

**ACADEMIC REGULATIONS
COURSE STRUCTURE
AND
DETAILED SYLLABUS**

XIII

**MINING
ENGINEERING**

For

B.TECH. FOUR YEAR DEGREE COURSE
(Applicable for the batches admitted from 2010-2011)



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
KAKINADA - 533 003, ANDHRA PRADESH, INDIA

Academic Regulations 2010 for B. Tech. (Regular)

(Effective for the students admitted in to I year from the Academic Year 2010-2011 and onwards)

1. Award of B.Tech. Degree

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

- (a) Pursued a course of study for not less than four academic years and not more than eight academic years. However, the student is permitted to write Supplementary examinations for two more years, giving a facility to the student to complete the Degree within 10 academic years.
- (b) For the award of a degree, candidate has to register for **208** credits and secure **200** credits with compulsory subjects: (compulsory subjects are: all Laboratories and Project work, i.e. the student shall pass all laboratory examinations and project work)

2. Students, who fail to complete their Four years Course of study within Eight years or fail to acquire the 200 Credits for the award of the degree within ten academic years from the year of their admission, shall forfeit their seat in B. Tech course and their admission shall stand cancelled.

3. Courses of study

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

S. No.	Branch	Branch
	Code	Abbreviation

01	01-CE	Civil Engineering
02	02-EEE	Electrical and Electronics Engineering
03	03-ME	Mechanical Engineering
04	04-ECE	Electronics and Communication Engineering
05	05-CSE	Computer Science Engineering

06	08-CHEM	Chemical Engineering
07	10-EIE	Electronics and Instrumentation Engineering
08	11-BME	Bio – Medical Engineering
09	12-IT	Information Technology
10	19-ECom.E	Electronics and Computer Engineering
11	21-AE	Aeronautical Engineering
12	23-BT	Bio – Technology
13	24-AME	Auto Mobile Engineering
14	25-PCE	Petrochemical Engineering
15	26-MM	Mining
16	27-PT	Petroleum Technology / Petroleum Engineering
17.	31-MtE	Metallurgical Engineering

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

4. Distribution and Weightage of Marks

- (i) The performance of a student in each semester shall be evaluated subject – wise with a maximum of 100 marks for theory and 75 marks for practical subject. The project work shall be evaluated for 200 marks.
- (ii) For theory subjects the distribution shall be 25 marks for Internal Evaluation and 75 marks for the End - Examinations.
- (iii) Out of 25 internal marks – 15 marks are assigned for subjective exam, 10 marks for objective “On Line” exam.
- (iv.) For theory subjects, during the semester there shall be 2 tests. Each test consists of 20 minutes duration objective “On Line” exam for 10 marks and **120 minutes** duration subjective exam for **40 marks**. The Objective exam marks for 10 and subjective exam marks scaled for 15 to be added to get test marks for 25. The best of the two tests will be taken for internal marks. The first test to be conducted in 1-4 units and second test in 5-8 units of each semester.

Each Objective question paper shall contain 20 objective type questions for 10 marks. This examination is conducted “**on line**”

to train the student for on line examinations such as GRE, GMAT etc.

Each subjective type test question paper shall contain 4 questions and all questions need to be answered. The subjective type question paper should be for 40 marks.

- (v.) For practical subjects there shall be continuous evaluation during the semester for 25 marks for internal exam and 50 marks for semester end examination. Of the 25 marks for internal, 15 marks shall be awarded as follows: day to day work 10 and Record-5, and 10 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted by the teacher concerned and external examiner.
- (vi.) 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.
- (vii.) 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 committee. The committee consists of an external examiner, Head of the Department and Supervisor of the Project. The evaluation of project work shall be conducted at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project and evaluated by an internal committee.
- (viii) Laboratory marks and the internal marks awarded by the College are not final. The marks are subject to scrutiny and scaling by the University wherever felt desirable. The internal and laboratory marks awarded by the College will be referred to a Committee. The Committee shall arrive at scaling factor and the marks will be scaled as per the scaling factor. The recommendations of the

Committee are final and binding. The laboratory records and internal test papers shall be preserved in the respective departments as per the University norms and shall be produced to the Committees of the University as and when they ask for.

5. 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.) Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester for genuine reasons and shall be approved by a committee duly appointed by the college. The condonation approved or otherwise can be reviewed by the University.
- (iii.) A Student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester. They may seek re-admission for that semester when offered next.
- (iv.) **Shortage of Attendance below 65% in aggregate shall in NO case be condoned.**
- (v.) Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class and their registration shall stand cancelled.
- (vi.) A fee stipulated by the university shall be payable towards condonation of shortage of attendance.

6. Minimum Academic Requirements:

The following academic requirements have to be satisfied in addition to the attendance requirements mentioned in item No. 5.

- (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 will be promoted to second year, if he put up the minimum attendance requirement.
- (iii.) A student shall be promoted from II to III year only if he fulfills the academic requirement of total 48 credits from regular and supplementary examinations of I year and II year examinations, irrespective of whether the candidate takes the examination or not.
- (iv.) A student shall be promoted from third year to fourth year only if he fulfills the academic requirements of total 76 credits from regular and supplementary examinations of I Year, II Year and III Year examinations, irrespective of whether the candidate takes the examinations or not.
- (v.) A student shall register and put up minimum attendance in all 208 credits and earn at least 200 credits. Marks obtained in the best of 200 credits shall be considered for the calculation of percentage of marks.
- (vii.) Students, who fail to complete their Four year Course study within Eight years or fail to acquire the 200 Credits for the award of the degree within ten academic years from the year of their admission, shall forfeit their seat in B. Tech course and their admission shall stand cancelled.

7. Course pattern:

- (i.) The entire course of study is of four academic years and each year will have TWO Semesters (Total EIGHT Semesters).
- (ii.) A student eligible to appear for the end examination in a subject, but absent for it or has failed in the end examinations may appear for that subject's **supplementary** examinations, when offered.
- (iii.) When a student is detained due to lack of credits / shortage of attendance, he may be re-admitted when the semester is offered after fulfillment of academic regulations. Whereas the academic regulations hold good with the regulations he/she first admitted.

8. Award of Class:

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

Class Graded	% of marks to be secured	
E	40% to < 50%	From the aggregate marks secured from the best 200 Credits.
D	50% to < 60%	
C	60% to < 70 %	
B	70 % to < 80 %	
A	80 % to < 90%	
O	90 and above	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

9. Minimum Instruction Days:

The minimum instruction days for each semester shall be 95 clear instruction days.

10. There shall be no branch transfer after the completion of admission process.

11. There shall be no transfer within the Constituent Colleges.

12. 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.

Academic Regulations 2010 for B. Tech. (Lateral Entry Scheme)

(Effective for the students getting admitted into II year from the Academic Year 2011- 2012 and onwards)

1. Award of B. Tech. Degree

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

- (a.) Pursued a course of study for not less than three academic years and not more than six academic years. However, the student is permitted to write Supplementary examinations for two more years, giving a facility to the student to complete the Degree within 8 academic years.
- (b.) For the award of a degree, candidate has to register for 170 credits and secure 162 credits with compulsory subjects: (compulsory subjects are: all Laboratories and Project work, i.e., the students i.e. the student shall pass all laboratory examinations and project work.

