ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS

MINING MACHINERY

For

B.TECH. FOUR YEAR DEGREE COURSE

(Aplicable for the batches admitted from 2010-2011)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
KUKATPALLY, HYDERABAD – 500 085.

Academic Regulations 2009 for B. Tech (Regular)

(Effective for the students admitted into I year Mining Machinery from the Academic Year 2009-2010 onwards)

1. **Award of B.Tech. Degree**

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

   i. **Pursued a course of study for not less than four academic years and not more than eight academic years.**

   ii. **Register for 200 credits and secure 200 credits**

2. Students, who fail to fulfil all the academic requirements for the award of the degree within eight academic years from the year of their admission, shall forfeit their seat in B.Tech course.

3. **Courses of study**

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

Branch Code	Branch
I.	Aeronautical Engineering.
II.	Automobile Engineering.
III.	Bio-Medical Engineering.
IV.	Biotechnology.
V.	Chemical Engineering.
VI.	Civil Engineering.
VII.	Computer Science and Engineering.
VIII.	Electrical and Electronics Engineering.
IX.	Electronics and Communication Engineering.
X.	Electronics and Computer Engineering.
XI.	Electronics and Instrumentation Engineering.
XII.	Electronics and Telematics Engineering.
XIII.	Information Technology.
XIV.	Instrumentation and Control Engineering.
XV.	Mechanical Engineering (Mechatronics).

XVI. Mechanical Engineering (Production).

XVII. Mechanical Engineering.

XVIII. Metallurgy and Material Technology.

XIX. Mining Engineering

XX. Mining Machinery

and any other course as approved by the authorities of the University from time to time.

4. Credits

	I Year		Semester	
	Periods / Week	Credits	Periods / Week	Credits
Theory	03	06	03	03
	02	04	—	—
Practical	03	04	03	02
Drawing (Eng. Drawing/ Machine Drawing & Computer aided graphics	02T/03D	04	03 06 05	02 04 03
Mini Project	—	—	—	02
Comprehensive Viva Voce	—	—	—	02
Seminar	—	—	6	02
Project	—	—	15	10

5. Distribution and Weightage of Marks

i. The performance of a student in each semester / I year shall be evaluated subject–wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition, Industry oriented mini-project, seminar and project work shall be evaluated for 50, 50 and 200 marks respectively.

ii. For theory subjects the distribution shall be 25 marks for Internal Evaluation and 75 marks for the End-Examination.

iii. For theory subjects, during the semester there shall be 2 mid term examinations. Each mid term examination consists of one objective

paper, one subjective paper and one assignment. The objective paper is for 10 marks and subjective paper is for 10 marks, with a duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for subjective paper). Objective paper is set for 20 bits of – multiple choice questions, fill-in the blanks, matching type questions – for the 10 marks.

Subjective paper of each semester shall contain 4 full questions (one from each unit) of which, the student has to answer 2 questions, each carrying 5 marks.

First mid term examination shall be conducted for 1-4 units of syllabus and second mid term examination shall be conducted for 5-8 units. 5 marks are allocated for Assignments (as specified by the concerned subject teacher) – first Assignment should be submitted before the conduct of the first mid, and the second Assignment should be submitted before the conduct of the second mid. The total marks secured by the student in each mid term examination are evaluated for 25 marks, and the better of the two mid term examinations shall be taken as the final marks secured by each candidate.

However, for first year, there shall be 3 mid term examinations (each for 25 marks), along with 3 assignments in a similar pattern as above [1st mid shall be from 1-2 units, 2nd mid from 3-5 units and 3rd mid shall be from 6-8 units], and the average marks of the best two examinations secured (each evaluated for a total of 25 marks) in each subject shall be considered as final marks for the internals / sessionals.

iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Out of the 25 marks for internal, day-to-day work in the laboratory shall be evaluated for 15 marks and internal examination for practical shall be evaluated for 10 marks conducted by the concerned laboratory teacher. The end examination shall be conducted with external examiner and laboratory teacher. The external examiner shall be appointed from the cluster of colleges as decided by the University examination branch.

v. For the subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and 10 marks for internal tests) and 75 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. However in the I year class, there shall be three tests and the average of best two will be taken into consideration.

vi. There shall two training program schedules (Industrial Training) of 30 days each, one in the summer period between II & III years and the other in the summer period between III & IV years. The first training programme shall be evaluated in III year I Semester for 25 marks, and the second training programme shall be evaluated in IV year I Semester for 25 marks, based on the two individual training reports submitted by each student. The total shall be evaluated for 50 marks with a weightage of 2 credits and the same shall be posted in the IV year II Semester marks sheet of the student. The Training Report Evaluation Committee consists of an external examiner, head of the department, the supervisor of Training Programme and a senior faculty member of the department. There shall be no internal marks for industry training.

vii. There shall be a seminar presentation in IV year II Semester. 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.

vii. There shall be a Comprehensive Viva-Voce in IV year II semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of (i) Head of the Department (ii) two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he / she studied during the B.Tech course of study. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There are no internal marks for the Comprehensive viva-voce.

ix. Out of a total of 200 marks for the project work, 50 marks shall be for Internal Evaluation and 150 marks for the End Semester Examination. The End Semester Examination (viva-voce) shall be conducted by the same committee appointed for industry oriented mini project. In addition the project supervisor shall also be included in the committee. The topics for industry oriented mini project, seminar and project work shall be different from each other. 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.

x. Laboratory marks and the sessional marks awarded by the College are not final. They are subject to scrutiny and scaling by the University wherever necessary. In such cases, the sessional and laboratory marks awarded by the College will be referred to a Committee. The Committee will 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 institutions as per the University norms and shall be produced to the Committees of the University as and when the same is asked for.

6. Attendance Requirements:

i. A student shall be eligible to appear for University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.

ii. **Shortage of Attendance below 65% in aggregate shall in <u>NO</u> case be condoned.**

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

iv. A student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester / I year, as applicable. They may seek re-admission for that semester / I year when offered next.

v. Students whose shortage of attendance is not condoned in any semester / I year are not eligible to take their end examination of that class and their registration shall stand cancelled.

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

7. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item no.**6**

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together.

ii. A student shall be promoted from II to III year only if he fulfils the academic requirement **of 37** credits from one regular and one supplementary examinations of I year, and one regular examination of II year I semester irrespective of whether the candidate takes the examination or not.

iii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of total **62** credits from the following examinations, whether the candidate takes the examinations or not.

a. Two regular and two supplementary examinations of I year.

b. Two regular and one supplementary examinations of II year I semester.

c. One regular and one supplementary examinations of II year II semester.

d. One regular examination of III year I semester.

iv. A student shall register and put up minimum attendance in all 200 credits and earn the 200 credits. Marks obtained in all 200 credits shall be considered for the calculation of percentage of marks.

v. Students who fail to earn 200 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.

8. Course pattern:

i. The entire course of study is of four academic years. The first year shall be on yearly pattern and the second, third and fourth years on semester pattern.

ii. A student eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject at the supplementary examination.

iii. When a student is detained due to lack of credits / shortage of attendance he may be re-admitted when the semester / year is offered after fulfilment of academic regulations, whereas the academic regulations hold good with the regulations he was first admitted.

9. 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 for the best 200
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 in internal evaluation and end examination shall be shown separately in the marks memorandum)

10. Minimum Instruction Days:

The minimum instruction days for each semester / I year shall be 90/ 180 clear instruction days.

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

12. There shall be no place transfer within the Constituent Colleges and Units of Jawaharlal Nehru Technological University Hyderabad.

13. General:

i. Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".

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

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

iv. 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.

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Academic Regulations for B. Tech. (Lateral Entry Scheme)

(Effective for the students getting admitted into II year from the Academic Year 2009-2010 and onwards)

1. The Students have to acquire 150 credits from II to IV year of B.Tech. Program (Regular) for the award of the degree.
   Register for **150** credits and secure **150** credits.
2. Students, who fail to fulfil the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.
3. The same attendance regulations are to be adopted as that of B. Tech. (Regular).
4. **Promotion Rule:**
   A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of 37 credits from the examinations.
   a. Two regular and one supplementary examinations of II year I semester.
   b. One regular and one supplementary examinations of II year II semester.
   c. One regular examination of III year I semester.
5. **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:

First Class with Distinction	70% and above	From the aggregate marks secured for 150 Credits. (i.e. 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 in internal evaluation and end examination shall be shown separately in the marks memorandum)

6. All other regulations as applicable for B. Tech. Four-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	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

	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.	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 UNIVERSITYHYDERABAD
B.TECH. MINING ENGINEERING
I YEAR COURSE STRUCTURE

Code	Subject	L	T/P/D	C
51001	English	2	-	4
51002	Mathematics – I	3	1	6
51003	Engineering Mechanics	3	1	6
51004	Engineering Physics	2	1	4
51005	Engineering Chemistry	2	-	4
51006	Computer Programming & Data Structures	3	-	6
51007	Engineering Drawing	2	3	4
51676	Computer Programming Lab.	-	3	4
51677	Engineering Physics & Engineering Chemistry Lab	-	3	4
51678	English Language Communication Skills Lab.	-	3	4
51679	Engineering Workshop / IT Workshop	-	3	4
	Total	**17**	**18**	**50**

II YEAR I SEMESTER COURSE STRUCTURE

Code	Subject	L	T/P/D	C
53013	Environmental Studies	3	0	3
53014	Probability and Statistics	3	1	3
53053	Electrical Technology	4	1	4
53016	Mechanics of Solids	3	1	3
53017	Thermodynamics	4	1	4
53018	Metallurgy and Material Science	4	1	4
53638	Electrical Engineering Applications Lab	0	3	2
53639	Metallurgy and Mechanics of Solids Lab	0	3	2
	Total	**21**	**11**	**25**

II YEAR II SEMESTER COURSE STRUCTURE

Code	Subject	L	T/P/D	C
54018	Numerical Methods	3	1	3
54014	Kinematics of Machinery	3	1	3
54058	IC Engines and Gas Turbines	4	1	4
54016	Mechanics of fluids and Hydraulic Machines	4	0	4
54059	Mining Methods and Unit Operations	4	0	4
54060	Machine Drawing and Computer Aided Graphics	0	5	3
54638	Mechanics of fluids and Hydraulic Machines Lab	0	3	2
54639	Thermal Engineering Lab	0	3	2
	Industrial Training - I (Summer)			
	Total	**18**	**14**	**25**

III YEAR I SEMESTER COURSE STRUCTURE

Code	Subject	L	T/P/D	C
55015	Managerial Economics and Financial Analysis	4	0	4
55086	Production Technology	3	1	3
55087	Electronics Engineering	4	0	4
55088	Applied Electrical Engineering	3	1	3
55017	Dynamics of Machinery	3	1	3
55019	Design of Machine Members	4	1	4
55640	Production Technology Lab	0	3	2
55641	Electronics Engineering Lab	0	3	2
	Total	**21**	**10**	**25**

III YEAR II SEMESTER COURSE STRUCTURE

Code	Subject	L	T/P/D	C
56016	Industrial Management	4	0	4
56091	Fluid Power and Control	4	1	4
56092	Open Cast Drilling and Production Equipment	3	1	3
56093	Instrumentation and Control System Engineering	3	1	3
56094	Bulk Solids Handling Equipment	3	1	3
56095	Mechantronics	4	1	4
56645	Mining Machines Lab	0	3	2
56646	Advanced English Communication Skills Lab	0	3	2
	Industrial Training - II (Summer)			
	Total	**21**	**11**	**25**

IV YEAR I SEMESTER COURSE STRUCTURE

Code	Subject	L	T/P/D	C
57155	Mechanical Handling Transport and Loading Equipment	3	1	3
57156	Mine Electrical Engineering	4	1	4
57157	Automobile Engineering	3	1	3
57158	Metrology and Machine Tools	4	1	4
57159 57160 57075	Elective-I Principles of Tribology Mechanical Systems Design Microprocessors and microcontrollers	3	1	3
57161 57162 57163	Elective-II Underground Production Equipment Maintenance Engineering System Modeling and Simulation	4	1	4
57639	Electrical Machines Power and Controls Lab	0	3	2
57640	Metrology and Machine Tools Lab	0	3	2
	Total	**21**	**12**	**25**

IV YEAR II SEMESTER COURSE STRUCTURE

Code	Subject	L	T/P/D	C
58117	Power Plant Engineering	3	1	3
	Elective-III	3	1	3
58118	Automation and Robotics			
58119	Electrical Drives			
58120	Refrigeration and Air Conditioning			
58009	Neural Networks and Fuzzy Logic			
	Elective-IV	3	1	3
58121	Operations Research			
58017	Reliability Engineering			
58122	Energy Conversion Equipment			
58677	Industrial Training	0	0	2
58678	Seminar	0	6	2
58679	Project work	0	15	10
58680	Comprehensive Viva	0	0	2
	Total	9	24	25

Note : All End Examinations (Theory and Practical) are of three hours duration.
T-Tutorial L – Theory
P – Practical/Drawing C – Credits

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I Year B.Tech. Mining Machinery

L	T/P/D	C
2	-/-/-	4

(51001) ENGLISH

1. INTRODUCTION:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure by the students. Hence, it is suggested that they read it on their own with topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section , as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. *However, the stress in this syllabus is on skill development and practice of language skills.*

2. OBJECTIVES:

a. To improve the language proficiency of the students in English with emphasis on LSRW skills.

b. To equip the students to study academic subjects with greater facility through the theoretical and practical components of the English syllabus.

c. To develop the study skills and communication skills in formal and informal situations.

3. SYLLABUS:

Listening Skills:

Objectives

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.
2. To enable students to express themselves fluently and appropriately in social and professional contexts.
   - Oral practice
   - Describing objects/situations/people
   - Role play – Individual/Group activities (Using exercises from all the nine units of the prescribed text: *Learning English: A Communicative Approach.*)
   - Just A Minute(JAM) Sessions.

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.

2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
   - Skimming the text
   - Understanding the gist of an argument
   - Identifying the topic sentence
   - Inferring lexical and contextual meaning
   - Understanding discourse features
   - Recognizing coherence/sequencing of sentences

NOTE: *The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using 'unseen' passages which may be taken from the non-detailed text or other authentic texts, such as magazines/newspaper articles.*

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.

   - Writing sentences
   - Use of appropriate vocabulary
   - Paragraph writing
   - Coherence and cohesiveness
   - Narration / description
   - Note Making
   - Formal and informal letter writing
   - Editing a passage

4. TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into **Eight Units**, are prescribed:

For Detailed study

1. **First Text book entitled "Enjoying Everyday English", Published by Sangam Books, Hyderabad**

For Non-detailed study

1. **Second text book "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur**

A. STUDY MATERIAL:

Unit–I

1. **Chapter entitled *Heaven's Gate* from "Enjoying Everyday English", Published by Sangam Books, Hyderabad**
2. **Chapter entitled *Haragovind Khorana* from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur**

Unit–II

1. **Chapter entitled *Sir CV Raman: A Pathbreaker in the Saga of Indian Science* from "Enjoying Everyday English", Published by Sangam Books, Hyderabad**
2. **Chapter entitled *Sam Petroda* from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur**

Unit–III

1. **Chapter entitled *The Connoisseur* from "Enjoying Everyday English", Published by Sangam Books, Hyderabad**
2. **Chapter entitled *Mother Teresa* from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur**

Unit–IV

1. **Chapter entitled *The Cuddalore Experience* from "Enjoying Everyday English", Published by Sangam Books, Hyderabad**
2. **Chapter entitled *Dr Amartya Kumar Sen* from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur**

Unit–V

1. **Chapter entitled *Bubbling Well Road* from "Enjoying Everyday English", Published by Sangam Books, Hyderabad**
2. **Chapter entitled *I Have a Dream* by Martin Luther King from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur**

Unit–VI

1. **Chapter entitled *Odds Against Us* from "Enjoying Everyday English", Published by Sangam Books, Hyderabad**
2. **Chapter entitled *Ask Not What Your Country can do for you* by John F Kennedy from "Inspiring Speeches and Lives", Published by Maruthi Publications, Guntur**

* Exercises from the lessons not prescribed shall also be used for classroom tasks.

Unit–VII

Exercises on

Reading and Writing Skills

Reading Comprehension

Situational dialogues

Letter writing

Essay writing

Unit–VIII

Practice Exercises on Remedial Grammar covering

Common errors in English, Subject-Verb agreement, Use of Articles and Prepositions,

Tense and aspect

Vocabulary development covering

Synonyms & Antonyms, one-word substitutes, prefixes & suffixes, Idioms & phrases, words often confused.

REFERENCES

1. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books
2. English Grammar Practice, **Raj N Bakshi, Orient Longman.**
3. **Effective English, edited** by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
4. Handbook of English Grammar& Usage, **Mark Lester and Larry Beason, Tata Mc Graw–Hill.**
5. Spoken English, R.K. **Bansal & JB Harrison, Orient Longman.**
6. Technical Communication, **Meenakshi Raman, Oxford University Press**
7. Objective English Edgar Thorpe & **Showick Thorpe, Pearson Education**
8. Grammar Games, Renuvolcuri Mario, **Cambridge University Press.**
9. Murphy's English Grammar with CD, **Murphy, Cambridge University Press.**
10. Everyday Dialogues in English, **Robert J. Dixson, Prentice Hall India Pvt Ltd.,**
11. ABC of Common Errors **Nigel D Turton, Mac Millan Publishers.**
12. Basic Vocabulary **Edgar Thorpe & Showick Thorpe. Pearson Education**
13. Effective Technical Communication, **M Ashraf Rizvi, Tata Mc Graw – Hill.**
14. An Interactive Grammar of Modern English, **Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO**
15. A Communicative Grammar of English, **Geoffrey Leech, Jan Svartvik, Pearson Education**
16. Enrich your English, **Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,**
17. A Grammar Book for You And I, **C. Edward Good, MacMillan Publishers.**

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(51002) MATHEMATICS – I

UNIT – I

Sequences – Series

Basic definitions of Sequences and series – Convergences and divergence – Ratio test – Comparison test – Integral test – Cauchy's root test – Raabe's test – Absolute and conditional convergence

UNIT – II

Functions of Single Variable

Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – Generalized Mean Value theorem (all theorems without proof) Functions of several variables – Functional dependence- Jacobian- Maxima and Minima of functions of two variables with constraints and without constraints

UNIT – III

Application of Single variables

Radius, Centre and Circle of Curvature – Evolutes and Envelopes Curve tracing – Cartesian , polar and Parametric curves.

UNIT – IV

Integration & its applications

Riemann Sums , Integral Representation for lengths, Areas, Volumes and Surface areas in Cartesian and polar coordinates multiple integrals - double and triple integrals – change of order of integration- change of variable

UNIT – V

Differential equations of first order and their applications

Overview of differential equations- exact, linear and Bernoulli. Applications to Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories and geometrical applications.

UNIT – VI

Higher Order Linear differential equations and their applications

Linear differential equations of second and higher order with constant coefficients, RHS term of the type $f(X)= e^{ax}$, Sin ax, Cos ax, and x^n, $e^{ax} V(x)$,

x n V(x), method of variation of parameters. Applications bending of beams, Electrical circuits, simple harmonic motion.

UNIT – VII

Laplace transform and its applications to Ordinary differential equations

Laplace transform of standard functions – Inverse transform – first shifting Theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function – Convolution theorem – Periodic function - Differentiation and integration of transforms-Application of Laplace transforms to ordinary differential equations.

UNIT – VIII

Vector Calculus

Vector Calculus: Gradient- Divergence- Curl and their related properties- Potential function - Laplacian and second order operators. Line integral – work done — Surface integrals - Flux of a vector valued function.

