>Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.</p>	<p>Expulsion from the examination hall and cancellation of 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.</p>
8.	<p>Possess any lethal weapon or firearm in the examination hall.</p>	<p>Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.</p>

9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	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.

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**JAWAHARLAL NEHRU TECHNOLOGICAL
UNIVERSITY: KAKINADA**
KAKINADA-533003, 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 & 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-533003, Andhra Pradesh (India)
For Constituent Colleges and Affiliated Colleges of JNTUK

Ragging

ABSOLUTELY NOT 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	T	P	Credits
1	English – I	3+1	--	3
2	Mathematics - I	3+1	--	3
3	Engineering Chemistry	3+1	--	3
4	Engineering Mechanics	3+1	--	3
5	Computer Programming	3+1	--	3
6	Environmental Studies	3+1	--	3
7	Engineering Chemistry Laboratory	--	3	2
8	English - Communication Skills Lab - I	--	3	2
9	C Programming Lab	--	3	2
Total Credits				24

I Year – II SEMESTER

S. No.	Subject	T	P	Credits
1	English – II	3+1	--	3
2	Mathematics – II (Mathematical Methods)	3+1	--	3
3	Mathematics – III	3+1	--	3
4	Engineering Physics	3+1	--	3
5	Professional Ethics and Human Values	3+1	--	3
6	Engineering Drawing	3+1	--	3
7	English - Communication Skills Lab - II	--	3	2
8	Engineering Physics Lab	--	3	2
9	Engineering Physics – Virtual Labs - Assignments	--	2	--
10	Engg. Workshop & IT Workshop	--	3	2
Total Credits				24

II Year – I SEMESTER

S. No.	Subject	T	P	Credits
1	Metallurgy & Materials Science	3+1*	--	3
2	Mechanics of Solids	3+1*	--	3

3	Thermodynamics	3+1*	--	3
4	Managerial Economics & Financial Analysis	3+1*	--	3
5	Basic Electrical & Electronics Engineering	3+1*	--	3
6	Computer aided Engineering Drawing Practice	3+1*	--	3
7	Basic Electrical & Electronics Engg. Lab	--	3	2
8	Mechanics of Solids & Metallurgy lab	--	3	2
Total Credits				22

II Year – II SEMESTER

S. No.	Subject	T	P	Credits
1	Kinematics of Machinery	3+1*	--	3
2	Thermal Engineering -I	3+1*	--	3
3	Production Technology	3+1*	--	3
4	Fluid Mechanics & Hydraulic machinery	3+1*	--	3
5	Machine Drawing	3+1*	--	3
6	Fluid mechanics & Hydraulic machinery Lab	--	3	2
7	Production Technology Lab	--	3	2
8	Thermal Engineering Lab	--	3	2
Total Credits				21

III Year – I SEMESTER

S. No.	Subject	T	P	Credits
1	Dynamics of Machinery	3+1*		3
2	Metal Cutting & Machine Tools	3+1*		3
3	Design of Machine Members–I	3+1*		3
4	Instrumentation & Control Systems	3+1*		3
5	Thermal Engineering -II	3+1*		3
6	Metrology	3+1*		3
7	Metrology & Instrumentation Lab		3	2
8	Machine Tools Lab		3	2
9	IPR & Patents		3	2
Total Credits				24

III Year – II SEMESTER

S. No.	Subject	T	P	Credits
1	Operations Research	3+1*		3
2	Interactive Computer Graphics	3+1*		3
3	Design of Machine Members– II	3+1*		3
4	Robotics	3+1*		3
5	Heat Transfer	3+1*		3
6	Industrial Engineering Management	3+1*		3
7	Departmental Elective – I	3+1*		3
8	Heat Transfer Lab		3	2
Total Credits				23

IV Year – I SEMESTER

S. No.	Subject	T	P	Credits
1	Automobile Engineering	3+1*		3
2	CAD/CAM	3+1*		3
3	Finite Element Methods	3+1*		3
4	Unconventional Machining Processes	3+1*		3
5	Open Elective	3+1*		3
6	Departmental Elective – II	3+1*		3
7	Simulation Lab		3	2
8	Design/Fabrication Project		2	1
Total Credits				21

IV Year – II SEMESTER

S. No.	Subject	T	P	Credits
1	Production Planning and Control	3+1*		3
2	Green Engineering Systems	3+1*		3
3	Departmental Elective – III	3+1*		3
4	Departmental Elective – IV	3+1*		3
5	Project Work			9
Total Credits				21