2. Students, who fail to complete their three year Course of study within six years or fail to acquire the 162 Credits for the award of the degree within 8 academic years from the year of their admission, shall forfeit their seat in B. Tech course and their admission shall stand cancelled.

3. Promotion Rule:

- (a.) A lateral entry student will be promoted from II year to III year if he puts up the minimum required attendance in II year.
- (b.) A student shall be promoted from third year to fourth only if he fulfills the academic requirements of 56 credits from the II Year and III Year examinations, whether the candidate takes the examinations or not.

4. Award of Class:

After having satisfied the requirements prescribed for the completion of the program, the *student* shall be eligible for the award of B. Tech

Degree and shall be placed in one of the following grades:

Class Graded	% of marks to be secured	
E	40% to < 50%	From the aggregate marks secured from the best 162 Credits.
D	50% to < 60%	
C	60% to < 70 %	
B	70 % to < 80 %	
A	80 % to < 90%	
O	90 and above	

(The marks in internal evaluation and end examination shall be shown separately in the marks memorandum)

5. All other regulations as applicable for B. Tech. Four- year degree course (Regular) will hold good for B.Tech. (Lateral Entry Scheme)

**DISCIPLINARY ACTION FOR MALPRACTICES /
IMPROPER CONDUCT IN EXAMINATIONS**

	Nature of Malpractices/Improper conduct	Punishment
1 (a)	If the candidate 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)	If the candidate 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	If the candidate 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

		<p>remaining examinations of the subjects of that Semester/year.</p> <p>The Hall Ticket of the candidate is to be cancelled and sent to the University.</p>
3	<p>If the candidate impersonates any other candidate in connection with the examination.</p>	<p>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.</p>

4	If the candidate 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	If the candidate 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	If the candidate 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	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

	duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	to appear for the remaining examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7	If the candidate 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	If the candidate possesses 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 a 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 college, 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	If the candidate 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 center from the college to another college for a specific period of not less than one year.

Malpractice identified at Nodal Center/Spot Center during valuation

The following procedure is to be followed in the case of malpractice cases detected during valuation, scrutiny etc. at Nodal Center/Spot Center.

- (i) A notice regarding the malpractice, is to be served to the candidate
 - (i) Through the Principal of the concerned college,
 - (ii) To his/her college address
 - (iii) To his/her permanent address.
- (ii) A committee consisting of the following is to be constituted **at nodal center** to process such malpractice cases and the recommendations of the malpractice committee are to be sent to the University.
 1. Nodal Officer : Chairman
 2. Principal of the concerned college : Member
 3. Chief examiner of that subject/Subject expert from Nodal Centre : Member
 4. OIE of nodal centre : Convener

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, KAKINADA
MINING ENGINEERING
COURSE STRUCTURE

I YEAR**I SEMESTER**

S. No.	Subject	T	P	Credits
1	English – I	3	-	2
2	Mathematics - I	3	-	2
3	Engineering Physics – I	3	-	2
4	Engineering Chemistry I	3	-	2
5	C Programming	3	-	2
6	Environmental Studies	3	-	2
7	Engineering Physics & Engineering Chemistry Laboratory -I	-	3	2
8	Engineering Workshop (Carpentry, Fitting, House wiring,)	-	3	2
9	C Programming Lab	-	3	2
10	English - Communication Skills Lab - 1	-	3	2
	Total			20

I YEAR**II SEMESTER**

S. No.	Subject	T	P	Credits
1	English – II	3	-	2
2	Mathematics – II	3	-	2
3	Engineering Physics – II	3	-	2
4	Engineering Chemistry— II	3	-	2
5	Engineering Drawing	3	-	2
6	Mathematical Methods	3	-	2
7	Engineering Physics & Engineering Chemistry Laboratory -II	-	3	2
8	English - Communication Skills Lab - 2	-	3	2
9	IT Workshop	-	3	2
	Total			18

IIYEAR**ISEMESTER**

S. No.	Subject	T	P	Credits
1	Engineering Mechanics	4	-	4
2	Thermodynamics	4	-	4
3	Fluid Mechanics & Hydraulic Machinery	4	-	4
4	Electrical and Electronics Engineering	4	-	4
5	Mining Geology- I	4	-	4
6	Computer Aided Engineering Drawing Practice	6	-	4
7	Electrical and Electronics Engineering Lab	-	3	2
8	Fluid Mechanics and Hydraulic Machinery Lab	-	3	2
9	English Communication Practice-1	-	2	1
10	Ethics & Morals – I	2	-	-
	Total			29

IIYEAR**IISEMESTER**

S. No.	Subject	T	P	Credits
1	Kinematics of Machinery	4	-	4
2	Metallurgy and Material Science	4	-	4
3	Mechanics of Solids	4	-	4
4	Managerial Economics and Financial Analysis	4	-	4
5	Surface Mining	4	-	4
6	Mining Geology - II	6	-	4
7	Geology Lab	-	3	2
8	Mechanics of Solids and Metallurgy Lab	-	3	2
9	English Communication Practice-2	-	2	1
10	Ethics & Morals – II	2	-	-
	Total			29

III YEAR**I SEMESTER**

S. No.	Subject	T	P	Credits
1	Under Ground Coal Mining Technology	4	-	4
2	Mine Environment Engineering – I	4	-	4
3	Electrical equipment in Mines	4	-	4
4	Mine Surveying	4	-	4
5	Mine Development	4	-	4
6	Mine Mechanization	4	-	4
7	Advanced English Communication Skills Lab	-	3	2
8	Mine Surveying Lab	-	3	2
9	IPR & Patent – I	2	-	-
	Total			28

III YEAR**II SEMESTER**

S. No.	Subject	T	P	Credits
1	Industrial Management	4	-	4
2	Mineral Engineering and fuel Technology	4	-	4
3	Mine Environment Engineering - II	4	-	4
4	Mining Machinery	4	-	4
5	Under Ground Metal Mining Technology.	4	-	4
6	Mine Systems Engineering	4	-	4
7	Mineral Engineering Lab.	-	3	2
8	Environmental Engg. Lab.	-	3	2
9	IPR & Patent – II	2	-	-
	* Short industrial experience (15 days) (M)			
	Total			28

IV YEAR**ISEMESTER**

S. No.	Subject	T	P	Credits
1	Mine Economics	4	-	4
2	Computer Applications in Mining	4	-	4
3	Rock Mechanics & Ground Control	4	-	4
4	Mine Legislation & General Safety	4	-	4
5	Open Elective	4	-	4
6	Departmental Elective - I	4	-	4
7	Computer Applications in Mining lab	-	3	2
8	Rock Mechanics Lab	-	3	2
	*Short survey camp (5 to 7 days) (M)			
	Total			28