Vector integrals theorems: Green's -Stoke's and Gauss's Divergence Theorems (Statement & their Verification) .

TEXT BOOKS:

1. Engineering Mathematics – I by P.B. Bhaskara Rao, S.K.V.S. Rama Chary, M. Bhujanga Rao.
2. Engineering Mathematics – I by C. Shankaraiah, VGS Booklinks.

REFERENCES:

1. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
2. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
3. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
4. Higher Engineering Mathematics – B.S. Grewal, Khanna Publications.
5. Advance Engineering Mathematics by Jain and S.R.K. Iyengar, Narosa Publications.
6. A text Book of KREYSZIG'S Engineering Mathematics, Vol-1 Dr .A. Ramakrishna Prasad. WILEY publications.

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(51003) ENGINEERING MECHANICS

UNIT – I

Introduction to Engineering. 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.

UNIT – II

Equilibrium of Systems of Forces : Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. Lamis 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

Centroid : Centroids of simple figures (from basic principles) – Centroids of Composite Figures

Centre of Gravity : Centre of gravity of simple body (from basis principles), centre of gravity of composite bodies, pappus theorem.

UNIT – IV

Area moment 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

Analysis of perfect frames (Analytical Method) – Types of Frames – Assumptions for forces in members of a perfect frame, Method of joints, Method of sections, Force table, Cantilever Trusses, Structures with one end hinged and the other freely supported on rollers carrying horizontal or inclined loads.

UNIT – VI

Kinematics : Rectilinear and Curvilinear 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 – VII

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

UNIT – VIII

Principle of virtual work: Equilibrium of ideal systems, efficiency of simple machines, stable and unstable equilibriums

TEXT BOOKS :

1. Engineering. Mechanics / Timoshenko & Young.
2. Engineering. Mechanics / S.S. Bhavikatti & J.G. Rajasekharappa

REFERENCES :

1. Engineering Mechanics / Fedinand . L. Singer / Harper – Collins.
2. Engineering. Mechanics / Irving. H. Shames Prentice – Hall.
3. Engineering. Mechanics Umesh Regl / Tayal.
4. Engineering. Mechanics / R.V. Kulkarni & R.D. Askhevkar
5. Engineering. Mechanics/Khurmi/S.Chand.
6. Engineering. Mechanics / KL Kumar / Tata McGraw Hill.

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(51004) ENGINEERING PHYSICS

UNIT-I

1. Bonding in Solids: Ionic Bond, Covalent Bond, Metallic Bond, Hydrogen Bond, Vander-Waal's Bond, Calculation of Cohesive Energy.

2. Crystallography and Crystal Structures: Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Diamond and hcp Structures, Structures of NaCl, ZnS, CsCl.

UNIT-II

3. X-ray Diffraction: Basic Principles, Bragg's Law, Laue Method, Powder Method, Applications of X- ray Diffraction.

4. Defects in Crystals: Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects; Qualitative treatment of line (Edge and Screw Dislocations) Defects, Burger's Vector, Surface Defects and Volume Defects.

UNIT-III

5. Elements of Statistical Mechanics: Maxwell-Boltzman, Bose Einstein and Fermi-Dirac Statistics (Qualitative Treatment), Photon gas , Wein's Law, Rayleigh-Jeans law,, Planck's Law of Black Body Radiation, Concept of Electron Gas, Fermi Energy, Density of States.

6. Principles of Quantum Mechanics: Waves and Particles, de Broglie Hypothesis , Matter Waves, Davisson and Germer's Experiment, G. P. Thomson Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function - Particle in One Dimensional Potential Box.

UNIT-IV

7. Band Theory of Solids: Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), Origin of Energy Band Formation in Solids, Classification of Materials into Conductors, Semi Conductors & Insulators, Concept of Effective Mass of an Electron and Hole.

UNIT-V

8. Semiconductor Physics: Fermi Level in Intrinsic and Extrinsic Semiconductors, Intrinsic Semiconductors and Carrier Concentration, Extrinsic Semiconductors and Carrier Concentration, Equation of Continuity, Direct & Indirect Band Gap Semiconductors, Hall Effect.

9. Physics of Semiconductor Devices: Formation of PN Junction, Open Circuit PN Junction, Energy Diagram of PN Diode, I-V Characteristics of PN Junction, PN Diode as a Rectifier (Forward and Reverse Bias), Diode Equation, LED, LCD and Photo Diodes.

UNIT-VI

10. Dielectric Properties: Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities - Internal Fields in Solids, Clausius - Mossotti Equation, Piezo-electricity, Pyro-electricity and Ferro- electricity.

11. Magnetic Properties: Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials, Ferrites and their Applications, Concept of Perfect Diamagnetism, Meissner Effect, Magnetic Levitation, Applications of Superconductors.

UNIT-VII

12. Lasers: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Lasing Action, Einstein's Coefficients and Relation between them, Ruby Laser, Helium-Neon Laser, Carbon Dioxide Laser, Semiconductor Diode Laser, Applications of Lasers.

13. Fiber Optics: Principle of Optical Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers and Refractive Index Profiles, Attenuation in Optical Fibers, Application of Optical Fibers.

UNIT-VIII

14. Acoustics of Buildings & Acoustic Quieting: Basic Requirement of Acoustically Good Hall, Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time(Qualitative Treatment), Measurement of

Absorption Coefficient of a Material, Factors Affecting The Architectural Acoustics and their Remedies. Acoustic Quieting: Aspects of Acoustic Quieting, Methods of Quieting, Quieting for Specific Observers, Mufflers, Sound-proofing.

15. Nanotechnology: Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Precipitation, Combustion Methods; Top-down Fabrication: Chemical Vapour Deposition, Physical Vapour Deposition, Pulsed Laser Vapour Deposition Methods, Characterization(XRD&TEM) and Applications.

TEXT BOOKS:

1. Applied Physics – P.K.Palanisamy (SciTech Publications (India) Pvt. Ltd., Fifth Print 2008).
2. Applied Physics – S.O. Pillai & Sivakami (New Age International (P) Ltd., Second Edition 2008).
3. Applied Physics – T. Bhima Shankaram & G. Prasad (B.S. Publications, Third Edition 2008).

REFERENCES:

1. Solid State Physics – M. Armugam (Anuradha Publications).
2. Modern Physics – R. Murugeshan & K. Siva Prasath – S. Chand & Co. (for Statistical Mechanics).
3. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar– S. Chand & Co. (for acoustics).
4. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.Ltd
5. Nanotechnology – M.Ratner & D. Ratner (Pearson Ed.).
6. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
7. Solid State Physics – A.J. Dekker (Macmillan).
8. Applied Physics – Mani Naidu Pearson Education

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(51005) ENGINEERING CHEMISTRY

UNIT I:

Electrochemistry and Batteries: Concept of Electro Chemistry, Conductance-Electrolyte in solution, Conductance-Specific, Equivalent and molar conductance, Ionic mobilities, Kolrausch's Law. Application of conductance. EMF: Galvanic Cells, types of Electrodes, Reference Electrode (SCE, Quinhydrone electrode), Ion Selective Electrodes (Glass Electrode) Nernest equation, Concentration Cells, Galvanic series, Potentiometric titrations, Numerical problems.

Batteries: Primary and secondary cells, (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries, fuel cells – Hydrogen – Oxygen fuel cells, Advantages of fuel cells.

UNIT II:

Corrosion and its corrosion control: Introduction, causes and different types of corrosion and effects of corrosion, theories of corrosion – Chemical, Electrochemical corrosion, corrosion reactions, factors affecting corrosion – Nature of metal – galvanic series, over voltage, purity of metal, nature of oxide film, nature of corrosion product. Nature of environment-effect of temperature, effect of pH, Humidity, effect of oxidant. Corrosion control methods – Cathodic protection, sacrificial anode, impressed current cathode. Surface coatings – methods of application on metals- hot dipping, galvanizing, tinning, cladding, electroplating - Organic surface coatings – paints constituents and functions.

UNIT III:

Polymers: Types of Polymerization, Mechanism (Chain growth & Step growth).Plastics: Thermoplastic resins & Thermo set resins. Compounding & fabrication of plastics, preparation, properties, engineering applications of: polyethylene, PVC, PS, Teflon, Bakelite, Nylon. Conducting Polymers: Poly acetylene, polyaniline, conduction, doping, applications. Liquid Crystal polymers: Characteristics and uses Rubber – Natural rubber, vulcanization. Elastomers – Buna-s, Butyl rubber, Thiokol rubbers, Fibers – polyester, fiber

reinforced plastics (FRP), applications

UNIT IV:

Water: Introduction, Hardness: Causes, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water, numerical problems. Boiler troubles – Scale & sludge formation, caustic enbsittlement, corrosion, priming & foaming Softening of water (Internal & external treatment-Lime soda, Zeolite, Ion exchange process and Numerical problems) Reverse osmosis, electro dialysis.

UNIT V:

Surface Chemistry: Solid surfaces, types of adsorption, Longmuir adsorption isotherm, BET adsorption equip. Calculation of surface area of solid & application adsorption, classification of colloids, Electrical & optical properties micelles, applications of colloids in industry. Nano materials: Introduction, preparation and applications of nano meterials

UNIT VI:

Energy sources: fuels, classification – conventional fuels (solid, liquid, gaseous) Solid fuels – coal – analysis – proximate and ultimate analysis and their significance Liquid fuels – primary – petroleum – refining of petroleum-cracking knocking synthetic petrol – Bergius and Fischer Tropsech's process; Gaseous fuels – natural gas, analysis of flue gas by Orsat's method Combustion – problems, Calorific value of fuel – HCV, LCV, determination of calorific value by Junker's gas calorie meter.

UNIT VII:

Phase rule: Definitions – phase, component, degree of freedom, phase rule equitation. Phase diagrams – one component system: water system. Two component system lead- silver system, heat treatment based on iron-carbon phase diagram, hardening, annealing.

UNIT VIII:

Materials Chemistry: Cement: composition of Portland cement, manufacture of port land Cement, setting & hardening of cement (reactions). Lubricants: Criteria of a good lubricant, mechanism, properties of lubricants: Cloud point, pour point, flash & fire point, Viscocity. Refractoriess: Classification, Characteristics of a good refractory. Insulators & conductors: Classification of insulators characteristics of thermal & electrical insulators and applications of Superconductors (Nb-Sn alloy, $YBa_2Cu_3O_{7-x}$), applications.

TEXT BOOKS:

1. Text Books of Engineering Chemistry by C.P. Murthy, C.V. Agarwal, A. Naidu B.S. Publications, Hyderabad (2006).
2. Text of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co,New Delhi(2006)

REFERENCE BOOKS

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited , New Delhi(2006)
2. Enginering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills co., New Delhi (2004).
3. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).
4. Chemistry of Engineering Materials by CV Agarwal,C.P Murthy, A.Naidu, BS Publications.
5. Chemistry of Engineering Meterials by R.P Mani and K.N.Mishra, CENGAGE learning.
6. Applied Chemistry – A text for Engineering & Technology – Springar (2005).
7. Text Book of Engineering Chemistry – Shasi Chawla, Dhantpat Rai publishing Company, NewDelhi (2008).
8. Engineering Chemistry – R. Gopalan, D. Venkatappayya, D.V. Sulochana Nagarajan – Vikas Publishers (2008).

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(51006) COMPUTER PROGRAMMING AND DATA STRUCTURES

UNIT – I:

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programmes, Software Development Method, Algorithms, Pseudo code, flow charts, applying the software development method.

UNIT – II:

Introduction to C Language – Background, Simple C Programme, Identifiers, Basic data types, Variables, Constants, Input / Output, Operators. Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Bit wise operators, Statements, Simple C Programming examples.

Selection Statements – if and switch statements, Repetition statements – while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Programming examples.

UNIT – III:

Designing Structured Programmes, Functions, basics, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Preprocessor commands, example C programmes

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C programme examples.

UNIT – IV:

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions, command –line arguments.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C programme examples.

UNIT - V:

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, enumerated types, C programming examples.

UNIT – VI:

Input and Output – Concept of a file, streams, standard input / output functions, formatted input / output functions, text files and binary files, file input / output operations, file status functions (error handling), C programme examples.

UNIT – VII:

Searching and Sorting – Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort, Searching-linear and binary search methods.

UNIT – VIII:

Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Operations, array and linked representations of stacks, stack application-infix to postfix conversion, postfix expression evaluation, recursion implementation, Queues-operations, array and linked representations.

TEXT BOOKS:

1. C Programming & Data Structures, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, Fifth Edition, education.

REFERENCES:

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI/Pearson Education
3. C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press
4. Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion.
5. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International

Edition
6. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education/PHI
7. C Programming & Data Structures, E. Balagurusamy, TMH.
8. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
9. C& Data structures – E V Prasad and N B Venkateswarlu, S. Chand & Co.

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(51007) ENGINEERING DRAWING

UNIT – I

INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Graphics and their Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions. Curves used in Engineering Practice & their Constructions :

a) Conic Sections including the Rectangular Hyperbola – General method only.

b) Cycloid, Epicycloid and Hypocycloid

c) Involute.

d) Scales: Different types of Scales, Plain scales comparative scales, scales of chords.

UNIT – II

DRAWING OF PROJECTIONS OR VIEWS ORTHOGRAPHIC PROJECTION IN FIRST ANGLE

PROJECTION: Principles of Orthographic Projections – Conventions – First and Third Angle, Projections of Points and Lines inclined to both planes, True lengths, traces.

UNIT – III

PROJECTIONS OF PLANES & SOLIDS: Projections of regular Planes, auxiliary planes and Auxiliary projection inclined to both planes. Projections of Regular Solids inclined to both planes – Auxiliary Views.

UNIT – IV

SECTIONS AND SECTIONAL VIEWS:- Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

DEVELOPMENT AND INTERPENETRATION OF SOLIDS: Development of Surfaces of Right, Regular Solids – Prisms, Cylinder, Pyramid Cone and their parts. Interpenetration of Right Regular Solids

UNIT – V

INTERSECTION OF SOLIDS:- Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT - VI

ISOMETRIC PROJECTIONS : Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts.

UNIT – VII

TRANSFORMATION OF PROJECTIONS : Conversion of Isometric Views to Orthographic Views – Conventions.

UNIT – VIII

PERSPECTIVE PROJECTIONS : Perspective View : Points, Lines, Plane Figures and Simple Solids, Vanishing Point Methods (General Method only).

TEXT BOOK :

1. Engineering Drawing, N.D. Bhat / Charotar
2. Engineering Drawing and Graphics, Venugopal / New age.
3. Engineering Drawing – Basant Agrawal, TMH

REFERENCES :

1. Engineering drawing – P.J. Shah.S.Chand.
2. Engineering Drawing, Narayana and Kannaiah / Scitech publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill.
4. Computer Aided Engineering Drawing- Trymbaka Murthy- I.K. International.
5. Engineering Drawing – Grower.
6. Engineering Graphics for Degree – K.C. John.

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(51676) COMPUTER PROGRAMMING LAB

Objectives:

1. To make the student learn a programming language.
1. To teach the student to write programs in C to solve the problems.
1. To Introduce the student to simple linear data structures such as lists, stacks, queues.

Recommended Systems/Software Requirements:

1. Intel based desktop PC
1. ANSI C Compiler with Supporting Editors

Week 1.

a) Write a C program to find the sum of individual digits of a positive integer.

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.

Week 2.

a) Write a C program to calculate the following Sum:

$Sum=1-x^2/2!+x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$

b) Write a C program toe find the roots of a quadratic equation.

Week 3

a) Write C programs that use both recursive and non-recursive functions

i) To find the factorial of a given integer.

ii) To find the GCD (greatest common divisor) of two given integers.

iii) To solve Towers of Hanoi problem.

Week 4

a) The total distance travelled by vehicle in 't' seconds is given by distance $= ut+1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Week 5

a) Write a C program to find both the largest and smallest number in a list of integers.

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

i) Addition of Two Matrices

ii) Multiplication of Two Matrices

Week 6

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

i) To insert a sub-string in to a given main string from a given position.

ii) To delete n Characters from a given position in a given string.

b) Write a C program to determine if the given string is a palindrome or not

Week 7

a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.

b) Write a C program to count the lines, words and characters in a given text.

Week 8

a) Write a C program to generate Pascal's triangle.

b) Write a C program to construct a pyramid of numbers.

Week 9

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:

$1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal ? If so, test for them too.

Week 10

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 convert a Roman numeral to its decimal equivalent.

Week 11

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

i) Reading a complex number

ii) Writing a complex number

iii) Addition of two complex numbers

iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

Week 12

a) Write a C program which copies one file to another.

b) Write a C program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

Week 13

a) Write a C programme to display the contents of a file.

b) Write a C programme to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

Week 14

Write a C program that uses functions to perform the following operations on singly linked list.:

i) Creation ii) Insertion iii) Deletion iv) Traversal

Week 15

Write C programs that implement stack (its operations) using

i) Arrays ii) Pointers

Week 16

Write C programs that implement Queue (its operations) using

i) Arrays ii) Pointers

Week 17

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

i) Converting infix expression into postfix expression

ii) Evaluating the postfix expression

Week 18

Write a C program that implements the following sorting methods to sort a given list of integers in ascending order

i) Bubble sort

ii) Selection sort

Week 19

Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers :

i) Linear search ii) Binary search

Week 20

Write C program that implements the following sorting method to sort a given list of integers in ascending order:

i) Quick sort

Week 21

Write C program that implement the following sorting method to sort a given list of integers in ascending order:

i) Merge sort.

Week 22

Write C programs to implement the Lagrange interpolation and Newton-Gregory forward interpolation.

Week 23

Write C programs to implement the linear regression and polynomial regression algorithms.

Week 24

Write C programs to implement Trapezoidal and Simpson methods.

Text Books

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publications.
3. The Spirit of C, an introduction to modern programming, M.Cooper, Jaico Publishing House.
4. Practical C Programming,Steve Oualline,O'Reilly,SPD. TMH publications.
5. Computer Basics and C Programming, V. Rajaraman, PHI Publications.
6. Data structures and Program Design in C.R.Kruse, C.L.Tondo, B.P.Leung, M.Shashi, Pearson Education.

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(51677) ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB

ENGINEERING PHYSICS LAB

(Any twelve experiments compulsory)

1. Dispersive power of the material of a prism – Spectrometer
2. Determination of wavelength of a source – Diffraction Grating.
3. Newton's Rings - Radius of curvature of plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Time constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method.
8. Study the characteristics of LED and LASER sources.
9. Study the characteristics of p-i-n and avalanche photodiode detectors.
10. Bending losses of fibres.
11. Evaluation of numerical aperture of given fibre.
12. Energy gap of a material of p-n junction.
13. Thermo electric effect – Seebeck effect and Peltier effect.
14. Torsional pendulum.
15. Single slit diffraction using laser.

ENGINEERING CHEMISTRY LAB

List of Experiments (Any 12 of the following):

Titrimetry:

1. Estimation of hardness of water by EDTA method. (or)
   Estimation of calcium in limestone by Permanganometry.

Mineral Analysis:

2 Determination of percentage of copper in brass

3 Estimation of manganese dioxide in pyrolusite.

Instrumental Methods:

4. **Colorimetry:**
   Determination of ferrous iron in cement by colorimetric method.
   (Or) Estimation of Copper by Colorimetric method.
5. **Conductometry:**
   Conductometric titration of strong acid Vs strong base.
   (or) Conductometric titration of mixture of acids Vs strong base.
6. **Potentiometry:**
   Titration of strong acid Vs strong base by potentiometry.
   (or) Titration of weak acid Vs strong base by potentiometry.

Physical Properties:

7. Determination of viscosity of sample oil by redwood/oswald's viscometer
8. Determination Surface Tension of lubricants.