OPEN ELECTIVE:

- MEMS
- Nanotechnology

Departmental Elective -I:

1. Refrigeration & Air-conditioning
2. Computational Fluid Dynamics
3. Condition Monitoring
4. Rapid Prototyping

Departmental Elective -II:

1. Material Characterization Techniques
2. Design for Manufacture
3. Automation in Manufacturing
4. Industrial Hydraulics & Pneumatics

Departmental Elective -III:

1. Experimental Stress Analysis
2. Mechatronics
3. Advanced Materials
4. Power Plant Engineering

Departmental Elective -IV:

1. Non Destructive Evaluation
2. Advanced Optimization Techniques
3. Gas Dynamics & Jet Propulsion
4. Quality and Reliability Engineering

SYLLABUS**I Year – 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

I Year – I SEMESTER

T	P	C
3+1	0	3

MATHEMATICS – I (DIFFERENTIAL EQUATIONS)
(Common to All Branches)

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.

Subject Category

ABET Learning Objectives a d e

ABET internal assessments 1 2 6

JNTUK External Evaluation A B E

UNIT II: Linear differential equations of higher order:

Non-homogeneous 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

Subject Category

ABET Learning Objectives a d e

ABET internal assessments 1 2 6

JNTUK External Evaluation A B E

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 (with out proof).

Application: Solutions of ordinary differential equations using Laplace transforms.

Subject Category

ABET Learning Objectives a e

ABET internal assessments 1 2 6

JNTUK External Evaluation A B E

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 with constraints and without constraints.

Subject Category

ABET Learning Objectives a c e

ABET internal assessments 1 2 6

JNTUK External Evaluation A B E

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 (Lagrange) equation and nonlinear (standard type) equations

Subject Category

ABET Learning Objectives a e

ABET internal assessments 1 2 6

JNTUK External Evaluation A B E

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.

Subject Category

ABET Learning Objectives a e

ABET internal assessments 1 2 6

JNTUK External Evaluation B E

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.

Subject Category	ABET Learning Objectives	ABET Internal Assessments	JNTUK External Evaluation	Remarks
Theory Design Analysis Algorithms Drawings 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) 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. Troubleshooting type of questions F. Applications related questions G. Brainstorming questions	

I Year – I SEMESTER**T P C**
3+1 0 3**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, 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

Nanomaterials (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, Mc Graw-Hill companies.

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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.

I Year – I SEMESTER

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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, Spatial Systems for concurrent forces. Lami's Theorem, 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, Ferdinand. L. Singer, Harper – Collins.
9. Engineering Mechanics statics and dynamics, A Nelson, Mc Graw Hill publications.
10. Engineering Mechanics, Tayal. Umesh Publ.

I Year – I SEMESTER

T P C
3+1 0 3

COMPUTER PROGRAMMING

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, Arithmetic , 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: Understanding 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

FILE HANDLING: Input and output- concept of a file, text files 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, Anith Seth, Cengage Learning.

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

I Year – I SEMESTER**T P C**
3+1 0 3**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-spots 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.

I Year – I SEMESTER**T P C**
0 3 2**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 HCl using standard Na_2CO_3 solutions
3. Estimation of KMnO_4 using standard Oxalic acid solution.
4. Estimation of Ferric iron using standard $\text{K}_2\text{Cr}_2\text{O}_7$ solution.
5. Estimation of Copper using standard $\text{K}_2\text{Cr}_2\text{O}_7$ 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. Estimation of Zinc using standard potassium ferrocyanide solution
15. Estimation of Vitamin – C

TEXT BOOKS

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.

I Year – I SEMESTER

T P C
0 3 2

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).

I Year – I SEMESTER**T P C**
0 3 2**C PROGRAMMING LAB****Exercise 1**

- Write a C Program to calculate the area of triangle using the formula $\text{area} = (s(s-a)(s-b)(s-c))^{1/2}$ where $s = (a+b+c)/2$
- Write a C program to find the largest of three numbers using ternary operator.
- Write a C Program to swap two numbers without using a temporary variable.

Exercise 2

- 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.
- Write a C program to find the roots of a quadratic equation.
- 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

- Write a C program to find the sum of individual digits of a positive integer and find the reverse of the given number.
- 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
- 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

- 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.
- Write a C Program to enter a decimal number, and calculate and display the binary equivalent of that number.
- 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 t he 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 cncpts.

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.