IV YEAR**II SEMESTER**

S. No.	Subject	T	P	Credits
1	Production Planning and Control	4	-	4
2	Department Elective - II	4	-	4
3	Department Elective – III	4	-	4
4	Department Elective-IV	4	-	4
5	Project			12
	Total			28

Total credits obtained: 38+58+56+56= 208 Credits

Out of 208 Credits a student who obtains a Minimum of 200 Credits (With the credits of all Laboratories and Project) is Eligible to get Degree

DEPARTMENTAL ELECTIVE-I 1. Rock Slope Engineering 2. Mine Subsidence Engineering 3. Rock Fragmentation Engineering	DEPARTMENTAL ELECTIVE-II 1. Deep Sea mining 2. Mine Construction 3. Tunneling Engineering
DEPARTMENTAL ELECTIVE – III 1. Planning of Under Ground Metal Mining Project 2. Planning of Under Ground Coal Mining Project 3. Planning of Surface Mining Project	DEPARTMENTAL ELECTIVE –IV 1. Maintenance & Reliability Engineering 2. Rock Excavation Engineering 3. Mine Health & Safety Engineering
OPEN ELECTIVE 1. Industrial Robotics (except for Mechanical Branch Students) 2. Environmental Impact Assessment. (except Civil Engg. Students)	

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
I Year B. Tech Mining Engineering – I Sem.

ENGLISH SYLLABUS FOR SEM. 1 & 2 of JNTU-K

Introduction

The major challenge of a language teaching in a technical institution is to prepare the student for employability through imparting language skills to develop communicative competence. The proficiency in English language is closely linked to 'good communication skills' more so in the recent times when employability is at stake for want of communication skills on the part of the students. Since skills and personal attributes are revealed through communication, the responsibility of grooming students in life skills is also emphasized as part of language teaching and learning.

The core key skills needed are:

- i) Communication
- ii) Team Work
- iii) Problem Solving
- iv) Learning Skills

The personal attributes to be groomed are:

- i) Adaptability
- ii) Commitment
- iii) Enthusiasm
- iv) Stress Management
- v) Integrity
- vi) Sense of Humour
- vii) Self-Motivation
- viii) Reliability
- ix) Self-esteem
- x) Personal Presentation

Since the inception of the Board of Studies for English, effort to design a Course Structure that would cater to the needs of a wide range of learner groups has been made. It was felt by the Board that the Course Structure has to take into consideration the above criteria and therefore the objectives of the Language course ought to be much focused.

Objectives

- 1:** To improve the language proficiency of technical under graduates in English with emphasis on LSRW skills.
 - 1.1: To provide learning environment to practice *listening*, *speaking*, *reading*, and *writing* skills within and beyond the classroom environment.
 - 1.2: To assist the students to carry on the tasks and activities through guided instructions and materials.
- 2:** To effectively integrate English language learning with employability skills and training.
 - 2.1: To design the main course material and exercises with authentic materials drawn from everyday use to cater to everyday needs.

The material may be culled from newspaper articles, advertisements, promotional material etc.
 - 2.2: To provide hands-on experience through case-studies, mini-projects, group & individual presentations.

Each chapter will be structured with a short passage or collage of passages for reading. All further exercises and activities will draw upon the broad subject of the passage(s), and use **functional and situational approach**

<i>Chapter / Grammar & vocabulary</i>	<i>Reading & comprehension</i>	<i>Listening & speaking</i>	<i>Core skills and personal attributes developed through the exercises</i>	<i>Objectives achieved through the exercises</i>	<i>Plan of evaluation</i>
	Reading comprehension based on the passage(s): multiple-choice questions asking students to derive sense of a word from the context provided by a sentence, short questions asking students to sum up the key points of a passage, encouraging students to address not only explicit statement but also implied meaning.	Dialogues from situations related to what Writing and analysis has been encountered in the reading passages.; the dialogues may now be Instructions on how to lay out a piece of used in a role-play, and in groups, writing, and exercises where students may analyze them for meaning are asked to generate their own write-and implications, and ultimately engage in ups dialogues of their own making.			A three-tier system, allowing the student to work through self-assessment, assessment by peers, and finally, assessment by the teacher.

<p>Chapter – 1 .Read & Proceed</p> <p>The importance of the language used for communication:</p> <ul style="list-style-type: none"> • Understanding the need for English in the wider world, and the opportunities afforded by a strong command of the language • Assessing one's level within the language, and understanding the ways in which grasp of the language can be bettered • Understanding the basic structure of the sentence. English: subject – verb – object - Functional grammar exercise: <p>Students may discuss in groups or pairs when, why and where English is used. What, for example, if they have to face a job in-</p>	<p>Short extracts from:</p> <ol style="list-style-type: none"> 1.An interview with Arundhati Roy 2.Jawaharlal Nehru's 'Tryst with Destiny' speech 3.Albert Einstein's essay 'The World As I See It' 	<p>Sentences Understanding and using the basic structure of the sentence in English (subject – verb – object); creating sentences; understanding the different kinds of sentences (whether a statement, or a question, or an exclamation, and so on)</p>	<p>Small conversations between :</p> <ol style="list-style-type: none"> 1.A student and a hostel warden 2.An interviewee and an interviewer 3.Two friends together preparing for an oral examination at college 	<p>Communication teamwork, problem solving, learning skills</p>	<p>Enhanced learner-participation, development of linguistic proficiency</p>	<p>Both Teacher's Manual and Sample Test Questions will be provided]</p>
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<p>interview? Or make an official presentation in a State that does not use Telugu? Or even find their way in an unfamiliar city?</p> <p>Possible areas of focus and evaluation:</p> <ul style="list-style-type: none"> • Making sentences from given keywords • Correcting the order of words to make sentences, noting how change in word order can affect meaning. 						
<p>Chapter 2. Travel</p> <p>Nouns, pronouns, and adjectives:</p> <ul style="list-style-type: none"> • Understanding the kinds and uses of nouns • Understanding the use of pronouns to replace nouns • Understanding the ways in which nouns are qualified through adjectives 	<p>Reading and analysis of short extracts from two or more of the following:</p> <ol style="list-style-type: none"> 1. Vikram Seth, From Heaven Lake 2. Ruskin Bond, Lador Days 3. Rabindranath Tagore, The Europe Traveller's Diary 4. Pankaj Mishra, Butter Chicken in 	<p>Paragraphs</p> <p>Understanding the structure of a paragraph; retaining the thread of an argument; introducing the subject of the paragraph in the initial sentence; developing the argument in the next few sentences; drawing to a conclusion by reinforcing</p>	<p>Snippets of exchanges between:</p> <ol style="list-style-type: none"> 1. A tour guide and tourist 2. A local inhabitant of a city and a visitor 	<p>Communication, adaptability, sense of humour, reliability,</p>	<p>Functional approach to finding solutions, enhanced learner-participation, development of linguistic proficiency</p>	<p>[Both Teacher's Manual and Sample Test Questions will be provided]</p>