Identification and Preparations:

9. Identification of functional groups present in organic compounds.
10. Preparation of organic compounds
    Asprin (or) Benzimidazole

Kinetics:

11. To determine the rate constant of hydrolysis of methyl acetate catalysed

by an acid and also the energy of activation. (or) To study the kinetics of reaction between $K_2S_2O_8$ and KI.

12. Demonstration Experiments (Any One of the following) :
    a. Determination of dissociation constant of weak acid-by PH metry
    b. Preparation of Thiokol rubber
    c. Adsorption on Charcoal
    d. Heat of reaction

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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(51678) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The **Language Lab** focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

Objectives:

1. **To expose the students to a variety of self-instructional, learner-friendly modes of language learning.**
2. **To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.**
3. **To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.**
4. **To train them to use language effectively to face interviews, group discussions, public speaking.**
5. **To initiate them into greater use of the computer in resume preparation, report writing, format-making etc.**

SYLLABUS:

The following course content is prescribed for the **English Language Laboratory** sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues / Role Play.
4. Oral Presentations- Prepared and Extempore.
5. 'Just A Minute' Sessions (JAM).
6. Describing Objects / Situations / People.
7. Information Transfer

8. Debate
9. Telephoning Skills.
10. Giving Directions.

Minimum Requirement:

The English Language Lab shall have two parts:

i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

i) P – IV Processor
   a) Speed – 2.8 GHZ
   b) RAM – 512 MB Minimum
   c) Hard Disk – 80 GB

ii) Headphones of High quality

Suggested Software:

- Cambridge Advanced Learners' English Dictionary with CD.
- The Rosetta Stone English Library.
- Clarity Pronunciation Power – Part I.
- Mastering English in Vocabulary, Grammar, Spellings, Composition.
- Dorling Kindersley series of Grammar, Punctuation, Composition etc.
- Language in Use, Foundation Books Pvt Ltd with CD.
- Oxford Advanced Learner's Compass, 7th Edition.
- Learning to Speak English - 4 CDs.
- Vocabulary in Use, Michael McCarthy, Felicity O'Den, Cambridge.

- Murphy's English Grammar, Cambridge with CD.
- English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

Books Suggested for **English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the system)**:

1. A **Handbook for English Language Laboratories** – Prof. E. Suresh Kumar, P. Sreehari, Foundation Books.
2. **Effective Communication & Public Speaking** by S. K. Mandal, Jaico Publishing House.
3. **English Conversation Practice** by Grant Taylor, Tata McGraw Hill.
4. **Speaking English effectively** by Krishna Mohan, N. P. Singh, Mac Millan Publishers.
5. **Communicate or Collapse: A Handbook of Efffective Public Speaking, Group Discussions and Interviews**, by Pushpa Lata & Kumar, Prentice-Hall of India
6. **Lowa Correct English, Grammar, Usage and Composition** by Shiv. K. Kumar & Hemalatha Nagarajan, Pearson Longman
7. **Spoken English** by R. K. Bansal & J. B. Harrison, Orient Longman.
8. **English Language Communication: A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr. G. Natanam & Prof. S. A. Sankaranarayanan, Anuradha Publications, Chennai.
9. **Effective Technical Communication**, M. Ashraf Rizvi, Tata McGraw-
10. **A Practical Course in English Pronunciation**, (with two Audio Cassettes) by J. Sethi, Kamlesh Sadanand & D.V. Jindal, Prentice-Hall India Pvt. Ltd., New Delhi.
11. **A text book of English Phonetics for Indian Students** by T. Balasubramanian, Mac Millan
12. **Spoken English: A foundation Course, Parts 1 & 2, Kamalesh Sadanand and Susheela punitha**, Orient Longman

DISTRIBUTION AND WEIGHTAGE

English Language Laboratory Practical

1. The practical examinations for [illegible] be conducted as per the [illegible] engineering practical sessions.
2. For the Language lab sessions [illegible] during the year for 25 sessional [illegible] marks. Of the 25 marks, 15 marks [illegible] and 10 marks to be awarded by [illegible] year-end Examination shall be con[illegible] the teacher concerned with the help [illegible] the same department of the same institution.

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[illegible] Mining Machinery | L | T/P/D | C
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[illegible] WORKSHOP / IT WORKSHOP

[illegible]

[illegible] soldering.

[illegible]

8. [illegible] working electrical engineering and mechanical [illegible]

9. IT Workshop [illegible] hard ware [illegible] identification of parts, Disassembly [illegible] to working condition, Simple diagnostic exercises.

10. IT workshop-II: In[illegible] Operating system windows and Linux, simple diagnostic [illegible]

2. TRADES FOR DEMO[illegible] & EXPOSURE:

1. Plumbing
2. Machine S[illegible]
3. Metal [illegible]

TEXT BOOKS:

1. Work[illegible] P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Work[illegible] by Venkat Reddy

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(53013) ENVIRONMENTAL STUDIES

UNIT-I:

ECOSYSTEMS: Definition, Scope and Importance of ecosystem, Concept of ecosystem, Classification of ecosystems, Structure and Structural Components of an ecosystem, Functions of ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Homeostasis / Cybernetics, Food chain concentration, Biomagnification, ecosystems value, services and carrying capacity.

UNIT-II:

NATURAL RESOURCES: Classification of Resources: Living and Non-Living resources, Renewable and non-renewable resources. Water resources: use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. Mineral resources: use and exploitation, environmental effects of extracting and using mineral resources – case studies. Energy resources: growing energy needs, renewable and non renewable energy sources, use of alternate energy sources – case studies. Land resources: land as a resource, land degradation, man induced landslides and land use / land cover mapping.

UNIT-III:

BIODIVERSITY AND BIOTIC RESOURCES: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and intrinsic values. Hot spots of biodiversity. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, conservation of biodiversity: In-Situ and Ex-situ conservation. Food and fodder resources, Timber and non-timber forest products.

UNIT-IV:

ENVIRONMENTAL POLLUTION AND CONTROL: Classification of pollution and pollutants, causes, effects and control technologies. Air Pollution: Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. Water pollution: Point and non-point sources of pollution. Major pollutant of water and their sources,

drinking water quality standards, Waste water treatment methods: effluent treatment plants (ETP), Sewage treatment plants (STP), common and combined effluent treatment plants (CETP).Soil Pollution: Soil as sink for pollutants, Impact of modern agriculture on soil, degradation of soil. Marine Pollution: Misuse of International water for dumping of hazardous waste, coastal pollution due to sewage and marine disposal of industrial effluents. Noise Pollution: Sources, Industrial Noise- Occupational Health hazards, standards, Methods of control of Noise. Thermal Pollution: Thermal Comforts, Heat Island effect, Radiation effects. Nuclear Pollution: Nuclear power plants, nuclear radiation, disasters and impacts, genetical disorders. Solid waste: types, Collection processing and disposal of industrial and municipal solid wastes composition and characteristics of e-Waste and its management.

UNIT-V:

GLOBAL ENVIRONMENTAL PROBLEMS AND GLOBAL EFFORTS : Green house effect, Green House Gases (GHG), Global Warming, Sea level rise, climate change and their impacts on human environment. Ozone depletion and Ozone depleting substances (ODS).Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

UNIT-VI:

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) AND ENVIRONMENTAL MANAGEMENT PLAN: Definition of Impact: classification of impacts. Positive and Negative, Reversible and irreversible, light, moderate and severe, methods of baseline data acquisition. Impacts on different components: such as human health resources, air, water, flora, fauna and society. Prediction of impacts and impact assessment methodologies. Environmental Impact Statement (EIS). Environmental Management Plan (EMP): Technological Solutions, preventive methods, Control technologies, treatment technologies: green-belt-development, rain water harvesting, Remote sensing and GIS methods.

UNIT-VII:

ENVIRONMENTAL POLICY, LEGISLATION, RULES AND REGULATIONS

National Environmental Policy, Environmental Protection act, Legal aspects Air (Prevention and Control of pollution) Act- 1981, Water(Prevention and Control of pollution) Act-1974, Water pollution Cess Act-1977, Forest Conservation Act, Municipal solid waste management and handling rules,

biomedical waste management and handling rules, hazardous waste management and handling rules .

UNIT: VIII :

TOWARDS SUSTAINABLE FUTURE

Concept of Sustainable Development, Threats to Sustainability, Population and its explosion, Crazy Consumerism, Over-exploitation of resources, Strategies for Achieving Sustainable development, Environmental Education, Conservation of Resources, Urban Sprawl, Sustainable Cities and Sustainable Communities, Human health, Role of IT in Environment, Environmental Ethics, Environmental Economics, Concept of Green Building, Clean Development Mechanism (CDM).

SUGGESTED TEXT BOOKS:

1. Environmental studies , From crisis to cure by R.Rajagopalan, 2005
2. Text book of Environmental Science and Technology by M.Anji Reddy 2007
3. Environmental studies by Erach Bharucha 2005, University Grants Commission, University Press.

REFERENCES:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.

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(53014) PROBABILITY AND STATISTICS

UNIT-I : Probability

Sample space and events – Probability – The axioms of probability -- Some Elementary theorems - Conditional probability – Baye's theorem, Random variables – Discrete and continuous.

UNIT-II: Distributions

Binomial , Poisson & normal distributions related properties . Sampling distributions –Sampling distribution of means (σ known and Unknown)

UNIT-III: Testing of Hypothesis I

Tests of hypothesis point estimations – interval estimations Bayesian estimation. Large samples, Null hypothesis – Alternate hypothesis type I, & type II errors – critical region confidential interval for mean testing of single variance. Difference between the mean.

UNIT-IV : Testing of Hypothesis II

Confidential interval for the proportions. Tests of hypothesis for the proportions single and difference between the proportions.

UNIT-V: Small samples

Confidence interval for the t- distribution – Tests of hypothesis – t-distributions, F- distributions χ^2 distribution. Test of Hypothesis –.

UNIT-VI

Correlation & Regression

Coefficient of correlation – Regression Coefficient – The lines of regression – The rank correlation

UNIT-VII

Queuing Theory

Arrival Theorem - Pure Birth process and Death Process M/M/1 Model .

UNIT-VIII

Stochastic processes

Introduction to Stochastic Processes – Markov process classification of states – Examples of Markov Chains, Stochastic Matrix, limiting probabilities.

TEXT BOOKS:

1. Probability & Statistics by D.K. Murugesan & P.Guru Swamy, Anuradha Publications.
2. Probability & Statistics for Engineers by G.S.S.Bhisma Rao, Scitech Publications.

REFERENCES:

1. Probability & Statistics by T.K.V.Iyengar & B.Krishna Gandhi & Others, S.Chand.
2. Probability & Statistics by William Mendenhall & Others, Cengage Publications.
3. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications.
4. Higher Engineering Mathematics by Jain & S.K.R. Iyengar, Narasa Publications.
5. A first course in Probability & Statistics by B.L.S. Prakasa Rao, World Scientific.
6. Probability & Statistics for Engineers, Miller and John E. Freund, Prentice Hall of India.

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(53053) ELECTRICAL TECHNOLOGY

Unit-I

Network theorems (KCL, KVL, Thevenin, Norton, Maximum power transfer) applied to steady-state DC circuit

Unit-II

Single-phase AC circuits and phasor diagrams, series and parallel resonance

Unit-III

Three-phase AC circuits with balanced and unbalanced loads, phasor presentation, measurement of three-phase power by two-wattmeter method.

Unit-IV

Single-phase transfer: construction, types, EMF equation, equivalent circuit, phasor diagram, regulation, efficiency, OC and SC tests.

Unit-V

DC machines: Construction, types, principle of operation, EMF and torque equation,

DC generator: OCC and external characteristic curves and efficiency.

Unit-VI

DC motors: speed-torque characteristics, starting, 3-point starter, speed control and efficiency.

Unit-VII

Three-phase induction motor: construction, types, principles of operation, torque-slip characteristics, starting methods.

Unit-VIII

Introduction to three-phase synchronous motor.

TEXT BOOKS:

1. Introduction to Electrical Engineering – M.S. Naidu and S. Kamakshaiah, TMH.

2. Basic Electrical Engineering – Kothari and Nagarath, TMH, 2nd Edition.
3. Electric Machinery – A.E. Fitzgerald, C.Kingsley, S.D. Umans.

REFERENCES:

1. Electrical Engineering Fundamentals – V Del Toto.
2. Basic Electrical Engineering (Special Indian Edition) – JJ Cathey, S.A Nasar, P.Kumar.
3. Hughes Electrical and Electronic Technology – E.Hughes, I.M. Smith, J. Hiley, K.Brown.

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(53016) MECHANICS OF SOLIDS

UNIT – I

SIMPLE STRESSES & STRAINS : Elasticity and plasticity – Types of stresses & strains–Hooke's law– stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio& volumetric strain – Elastic moduli & the relationship between them – Bars of varying section – composite bars – Temperature stresses. Strain energy – Resilience – Gradual, sudden, impact and shock loadings.

UNIT – II

SHEAR FORCE AND BENDING MOMENT : Definition of beam – Types of beams – Concept of shearforce and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, u.d.l., uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III

FLEXURAL STRESSES : Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/y = E/R Neutral axis – Determination bending stresses – section modulus of rectangular and circular sections (Solid and Hollow), I,T,Angle and Channel sections – Design of simple beam sections.

UNIT – IV

SHEAR STRESSES : Derivation of formula – Shear stress distribution across various beams sections like rectangular, circular, triangular, I, T angle sections.

UNIT – V

ANALYSIS OF PIN-JOINTED PLANE FRAMES : Determination of Forces in members of plane, pin jointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever & simply-supported trusses-by method of joints, method of sections & tension coefficient methods.

UNIT – VI

DEFLECTION OF BEAMS : Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, - U.D.L uniformly varying load. Mohr's theorems – Moment area method – application to simple cases including overhanging beams.

UNIT – VII

THIN CYLINDERS : Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders – Riveted boiler shells – Thin spherical shells.

UNIT – VIII

Thick cylinders–lame's equation – cylinders subjected to inside & out side pressures – compound cylinders.

TEXT BOOKS :

1. Strength of materials – R.S. Kurmi and Gupta.
2. Solid Mechanics, by Popov
3. Strength of Materials – Ryder. G.H.; Macmillan Long Man Pub.
4. Strength of Materials – W.A. Nash, TMH

REFERENCES:

1. Strength of Materials -By Jindal, Umesh Publications.
2. Analysis of structures by Vazirani and Ratwani.
3. Mechanics of Structures Vol-III, by S.B.Junnarkar.
4. Strength of Materials by S.Timshenko

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(53017) THERMODYNAMICS

UNIT – I:

Introduction: Basic Concepts : System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic viewpoints, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process, Cycle – Reversibility – Quasi – static Process, Irreversible Process, Causes of Irreversibility – Energy in State and in Transition, Types, Work and Heat, Point and Path function.

UNIT II:

Zeroth Law of Thermodynamics – Concept of quality of Temperature – Principles of Thermometry – Reference Points – Const. Volume gas Thermometer – Scales of Temperature, Ideal Gas Scale – PMM I - Joule's Experiments – First law of Thermodynamics – Corollaries – First law applied to a Process – applied to a flow system – Steady Flow Energy Equation.

UNIT – III:

Limitations of the First Law – Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries, PMM of Second kind, Carnot's principle, Carnot cycle and its specialties, Thermodynamic scale of Temperature, Clausius Inequality, Entropy, Principle of Entropy Increase – Energy Equation, Availability and Irreversibility – Thermodynamic Potentials, Gibbs and Helmholtz Functions, Maxwell Relations – Elementary Treatment of the Third Law of Thermodynamics.

UNIT IV:

Pure Substances, p-V-T- surfaces, T-S and h-s diagrams, Mollier Charts, Phase Transformations – Triple point at critical state properties during change of phase, Dryness Fraction – Clausius – Clapeyron Equation Property tables. Mollier charts – Various Thermodynamic processes and energy Transfer – Steam Calorimetry.

UNIT – V:

Perfect Gas Laws – Equation of State, specific and Universal Gas constants – various Non-flow processes, properties, end states, Heat and Work Transfer, changes in Internal Energy – Throttling and Free Expansion

Processes - Flow processes – Deviations from perfect Gas Model – Vander Waals Equation of State – Compressibility charts – variable specific Heats – Gas Tables.

UNIT – VI:

Mixtures of perfect Gases – Mole Fraction, Mass friction Gravimetric and volumetric Analysis – Dalton's Law of partial pressure, Avogadro's Laws of additive volumes – Mole fraction , Volume fraction and partial pressure, Equivalent Gas const. And Molecular Internal Energy, Enthalpy, sp. Heats and Entropy of Mixture of perfect Gases and Vapour, Atmospheric air - Psychrometric Properties – Dry bulb Temperature, Wet Bulb Temperature, Dew point Temperature, Thermodynamic Wet Bulb Temperature, Specific Humidity, Relative Humidity, saturated Air, Vapour pressure, Degree of saturation – Adiabatic Saturation , Carrier's Equation – Psychrometric chart.

UNIT – VII:

Power Cycles : Otto, Diesel, Dual Combustion cycles, Sterling Cycle, Atkinson Cycle, Ericsson Cycle, Lenoir Cycle – Description and representation on P- V and T-S diagram, Thermal Efficiency, Mean Effective Pressures on Air standard basis – comparison of Cycles.

UNIT VIII:

Refrigeration Cycles : Brayton and Rankine cycles – Performance Evaluation – combined cycles, Bell- Coleman cycle, Vapour compression cycle-performance Evaluation.

TEXT BOOKS :

1. Engineering Thermodynamics / PK Nag /TMH, III Edition
2. Thermodynamics – An Engineering Approach – Yunus Cengel & Boles /TMH

REFERENCES:

1. An introduction to Thermodynamics - YVC Rao / University press
2. Solution Manual to Introduction to Thermodynamics, YVC Rao / University Press
3. Engineering Thermodynamics – Jones & Dugan
4. Thermodynamics – Robert Balmer, Jaico Pub.
5. Thermodynamics – J.P.Holman, McGrawHill
6. Engineering Thermodynamics – K. Ramakrishna, Anuradha Publishers.
7. Fundamentals of Thermodynamics – Sonntag, Borgnakke and van wylen , John Wiley & sons (ASIA) Pte Ltd

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(53018) METALLURGY AND MATERIAL SCIENCE

UNIT – I

Structure of Metals : Bonds in Solids – Metallic bond - crystallization of metals, grain and grain boundaries, effect of grain boundaries on the properties of metal / alloys – determination of grain size.

UNIT - II

Constitution of Alloys : Necessity of alloying, types of solid solutions, Hume Rotherys rules, intermediate alloy phases, and electron compounds.

UNIT -III

Equilibrium of Diagrams : Experimental methods of construction of equilibrium diagrams, Isomorphous alloy systems, equilibrium cooling and heating of alloys, Lever rule, coring miscibility gaps, eutectic systems, congruent melting intermediate phases, peritectic reaction. Transformations in the solid state – allotropy, eutectoid, peritectoid reactions, phase rule, relationship between equilibrium diagrams and properties of alloys. Study of important binary phase diagrams of Cu-Ni-, Al-Cu, Bi-Cd, Cu-An, Cus-Sn and Fe-Fe3C.

UNIT -IV

Cast Irons and Steels : Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheriodal graphite cast iron, Alloy cast irons. Classification of steels, structure and properties of plain carbon steels, Low alloy steels, Hadfield manganese steels, tool and die steels.

UNIT – V

Heat treatment of Alloys : Effect of alloying elements on Fe-Fe3C system, Annealing, normalizing, Hardening, TTT diagrams, tempering , Hardenability, surface - hardening methods, Age hardening treatment, Cryogenic treatment of alloys.