<p>• Understanding the kinds of adjectives, their degrees and their uses</p> <p>Functional grammar exercise:</p> <p>Students may be asked, in pairs, to plan a trip to a place of mutual interest. Each pair would then be encouraged to explain how and why they arrived at this choice. What words are used to identify – and distinguish – the proposed destination? What naming words are used? How those words are then qualified? How do the nouns (the naming words) and adjectives (the qualifiers) help to create a character and atmosphere for the place or site to be visited? Is it possible to build anticipation through such evoca</p>	Ludhiana	what has already been stated, but without introducing any new ideas towards the end; being brief and concise, but carrying all the information that needs to be conveyed	3 A photographer and her friend, with the photographer telling about the faces of interest she has been to in her recent travels		
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<p>tion?</p> <p>Potential areas of focus and evaluation:</p> <ul style="list-style-type: none"> • Changing nouns to the related adjectives • Changing adjectives to the related nouns • Replacing nouns with pronouns while retaining the meaning of the sentence 						
<p>Chapter 3. Gender</p> <p>Verbs and adverbs:</p> <ul style="list-style-type: none"> • Understanding the placement of a verb within a sentence • Understanding the use of adverbs to describe verbs <p><i>Functional grammar exercise:</i></p> <p>Students may be asked to consider recent news headlines for remarkable stories involving women. How are either the events or the women remark</p>	<p>Reading and analysis of short extracts from four newspaper/journal pieces:</p> <ol style="list-style-type: none"> 1. The Telegraph report on the 20-year old Burdwan girl who walked out of her marriage in revolt of her in-laws' demands for dowry 2. A perspective on astronaut Kalpana Chawla's achievement 3. The inspirational story of a young woman who survived 	<p>Essays and arguments</p> <p>Understanding that an essay or argument is a descriptive or persuasive piece of writing that needs to be organized as a succession of paragraphs; introducing the chief concerns in the first paragraph, and providing a layout of how the argument is going to be structured; developing the main thrust of the argument in the succeeding paragraphs; making smooth tran</p>	<p>Short exchanges between:</p> <ol style="list-style-type: none"> 1. Two friends, on an issue of contemporary interest 2. A reporter and a talk-show guest 3. A teacher and a student in school 	<p>Communication, teamwork, commitment, integrity, self-motivation, self-esteem</p>	<p>Enhanced learner-participation, development of linguistic proficiency, development of critical thinking</p>	<p>[Both Teacher's Manual and Sample Test Questions will be provided]</p>

able? What have these women done, or what do they do? What words of action are used to talk about the accomplishments of the women? How are actions of the past differentiated from actions of the present and actions yet to be performed? How (using what adverbs) are those actions qualified?	child-marriage 4.Sudha Murthy's write on what it is possible for women to achieve	sitions between ideas and paragraphs(using appropriate connecting words or phrases); winding to a conclusion by drawing the various strings of the argument together			
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Potential areas of focus and evaluation:

- Changing verbs to the related adverbs
- Changing adverbs to the related verbs
- Using verbs in their correct tenses, deriving the sense from the rest of the sentence.

<p>Chapter 4. Disaster Management</p> <p>Articles and punctuation:</p> <ul style="list-style-type: none"> •Understanding the uses of 'a', 'an', and 'the' •Understanding the uses of words/phrases expressing quantity, like 'some', 'a bit of', 'more', etc. •Understanding and using correct punctuation to convey meaning <p>Functional grammar exercise:</p> <p>Students may be asked to imagine that in the aftermath of a natural disaster, they are part of a relief team effort. When asked to effectively identify the needs of the situation, how do they plan to go about providing necessary aid? Is an ambulance to be ar</p>	Reading and analysis of a short piece on the tsunami	Official letters and emails Effectively using the format of official communication: providing one's own address and contact details, documenting the date and place from which the communication is sent, the salutation used for the addressee, the main body of the letter or email (keeping it comprehensive but to the point), and signing off	Dialogues between: 1.a social worker and an earthquake victim 2.two doctors working in an area afflicted by natural disaster 3.two school students campaigning to raise relief money	Communication, teamwork, problem solving, adaptability, stress management, reliability, integrity	Enhanced learner-participation, development of linguistic proficiency, functional approach to problem solving, enabling group work	[Both Teacher's Manual and Sample Test Questions will be provided]
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<p>anged for? Or a medical tent set up? Are <i>adequate</i> first-aid supplies available? Do <i>more</i> rations need to be fetched? Could there be a tie-up with <i>an</i> overseas relief organization?</p>						
<p>Chapter 5 –Health Prepositions, conjunctions and exclamations:</p> <ul style="list-style-type: none"> •Understanding the use of prepositions – words that connect verbs with their objects •Understanding that certain verbs use certain prepositions •Understanding the uses of common prepositions: to, for, at, by, of, and so on •Understanding the uses of conjunctions and exclamations 	<p>Reading and analysis of three different kinds of writing, and comparisons between them:</p> <ol style="list-style-type: none"> 1.A Government of India report on the success of nationwide campaigns for polio vaccination 2.A vegetarian's perspective on what makes for healthy living 3.An athlete's say on the benefits of lifelong exercise 	<p>Reports</p> <p>Learning the difference between an essay, for example, and a report; learning to identify the key points of an event or incident, and documenting them briefly but in a manner that conveys both the temper and the unfolding of the event; understanding what is meant by a 'target readership'; and learning to tailor the piece to the needs of that readership</p>	<p>Brief exchanges between:</p> <ol style="list-style-type: none"> 1.A father and his son/daughter, as he explains the importance of staying fit 2.A friends discussing the ideal diet 3.A campus counsellor and a student 	<p>Personal presentation, stress-management, commitment, enthusiasm,, self-motivation</p>	<p>Development of linguistic proficiency, functional approach to problem solving</p>	<p>[Both Teacher's Manual and Sample Test Questions will be provided]</p>

<p>Functional grammar exercise: Students may be asked to propose ways in which healthier living might be attained – eating better <i>and</i> exercising, drinking plenty <i>of</i> water, partaking fresh vegetables <i>from</i> the Market, and so on. Possible exercises may be framed around:</p> <ul style="list-style-type: none">• Filling in blanks within sentences• Distinguishing between different meanings possible through the use of different prepositions with the same verbs						
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<p>Chapter 6 Sports : Revision of all elements of grammar handled thus far, through evocative descriptions of State or national or international level sports stories, and discussion of them.</p> <p>Functional grammar exercise: Students may, in pairs, be asked to present an account of a memorable sports meet or game. The use of nouns pronouns, and adjectives should help to clarify exactly what event is being talked about. Judicious use of adjective will help provide the context: how important the game or match was, where it was held, and so on. In a brief account of the game, verbs and adverbs will</p>	<p>Reading and analysis of two of four short pieces in depiction of:</p> <ol style="list-style-type: none"> 1. Opportunities for men and women in sports 2. A decisive moment in a game 3. Expectation and failure 4. The attitude of sportsmanship 	<p>Presentations</p> <p>Learning to identify the key elements of any issue and putting them down as succinct points; structuring the points so that they may be elaborated on according to necessity; understanding the progression of points so that no important element is missed out, but also, repetitions are avoided</p>	<p>Small conversations between:</p> <ol style="list-style-type: none"> 1. A fitness instructor and a trainee 2. Two friends discussing a possible career in sports 3. Two friends discussing their favorite game 	<p>Teamwork, integrity, self-motivation, self-esteem, commitment</p>	<p>Development of linguistic proficiency, functional approach to problem solving</p>	<p>[Both Teacher's Manual and Sample Test Questions will be provided]</p>
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be necessary to report exactly what happened. If the account has to be detailed and lively, students will be obliged to use the correct forms and tenses. Of course, throughout, not only will the right inflections and articles be necessary, so too will the precise use of prepositions.					
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Book: *Step by Step : Learning Language and Life Skills by* Pearson Longman; Pearson Publishers
Lab Manual: Strengthen your Steps (A Multimodal course in communication skills) by Maruthi Publications

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, KAKINADA

I Year B. Tech Mining Engineering – I Sem.

MATHEMATICS-I (*Common to All Branches*)

UNIT – I

Differential equations of first order and first degree – exact, linear and Bernoulli. Applications to Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories.

UNIT – II

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax} V(x)$, $xV(x)$

UNIT-III

Generalized Mean Value theorem (without proof) Functions of several variables – Functional dependence- Jacobian- Maxima and Minima of functions of two variables with constraints and without constraints.

UNIT-IV

Curve tracing – Cartesian - Polar and Parametric curves.

UNIT – V

Applications of Integration to Lengths, Volumes and Surface areas of revolution in Cartesian and Polar Coordinates.

UNIT – VI

Multiple integrals - double and triple integrals – change of variables – Change of order of Integration.

UNIT – VII

Vector Differentiation: Gradient- Divergence- Curl and their related properties of sums-products- Laplacian and second order operators.

UNIT-VIII

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

TEXT BOOKS:

1. **‘A Text Book of Engineering Mathematics – I’** by U. M. Swamy, P. Vijaya Lakshmi, Dr. M. P.K.Kishore and Dr. K.L. Sai Prasad – Excel Books, New Delhi

REFERENCES:

1. Engineering Mathematics, Vol- 1, Dr. D. S.C. Prism Publishers
2. Engineering Mathematics, B. V. Ramana , Tata Mc Graw Hill
3. “Advanced Engineering Mathematics”, Erwin Kreszig, 8 Ed. Wiley Student Edition

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**I Year B. Tech Mining Engineering – I Sem.****ENGINEERING PHYSICS -1****UNIT-I**

INTERFERENCE: Superposition of waves - Young's double slit experiment
- Coherence - Interference in thin films by reflection -Newton's rings.

UNIT-II

DIFFRACTION: Fresnel and Fraunhofer diffractions - Fraunhofer diffraction at a single slit - Double slit - Diffraction grating - Grating spectrum - Resolving power of a grating - Rayleigh's criterion for resolving power.

UNIT-III

POLARIZATION: Types of Polarization - Double refraction - Nicol prism
- Quarter wave plate and Half wave plate..

UNIT-IV

CRYSTAL STRUCTURE: Introduction - Space lattice - Basis - Unit cell - Lattice parameters - Bravais lattices - Crystal systems - Structure and packing fractions of simple cubic, Body centered cubic, Face centered cubic crystals.

UNIT-V

X-RAY DIFFRACTION: Directions and planes in crystals - Miller indices
- Separation between successive $[h\ k\ l]$ planes - Diffraction of X - rays by crystal planes - Bragg's law - Laue method -Powder method.

UNIT-VI

LASERS: Introduction - Characteristics of lasers - Spontaneous and Stimulated emission of radiation -Einstein's coefficients - Population inversion - Ruby laser - Helium -Neon laser - Semiconductor laser - Applications of lasers in industry, scientific and medical fields.

UNIT-VII

FIBER OPTICS: Introduction - 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

NON-DESTRUCTIVE TESTING USING ULTRASONICS: Ultrasonic Testing - Basic Principle - Transducer - Couplant and Inspection Standards - Inspection Methods - Pulse Echo Testing Technique - Flaw Detector - Different Types of Scans - Applications.

TEXT BOOKS :

1. Perspective of Engineering Physics by Dr.M.Sri Rama Rao (Retd Prof. in Physics, Andhra University, Visakhapatnam), Dr.N.Chaudhary and D.Prasad, Pub: Acme Learning.

REFERENCE BOOKS:

1. Engineering Physics by S. Mani Naidu (Pearson publishers)
2. Engineering Physics by Sanjay D Jain and Girish G Sahasrabudhe (University press)
3. Engineering Physics by Alk and A K Singh (Tata Mc Graw-Hill Publishing company Limited)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

I Year B. Tech Mining Engineering – I Sem.

ENGINEERING CHEMISTRY –I

CONCEPTS IN CHEMISTRY –ENGINEERING APPLICATIONS

UNIT-I

1. JOULE THOMSON EFFECT

Definitions of Enthalpy, Free Energy, Entropy, Principle and explanation of Joule Thomson Effect, application to Air Conditioning, Refrigeration (WORKING PRINCIPLE AND FLOW DIAGRAMS)

2. OSMOSIS & REVERSE OSMOSIS

Principles of Osmosis & Reverse Osmosis, application to Desalination process-Types of Membranes used in desalination process-Limitations

3. LECHATLIER'S PRINCIPLE

Definition of Chemical Equilibrium, Factors influence the Chemical Equilibrium, Statement and explanation of Lechatliers principle-Industrial applications for the production of Sulphuric Acid and Ammonia

4. SOLUBILITY PRODUCT & COMMON ION EFFECT

Definition of Solubility & Ionic products, Industrial applications

UNIT-II

1. CATALYSIS

Explanation of Catalysis, Criteria of Catalysts, Few Industrial Catalysts

2. COLLOIDS

Explanation of Colloids- Properties of Colloids, Industrial applications of Colloids

3. FERMENTATION

Explanation of Fermentation with examples-Industrial applications

4. VISCOSITY:

Definition of Viscosity -Factors influence the Viscosity- Kinematic

Viscosity-Determination of Molecular Weight of any one compound-
Applications to fluids in motion –Type of flow.

UNIT-III

1. FLUORESCENCE&PHOSPHORESCENCE— LUMINISCENT COMPOUNDS

Explanation of Fluorescence &Phosphorescence JOB s Diagram,
Industrial applications of Chemiluminiscent compounds

2. PHOTO & LIGHT RESPONSIVE COMPOUNDS— SENSORS,BIOSENSORS

Explanation of Sensors & Biosensors-Principle –Few Applications

3. IONSELECTIVE ELECTRODES –

Principle- Chemistry &working of Electrode-applications to
determination of Fluoride,Chloride and Nitrate

4. NUCLEAR MAGNETIC RESONANCE(NMR):

Principle –Few Electronic applications

UNIT-IV

1. SUPERCONDUCTIVITY –

Definition-Preparation –Properties –Engineering Applications

2. SEMICONDUCTORS -

Definition –Types of semiconductors (Stiochiometric,Non
stichometric , Organic, Controlled Valency Semiconductors, Doping
)-applications

3. STORAGE DEVICES -

Materials used and working of Floppy, CD, Pendrive etc.