UNIT - VI

Non-ferrous Metals and Alloys : Structure and properties of copper and its alloys, Aluminium and its alloys, Titanium and its alloys.

UNIT – VII

Ceramic materials : Crystalline ceramics, glasses, cermaets, abrasive materials, nanomaterials –definition, properties and applications of the above.

UNIT - VIII

Composite materials : Classification of composites, various methods of component manufacture of composites, particle – reinforced materials, fiber reinforced materials, metal ceramic mixtures, metal – matrix composites and C – C composites.

TEXT BOOKS :

1. Introduction to Physical Metallurgy / Sidney H. Avener, TMH.
2. Essential of Materials science and engineering/ Donald R.Askeland/ Thomson.

REFERENCES:

1. Material Science and Metallurgy/kodgire.
2. Science of Engineering Materials / Agarwal
3. Materials Science and engineering / William and collister.
4. Elements of Material science / V. Rahghavan
5. An introduction to materialscience / W.g.vinas & HL Mancini
6. Material science & material / C.D.Yesudian & harris Samuel
7. Engineering Materials and Their Applications – R. A Flinn and P K Trojan / Jaico Books.
8. Engineering materials and metallurgy/R.K.Rajput/ S.Chand.

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(53638) ELECTRICAL ENGINEERING APPLICATION LAB

1. Experiments on Thevenin's theorem
2. R-L-C series circuits
3. Single phase power measurement
4. characteristics of fluorescent lamp and incandescent lamp
5. OC and SC tests of single phase transformer.
6. Open-circuit characteristics of DC separately excited generator.
7. External characteristics of separately excited DC generator.
8. Three –point starter of DC Shunt motor
9. Speed control of DC motor.

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(53639) METALLURGY AND MECHANICS OF SOLIDS LAB

(A) METALLURGY LAB :

1. Preparation and study of the Micro Structure of pure metals like Iron, Cu and Al.
2. Preparation and study of the Microstructure of Mild steels, low carbon steels, high – C steels.
3. Study of the Micro Structures of Cast Irons.
4. Study of the Micro Structures of Non-Ferrous alloys.
5. Study of the Micro structures of Heat treated steels.
6. Hardenability of steels by Jominy End Quench Test.
7. To find out the hardness of various treated and untreated steels.

(B) MECHANICS OF SOLIDS LAB :

1. Direct tension test
2. Bending test on
   a) Simple supported
   b) Cantilever beam
3. Torsion test
4. Hardness test
   a) Brinells hardness test
   b) Rockwell hardness test
5. Test on springs
6. Compression test on cube
7. Impact test
8. Punch shear test

NOTE : Any 10 experiments from the above are to be conducted taking atleast 4 from each section.

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(54018) NUMERICAL METHODS

UNIT-I: Roots of Non linear equations

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

UNIT-II: Solution of linear equations:

Existence of solution – Gauss Elimination method – Gauss elimination with Pivoting. Gauss Jordon Method- Ill conditioned systems – Jacobi iterative method – Gauss Seidel Method – Convergence of Iterative methods.

UNIT-III: Interpolation:

Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences – Symbolic relations and separation of symbols- Difference Equations - Differences of a polynomial-Newton's formulae for interpolation –Interpolation with unevenly spaced points-Lagrange's Interpolation formula. - Cubic spline.

UNIT-IV: Least squares method:

Linear. Non linear and curvilinear curve fitting – Multiple linear regression

UNIT – V: Numerical differentiation and integration

Numerical differentiation and integration Trapezoidal rule, simpson's 1/3 rule and $3/8^{th}$ rule.

UNIT – VI : Numerical solution of Initional Value Problems in Ordinary Differential Equations

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods –Predictor-Corrector Methods- Adams- Bashforth Method.

UNIT-VII: Boundary values & Eigen value problems

Shooting method, Finite difference method and solving eigen values problems, power method.

UNIT-VIII: Solution of partial differential equations

Classification of partial differential equation –Finite difference methods for: Elliptic equations –Laplace equations – Leibmann's iterative method - Parabola equations – Solution of heat equation (One dimensional).

TEXT BOOKS:

1. Numerical Methods by E. Balaguruswamy by Tata – Mc Graw Hill.
2. An Introduction to Numerical Analysis by S.S.Sastry – PHI Learning
3. Numerical Methods by Jain, Iyengar & Jain.

REFERENCES:

1. Numerical Methods by S. Armugam & Others Scitech.
2. Introduction to Numerical Analysis by K.E. Aitkinson, Wiley Publications.
3. Numerical Analysis by Scarborough, Oxford IVH.
4. Elements of Numerical Analysis by Radha S.Gupta McMillan.
5. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications.

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(54014) KINEMATICS OF MACHINERY

UNIT – I:

MECHANISMS : Elements or Links – Classification – Rigid Link, flexible and fluid link – Types of kinematic pairs – sliding, turning, rolling, screw and spherical pairs – lower and higher pairs – closed and open pairs – constrained motion – completely, partially or successfully constrained and incompletely constrained .

MACHINES : Mechanism and machines – classification of machines - kinematic chain – inversion of mechanism – inversion of mechanism - inversions of quadric cycle, chain – single and double slider crank chains.

UNIT – II:

STRAIGHT LINE MOTION MECHANISMS : Exact and approximate copiers and generated types – Peaucellier, Hart and Scott Russul – Grasshopper – Watt T. Chebicheff and Robert Mechanisms and straight line motion, Pantograph.

UNIT – III:

KINEMATICS : Velocity and acceleration – Motion of link in machine – Determination of Velocity and acceleration diagrams – Graphical method – Application of relative velocity method four bar chain.

Analysis of Mechanisms : Analysis of slider crank chain for displacement , velocity and acceleration of slider – Acceleration diagram for a given mechanism, Kleins construction, Coriolis acceleration, determination of Coriolis component of acceleration.

Plane motion of body : Instantaneous center of rotation, centroids and axodes – relative motion between two bodies – Three centres in line theorem – Graphical determination of instantaneous centre, diagrams for simple mechanisms and determination of angular velocity of points and links.

UNIT – IV:

STEERING Mechanisms : Conditions for correct steering – Davis Steering gear Ackermans steering gear – velocity ratio.

HOOKE'S JOINT : Single and double Hooke's joint – Universal coupling – application – problems.

UNIT – V:

CAMS : Definitions of cam and followers – their uses – Types of followers and cams – Terminology – Types of follower motion - Uniform velocity - Simple harmonic motion and uniform acceleration. Maximum velocity and maximum acceleration during outward and return strokes in the above 3 cases.

Analysis of motion of followers : Roller follower – circular cam with straight, concave and convex flanks.

UNIT – VI:

Higher pairs, friction wheels and toothed gears – types – law of gearing, condition for constant velocity ratio for transmission of motion, Form of teeth: cycloidal and involute profiles. Velocity of sliding – phenomena of interferences – Methods of interference. Condition for minimum number of teeth to avoid interference, expressions for arc of contact and path of contact – Introduction to Helical, Bevel and worm gearing.

UNIT – VII:

Belt Rope and Chain Drives : Introduction, Belt and rope drives, selection of belt drive- types of belt drives, V-belts, materials used for belt and rope drives, velocity ratio of belt drives, slip of belt, creep of belt, tensions for flat belt drive, angle of contact, centrifugal tension, maximum tension of belt, Chains- length, angular speed ratio, classification of chains.

UNIT – VIII:

GEAR TRAINS: Introduction – Train value – Types – Simple and reverted wheel train – Epicyclic gear Train. Methods of finding train value or velocity ratio – Epicyclic gear trains. Selection of gear box-Differential gear for an automobile.

TEXT BOOKS:

1. Theory of Machines by Thomas Bevan, CBS
2. Theory of Machines - R.K Bansal
3. Theory of Machines R.S Khurmi & J.K Gupta

REFERENCES:

1. Theory of machines – Rattan .S.S., TMH, 2009 Edition
2. Theory of machines – PL. Ballaney / khanna publishers.
3. Theory of Machines Sadhu Singh Pearsons Edn
4. Mechanism and Machine Theory / JS Rao and RV Dukkipati / New Age
5. Theory of Machines / Shigley / Oxford.

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II Year B.Tech. Mining Machinery II-Sem.	**L**	**T/P/D**	**C**
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54058

(~~54057~~) IC ENGINES AND GAS TURBINES

Unit-I

I.C. Engines: Review of basic concepts, comparison of ideal, fuel-air and real cycles, use of fuel-air cycle for engine performance prediction.

Unit-II

Fuels for S.I. and C.I. engines, fuel ratings, alternatives fuels. Fuel injection systems . fuel pump and injectors, MPFI systems.

Unit-III

Principles of carburetion, modifications of carburetors. Ignition systems, power advancing.

Unit-IV

S.I. and C.I. engines combustion process, detonation and diesel knock.

Unit-V

Cooling and lubrication. Testing and performance. Engine emission and control.

Unit-VI

Super charging and Turbo charging in Engines.

Unit-VII

Turbo Machines: Gas Turbines: Classification, Open and Closed Cycle, Regenerative, Reheat, Inter-cooling, Regenerative and reheat cycle and their other combinations.

Unit-VIII

Jet Propulsion: Theory of Jet Propulsion, types of jet propulsion, thrust. thrust power and propulsive efficiency

TEXT BOOKS:

1. I.C. Engines – V. Ganesan, TMH
2. Gas Turbines – V. Ganesan, TMH.

REFERENCES:

1. I.C. Engines- Mathur and Sharma. Dhanapath Rai & Sons.
2. I. C. Engines - J.B. Heywood. McGrawhill Book Co.
3. Heat Engineering – Vasandani & Kumar, Metropolitan Book Co.
4. Thermodynamics and Heat Engines – B. Yadav, Central Book Depot. Alahabad.
5. Thermal Engineering – Rudramurthy, TMH.

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II Year B.Tech. Mining Machinery II-Sem.	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(54016) MECHANICS OF FLUIDS AND HYDRAULIC MACHINES

UNIT I

Fluid statics : Dimensions and units: physical properties of fluids- specific gravity, viscosity, surface tension- vapour pressure and their influence on fluid motion- atmospheric, gauge and vacuum pressures –measurement of pressure- Piezometer, U-tube and differential manometers.

UNIT II

Fluid kinematics : Stream line, path line and streak lines and stream tube, classification of flows-steady & unsteady, uniform & non uniform, laminar & turbulent, rotational & irrotational flows-equation of continuity for one dimensional flow and three dimensional flows.

Fluid dynamics : Surface and body forces –Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend.

UNIT III

Closed conduit flow: Reynold's experiment- Darcy Weisbach equation- Minor losses in pipes- pipes in series and pipes in parallel- total energy line-hydraulic gradient line.

Measurement of flow: pitot tube, venturimeter, and orifice meter, Flow nozzle.

UNIT IV

BOUNDARY LAYER CONCEPTS : Definition, thicknesses, characteristics along thin plate, laminar and turbulent boundary layers (No derivation) boundary layer in transition, separation of boundary layer, submerged objects – drag and lift.

UNIT V

Basics of turbo machinery : Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency, flow over radial vanes.

UNIT VI

Hydraulic Turbines : Classification of turbines, Heads and efficiencies,

impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies , hydraulic design – draft tube theory-functions and efficiency.

UNIT VII

Performance of hydraulic turbines : Geometric similarity, Unit and specific quantities, characteristic curves, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer.

UNIT VIII

Centrifugal pumps : Classification, working, work done – barometric head-losses and efficiencies specific speed- performance characteristic curves, NPSH.

Reciprocating pumps : Working, Discharge, slip, indicator diagrams.

TEXT BOOKS :

1. Hydraulics, fluid mechanics and Hydraulic machinery MODI and SETH.
2. Fluid Mechanics and Hydraulic Machines by Rajput.

REFERENCES :

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria & Sons.
2. Fluid Mechanics and Machinery by D. Rama Durgaiah, New Age International.
3. Hydraulic Machines by Banga & Sharma, Khanna Publishers.

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54059

(~~54058~~) MINING METHODS AND UNIT OPERATIONS

Unit-I

Surface Mining: Deposits amenable tp surface mining, Box cut: objectives, types, parameters and methods, production benches – objectives, formation and bench parameters,

Unit-II

Unit operations and associated equipment, classification of surface Mining Systems.

Unit-III

Underground Col Mining: Deposits amenable to underground coal mining, classification of underground coal mining methods, Bord and pillar methods – general description and applications and merits and demerits.

Unit-IV

Selection of panel; size, operation involved and associated equipment

Unit-V

Longwall methods: Types and their general description, applicability, merits & demerits, selection of face length & panel length, operations involved and associated equipment

Unit-VI

Methods for mining steeply inclined seams and thick seams, hydraulic mining.

Unit-VII

Underground metal mining: Deposits amenable to underground metal mining, shape, size and position of drifts and cross cuts, raises & winzes, classification of underground metal mining methods.

Unit-VIII

Stoping methods: general description, applicability, operations involved and associated equipments for room and their pillar mining, stope & pillar mining, shrinkage stoping, sub-level stoping, cut & fill stoping, VRC methods, sub-level caving & block caving.

REFERENCES:

1. Introduction Mining Engineers – 2nd edition H.L Hartman, J.M. Mutmansky, wilem student edition.
2. Elements of Mining Technology- I and II editions D.S. Deshmukh.

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II Year B.Tech. Mining Machinery II-Sem.	**L**	**T/P/D**	**C**
54060	**0**	**-/-/5**	**3**

(~~54059~~) MACHINE DRAWING AND COMPUTER AIDED GRAPHICS

Machine Drawing Conventions :

Need for drawing conventions – introduction to IS conventions

Conventional representation of materials, common machine elements and parts such as screws, nuts, bolts, keys, gears, webs, ribs.

I. Drawing of Machine Elements and simple parts

Selection of Views, additional views for the following machine elements and parts with every drawing proportions.

a) Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.

b) Keys, cottered joints and knuckle joint.

c) Rivetted joints for plates

d) Shaft coupling, spigot and socket pipe joint.

e) Journal, pivot and collar and foot step bearings.

II. Assembly Drawings:

Drawings of assembled views for the part drawings of the following using conventions and easy drawing proportions.

a) Engine parts – stuffing boxes, cross heads, Eccentrics, Petrol Engine connecting rod, piston assembly.

b) Other machine parts - Screws jacks, Machine Vices Plummer block, Tailstock.

c) Valves : Steam stop valve, spring loaded safety valve, feed check valve and air cock.

III Introduction to Computer Aided Graphics:

Fundamentals of 2D construction- line, circular, polyline , spline, polygon, simple problems, conversion of simple pictorial views into orthographic views.

NOTE : 1). First angle projection to be adopted. The student should be able

to provide working drawings of actual parts.

2). Unit III is only for class work practice, not to be included in the final examination.

TEXT BOOKS :

1. Machine Drawing – Ajeet Singh, TMH Publications
2. Machine Drawing –K.L.Narayana, P.Kannaiah & K. Venkata Reddy / New Age/ Publishers
3. Machine Drawing – N.D. Bhatt.
4. Engineering Graphics with Auto CAD – James D. Bethune – PHI 2009 Edition.

REFERENCES :

1. Machine Drawing – P.S.Gill.
2. Machine Drawing – Luzzader
3. Machine Drawing - Rajput

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II Year B.Tech. Mining Machinery II-Sem.	**L**	**T/P/D**	**C**
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(54638) MECHANICS OF FLUIDS AND HYDRAULIC MACHINES LAB

1. Impact of jets on Vanes.
2. Performance Test on Pelton Wheel.
3. Performance Test on Francis Turbine.
4. Performance Test on Kaplan Turbine.
5. Performance Test on Single Stage Centrifugal Pump.
6. Performance Test on Multi Stage Centrifugal Pump.
7. Performance Test on Reciprocating Pump.
8. Calibration of Venturimeter.
9. Calibration of Orifice meter.
10. Determination of friction factor for a given pipe line.
11. Determination of loss of head due to sudden contraction in a pipeline.
12. Verification of Bernoulli's Theorems

Note : Any 10 of the above 12 experiments are to be conducted.

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II Year B.Tech. Mining Machinery II-Sem.	**L**	**T/P/D**	**C**
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(54639) THERMAL ENGINEERING LAB

Perform any 10 out of the 12 exercises

1. I.C. Engines Valve / Port Timing Diagrams
2. I.C. Engines Performance Test(4 -Stroke Diesel Engines)
3. I.C. Engines Performance Test on 2-Stroke Petrol
4. Evaluation of Engine friction by conducting Morse test on 4-Stroke Multi cylinder Petrol Engine
5. Evaluate of engine friction by conducting motoring /retardation test on 4 stroke diesel Engine.
6. Heat balance on IC Engines.
7. Determination of A/F Ratio and Volumetric Efficiency on IC Engines.
8. Determine of Economical speed test for fixed load on 4-stroke Engine.
9. Determine optimum cooling water temperature on IC Engine
10. Dis-assembly / Assembly of Engines.
11. Performance test on Reciprocating Air-compressor unit.
12. Study of Boilers.

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III Year B.Tech. Mining Machinery I-Sem.	**L**	**T/P/D**	**C**
	4	**-/-/-**	**4**

(55015) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Unit I

Introduction to Managerial Economics: Definition, Nature and Scope of Managerial Economics–Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

Unit II

Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

Unit III

Theory of Production and Cost Analysis: Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost concepts, Opportunity cost, Fixed vs. Variable costs, Explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)- Managerial Significance and limitations of BEA.

Unit IV

Introduction to Markets & Pricing Policies: Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.

Objectives and Policies of Pricing- Methods of Pricing: Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two-Part Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization.

Unit V

Business & New Economic Environment: Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock

Company, Public Enterprises and their types. Changing Business Environment in Post-liberalization scenario.

Unit VI

Capital and Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance.

Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

Unit VII

Introduction to Financial Accounting: Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

Unit VIII

Financial Analysis through ratios: Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt-Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Profit Ratio, P/E Ratio and EPS).

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, TMH, 2009.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.

REFERENCES:

1. Raghunatha Reddy & Narasimhachary: Managerial Economics& Financial Analysis, Scitech, 2009.
2. V.Rajasekarn & R.Lalitha, Financial Accounting, Pearson Education, New Delhi, 2010.
3. Suma Damodaran, Managerial Economics, Oxford University Press, 2009.
4. Domnick Salvatore: Managerial Economics in a Global Economy, 4th Edition, Cengage, 2009.
5. Subhash Sharma & M P Vittal, Financial Accounting for Management, Text & Cases, Machmillan, 2008.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2008.

7. Truet and Truet: Managerial Economics:Analysis, Problems and Cases, Wiley, 2009.

8. Dwivedi:Managerial Economics, Vikas, 2009.

9. M.Kasi Reddy, S.Saraswathi: Managerial Economics and Financial Accounting, PHI, 2007.

10. Erich A. Helfert: Techniques of Financial Analysis, Jaico, 2007.

Prerequisites: Nil

Objective: To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making.

Codes/Tables: Present Value Tables need to be permitted into the examinations Hall.

Question Paper Pattern: 5 Questions to be answered out of 8 questions .Out of eight questions 4 questions will be theory questions and 4 questions should be problems.

Each question should not have more than 3 bits.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. Mining Machinery I-Sem.

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(55086) PRODUCTION TECHNOLOGY

UNIT – I

CASTING : Steps involved in making a casting – Advantage of casting and its applications. – Patterns and Pattern making – Types of patterns – Materials used for patterns, pattern allowances and their construction. Principles of Gating, Gating ratio and design of Gating systems

UNIT – II

Solidification of casting – Concept – Solidification of pure metal and alloys, short & long freezing range alloys. Risers – Types, function and design, casting design considerations, special casting processes 1) Centrifugal 2)Die, 3) Investment.

Methods of Melting : Crucible melting and cupola operation, steel making processes, special.

UNIT – III

A) Welding : Classification of welding process types of welds and welded joints and their characteristics, design of welded joints, Gas welding, ARC welding, Forge welding, resistance welding. Thermit welding and Plasma (Air and water) welding.

B) Cutting of Metals: Oxy – Acetylene Gas cutting, water plasma, Cutting of ferrous, non-ferrous metals.

UNIT – IV

Inert Gas welding, TIG & MIG, welding, Friction welding, Induction welding, Explosive welding, Laser welding, Soldering & Brazing. Heat affected zones in welding; welding defects – causes and remedies – destructive nondestructive testing of welds.

UNIT – V

Hot working, cold working, strain hardening, recovery, recrystallisation and grain growth, Comparison of properties of Cold and Hot worked parts, Rolling fundamentals – theory of rolling, types of Rolling mills and products. Forces in rolling and power requirements.

7. Truet and Truet: Managerial Economics:Analysis, Problems and Cases, Wiley, 2009.

8. Dwivedi:Managerial Economics, Vikas, 2009.

9. M.Kasi Reddy, S.Saraswathi: Managerial Economics and Financial Accounting, PHI, 2007.

10. Erich A. Helfert: Techniques of Financial Analysis, Jaico, 2007.

Prerequisites: Nil

Objective: To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making.

Codes/Tables: Present Value Tables need to be permitted into the examinations Hall.

Question Paper Pattern: 5 Questions to be answered out of 8 questions .Out of eight questions 4 questions will be theory questions and 4 questions should be problems.

Each question should not have more than 3 bits.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B.Tech. Mining Machinery I-Sem.

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(55036) PRODUCTION TECHNOLOGY

UNIT – I

CASTING : Steps involved in making a casting – Advantage of casting and its applications. – Patterns and Pattern making – Types of patterns – Materials used for patterns, pattern allowances and their construction. Principles of Gating, Gating ratio and design of Gating systems.

UNIT – II

Solidification of casting – Concept – Solidification of pure metal and alloys, short & long freezing range alloys. Risers – Types, function and design, casting design considerations, special casting processes 1) Centrifugal 2)Die, 3) Investment.

Methods of Melting : Crucible melting and cupola operation, steel making processes, special.

UNIT – III

A) Welding : Classification of welding process types of welds and welded joints and their characteristics, design of welded joints. Gas welding, ARC welding, Forge welding, resistance welding. Thermit welding and Plasma (Air and water) welding.

B) Cutting of Metals: Oxy – Acetylene Gas cutting, water plasma. Cutting of ferrous, non-ferrous metals.

UNIT – IV

Inert Gas welding, TIG & MIG, welding, Friction welding, Induction welding, Explosive welding, Laser welding, Soldering & Brazing. Heat affected zones in welding; welding defects – causes and remedies – destructive nondestructive testing of welds.

UNIT – V

Hot working, cold working, strain hardening, recovery, recrystallisation and grain growth, Comparison of properties of Cold and Hot worked parts, Rolling fundamentals – theory of rolling, types of Rolling mills and products. Forces in rolling and power requirements.

UNIT - VI

Stamping, forming and other cold working processes : Blanking and piercing – Bending and forming – Drawing and its types – wire drawing and Tube drawing – coining – Hot and cold spinning – Types of presses and press tools. Forces and power requirement in the above operations.

UNIT- VII

EXTRUSION OF METALS : Basic extrusion process and its characteristics. Hot extrusion and cold extrusion - Forward extrusion and backward extrusion – Impact extrusion Hydrostatic extrusion.

Forging processes: Principles of forging – Tools and dies – Types Forging – Smith forging, Drop Forging – Roll forging – Forging hammers : Rotary forging – forging defects.

UNIT - VIII

Processing of Plastics: Types of Plastics, Properties, applications and their Processing methods & Equipment (blow &injection modeling)

TEXT BOOKS :

1. Manufacturing Processes for Engineering Materials - Serope Kalpakjian and Steven R Schmid, Pearson Pub.
2. Manufacturing Technology - P.N. Rao, TMH
3. Production Technology - Sarma P C, S. Chand Pub.

REFERENCES:

1. Production Technology / R.K. Jain
2. Process and materials of manufacturing –Lindberg/PE
3. Principles of Metal Castings / Roenthal.
4. Welding Process / Paramar /
6. Production Engineering – Suresh Dalela & Ravi Shankar / Galgotia Publications Pvt. Ltd.
7. Manufacturing Engineering and Technology/Kalpakjin S/ Pearson Edu.

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III Year B.Tech. Mining Machinery I-Sem.	**L**	**T/P/D**	**C**
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(55087) ELECTRONICS ENGINEERING

Unit- I: p-n Junction Diode

Qualitative Theory of p-n Junction, p-n Junction as a Diode, Diode Equation, Volt-Ampere Characteristics, Temperature dependence of VI characteristic, Ideal versus Practical – Resistance levels (Static and Dynamic), Transition and Diffusion Capacitances, Diode Equivalent Circuits, Load Line Analysis, Breakdown Mechanisms in Semi Conductor Diodes, Zener Diode Characteristics.

Unit- II: Rectifiers and Filters

The p-n junction as a Rectifier, Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Harmonic components in a Rectifier Circuit, Inductor Filters, Capacitor Filters, L- Section Filters, - Section Filters, Comparision of Filters, Voltage Regulation using Zener Diode.

Unit- III: Bipolar Junction Transistor

The Junction Transistor, Transistor Current Components, Transistor as an Amplifier, Transistor Construction, BJT Operation, BJT Symbol, Common Base, Common Emitter and Common Collector Configurations, Limits of Operation , BJT Specifications.

Unit- IV: Transistor Biasing and Stabilization

Operating Point, The DC and AC Load lines, Need for Biasing, Fixed Bias, Collector Feedback Bias, Emitter Feedback Bias, Collector - Emitter Feedback Bias, Voltage Divider Bias, Bias Stability, Stabilization Factors, Stabilization against variations in V_{BE} and , Bias Compensation using Diodes and Transistors, Thermal Runaway, Thermal Stability.

Unit- V: Small Signal Low Frequency BJT Models

BJT Hybrid Model, Determination of h-parameters from Transistor Characteristics, Analysis of a Transistor Amplifier Circuit using h-Parameters, Comparison of CB, CE, and CC Amplifier Configurations.

Unit-VI: Field Effect Transistor

The Junction Field Effect Transistor (Construction, principle of operation,

symbol) – Pinch-off Voltage - Volt-Ampere characteristics, The JFET Small Signal Model, MOSFET (Construction, principle of operation, symbol), MOSFET Characteristics in Enhancement and Depletion modes.

Unit VII: FET Amplifiers

FET Common Source Amplifier, Common Drain Amplifier, Generalized FET Amplifier, Biasing FET, FET as Voltage Variable Resistor, Comparison of BJT and FET, The Uni Junction Transistor.

Unit VIII: Special Purpose Electronic Devices

Principle of Operation and Characteristics of Tunnel Diode (with the help of Energy Band Diagram) and Varactor Diode. Principle of Operation of Schottky Barrier Diode, SCR, and Semiconductor Photo Diode.

Text Books

1. Millman's Electronic Devices and Circuits – J. Millman, C.C.Halkias, and Satyabrata Jit, 2ed., 1998, TMH.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, 9 ed., 2006, PEI/PHI.
3. Introduction to Electronic Devices and Circuits - Rober T. Paynter, PE.

References

1. Integrated Electronics – J. Millman and Christos C. Halkias, 1991 ed., 2008, TMH.
2. Electronic Devices and Circuits - K. Lal Kishore, 2 ed., 2005, BSP.
3. Electronic Devices and Circuits – Anil K. Maini, Varsha Agarwal, 1 ed., 2009, Wiley India Pvt. Ltd.
4. Electronic Devices and Circuits – S.Salivahanan, N.Suresh Kumar, A.Vallavaraj, 2 ed., 2008, TMH.

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III Year B.Tech. Mining Machinery I-Sem.	**L**	**T/P/D**	**C**
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(55088) APPLIED ELECTRICAL ENGINEERING

Unit-I

Three phase transformer: construction, connection and operation. Parallel operation of transformers and simple related problems.

Unit-II

Synchronous Machine: Types of alternators and operating principles. Voltage regulation of alternator. Parallel operation of alternators, synchronizing to infinite bus bars and operating characteristics.

Unit-III

Operating principle and characteristics of synchronous motor. Damper winding, methods of starting of synchronous motor. Application of synchronous motor.

Unit-IV

Three phase induction motor: Deep bar and double cage induction motor – Construction, operating principle and characteristics.

Unit-V

Methods of starting and speed control of three –phase induction motor for cage and wound rotor motors. Electric braking systems.

Unit-VI

Performance of short and medium transmission line, nominal T and methods of representation of medium lines, ABCD constants, regulation and efficiency.

Unit-VII

Principles of rate making of electricity. Tariff-flat rate, block rate and two-part tariff.

Causes and disadvantages of low power factor, methods of power factor improvement with particular reference to mines.

Unit-VIII

Faults in power system, sources and types of faults, calculation of symmetrical

three phase short circuit MVA.

Text Books:

1. Electrical Machines – I.J. Nagrath & D.P. Kotari, Tata McGraw Hill 2006
2. Electrical Machines – P.S. Bhimbra, Khanna Publications 2nd Edition
3. A Text Book on Power Systems Engineering M.L. Soni, P.V. Gupta, A. Chakrabarti Dhanpat Rai.
4. Principles of Power Systems. – V.K. Mehta, Rohit Mehta. S. Chand & Company 2004.

Reference Books:

1. Electrical Machinery – A.E. Fitzgerald, C. Kingly, S.Umans, McGraw Hill
2. Elements of Power Systems Design & Practice – M.V.Deshpande, Wheeler Publications

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III Year B.Tech. Mining Machinery I-Sem.	**L**	**T/P/D**	**C**
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(55017) DYNAMICS OF MACHINERY

UNIT – I

PRECESSION:

Gyroscopes, effect of precession motion on the stability of moving vehicles such as motor car, motor cycle, aero planes and ships.

UNIT – II

STATIC AND DYNAMIC FORCE ANALYSIS OF PLANAR MECHANISMS:

Introduction – Free Body Diagrams – Conditions for equilibrium – Two, three and four force Members – Inertia forces and D' Alembert's Principle – planar rotation about a fixed center.

UNIT – III

SYNTHESIS OF LINKAGES:

Three position synthesis – Four Position Synthesis – Precision positions – structural error – Chebychev's spacing, Freudentein's Equation, Problems.

UNIT – IV

CLUTCHES: Friction clutches- Single Disc or plate clutch, Multiple Disc Clutch, Cone Clutch, Centrifugal Clutch.

BRAKES AND DYNAMOMETERS: Simple block brakes, internal expanding brake, band brake of vehicle. Dynamometers – absorption and transmission types. General description and methods of operations.

UNIT – V

TURNING MOMENT DIAGRAM AND FLY WHEELS:

Turning moment – Inertia Torque connecting rod angular velocity and acceleration, crank effort and torque diagrams – Fluctuation of energy – Fly wheels and their design.

UNIT-VI

GOVERNERS:

Watt, Porter and Proell governors. Spring loaded governors – Hartnell and Hartung with auxiliary springs. Sensitiveness, isochronism and hunting.

UNIT – VII

BALANCING:

Balancing of rotating masses Single and multiple – single and different planes. Balancing of Reciprocating Masses: Primary and Secondary balancing of reciprocating masses. Analytical and graphical methods -. Unbalanced forces and couples – Balancing of "V", multi cylinder in line and radial engines for primary and secondary balancing, locomotive balancing.

UNIT – VIII

VIBRATION:

Free Vibration of mass attached to vertical spring – Simple problems on forced damped vibration Vibration Isolation & Transmissibility- Whirling of shafts, critical speeds, torsional vibrations, two and three rotor systems.

TEXT BOOKS:

1. Theory of Machines by T.Beven. Pearson Education
2. Theory of Machines by SS Ratan, Mc Graw Hill

REFERENCES:

1. Theory of Machines and Mechanisms by P.L.Ballaney, Khanna Publishers
2. Kinematics and Dynamics of Machinery by R.L.Norton, Mc Graw - Hill
3. Mechanism and Machine Theory / JS Rao and RV Dukkipati / New Age
4. Theory of Machines and Mechanisms by Uicker, Pennock and Shigley, Oxford

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(55019) DESIGN OF MACHINE MEMBERS

UNIT – I

INTRODUCTION : General considerations in the design of Engineering Materials and their properties – selection –Manufacturing consideration in design. Tolerances and fits –BIS codes of steels.

STRESSES IN MACHINE MEMBERS : Simple stresses –Complex stresses – impact stresses – stress strain relations – static theories of failure – factor of safety – Design for strength and rigidity – preferred numbers. The concept of stiffness in tension, bending, torsion and combined situations.

UNIT – II

FATIGUE LOADING : Stress concentration – Theoretical stress Concentration factor – Fatigue stress concentration factor notch sensitivity – Design for fluctuating stresses – Endurance limit – Estimation of Endurance strength – Fatigue theories of failure – Goodman and Soderberg.

UNIT – III

RIVETED AND WELDED JOINTS: Riveted joints: Modes of failure of riveted joints – Strength Equations – efficiency of riveted joints - Design of boiler joints – eccentrically loaded riveted joints.

Welded joints: Design of Fillet welds - axial loads - Circular fillet welds - bending and torsion – eccentrically loaded joints.

UNIT – IV

BOLTED JOINTS: Design of bolts with pre-stresses – Design of joints under eccentric loading – bolt of uniform strength, Cylinder cover joints.

UNIT – V

AXIALLY LOADED JOINTS: Keys, Cotters And Knuckle Joints : Design of Keys-stresses in keys-cottered joints-spigot and socket, sleeve and cotter. jib and cotter joints- Knuckle joints.

UNIT – VI

DESIGN OF SHAFTS : Design of solid and hollow shafts for strength and

rigidity – Design of shafts for complex loads – Shaft sizes – BIS code – Design of shaft for a gear and belt drives.

UNIT – VII

SHAFT COUPLING : Rigid couplings – Muff, Split muff and Flange couplings. Flexible couplings – Pin – Bush coupling.

UNIT – VIII

MECHANICAL SPRINGS : Stresses and deflections of helical springs – Extension -compression springs – Springs for static and fatigue loading – natural frequency of helical springs – Energy storage capacity – helical torsion springs – Co-axial springs.

TEXT BOOKS :

1. Mechanical Engineering Design by Bahl and Goel, Standard Publications
2. Machine Design by R.L.Norton, Mc Graw Hill

REFERENCES :

1. Machine Design by Timothy H. Wenzell PE, Cengage
2. Machine Design by V.Bandari, Tmh Publishers
3. Machine design / Schaum Series.
4. Machine design – Pandya & shah.
5. Machine Design, S MD Jalaludin, Anuradha Publishers

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(55640) PRODUCTION TECHNOLOGY LAB

Minimum of 12 Exercises need to be performed

I. METAL CASTING LAB :

1. Pattern Design and making - for one casting drawing.
2. Sand properties testing - Exercise -for strengths, and permeability – 1
3. Moulding Melting and Casting - 1 Exercise

II WELDING LAB :

1. ARC Welding Lap & Butt Joint - 2 Exercises
2. Spot Welding - 1 Exercise
3. TIG Welding - 1 Exercise
4. Plasma welding and Brazing - 2 Exercises (Water Plasma Device)

III MECHANICAL PRESS WORKING :

1. Blanking & Piercing operation and study of simple, compound and progressive press tool.
2. Hydraulic Press : Deep drawing and extrusion operation.
3. Bending and other operations

IV PROCESSING OF PLASTICS

1. Injection Moulding
2. Blow Moulding

REFERENCE BOOK:

1. Dictionary of Mechanical Engineering – G.H.F. Nayler, Jaico Publishing House.

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(55641) ELECTRONIC DEVICES AND CIRCUITS LAB

PART A: (Only for Viva-voce Examination)

ELECTRONIC WORKSHOP PRACTICE (in 3 lab sessions) :

1. Identification, Specifications, Testing of R, L, C Components (Color Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards, PCB's
2. Identification, Specifications and Testing of Active Devices, Diodes, BJT's, Low power JFET's, MOSFET's, Power Transistors, LED's, LCD's, SCR, UJT.
3. Study and operation of
   - Multimeters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   - CRO.

PART B: (For Laboratory Examination – Minimum of 10 experiments)

1. Forward & Reverse Bias Characteristics of PN Junction Diode.
2. Zener diode characteristics and Zener as voltage Regulator.
3. Input & Output Characteristics of Transistor in CB Configuration.
4. Input & Output Characteristics of Transistor in CE Configuration.
5. Half Wave Rectifier with & without filters
6. Full Wave Rectifier with & without filters
7. FET characteristics
8. Measurement of h parameters of transistor in CB, CE, CC configurations
9. Frequency Response of CC Amplifier.
10. Frequency Response of CE Amplifier.
11. Frequency Response of Common Source FET amplifier

12. SCR characteristics.
13. UJT Characteristics

PART C:

Equipment required for Laboratories:

1.	Regulated Power supplies (RPS	-	0-30 V
2.	CRO's	-	0-20 MHz.
3.	Function Generators	-	0-1 MHz.
4.	Multimeters		
5.	Decade Resistance Boxes/Rheostats		
6.	Decade Capacitance Boxes		
7.	Ammeters (Analog or Digital)	-	0-20 μA, 0-50μA, 0-100μA, 0-200μA, 0-10 mA.
8.	Voltmeters (Analog or Digital)	-	0-50V, 0-100V, 0-250V
9.	Electronic Components	-	Resistors, Capacitors, BJTs, LCDs, SCRs, UJTs, FETs, LEDs, MOSFETs,diodes Ge& Si type, Transistors – npn,pnp type)

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(56016) INDUSTRIAL MANAGEMENT

Unit I:

***Introduction to Management*:** Entrepreneurship and organization - Nature and Importance of Management, Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

Unit II:

***Designing Organisational Structures*:** Departmentation and Decentralisation, Types of Organisation structures - Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundaryless organization, inverted pyramid structure, lean and flat organization structure and their merits, demerits and suitability.

Unit III:

***Operations Management*:** Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement-Statistical Quality Control: $\overline{X}$ chart, R chart, *c* chart, *p* chart, (simple Problems), Acceptance Sampling, Deming's contribution to quality.

Unit IV:

***A) Materials Management*:** Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records - Supply Chain Management

***B) Marketing*:** Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle., Channels of distribution.

Unit V:

***Human Resources Management (HRM)*:** Evolution of HRM, Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment,

Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

Unit VI:

***Project Management (PERT/CPM)*:** Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (simple problems)

Unit VII:

***Strategic Management*:** Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

Unit VIII:

***Contemporary Management Practices*:** Basic concepts of Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels, Value Chain Analysis,Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business Process Re-engineering 5S Model, Deming's PDCA, Kaizen, Poka-Yoke, Muda, Benchmarking, Balanced Score Card.

TEXT BOOKS:

1. Aryasri: *Management Science*, TMH, New Delhi, 2009

REFERENCE BOOKS:

1. Stoner, Management, Pearson, 2009
2. Kotler Philip & Keller Kevin Lane: Marketing Management PHI, 2009.
3. Koontz, Weihrich, & Aryasri: Principles *of Management*, TMH, 2009.
4. Thomas N.Duening & John M.Ivancevich *Management, Principles and Guidelines*, Cengage, 2009.
5. Kanishka Bedi, *Production and Operations Management*, Oxford University Press, 2009.
6. Memoria & S.V.Ganker, *Personnel Management*, Himalaya, 2009

7. Schermerhorn: *Management*, Wiley, 2009.

8. Parnell: Strategic Management, Biztantra, 2009.

9. L.S.Srinath: PERT/CPM,Affiliated East-West Press, 2009.

10. William J. Stevenson & Ceyhun Ozgur: Introduction to Management Science, TMH, 2007.

Pre-requisites: Managerial Economics

Objective: To familiarize with the process of management and to provide basic insights into select contemporary management practices.