4. LIQUID CRYSTALS -

Definition –Types - applications in LCD and Engineering,
Applications.

UNIT – V

THERMAL ENERGY- Introduction to solid fuels – definition – calorific
value (LCV, HCV) bomb calorimeter, pulverized coal – carbonization –

analysis of coal (proximate and ultimate analysis) – working of thermal power station.

UNIT - VI

Chemical sources of energy – single electrode potential – Nernst Equation-reference electrodes – concentration cells-primary and secondary cells – fuel cells.

UNIT-VII

NUCLEAR ENERGY: Introduction to nuclear fuels – binding energy – nuclear fission and fusion reactions – nuclear reactions – disposal of nuclear wastes.

UNIT-VIII

SOLAR CELLS- Introduction – harnessing solar energy – solar heaters – photo voltaic cells – solar reflection – green house concepts.

*Teachers Are Requested To Provide Information About National And International Status Of Conventional And Non Conventional Sources To The Students.

TEXT BOOK :

1. A Text Book Of Engineering Chemistry By N.Krishan Murty
Anuradha, Maruthi Publications

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

I Year B. Tech Mining Engineering – I Sem.

C- Programming

UNIT I:

INTRODUCTION: Computer systems, Hardware & software concepts.

PROBLEM SOLVING: Algorithm / pseudo code, flowchart, program development steps, Computer Languages: machine, symbolic, and high-level languages, Creating and running programs: Writing, editing, compiling, linking, and executing.

BASICS OF C: Structure of a C program, identifiers, basic data types and sizes. Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation, Sample programs.

UNIT II:

BIT-WISE OPERATORS: logical, shift, rotation, masks.

SELECTION – MAKING DECISIONS: Two-way selection: if- else, null else, nested if, examples, Multi-way selection: switch, else-if, examples.

UNIT III:

STRINGS: concepts, c strings.

ITERATIVE: Loops - while, do-while and for statements, break, continue, initialization and updating, event and counter controlled loops, Looping applications: Summation, powers, smallest and largest.

UNIT IV:

ARRAYS: Arrays - concepts, declaration, definition, accessing elements, storing elements, Strings and string manipulations, 1-D arrays, 2-D arrays and character arrays, string manipulations, Multidimensional arrays , Array applications: Matrix Operations, checking the symmetricity of a Matrix,

UNIT V:

FUNCTIONS-MODULAR PROGRAMMING: Functions, basics, parameter passing, storage classes- extern, auto, register, static, scope rules, block

structure, user defined functions, standard library functions, recursive functions, Recursive solutions for Fibonacci series, Towers of Hanoi, header files, C pre-processor, example c programs. Passing 1-D arrays, 2-D arrays to functions.

UNIT VI:

POINTERS: Pointers- concepts, initialization of pointer variables, pointers and function arguments, passing by address –dangling memory, address arithmetic, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory management functions, command line arguments.

UNIT VII:

ENUMERATED, STRUCTURE AND UNION TYPES: Derived types- structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, program applications.

UNIT VIII:

FILE HANDLING: Input and output – concept of a file, text files and binary files, Formatted I/o, file I/o operations, example programs.

TEXT BOOKS:

1. The C – Programming Language' B.W. Kernighan, Dennis M. Ritchie, PHI

REFERENCE:

1. C Programming : A Problem - Solving Approach, Forouzan, E. V. Prasad, Giliberg, Cengage, 2010.
2. Programming in C, Stephen G. Kochan, 3/e Pearson, 2007.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

I Year B. Tech Mining Engineering – I Sem.

ENVIRONMENTAL STUDIES

UNIT - I

Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance – Need for Public Awareness.

UNIT - II

Natural Resources : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems - Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, 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, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT - III

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

- a. Forest ecosystem
- b. Grassland ecosystem
- c. Desert ecosystem
- d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT - IV

Biodiversity and its conservation : Introduction - Definition: genetic, species and ecosystem diversity. - Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - Biodiversity at global, National and local levels. - India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT - V

Environmental Pollution : Definition, Cause, effects and control measures of :

- a. Air pollution
- b. Water pollution
- c. Soil pollution
- d. Marine pollution
- e. Noise pollution
- f. Thermal pollution
- g. Nuclear hazards

Solid waste Management: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT - VI

Social Issues and the Environment: From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, watershed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies -Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. - Wasteland reclamation. – Consumerism and waste products. -Environment Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act -Wildlife Protection Act -Forest

Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT - VII

Human Population and the Environment: Population growth, variation among nations. Population explosion – Family Welfare Programme. - Environment and human health. -Human Rights. -Value Education. HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. –Case Studies.

UNIT - VIII

Field work : Visit to a local area to document environmental assets River /forest grassland/hill/mountain -Visit to a local polluted site Urban/Rural/ industrial/ Agricultural Study of common plants, insects, birds. -Study of simple ecosystemspond, river, hill slopes, etc.

TEXT BOOKS :

1. An Introduction to Environmental Studies by B. Sudhakara Reddy, T. Sivaji Rao, U. Tataji & K. Purushottam Reddy, Maruti Publications.

REFERENCE:

1. Text Book of Environmental Studies by Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2. Environmental Studies by K.V.S.G. Murali Krishna, VGS Publishers, Vijayawada
3. Text Book of Environmental Sciences and Technology by M. Anji Reddy, BS Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**I Year B. Tech Mining Engineering – I Sem.****ENGINEERING PHYSICS & CHEMISTRY LABORATORY-1****PHYSICS-I****A. Mechanics**

1. Determine the Rigidity Modulus of the material of the wire using Torsional Pendulum.
2. Determine the Frequency of vibration in Transverse and Longitudinal Mode using Melde's Apparatus.
3. Verify the Laws Transverse vibrations in stretched strings using Sonometer.
4. Determine the Velocity of Sound by Volume Resonator method.
5. Determine the Acceleration due to Gravity and Radius of Gyration using Compound Pendulum.

B. Optics:

6. Determine the Wavelength of a source by Normal Incidence method using Diffraction Grating.
7. Determine the Radius Curvature of a convex lens by forming Newton's Rings.
8. Determine the Refractive Index of the material of Prism (Minimum Deviation method) using Spectrometer.
9. Determine the Thickness of the Spacer used to form Parallel fringes due to Wedge shaped film.
10. Determination of Single slit diffraction using Lasers.