Codes/Tables: Normal Distribution Function Table need to be permitted into the examination Hall.

Question Paper Pattern: 5 Questions to be answered out of 8 questions. The question paper should contain atleast 2 practical problems, one each from units –III & VI

Each question should not have more than 3 bits.

Unit VIII will have only short questions, not essay questions.

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(56091) FLUID POWER AND CONTROL

Unit-I

General: Classification and application of fluid flow machinery, basic concepts of capacity, head, power, energy and efficiency.

Unit-II

Centrifugal pumps: Principle of operation; Euler's equation, theoretical and actual head, energy equation for liquid flow through impeller, construction of impeller, multistage centrifugal pumps, axial thrust balancing, performance curves, parallel and series operation of pumps, capacity regulation; selection of mine pumps.

Unit-III

Other Mine Pumps: Construction and operation of slurry, submersible, air lift and mono pumps; Installation and maintenance of mine pumps.

Unit-IV

Reciprocation and Rotary Positive Displacement Pumps: Basis theory or reciprocation pumps, indicator diagram, net positive suction head, capacity, power, application and constructional details of reciprocation pumps; Application, types, construction and main design features of rotary positive displacement pumps used for dewatering.

Unit-V

Fans: Application and types of mine fans; Determination of capacity of centrifugal fans; Axial flow Fan: Cascade of profiles; basic theoretical equations, head, energy, losses, efficiency, multistage machines: construction, calculations, selection procedure with special reference to mining application.

Main features of auxiliary and booster fans. Installation and maintenance of mine fans.

Unit-VI

Compressors: Basic theory, classification and application in mines; construction and approximate calculation of centrifugal compressors, multistaging; main details, basic design features of axial flow compressors;

construction of single and multistage reciprocating compressors, compressor type, design and calculation of main dimensions of reciprocating compressors; construction, performance, capacity regulation and basic design of rotary compressors, installation and maintenance of compressors.

Unit-VII

Fluid Power Systems – Hydraulic Cylinders, rams and Valves – Different Types.

Unit-VIII

Industrial Hydraulic circuits - Pressure regulatory circuits, speed control circuits, Basic Automation Circuits, Choice of components.

Text Books:

1. Fluid Mechanics and Hydraulic Machines – Jagadish Lal
2. Industrial Hydraulics John J. Pippenger & Tyler Hicks, International Student Edition.
3. Selection and Installation of Power Mine Pumps, Rakesh and Lele

Reference Books:

1. Fluid Mechanics and Hydraulic Machines – Dodi & Seth
2. Fluid Power Controls- John J. Pippenger Richard M. Koff, McGraw hill Book Company.
3. Hydraulic and Pneumatic Power and Control – Design, Performance Application, Edited by Franklin D. Yeaple, MCGraw Hill Book Company.

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(56092) OPEN CAST DRILLING AND PRODUCTION EQUIPMENT

Unit-I

Introduction to surface mining equipment:

Classification of equipment; system with different combinations of excavator and transport equipment. Machanics of rock cutting/loading by excavator bucket.

Unit-II

Prime movers used in surface mining equipment:

Turbo charged diesel engine, construction, operation and maintenance of its subsystems, trouble shooting of the engine.

Unit-III

Blast hole drilling Machines: Construction, operation and maintenance of its subsystems, types of drill bits, maintenance of drilling machines.

Unit-IV

Different types of excavators:

Shovel: Classification of shovels, detailed construction, operation and maintenance of various subsystems of shovels. Applicability of various types of shovels. Dragline: Classification dragline; detailed constructional features of different subsystems/components of dragline. Maintenance of dragline. Bucket wheel excavator: Classification of bucket wheel excavator, construction and operation of various mechanisms of the machine; maintenance of the equipment. Selection and application of bucket wheel excavator.

Unit-V

Scraper: Classification of the scraper, constructional details of the various subsystems/components of scraper, application of scraper, maintenance of the equipment.

Unit-VI

Surface Miner: Constructional details of various subsystem/components of

surface miner, application and maintenance of surface miner.

Unit-VII

Unconventional mining equipment used in surface mining project. Recent trends and development of surface mining equipment.

Unit-VIII

Selection criteria of the openpit production equipment.

Safety aspects related to openpit production equipment.

Text Books:

1. Recent Developments of Heavy Earth Moving Equipments- A De Lovely Prakasan
2. Moving the Earth – Nicholas
3. On and with the Earth – J. Singh.

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(56093) INSTRUMENTATION AND CONTROL SYSTEM ENGINEERING

UNIT – I

Definition – Basic principles of measurement – Measurement systems, generalized configuration and functional descriptions of measuring instruments – examples. Dynamic performance characteristics – sources of error, Classification and elimination of error.

UNIT – II

Measurement of Displacement: Theory and construction of various transducers to measure displacement – Piezo electric, Inductive, capacitance, resistance, ionization and Photo electric transducers, Calibration procedures.

Measurement Of Temperature: Classification – Ranges – Various Principles of measurement – Expansion, Electrical Resistance – Thermistor – Thermocouple – Pyrometers – Temperature Indicators..

UNIT – III

Measurement Of Pressure: Units – classification – different principles used. Manometers, Piston, Bourdon pressure gauges, Bellows – Diaphragm gauges. Low pressure measurement – Thermal conductivity gauges – ionization pressure gauges, Mcleod pressure gauge.

UNIT – IV

Measurement of Level: Direct method – Indirect methods – capacitative, ultrasonic, magnetic, cryogenic fuel level indicators – Bubbler level indicators.

Flow Measurement: Rotameter, magnetic, Ultrasonic, Turbine flow meter, Hot – wire anemometer, Laser Doppler Anemometer (LDA).

UNIT – V

Measurement Of Speed: Mechanical Tachometers – Electrical tachometers – Stroboscope, Non- contact type of tachometer.

Measurement of Acceleration and Vibration: Different simple instruments – Principles of Seismic instruments – Vibrometer and accelerometer using

this principle.

UNIT – VI

Stress Strain Measurements: Various types of stress and strain measurements – electrical strain gauge – gauge factor – method of usage of resistance strain gauge for bending compressive and tensile strains – usage for measuring torque, Strain gauge Rosettes.

UNIT – VII

Measurement Of Humidity: Moisture content of gases, sling psychrometer, Absorption psychrometer, Dew point meter

Measurement Of Force,Torque And Power: Elastic force meters, load cells, Torsion meters, Dynamometers.

UNIT – VIII

Elements Of Control Systems: Introduction, Importance – Classification – Open and closed systems Servomechanisms – Examples with block diagrams – Temperature, speed and position control systems.

Pre-Requisite:

Objective: This subject provides insight into the different mechanical measurement systems and working and testing procedures

TEXT BOOKS:

1. Measurement Systems: Applications & Design by D.S Kumar, Anuradha Agencies
2. Instrumentation, measurement & analysis by B.C.Nakra & K.K.Choudhary, TMH

REFERENCE BOOKS:

1. Instrumentation and Control systems/ S.Bhaskar/ Anuradha Agencies
2. Experimental Methods for Engineers / Holman
3. Mechanical and Industrial Measurements / R.K. Jain/ Khanna Publishers.
4. Mechanical Measurements / Sirohi and Radhakrishna / New Age
5. Instrumentation &mech. Measurements by A.K. Tayal ,Galgotia Publications.

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(56094) BULK SOLIDS HANDLING EQUIPMENT

Unit-I

Surface Mining Loaders: Construction and operation of loader; constructional aspects of loader mechanisms, such as front attachment, bucket hoist control, power transmission systems, braking system, different mounting of loader, steering mechanism; maintenance of loader.

Unit-II

Dozer: Various types of dozers, component details such as blade, blade arms, blade control circuit, power transmission system, steering mechanism, under carriage unit shoe construction, various activities of dozer, maintenance of dozer.

Unit-III

Grader: Various types of grader, constructional details of blade, blade operational mechanism, power transmission system, activities of grader, maintenance of grader.

Unit-VI

Dumper: Different types, constructional details of dumper chasis, dump body.

Component details of power transmission system, suspension system.

Hydraulic circuit details for dump body hoisting, power steering, Air system details in dumpers, different types of dumper brake and their uses; Wheel brake assembly of dumper, constructional details of tyre and tyre maintenance.

Dumper maintenance.

Unit-V

High Capacity Belt Conveyor: Steel chord belting flexible shaft idler rollers, garlanded type of idlers for heavy duty conveyors, cable belt conveyors, high angle conveyor, belt selection and drive assessment, conveyor shifting arrangement, mobile transfer conveyor, transfer feeder, tipler speader.

Unit-VI

Aerial Ropeways: Classification, construction, operation and application.

Loading and unloading systems; construction and operations of bed blending equipment, stacker, reclaimer, wagon loader, wagon tipler.

Unit-VII

Compactor: Construction and operation of various types of compactors; road rollers, sheep's foot roller, pneumatic rollers, maintenance aspects of rollers. Safety aspects of the open pit loading and transport equipment

Unit-VIII

Truck Navigation system.

Text Books

1. Mechanical Conveyors for bulk Soilds- A. Colijun, Elsevier Sciences Publication
2. Material Handling Equipment – M.P. Alexander, MIR Publications.

Reference Books

1. Good Year handbook of Belting & Conveyor
2. Pneumatic Conveying – H.A. Stocss John Wiley & Sons.
3. Mineral Processing – G. Tarjan Akademia Kado
4. Mineral Processing – B.A. Will Peragamon Press.
5. Mine Transport- Karelin
6. Elements of Mining Technology, Vol.-III, D.J. Desh Mukh.

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(56095) MECHATRONICS

UNIT – I

Introduction: Definition – Trends - Control Methods: Stand alone, PC Based (Real Time Operating Systems, Graphical User Interface, Simulation) - Applications: SPM, Robot, CNC, FMS, CIM.

UNIT – II

Signal Conditioning: Introduction – Hardware - Digital I/O , Analog input – ADC , resolution , sped channels Filtering Noise using passive components – Resistors, capacitors - Amplifying signals using OP amps – Software - Digital Signal Processing – Low pass , high pass, notch filtering

UNIT – III

Precision Mechanical Systems: Pneumatic Actuation Systems - Electro-pneumatic Actuation Systems - Hydraulic Actuation Systems - Electro-hydraulic Actuation Systems - Timing Belts – Ball Screw and Nut - Linear Motion Guides - Linear Bearings - Harmonic Transmission - Bearings- Motor / Drive Selection.

UNIT – IV

Electronic Interface Sub systems: TTL, CMOS interfacing - Sensor interfacing - Actuator interfacing – solenoids , motors Isolation schemes- opto coupling, buffer IC's - Protection schemes – circuit breakers , over current sensing , reset able fuses , thermal dissipation - Power Supply - Bipolar transistors / mosfets

UNIT – V

Electromechanical Drives : Relays and Solenoids - Stepper Motors - DC brushed motors – DC brushless motors - DC servo motors - 4-quadrant servo drives, PWM's - Pulse Width Modulation – Variable Frequency Drives, Vector Drives - Drive System load calculation.

UNIT – VI

Microcontrollers Overview: 8051 Microcontroller , micro processor structure – Digital Interfacing - Analog Interfacing - Digital to Analog Convertors - Analog to Digital Convertors - Applications. Programming –Assembly, C (

LED Blinking , Voltage measurement using ADC).

UNIT – VII

Programmable Logic Controllers: Basic Structure - Programming : Ladder diagram - Timers, Internal Relays and Counters - Shift Registers - Master and Jump Controls - Data Handling - Analog input / output - PLC Selection - Application.

Unit – VIII

Programmable Motion Controllers : Introduction - System Transfer Function - Laplace transform and its application in analysing differential equation of a control system - Feedback Devices : Position, Velocity Sensors - Optical Incremental encoders - Proximity Sensors: Inductive , Capacitive , Infrared - Continuous and discrete processes- Control System Performance & tuning - Digital Controllers - P , PI, PID Control - Control modes – Position , Velocity and Torque - Velocity Profiles – Trapezoidal - S. Curve - Electronic Gearing - Controlled Velocity Profile - Multi axis Interpolation, PTP, Linear, Circular - Core functionalities – Home, Record position , Go to Position - Applications: SPM, Robotics.

TEXT BOOKS:

1. Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering by W Bolton, Pearson Education Press, 3rd edition, 2005.
2. Mechatronics/M.D.Singh/J.G.Joshi/PHI.

REFERENCES:

1. Mechatronics Source Book by Newton C Braga, Thomson Publications, Chennai.
2. Mechatronics – N. Shanmugam / Anuradha Agencies Publisers.
3. Mechatronics System Design / Devdas shetty/Richard/Thomson.

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(56645) MINING MACHINES LAB

1. Different types of ropes, rope capping and rope splicing
2. Different types of rope hau9lages
3. Haulage clips
4. Haulage track and rolling stocks
5. Winding drums safety devices and braking systems
6. Experiments related to Hand held coal drill (its assembly and disassembly), drill bits and drill rods.
7. Single drum shearer loader, mounting arrangement, mountings on AFC and its trapping mechanism (shearer in longwall gallery).
8. Friction prop, close-circuit hydraulic prop, multileg chock support (in longwall gallery).
9. Practical work related to the Dumper, Dozer, Motor Grader and Loader in actual operating conditions through arraged visits in the field.

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(56646) ADVANCED ENGLISH COMMUNICATION SKILLS LAB

1. Introduction

The introduction of the English Language Lab is considered essential at 3rd year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

1. Gather ideas and information, to organise ideas relevantly and coherently.
1. Engage in debates.
1. Participate in group discussions.
1. Face interviews.
1. Write project/research reports/technical reports.
1. Make oral presentations.
1. Write formal letters.
1. Transfer information from non-verbal to verbal texts and vice versa.
1. To take part in social and professional communication.

2. Objectives:

This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

1. To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
1. Further, they would be required to communicate their ideas relevantly and coherently in writing.

3. Syllabus:

The following course content is prescribed for the Advanced Communication Skills Lab:

* **Functional English** - starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.
* **Vocabulary Building** – synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.
* **Reading Comprehension** – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, Critical reading.
* **Writing Skills** – structure and presentation of different types of writing – *Resume writing / e-correspondence/Technical report writing/ Portfolio writing* – planning for writing – *research abilities/data collection/organizing data/tools/analysis* – improving one's writing.
* **Group Discussion** – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
* **Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars and written presentations through posters/ projects/reports/PPTs/e-mails/assignments etc.
* **Interview Skills** – concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.

4. Minimum Requirement:

The English Language Lab shall have two parts:

i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.

ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the

following specifications:

i) P – IV Processor
   a) Speed – 2.8 GHZ
   b) RAM – 512 MB Minimum
   c) Hard Disk – 80 GB

ii) Headphones of High quality

5. Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

Suggested Software:

1. **Clarity Pronunciation Power** – part II
1. **Oxford Advanced Learner's Compass**, 7th Edition
1. **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
1. **Lingua TOEFL CBT Insider**, by Dreamtech
1. **TOEFL & GRE**(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
1. **The following software from 'train2success.com'**
   * **Preparing for being Interviewed,**
   * **Positive Thinking,**
   * **Interviewing Skills,**
   * **Telephone Skills,**
   * **Time Management**
   * **Team Building,**
   * **Decision making**
1. **English in Mind**, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

6. Books Recommended:

1. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.

2. **Advanced Communication Skills Laboratory Manual** by Sudha Rani, D, Pearson Education 2011.
3. **English Language Communication : A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
4. **English Vocabulary in Use** series, Cambridge University Press 2008.
5. **Management Shapers Series** by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
6. **Communication Skills** by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
7. **Handbook for Technical Writing** by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
8. **Job Hunting** by Colm Downes, Cambridge University Press 2008.
9. **Master Public Speaking** by Anne Nicholls, JAICO Publishing House, 2006.
10. **English for Technical Communication for Engineering Students**, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
11. Books on **TOEFL/GRE/GMAT/CAT/ IELTS** by Barron's/DELTA/ Cambridge University Press.
12. **International English for Call Centres** by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

Advanced Communication Skills Lab Practicals:

1. The practical examinations for the English Language Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. Mining Machinery I-Sem.

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3	1/-/-	3

(57155) MECHANICAL HANDLING TRANSPORT AND LOADING EQUIPMENT

Unit-I

Mechanical Loaders: Classifications, scope of use of each in different conditions, construction and operations of scraper loader, pneumatics loaders, gathering arm loader.

Unit-II

Load-haul-dumper, low profile dump trucks, side discharge loader.

Mine Track: Track work, turns and crossings, layout of tracks, switch points.

Unit-III

Rope Haulage: Different types of rope haulages with their use and constructional details, haulage rope constructions, caping and splicing, rope clips, haulage safety devices, rope haulage calculations.

Unit-IV

Locomotives: Different types with uses, construction and operation of diesel, battery and trolley wire locomotives, control and breaking systems, power and capacity assessments, construction of shuttle cars and man riding systems.

Unit-V

Conveyors: Construction of different types of belt conveyors, chain conveyors, armoured flexible conveyors, stage loaders; main and extensible belt conveyors, principles of hydraulic and pneumatic conveying . power calculation and selection of conveyors.

Unit-VI

Mine Winders:

Different types of winding systems with their construction and operational differences; Construction, selection, inspection and maintenance of winding ropes, suspension gear components and other shaft fitting; Kinematics and dynamics of winding systems including duty cycles, capacity assessments

and power calculation; Mechanical and electrical braking winders.

Unit-VII

Selection, installation and maintenance of winders; Automatic contrivances and safety devices.

Unit-VIII

Safety aspects of underground loading and transport equipment.

Text Books:

1. Material Handling Equipment – N. Rudenko, Peace Publications.
2. Material Handling – R. John Fenner, McGraw Hills.

Reference Books:

1. Material Handling Equipment – D.O. Haynes Clilton & Co.
2. Handbook of Material Handling- H. Boldz.
3. Elements of Mining Technology – D.J. Deshmukh.
4. Mining Mechanical Engineering – R. Khadzhikor, MIR Publications.
5. Mechanics of Bulk Material Handling – NormanBrook, London, Butter Worth.
6. Electric Handling – L. Szlaraski, Academic Press.

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IV Year B.Tech. Mining Machinery I-Sem.

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(57156) MINE ELECTRICAL ENGINEERING

Unit-I

Types of electrical power supply systems for underground coal mines – solidly earthed, restricted neutral and insulated – neutral systems of electrical power supply; their comparisons.

Unit-II

Earth fault protection techniques for above mine power supply systems, sensitive and fail-safe earth fault relays. On-line insulation monitoring for insulated-neutral electrical distribution system.

Unit-III

Mining type circuit breakers – Air circuit breaker, vacuum and Hexa Sulfa Flouride ($Sf_{6)}$ circuit breakers, Field switch, Transwitch Unit, Gate End Box, Drill Panel.

Unit-IV

Electrical power planning for mechanized longwall faces – general scheme of electrical power distribution, voltage drop problems and remedial measurers; Inbye substation capacity selection. General scheme of electrical power distribution in opencast projects. Quarry substation capacity selection. Choice of restricted-neutral and insulated-neutral systems in open cast mines.

Unit-V

Illumination planning for mines – underground roadway lighting system; intrinsically-safe lighting system for longwall faces, opencast mine lighting.