Manual/Record Books:

1. Manual cum Record for Engineering Physics Lab-1, by Prof.Sri M. Rama Rao, Acme Learning.
2. Lab manual – 1, of Engineering Physics by Dr. Y.Aparna and Dr. K.Venkateswara Rao (VGS Books links, Vijayawada)

CHEMISTRY LAB - 1

LIST OF EXPERIMENTS

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

2. Introduction to Volumetric Analysis:

The Teacher has to perform four types of volumetric titrations and will explain about the Working of Indicators. (The Teacher has to call the students at random to perform the titrations)

2. ANALYSIS OF WATER

Estimation of :

- a. **Calcium, Magnesium, Iron (111), Zinc (SEPERATELY)**
- b. TOTAL HARDNESS BY EDTA METHOD
- c. TURBIDITY
- d. CONDUCTIVITY
- e. pH
- f. TOTAL DISSOLVED SALTS
- g. FLORIDES, CHLORIDES AND NITRATES (USING ION ANALYSER OR BY COLORIMETER)
- h. DISSOLVED OXYGEN
- i. BACTERIAL COUNT

The student has to get his water sample and the teacher has to explain the analysis and the results are to be compared with the INDIAN STANDARDS.

- All the teachers are requested to give top priority to water analysis as it is very useful for the students and society. complete water analysis may take couple of hours more but this has a unique influence on the system.

3. CONSTRUCTION OF GALVANIC CELL

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

Lab Manual :

Engineering chemistry laboratory manual & record By srinivasulu .d parshva publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**I Year B. Tech Mining Engineering – I Sem.****ENGINEERING WORKSHOP****Note: At least two exercises to be done from each trade.****Trade:****Carpentry**

1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tennon Joint

Fitting

1. V- Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

Black Smithy

1. Round rod to Square
2. S-Hook
3. Round Rod to Flat Ring
4. Round Rod to Square headed bolt

House Wiring

1. Parallel / Series Connection of three bulbs
2. Stair Case wiring
3. Florescent Lamp Fitting
4. Measurement of Earth Resistance

Tin Smithy

1. Taper Tray
2. Square Box without lid
3. Open Scoop
4. Funnel

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
I Year B. Tech Mining Engineering – I Sem.

C PROGRAMMING LAB

Objectives:

- To learn/strengthen a programming language like C, To learn problem solving techniques

Recommended Systems/Software Requirements:

- Intel based desktop PC, ANSI C Compiler with Supporting Editors, IDE's such as Turbo C, Bloodshed C,
- Linux with gcc compiler

Exercise 1

Solving problems such as temperature conversion, student grading, income tax calculation, etc., which expose students to use basic C operators

Exercise 2

2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.

Exercise 3

- Write a C program to find the sum of individual digits of a positive integer.
- 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.
- Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
- Write a program which checks a given integer is Fibonacci number or not.

Exercise 4

- Write a C program to calculate the following Sum:

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

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

Exercise 5

- 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/sec²). 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)

Exercise 6

- a) Simple programming examples to manipulate strings.
- b) Verifying a string for its palindrome property

Exercise 7

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

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

Exercise 8

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

- Reading a complex number
- Writing a complex number
- Addition of two complex numbers
- Multiplication of two complex numbers

Exercise 9

- a) Addition of Two Matrices
- b) Calculating transpose of a matrix in-place manner.
- c) Matrix multiplication by checking compatibility

Exercise 10

- a) Write C programs that use both recursive and non-recursive functions for the following
 - i) To find the factorial of a given integer.
 - ii) To find the GCD (greatest common divisor) of two given integers.
 - iii) To solve Towers of Hanoi problem.

Exercise 11

- a) Write a C functions to find both the largest and smallest number of an array of integers.
- b) Write a C function that uses functions to perform the following:
 - i) that displays the position/ index in the string S where the string T begins, or -1 if S doesn't contain T.
 - ii) to count the lines, words and characters in a given text.

Exercise 12

- a) Write a C function to generate Pascal's triangle.
- b) Write a C function to construct a pyramid of numbers.

Exercise 13

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

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

Write a C function to read in two numbers, x and n(no. of terms), and then compute sin(x) and cos(x).

Exercise 14

- a. Pointer based function to exchange value of two integers using passing by address.
- b. Program which explains the use of dynamic arrays.
- c. Program to enlighten dangling memory problem (Creating a 2-D array dynamically using pointer to pointers approach).

Exercise 15

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

Exercise 16

- a) Write a C program which copies one file to another.
- b) Write a C program to reverse the first n characters in a file. (Note: The file name and n are specified on the command line)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

I Year B. Tech Mining Engineering – I Sem.

ENGLISH - COMMUNICATION SKILLS LAB -1

UNIT-1

Section -A Hello, I'm....

Section –B Practicing Sounds

UNIT – 2

Section-A I Would Love tobut

Section-B practicing Sounds

UNIT -3

Section-A With your permission I would to ...

Section-B Practicing Sounds

UNIT-4

Section-A Why don't we.....

Section-B Practicing Sounds

UNIT-5

Section-A Could you Please.....

Section-B practicing Sounds

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**I Year B. Tech Mining Engineering – II Sem.****MATHEMATICS-II****UNIT – I**

Laplace transforms of standard functions –Shifting Theorems, Transforms of derivatives and integrals – Unit step function –Dirac's delta function.

UNIT – II

Inverse Laplace transforms– Convolution theorem - Application of Laplace transforms to ordinary differential equations Partial fractions.

UNIT – III

Fourier Series: Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval– Half-range sine and cosine series.

UNIT – IV

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

UNIT – V

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

UNIT – VI

Method of Separation of Variables - Applications to wave equation, heat equation and Laplace Equation.

UNIT – VII

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

UNIT – VIII

Gamma and Beta Functions – Properties – Evaluation of improper integrals.

TEXT BOOK:

1. Swamy,U.M., Vijayalaxmi, P.,Ravikumar, R.V.G., and Phani Krishna Kishore., Mathematics II, Excel Books, New Delhi.

BOOKS:

1. B.V.Ramana, Engineering Mathematics, Tata Mc Graw Hill.
2. Iyengar,T.K.V, Krishna Gandhi, et.al Engineering Mathematics Vol-II, S.Chand Co. New Delhi.
3. Erwin Kreszig, “Advanced Engineering Mathematics”, 8 Ed Wiley Student Edition.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**I Year B. Tech Mining Engineering – II Sem.****ENGINEERING PHYSICS - II****UNIT-I**

QUANTUM MECHANICS & QUANTUM COMPUTING: Introduction - Schrodinger Time Independent and Time Dependent wave equations - Particle in a box - Operator version - Suitability of Quantum system for Information Processing - Classical Bits and Qu-Bits - Bloch's Sphere - Quantum Gates - Multiple Qu-Bits - Advantages of Quantum Computing over classical Computation.

UNIT-II

ELECTRON THEORY OF METALS: Classical free electron theory - Mean free path - Relaxation time and drift velocity - Quantum free electron theory - Fermi - Dirac (analytical) and its dependence on temperature - Fermi energy - Electron scattering and resistance.

UNIT-III

BAND THEORY OF SOLIDS: Bloch theorem (qualitative) - Kronig - Penney model - Origin of energy band formation in solids - Classification of materials into conductors, semi- conductors & insulators - Concept of effective mass of an electron.