Unit-VI

Earthing practice in mines – earth pits, earthing of mobile electrical equipment in mines. Mining cables – types, constructional details; layout of cables through shaft and other locations.

Unit-VII

Principles of flame proof enclosures. Intrinsically safe circuit methods of attaining intrinsic safety, zeener safety barriers and their applications.

Unit-VIII

Indian electricity rules as applied to mines.

Text Books:

1. A Text Book on Power Systems Engineering – Soni Gupta, Bhatnagar, Chakarbarti, Dhanpat Rai & Sons.
2. Electrical Equipment in mines- H. Cotton.
3. Switchgear and Protection- S.S. Rao Khanna Publications.
4. Indian ElectricityRules.
5. Principles of Mine Planning J. Bhattacharya, Allied Publications.

Reference Books:

1. Universal Mining School Series (UK)
2. Coal Mining Practice- J.C. F Statharm Vol III, Heart Series.
3. Electrical Power Systems – C.L. Wadhwa, New Age International Publishers.

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IV Year B.Tech. Mining Machinery I-Sem.	**L**	**T/P/D**	**C**
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(57157) AUTOMOBILE ENGINEERING

UNIT – I

Introduction : Components of four wheeler automobile – chassis and body – power unit – power transmission – rear wheel drive, front wheel drive, 4 wheel drive – types of automobile engines, engine construction, turbo charging and super charging – engine lubrication, splash and pressure lubrication systems, oil filters, oil pumps – crank case ventilation – engine service, reboring, decarbonisation, Nitriding of crank shaft.

UNIT – II

Fuel System : S.I. Engine : Fuel supply systems, Mechanical and electrical fuel pump – filters – carburettor – types – air filters – petrol injection.

C.I. Engines : Requirements of diesel injection systems, types of injection systems, fuel pump, nozzle, spray formation, injection timing, testing of fuel pumps.

UNIT – III

Cooling System : Cooling Requirements, Air Cooling, Liquid Cooling, Thermo, water and Forced Circulation System – Radiators – Types – Cooling Fan - water pump, thermostat, evaporating cooling – pressure sealed cooling – antifreeze solutions.

Ignition System : Function of an ignition system, battery ignition system, constructional features of storage, battery, auto transformer, contact breaker points, condenser and spark plug – Magneto coil ignition system, electronic ignition system using contact breaker, electronic ignition using contact triggers – spark advance and retard mechanism.

Unit – IV

Emission from Automobiles – Pollution standards National and international – Pollution Control – Techniques – Multipoint fuel injection for SI Engines. Common rail diesel injection Energy alternatives – Solar, Photo-voltaic, hydrogen, Biomass, alcohols, LPG,CNG, liquid Fuels and gaseous fuels, electrical-their merits and demerits.

UNIT – V

Electrical System : Charging circuit, generator, current – voltage regulator – starting system, bendix drive mechanism solenoid switch, lighting systems, Horn, wiper, fuel gauge – oil pressure gauge, engine temperature indicator etc.

UNIT – VI

Transmission System : Clutches, principle, types, cone clutch, single plate clutch, multi plate clutch, magnetic and centrifugal clutches, fluid fly wheel – gear boxes, types, sliding mesh, construct mesh, synchro mesh gear boxes, epicyclic gear box , over drive torque converter. Propeller shaft – Hotch – Kiss drive, Torque tube drive, universal joint, differential rear axles – types – wheels and tyres.

UNIT – VII

Suspension System : Objects of suspension systems – rigid axle suspension system, torsion bar, shock absorber. Independent suspension system.

Braking System : Mechanical brake system, Hydraulic brake system, Master cylinder, wheel cylinder tandem master cylinder Requirement of brake fluid, Pneumatic and vacuum brakes.

UNIT – VIII

Steering System : Steering geometry – camber, castor, king pin rake, combined angle toein, center point steering. Types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism, steering gears – types, steering linkages.

TEXT BOOKS:

1. Automobile Engineering / William Crouse, TMHill Publishers
2. A Systems Approach to Automobile Technology, Jack Erjavec, YESSDEE Publishers Pvt Ltd., New Delhi.

REFERENCES:

1. Automotive Mechanics / G.B.S. Narang
2. Automotive Mechanics / Heitner
3. Automotive Engines / Srinivasan
4. Automobile Engineering – K.K. Ramalingam / Scitech Publications (India) PVT. LTD.
5. Automotive Engineering / Newton Steeds & Garrett.

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IV Year B.Tech. Mining Machinery I-Sem.	**L**	**T/P/D**	**C**
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(57158) METROLOGY AND MACHINE TOOLS

UNIT – I

Elementary treatment of metal cutting theory: Element of cutting process – Geometry of single point tool and angles chip formation and types of chips – built up edge, chip breakers. Mechanics of orthogonal cutting – Merchant's Force diagram, cutting forces – cutting speeds, feed, depth of cut, tool life, coolants, machinability – Tool materials.

UNIT – II

Engine lathe: Principle of working, specification of lathe – types of lathe – work holders tool holders – Box tools Taper turning thread turning – for Lathes and attachments. Turret and capstan lathes – collet chucks – other work holders – tool holding devices – box and tool layout. Principal features of automatic lathes – tool layout and cam design.

UNIT – III

Shaping slotting and planing machines: Principles of working – Principal parts – specification classification, operations performed, machining time calculations.

Milling machines: Principles of working – specifications – classifications of milling machines – Principal features of horizontal, vertical and universal milling machines – machining operations Types geometry of milling cutters – milling cutters – methods of indexing – Accessories to milling machines

UNIT – IV

Grinding machines: Fundamentals – Theory of grinding – classification of grinding machine – cylindrical and surface grinding machine – Tool and cutter grinding machine – special types of grinding machines – Different types of abrasives – bonds specification of a grinding wheel and selection of a grinding wheel Kinematic scheme of grinding machines.

Lapping, honing and broaching machines: comparison to grinding – lapping and honing. Kinematics scheme of Lapping, Honing and Broaching machines. Constructional features of speed and feed Units, machining time calculations

UNIT – V

Systems of limits and fits: Introduction, normal size, tolerance limits,

deviations, allowance, fits and their types – unilateral and bilateral tolerance system, hole and shaft basis systems – interchangeability and selective assembly. Indian standard Institution system – British standard system, International Standard system for plain ad screwed work.

UNIT – VI

LINEAR MEASUREMENT: Length standard, line and end standard, slip gauges – calibration of the slip gauges, Dial indicator, micrometers.

MEASUREMENT OF ANGLES AND TAPERS: Different methods – Bevel protractor – angle slip gauges – spirit levels – sine bar – Sine plate, rollers and spheres used to determine the tapers.

LIMIT GAUGES : Taylors principle – Design of go and No go gauges, plug ring, snap, gap, taper, profile and position gauges.

UNIT – VII

OPTICAL MEASURING INSTRUMENTS: Tool maker's microscope and its uses – collimators, optical projector – optical flats and their uses, interferometer.

FLAT SURFACE MEASUREMENT: Measurement of flat surfaces – instruments used – straight edges – surface plates – optical flat and auto collimator.

UNIT – VIII

SURFACE ROUGHNESS MEASUREMENT: Differences between surface roughness and surface waviness-Numerical assessment of surface finish – CLA.R, R.M.S Values – Rz values, Rz value, Methods of measurement of surface finish-profilograph. Talysurf, ISI symbols for indication of surface finish.

TEXT BOOKS:

1. A Text Book of Manufacturing Technology–II by PC Sharma, S. Chand, 2010.
2. Metrology and Measurement, Anand Bewoor, Vinay A. Kulkarni, TMH, 2009

REFERENCES:

1. Manufacturing Technology by P.N Rao, Vol 2 – Metal Cutting and Machine Tools, TMH.2009, Ed.2.
2. Manufacturing Engineering and Technology, Serope Kalpakjian and Steven R. Schmid, Ed. 4, Pearson Publications, 2001
3. Principles of Engineering Metrology, R. Rahendra, JAICO Publications, 2008.

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IV Year B.Tech. Mining Machinery I-Sem. | **L** | **T/P/D** | **C**
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(57159) PRINCIPLES OF TRIBOLOGY
(Elective-I)

Unit-I

Introduction

Unit-II

Surface properties and measurements

Unit-III

Friction theories

Unit-IV

Wear

Unit-V

Tribological properties of solid materials

Unit-VI

Lubricant properties and testing

Unit-VII

Hydrodynamic lubrication.

Unit-VIII

Selection of Tribological solutions.

Text Books:

1. Principles of Tribology – Edited by J. Halling, Macmillan Press.
2. Fundamentals of Tribology – S.K. Basu and Sengupta.

Reference Books:

1. Wear Control Principles & Practice – Jaico Publications.
2. Friction, Wear and Lubrication, Vol. 1, 2 & 3 Edited by I.V. Kragelsky, MIR Publications.

3. Friction and Wear - I.V. Kragelsky, M.N. Dobychin, V.S. Kombalov, Pergamon Press.
4. Industrial Tribology Edited by Meruin H. Jone & Douglas Scott, Elsevier Scientific Publishing Company.
5. Engineering Tribology – Prasant Sahoo.
6. Introduction to Tribology and Beariss, B.C. Majumdar.

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(57160) MECHANICAL SYSTEMS DESIGN
(Elective-I)

Unit-I

Product Design Process

Unit-II

Mechanical Engineering Design

Unit-III

Human Factor in Design

Unit-IV

Optimization Techniques for Design

Unit-V

Design of Mechanical Handling Power Transmission Systems

Unit-VI

Design of Braking Systems

Unit-VII

Design of Material Handling Systems.

Unit-VIII

Case studies: Design of Automobile Engine, Design of Fly Press.

Text Book:

1. Mechanical system Design – S.P. Patil, Jaico, Publishing House.

Reference Books:

1. Design Engineering – Dixon F.R. Tata McGraw hill.
2. Introduction to Ergonomics - Bridger R.S, McGraw Hill.
3. Mechanical Engineering Desgin – Shigley J.E. McGraw hill.

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(57075) MICROPROCESSORS AND MICROCONTROLLERS
(Elective-I)

Unit 1

8086 Architecture: Introduction to 8085 Microprocessor, 8086 Architecture-Functional diagram, Register Organization, Memory Segmentation, Programming Model, Memory addresses, Physical memory organization, Architecture of 8086, signal descriptions of 8086- common function signals, Minimum and Maximum mode signals, Timing diagrams, Interrupts of 8086.

Unit 2

Instruction Set and Assembly Language Programming of 8086: Instruction formats, addressing modes, instruction set, assembler directives, macros, simple programs involving logical, branch and call instructions, sorting, evaluating arithmetic expressions, string manipulations.

Unit 3

I/O Interface: 8255 PPI, various modes of operation and interfacing to 8086, interfacing keyboard, display, stepper motor interfacing, D/A and A/D converter.

Unit 4

Interfacing with advanced devices: Memory interfacing to 8086, Interrupt structure of 8086, Vector interrupt table, Interrupt service routine, Introduction to DOS and BIOS interrupts, Interfacing Interrupt Controller 8259 DMA Controller 8257 to 8086.

Unit 5

Communication Interface: Serial communication standards, Serial data transfer schemes, 8251 USART architecture and interfacing, RS- 232, IEEE-488, Prototyping and trouble shooting.

Unit 6

Introduction to Microcontrollers: Overview of 8051 microcontroller, Architecture, I/O Ports, Memory organization, addressing modes and instruction set of 8051, simple programs

Unit 7

8051 Real Time Control: Interrupts, timer/ Counter and serial communication, programming Timer Interrupts, programming external hardware interrupts, programming the serial communication interrupts, programming 8051 timers and counters

Unit 8

The AVR RISC microcontroller architecture: Introduction, AVR Family architecture, Register File, The ALU, Memory access and Instruction execution, I/O memory. EEPROM, I/O ports, Timers, UART, Interrupt Structure

TEXT BOOKS:

1. D. V. Hall, Micro processors and Interfacing, TMGH, 2nd edition 2006.
2. Kenneth. J. Ayala, The 8051 microcontroller , 3rd edition, Cengage learning, 2010

REFERENCES:

1. Advanced Microprocessors and Peripherals – A. K. Ray and K.M. Bhurchandani, TMH, 2nd edition 2006.
2. The 8051Microcontrollers, Architecture and programming and Applications -K.Uma Rao, Andhe Pallavi, , Pearson, 2009.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - By Liu and GA Gibson, PHI, 2nd Ed.,
4. Microcontrollers and application, Ajay. V. Deshmukh, TMGH, 2005
5. The 8085 Microprocessor: Architecture, programming and Interfacing – K.Uday Kumar, B.S.Umashankar, 2008, Pearson

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. Mining Machinery I-Sem.

L	T/P/D	C
4	1/-/-	4

(57161) UNDERGROUND PRODUCTION EQUIPMENT
(Elective-II)

Unit-I

Classification of underground production equipment

Mechanics of coal cutting and introduction to coal cutting machines;

Unit-II

Drills: Construction, operation and maintenance of the drills used for underground coal and metal mining operations.

Unit-III

Shearers: Different types, single and double drums; fixed and ranging drums, mechanical and hydraulic haulage; chain and chainless haulage; trapping mechanism;

Left hand and right hand drums, picks and pick boxes, water spraying arrangement. Assessment of shearer power.

Unit-IV

Plough: Different ploughing techniques; construction and operation of hook and sliding plough, mechanics of ploughing, propel mechanism, steering system of plough. Calculation for haulage power.

Unit-V

Road header and dint header: Types, drive arrangement, cutting, loading and propel mechanisms. Continuous miner used for Bord and Pillar mining operation.

Unit-VI

Supports: Mechanical and hydraulic roof supports; roof boloters, link bars, different types of powered supports, construction and controls. Power pack.

Unit-VII

Construction, operation of tunnel boring machines.

Unit-VIII

Selection criteria of the underground production equipment, Safety and regulations related to underground mining equipment.

Text Books:

1. Long Wall Mining- Peng SS, Wiley, New York.
2. Underground mining of coal – T.N. Singh Oxford & IBH Publication.
3. Principles and Practices of Coal Mining – Prof. R.D. Singh.
4. Techniques in Underground Mining- Ed. Richard E. Gersch, Richard L. Bullock Society for Mining, Mettalugy and Exploration USA.

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IV Year B.Tech. Mining Machinery I-Sem.	**L**	**T/P/D**	**C**
	4	**1/-/-**	**4**

(57162) MAINTENANCE ENGINEERING
(Elective-II)

Unit-I

Maintenance – Key to equipment control:

Basic definitions, preventive maintenance, operationg maintenance, shutdown maintenance; level of maintenance; factor influencing the level of preventive maintenance; evaluating PM data processing techniques for upgrading PM program; focus on implementing with examples; measuring maintenance effectiveness and maintenance control.

Unit-II

Application of preventive maintenance for system of equipment used in mining – case studies.

Unit-III

Maintenance associated with inspection (condition monitoring technique)' diagnostic, maintenance techniques; Modern testing techniques; Vibration and signature analysis; causes and remedy in rotating machinery.

Unit-IV

Non-destructive testing as an aid to maintenance; principle methods, such as dye-penetrant, magnetic particle testing and ultrasonic tests.

Tero-Technological approach to maintenance.

Unit-V

Lubrication:

Introduction to lubrication engineering, type, classification of lubrications with their properties and characteristics. Science of friction and wear; theories of lubrication, Bearing lubrication technique for minimization of friction and wear.

Unit-VI

Wear:

Different types of wear, such as abrasive, corrosive, seizure, scoring, scuffing,

pitting, spalling, adhesive etc.

Unit-VII

Techniques for minimization of wear with examples.

Unit-VIII

Principles of total productive maintenance (TPM), concepts of six sigma.

Text Books:

1. Industrial Maintenance- H.P. Garg.
2. Industrial Maintenance Management – S.K. Srivastava
3. Engineering Maintenance a Modern Approach – B.S. Dhillon 2002, CRC Publications.

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IV Year B.Tech. Mining Machinery I-Sem.

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(57163) SYSTEM MODELING AND SIMULATION
(Elective-II)

Unit-I

Systems Description and dynamic systems

Unit-II

Static generation and data representation

Unit-III

Spatial distribution

Unit-IV

Modeling Time Drives Systems

Unit-V

Exogenous signals and events

Unit-VI

Markov Processes

Unit-VII

Event Driven Models

Unit-VIII

System optimization

TEXT BOOKS

1. System Modeling and Simulation – Frank L. Severance, John Wiley & Sons.
2. Geoffrey Gordon, "System Simulation" 2nd Edition, prentice Hall, India, 2002.

REFERENCES

1. Jerry banks and John S. Carson, Barry L. Nelson, David M. Nicol,

"Discrete Event System Simulation", 3rd Edition, Prentice Halll, 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.

4. Narsingh Deo, "System Simulation with Digital Computer, "Pretice Hall, Indi, 2001.

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IV Year B. Tech. Mining Machinery I-Sem.	**L**	**T/P/D**	**C**
	0	**-/3/-**	**2**

(57639) ELECTRICAL MACHINES POWER AND CONTROLS LAB

Experiments related to Performance characteristics of induction motor, circle diagram of induction motor, voltage regulation of alternators, parallel operation of alternator, synchronous motor characteristics, electrical braking.

Experiments related to Contactors, il circuit breaker, power factor improvement, reactive power compensation, thermal overload relay, induction type over-current relay.

Experiments related to Gate triggering circuits, single phase half and fully controlled bridge converters, single phase dual converter, single phase series and parallel inverters.

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IV Year B.Tech. Mining Machinery I-Sem.	L	T/P/D	C
	0	-/3/-	2

(57640) METROLOGY AND MACHINE TOOLS LAB

Section A :

1. Measurement of lengths, heights, diameters by vernier calipers micrometers etc.
2. Measurement of bores by internal micrometers and dial bore indicators.
3. Use of gear teeth, vernier calipers and checking the chordal addendum and chordal height of spur gear.
4. Machine tool "alignment test on the lathe.
5. Machine tool alignment test on milling machine.
6. Tool makers microscope and its application
7. Angle and taper measurements by Bevel protractor, Sine bars, etc.
8. Use of spirit level in finding the flatness of surface plate.
9. Thread measurement by Two wire/ Three wire method or Tool makers microscope.
10. Surface roughness measurement by Taly Surf.
11. Surface Wear Resistances Test using Electro Spark Coating Device.

Section B :

1. Introduction of general purpose machines -Lathe, Drilling machine, Milling machine, Shaper,
2. Planing machine, slotting machine, Cylindrical Grinder, surface grinder and tool and cutter grinder.
3. Step turning and taper turning on lathe machine
4. Thread cutting and knurling on -lathe machine.
5. Drilling and Tapping
6. Shaping and Planing
7. Slotting
8. Milling
9. Cylindrical Surface Grinding
10. Grinding of Tool angles.

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IV Year B.Tech. Mining Machinery II-Sem.	L	T/P/D	C
	3	1/-/-	3

(58117) POWER PLANT ENGINEERING

UNIT – I

Introduction to the Sources of Energy – Resources and Development of Power in India.

Steam Power Plant : Plant Layout, Working of different Circuits, Fuel and handling equipments, types of coals, coal handling, choice of handling equipment, coal storage, Ash handling systems.

UNIT II

Steam Power Plant: Combustion Process: Properties of coal – overfeed and underfeed fuel beds, traveling grate stokers, spreader stokers, retort stokers, pulverized fuel burning system and its components, combustion needs and draught system, cyclone furnace, design and construction, Dust collectors, cooling towers and heat rejection. Corrosion and feed water treatment.

UNIT – III

Internal Combustion Engine Plant: DIESEL POWER PLANT: Introduction – IC Engines, types, construction– Plant layout with auxiliaries – fuel supply system, air starting equipment, lubrication and cooling system – super charging.

UNIT IV

Gas Turbine Plant: Introduction – classification - construction – Layout with auxiliaries – Principles of working of closed and open cycle gas turbines. Combined Cycle Power Plants and comparision.

UNIT – V

Hydro Electric Power Plant: Water power – Hydrological cycle / flow measurement – drainage area characteristics – Hydrographs – storage and Pondage – classification of dams and spill ways.

Hydro Projects And Plant: Classification – Typical layouts – plant auxiliaries – plant operation pumped storage plants.

UNIT VI

Power From Non-Conventional Sources: Utilization of Solar- Collectors- Principle of Working, Wind Energy – types – HAWT, VAWT -Tidal Energy.

Direct Energy Conversion: Solar energy, Fuel cells, Thermo electric and Thermo ionic, MHD generation.

UNIT – VII

NUCLEAR POWER STATION: Nuclear fuel – breeding and fertile materials – Nuclear reactor – reactor operation.

Types Of Reactors: Pressurized water reactor, Boiling water reactor, sodium-graphite reactor, fast Breeder Reactor, Homogeneous Reactor, Gas cooled Reactor, Radiation hazards and shielding – radioactive waste disposal.

UNIT – VIII

Power Plant Economics And Environmental Considerations: Capital cost, investment of fixed charges, operating costs, general arrangement of power distribution, Load curves, load duration curve. Definitions of connected load, Maximum demand, demand factor, average load, load factor, diversity factor – related exercises. Effluents from power plants and Impact on environment – pollutants and pollution standards – Methods of Pollution control.

TEXT BOOK :

1. Power Plant Engineering – P.C.Sharma / S.K.Kataria Pub
2. A Course in Power Plant Engineering: / Arora and S. Domkundwar.

REFERENCES:

1. A Text Book of Power Plant Engineering / Rajput / Laxmi Publications
2. Power plant Engineering/ Ramalingam/ Scietech Publishers
3. Power Plant Engineering: P.K.Nag/ II Edition /TMH.
4. An Introduction to Power Plant Technology / G.D. Rai.
5. Power plant Engg - Elanchezhian- I.K. International Pub.

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IV Year B.Tech. Mining Machinery II-Sem.	**L**	**T/P/D**	**C**
	3	**1/-/-**	**3**

(58118) AUTOMATION AND ROBOTICS
(Elective – III)

UNIT – I

Introduction: Types and strategies of automation, pneumatic and hydraulic components circuits, Automation in machine tools, Mechanical Feeding and tool changing and machine tool control transfer the automation.

UNIT – II

Automated flow lines: Methods or work port transport transfer Mechanical buffer storage control function, design and fabrication consideration.

UNIT – III

Automated material handling: Types of equipment, functions, analysis and design of material handling systems conveyor systems, automated guided vehicle systems.

UNIT – IV

Introduction: Automation and Robotics – An over view of Robotics – classification by coordinate system and control systems - **Components of the Industrial Robotics:** Degrees of freedom – End effectors: Mechanical gripper – Magnetic – Vacuum cup and other types of grippers – General consideration on gripper selection and design.

UNIT – V

Motion Analysis: Basic rotation matrices – Composite rotation matrices – Euler Angles – Equivalent Angle and Axis – Homogeneous transformation – Problems.

UNIT VI

Manipulator Kinematics: D-H notations - Joint coordinates and world coordinates - Forward and inverse kinematics – problems.

UNIT VII

Differential Kinematics : Differential Kinematics of planar and spherical manipulators - Jacobians – problems.

UNIT VIII

Robot Dynamics: Lagrange – Euler formulations – Newton-Euler formulations – Problems on planar two link manipulators.

Robot actuators and Feed back components: Actuators: Pneumatic and Hydraulic actuators. **Electric Actuators:** DC servo motors - stepper motors. **Feedback components:** position sensors – potentiometers, resolvers and encoders – Velocity sensors – Tactile sensors.

TEXT BOOKS:

1. Industrial Robotics / Groover M P /Pearson Edu.
2. Introduction to Robotic Mechanics and Control by JJ Craig, Pearson, 3rd edition.

REFERENCES:

1. Robotics / Fu K S/ McGraw Hill.
2. Robotic Engineering / Richard D. Klafter, Prentice Hall
3. Robot Analysis and Intelligence / Asada and Slotine / Wiley Inter-Science.
4. Robot Dynamics & Control – Mark W. Spong and M. Vidyasagar / John Wiley & Sons (ASIA) Pte Ltd.
5. Robotics and Control / Mittal R K & Nagrath I J / TMH

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(58119) ELECTRICAL DRIVES
(Elective – III)

Objective:

This course is an extension of Power Electronics applications to AC and DC drives. Control of DC motor drives with single phase and three phase converters and choppers are given in detail. The control of AC motor drives with variable frequency converters and variable voltage are presented.

UNIT – I:

Starting and braking characteristics of electrical drives motor power rating loading conditions and class of duty. Motor heating and cooling and continues short term period loading calculation of motor power rating.

Control of DC motors by Single phase Converters

Introduction to Thyristor controlled Drives, Single Phase semi and Fully controlled converters connected to d.c separately excited and d.c series motors – continuous current operation – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque Characteristics- Problems on Converter fed d.c motors.

UNIT-II: Control of DC motors by Three phase Converters

Three phase semi and fully controlled converters connected to d.c separately excited and d.c series motors – output voltage and current waveforms – Speed and Torque expressions – Speed – Torque characteristics – Problems.

UNIT – III:

Four Quadrant operation of DC Drives

Introduction to Four quadrant operation – Motoring operations, Electric Braking – Plugging, Dynamic and Regenerative Braking operations. Four quadrant operation of D.C motors by dual converters – Closed loop operation of DC motor (Block Diagram Only)

UNIT-IV:

Control of DC motors by Choppers

Single quadrant, Two –quadrant and four quadrant chopper fed dc separately

excited and series excited motors – Continuos current operation – Output voltage and current wave forms – Speed torque expressions – speed torque characteristics – Problems on Chopper fed d.c Motors – Closed Loop operation (Block Diagram Only)

UNIT – V:

Control of Induction Motor through Stator voltage

Variable voltage characteristics-Control of Induction Motor by Ac Voltage Controllers – Waveforms – speed torque characteristics.

UNIT – VI :

Control of Induction Motor through Stator Frequency

Variable frequency characteristics-Variable frequency control of induction motor by Voltage source and current source inverter and cyclo converters-PWM control – Comparison of VSI and CSI operations – Speed torque characteristics – numerical problems on induction motor drives – Closed loop operation of induction motor drives (Block Diagram Only)

UNIT – VII:

Control of Induction motor of Rotor side

Static rotor resistance control – Slip power recovery – Static Scherbius drive – Static Kramer Drive – their performance and speed torque characteristics – advantages applications – problems

UNIT – VIII:

Control of Synchronous Motors

Separate control & self control of synchronous motors – Operation of self controlled synchronous motors by VSI and CSI cycloconverters. Load commutated CSI fed Synchronous Motor – Operation – Waveforms – speed torque characteristics – Applications – Advantages and Numerical Problems – Closed Loop control operation of synchronous motor drives (Block Diagram Only), variable frequency control, Cyclo converter, PWM, VFI, CSI

TEXT BOOKS:

1. Fundamentals of Electric Drives – by G K Dubey Narosa Publications
2. Power Electronic Circuits, Devices and applications by M.H.Rashid, PHI.

REFERENCE BOOKS:

1. Power Electronics – MD Singh and K B Khanchandani, Tata – McGraw-Hill Publishing company, 1998
2. Modern Power Electronics and AC Drives by B.K.Bose, PHI.
3. Thyristor Control of Electric drives – Vedam Subramanyam Tata McGraw Hill Publications.
4. A First course on Electrical Drives – S K Pillai New Age International(P) Ltd. 2nd Edition.

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(58120) REFRIGERATIONAND AIR CONDITIONING
(Elective – III)

UNIT – I

Introduction to Refrigeration: Necessity and applications – Unit of refrigeration and C.O.P. –

Mechanical Refrigeration – Types of Ideal cycles of refrigeration.

Air Refrigeration: Bell Coleman cycle and Brayton Cycle, Open and Dense air systems – Actual air refrigeration system problems – Refrigeration needs of Air crafts.

UNIT – II

Vapour compression refrigeration: – working principle and essential components of the plant – simple Vapour compression refrigeration cycle – COP – Representation of cycle on T-S and p-h charts – effect of sub cooling and super heating – cycle analysis – Actual cycle Influence of various parameters on system performance – Use of p-h charts – numerical Problems.

UNIT III

Principles of Evaporators: – classification – Working Principles Expansion devices – Types – Working Principles

Refrigerants – Desirable properties – classification refrigerants used – Nomenclature – Ozone Depletion – Global Warming .

UNIT IV

Vapor Absorption System – Calculation of max COP – description and working of NH3 – water system and Li Br –water (Two shell & Four shell) System. Principle of operation Three Fluid absorption system, salient features.

UNIT V

Steam Jet Refrigeration System – Working Principle and Basic Components. Principle and operation of (i) Thermoelectric refrigerator (ii) Vortex tube or Hilsch tube.

UNIT – VI

Introduction to Air Conditioning : Psychometric Properties & Processes – Characterization of

Sensible and latent heat loads — Need for Ventilation, Consideration of Infiltration – Load concepts of RSHF, GSHF- Problems, Concept of ESHF and ADP.

UNIT VII

Requirements of human comfort and concept of effective temperature- Comfort chart -Comfort Air conditioning – Requirements of Industrial air conditioning , Air conditioning Load Calculations.

UNIT – VIII

Air Conditioning systems - Classification of equipment, cooling, heating humidification and dehumidification, filters, grills and registers, fans and blowers. Heat Pump – Heat sources – different heat pump circuits.

TEXT BOOKS :

1. Refrigeration and Air Conditioning / CP Arora / TMH.
2. A Course in Refrigeration and Air conditioning / SC Arora & Domkundwar / Dhanpatrai

REFERENCES:

1. Refrigeration and Air Conditioning / Manohar Prasad / New Age.
2. Principles of Refrigeration - Dossat / Pearson Education.
3. Refrigeration and Air Conditioning-P.L.Bellaney
4. Basic Refrigeration and Air-Conditioning – Ananthanarayanan / TMH
5. Refrigeration and Air Conditioning – R.S. Khurmi & J.K Gupta – S.Chand – Eurasia Publishing House (P) Ltd.

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(58009) NEURAL NETWORKS AND FUZZY LOGIC
(Elective-III)

Objective :

This course introduces the basics of Neural Networks and essentials of Artificial Neural Networks with Single Layer and Multilayer Feed Forward Networks. Also deals with Associate Memories and introduces Fuzzy sets and Fuzzy Logic system components. The Neural Network and Fuzzy Network system application to Electrical Engineering is also presented. This subject is very important and useful for doing Project Work.

Unit – I:

Introduction to Neural Networks

Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Hodgkin-Huxley Neuron Model, Integrate-and-Fire Neuron Model, Spiking Neuron Model, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential Applications of ANN.

Unit- II:

Essentials of Artificial Neural Networks

Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Neural Dynamics (Activation and Synaptic), Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Application.

Unit–III:

Single Layer Feed Forward Neural Networks

Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Perceptron Convergence theorem, Limitations of the Perceptron Model, Applications.

Unit- IV:

Multilayer Feed forward Neural Networks

Credit Assignment Problem, Generalized Delta Rule, Derivation of Backpropagation (BP) Training, Summary of Backpropagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

Unit V:

Associative Memories

Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory (Associative Matrix, Association Rules, Hamming Distance, The Linear Associator, Matrix Memories, Content Addressable Memory),

Unit – VI

Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function, Proof of BAM Stability Theorem

Architecture of Hopfield Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis, Capacity of the Hopfield Network

Summary and Discussion of Instance/Memory Based Learning Algorithms, Applications.

Unit – VII :

Classical & Fuzzy Sets

Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

UNIT VIII:

Fuzzy Logic System Components

Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

TEXT BOOK:

1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and Rai – PHI Publication.

2. Nureal networks by satish Kumar , TMH, 2004

REFERENCE BOOKS:

1. Neural Networks – James A Freeman and Davis Skapura, Pearson Education, 2002.
2. Neural Networks – Simon Hakins , Pearson Education
3. Neural Engineering by C.Eliasmith and CH.Anderson, PHI
4. Neural Networks and Fuzzy Logic System by Bart Kosko, PHI Publications.

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(58121) OPERATIONS RESEARCH
(Elective-IV)

UNIT – I

Introduction: Development – Definition – Characteristics and Phases – Types of operation Research models – applications. **Allocation :** Linear Programming - Problem Formulation – Graphical solution – Simplex method – Artificial variables techniques -Two–phase method, Big-M method – Duality Principle.

UNIT – II

Transportation Problem: Formulation – Optimal solution - unbalanced transportation problem – Degeneracy. Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem- Traveling Salesman problem.

UNIT – III

Sequencing: Introduction – Flow –Shop sequencing – n jobs through two machines – n jobs through three machines – Job shop sequencing – two jobs through 'm' machines.

Replacement: Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, group replacement.

UNIT – IV

Theory Of Games: Introduction – Minimax (maximin) – Criterion and optimal strategy – Solution of games with saddle points – Rectangular games without saddle points – dominance principle – m X 2 & 2 X n games -graphical method.

UNIT – V

Waiting Lines: Introduction – Single Channel – Poisson arrivals – exponential service times – with infinite population and finite population models– Multichannel – Poisson arrivals – exponential service times with infinite population single channel Poisson arrivals.

UNIT – VI

Inventory: Introduction – Single item – Deterministic models – Purchase inventory models with one price break and multiple price breaks – shortages are not allowed – Stochastic models – demand may be discrete variable or continuous variable – Instantaneous production. Instantaneous demand and continuous demand and no set up cost- Single period model.

UNIT – VII

Dynamic Programming: Introduction –Terminology- Bellman's Principle of optimality – Applications of dynamic programming- shortest path problem – linear programming problem.

UNIT – VIII

Simulation: Definition – Types of simulation models – phases of simulation– applications of simulation – Inventory and Queuing problems – Advantages and Disadvantages – Brief Introduction of Simulation Languages.

TEXT BOOKS:

1. Operations Research /J.K.Sharma 4e. /MacMilan
2. Operations Research / R.Pannerselvam 2e.,PHI Publications

REFERENCES:

1. Operations Research /A.M.Natarajan, P.Balasubramani, A. Tamilarasi/ Pearson Education.
2. Operations Research: Methods & Problems / Maurice Saseini, Arhur Yaspan & Lawrence Friedman
3. Introduction to O.R /Taha 8e/PHI
4. Operations Research / Wagner/ PHI Publications.
5. Operations Research / S.D.Sharma-Kedarnath
6. O.R/Wayne L.Winston/Thomson Brooks/cole
7. Introduction to O.R/Hiller & Libermann (TMH).

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(58017) RELIABILITY ENGINEERING
(Elective – IV)

Unit - I

Basic concepts of reliability: Introduction, Reliability and quality ,Failures and failure modes ,Causes of failures and reliability, Maintainability and availability, History of reliability , reliability literature.

Unit-II

Reliability mathematics: Introduction, Random experiment , Probability , Random variables, Distribution functions, Discrete distribution ,Continuous distribution, Numerical characteristics of random variables , Laplace transform.

Unit-III

Component reliability and hazard models: Introduction, Component reliability from test data, Mean time to failure, Time – dependent hazard models, Stress- Dependent hazard models , Derivation of reliability function using Markov, Treatment of field data.

Unit-IV

System reliability models: Introduction - Systems with series components - Systems with parallel components - k-out – of- m systems - Non series parallel systems - Systems with - mixed – mode failures - Fault- tree technique

Unit-V

Maintainability and availability concepts: Introduction - Maintainability function - Availability function - Frequency of failures - Two-unit parallel systems with repair - k-out-of-m systems - Preventive maintenance.

Unit-VI

Reliability improvement: Introduction - Improvement components - Redundancy - Element redundancy - Unit redundancy - Stand by redundancy - Optimization - Reliability – cost trade – off .

Unit-VII

Economics of reliability engineering : Economic issues - Manufacture's

cost - Customer's cost - Reliability achievement cost - models - Reliability utility cost models - Depreciation cost models - Availability – cost – model of parallel systems.

Unit-VIII

Reliability management: Reliability programming - Management policies and decision - Reliability management by objectives - Reliability group - Reliability data : Acquisition and analysis - Managing people for reliability

TEXT BOOKS;

1. Reliabaility Evaluation of Engineering Systems. R. Billington, RN Allan, BS Publications 2007.
2. Reliability, Maintenance and safety Engineering - Dr. A.K. Gupta, Laxmi Publications
3. Engineering Maintenance a Modern Approach, B.S.Dhillon,2002 CRR Publications..
4. Maintenance Engineering and Management – RC Misra, PHI
5. Reliability Engineering – Balaguruswamy- TMH
6. Reliability Engineering- L.S.Srinath

REFERENCE BOOKS:

1. Reliability Engineering- Patrick DTO-Wiley India
2. Reliability Engineering and life testing –Naikan-PHI

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(58122) ENERGY CONVERSION EQUIPMENT
(Elective –IV)

Unit – I

PRINCIPLES OF SOLAR RADIATION: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, instruments for measuring solar radiation and sun shine, solar radiation data.

Unit –II

SOLAR ENERGY COLLECTION: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advance collectors.

Unit –III

SOLAR ENERGY STORAGE AND APPLICATIONS: Different methods, Sensible, latent heat and stratified storage, solar ponds, Solar Applications – solar heating/cooling technique, solar distillation and drying photovoltaic energy conversion.

Unit –IV

WIND ENERGY: Source and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria.

Unit –V

BIO-MASS: Principles of bio-conversion, anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.E. Engine operation and economic aspects.

Unit –VI

GEOTHERMAL ENERGY: Resources, types of wells, methods of harnessing the energy, potential in India.

Unit –VII

OCEAN ENERGY: OTEC, Principles utilization, setting of OTEC plants,

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

Unit–VIII

DIRECT ENERGY CONVERSION: Need for Dec, Carnot cycle, limitations, principles of DEC. Thermo-electric generators, seebeck, peltier and joule-Thomson effects, Figure of merit, materials, applications, MHD generators, principles, dissociation and ionization, hall effect, magnetic flux, MHD accelerator, MHD Engine, power generation systems, electron gas dynamic conversion, economic aspects. Fuel cells, principles, faraday's law's thermodynamic aspects, selection of fuels and operating conditions.

TEST BOOKS:

1. Renewable energy resources/Tiwari and Ghosal/Narosa.
2. Non-Conventional Energy Sources/G.D. Rai

REFERENCES:

1. Renewable Energy Sources/Twidell & Weir
2. Solar energy/Sukhatme
3. Solar Power Engineering / B.S. Magal Frank Kreith & J. F. Kreith.
4. Principles of Solar Energy / Frank Krieth & John F Kreider.
5. Non-Conventional Energy/ Ashok V Desai/Wiley Eastern
6. Non-Conventional Energy Systems / K Mittal / Wheeler
7. Renewable Energy Technologies / Ramesh & Kumar / Narosa.

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(58677) INDUSTRIAL TRAINING

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IV Year B.Tech. Mining Machinery II-Sem.	**L**	**T/P/D**	**C**
	0	**-/6/-**	**2**

(58678) SEMINAR

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IV Year B.Tech. Mining Machinery II-Sem.	**L**	**T/P/D**	**C**
	0	**-/15/-**	**10**

(58679) PROJECT WORK

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IV Year B.Tech. Mining Machinery II-Sem.	L	T/P/D	C
	0	-/-/-	2

(58680) COMPREHENSIVE VIVA