UNIT-IV

MAGNETIC PROPERTIES: Permeability - Magnetization - Origin of magnetic moment - Classification of Magnetic materials - Dia, para and ferro-magnetism - Domain and Weiss field theory - Hysteresis Curve - Soft and Hard magnetic materials.

UNIT-V

SUPERCONDUCTIVITY: General properties - Meissner effect - Penetration depth - Type I and type II superconductors - Flux quantization - DC and AC Josephson effect - BCS Theory - Applications of superconductors.

UNIT-VI

DIELECTRIC PROPERTIES: Introduction - Dielectric constant - Electronic, ionic and orientational polarizations - Internal fields in solids - Clausius-Mossotti equation - Dielectrics in alternating fields - frequency dependence of the polarizability - Ferro and Piezo electricity.

UNIT-VII

SEMICONDUCTORS: Introduction - Intrinsic semiconductor and carrier concentration - Equation for conductivity - Extrinsic semiconductor and carrier concentration - Drift and diffusion - Einstein's equation - Hall effect - Direct & indirect band gap semiconductors.

UNIT-VIII

PHYSICS OF NANO MATERIALS: Introduction - Properties and preparation of Nano Materials -Surface occupancy - Reduction of Dimensionality - 4D -Force vector - Quantum wires - Quantum dots and Quantum wells - Density of states and Energy spectrum - Nanotubes - Applications of nanomaterials.

TEXT BOOK:

1. Perspective of Engineering Physics - II by M Sri Ramarao, Nityananda Choudary, Daruka Prasad, ACME Learning.

REFERENCE BOOKS:

1. Solid State Physics – by A J Dekker , Mcmilan India Ltd.
2. A Text Book of Engineering Physics , by Bhattacharya & Bhaskara, Oxford University Press
3. Engineering Physics by K Shiva Kumar, Prism Books Pvt. Ltd

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**I Year B. Tech Mining Engineering – II Sem.****ENGINEERING CHEMISTRY – II****UNIT-I**

POLYMERS: Introduction - Types of polymers – Classification - Methods of polymerisation – Stereo specific polymers - Ziegler Natta catalysis - Properties of polymers –Conducting Polymers- Engineering applications – Biodegradable polymers - Individual polymers(Preparation ,Properties,Uses of Poly Styrene, PVC, PTFE, Bakelite's, Cellulose derivatives, Poly Carbonates)

UNIT-II

PLASTICS – Types –Compounding of plastics- Moulding(Four types)- Fiber reinforced , Glass fibre reinforced plastics –Bullet Proof Plastics– Properties of plastics – Engineering applications

UNIT-III

RUBBERS & ELASTOMERS: Introduction – Preparation – Vulcanization – Properties - Engineering applications.

Buna-S,Buna-N, - Poly Urethane - Engineering applications of Elastomers

UNIT-IV**NANO MATERIALS**

Introduction to Nano materials-preparation of few Nano materials(Carbon Nano Tubes,Fullerenes etc)-Properties of Nano materials- Engineering applications.

UNIT-V**BUILDING MATERIALS(CEMENT,REFRACTORIES,CERAMICS):
CEMENT**

Introduction, Manufacturing of Portland Cement(Dry & Wet Process)- Chemistry of Setting and Hardening of Cement-Effect of Carbon dioxide,Sulphur Dioxide ,Chloride on Cement concrete.

REFRACTORIES

Introduction-Classification –Properties-Applications

CERAMICS

Introduction-Classification – Glazed & Unglazed Ceramics -Properties-Engineering Applications.

UNIT-VI**FUEL TECHNOLOGY**

Introduction to Liquid Fuels-Classification of Crude Oil-Fractional Distillation-Cracking (Thermal & Catalytic), Polymerization-Refining & Reforming –Working of Internal Combustion Engine, Heated Chambers-Knocking –AntiKnocking Agents-Octane & Cetane Number.

LUBRICANTS

Definition and Explanation of Lubrication-Mechanism of Lubrication – Types of Lubricants-Properties of Lubricants-Engineering applications

UNIT-VII

CORROSION – Mechanism- Factors influence the rate of corrosion - Types of Corrosion -Protection methods (Anodic & Cathodic protection), - Metallic Coatings - Paints, Varnishes, Enamels , Special paints.

UNIT-VIII**GREEN CHEMISTRY**

Introduction-Concepts- Engineering Applications

TEXT BOOK :

1. A Text book of engineering chemistry by Srinivasulu D. Parshva publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**I Year B. Tech Mining Engineering – II Sem.****ENGINEERING DRAWING****UNIT-I**

Polygons-Construction of Regular Polygons using given length of a side; Ellipse- Arcs of Circles and Oblong Methods; Scales-Vernier and Diagonal Scales.

UNIT-II

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

UNIT-III

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

UNIT-IV

Projections of Planes; Regular Planes Perpendicular / Parallel to one Reference

Plane and inclined to other Reference Plane; inclined to both the Reference Planes.

UNIT-V

Projections of Solids-Prisms and Cylinders with the axis inclined to one Plane.

UNIT-VI

Projections of Solids- Pyramids and Cones with the axis inclined to one plane.

UNIT-VII

Conversion of Isometric Views to Orthographic Views.

UNIT-VIII

Conversion of Orthographic Views to Isometric Projections and Views.

TEXT BOOK:

1. Engineering Drawing by N.D. Bhat, Chariot Publications

REFERENCE BOOKS:

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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**I Year B. Tech Mining Engineering – II Sem.****MATHEMATICAL METHODS****UNIT – I**

Linear systems of equations: Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods- Gauss Elimination - Gauss Jordan and Gauss Seidal Methods.

UNIT – II

Eigen values - Eigen vectors – Properties – Cayley-Hamilton Theorem - Inverse and powers of a matrix by using Cayley-Hamilton theorem.

UNIT-III

Quadratic forms- Reduction of quadratic form to canonical form – Rank - Positive, negative definite - semi definite - index – signature.

UNIT – IV

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

UNIT-V

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

UNIT – VI

Numerical Differentiation and Integration – Differentiation using finite differences - Trapezoidal rule – Simpson's 1/3 Rule –Simpson's 3/8 Rule.

UNIT – VII

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- Milne's Method.

UNIT – VIII

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

TEXT BOOK :

1. Ravindranath, V. and Vijayalaxmi, A., A Text Book on Mathematical Methods, Himalaya Publishing House, Bombay.

Reference Books :

1. Rukmangadachari, E. Mathematical Methods, Pearson Education, Delhi.
2. Kreszig, Erwin “Advanced Engineering Mathematics”, 8 Ed. Wiley Student Edition.
3. Peter O’ Neil, “Engineering Mathematics”, Cengage Learning. Gordon, “Engineering Mathematics”, Pearson Education

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

I Year B. Tech Mining Engineering – II Sem.

ENGINEERING PHYSICS&CHEMISTRY LABORATORY- II

PHYSICS:

Electro-Magnetism and Electronics:

1. Determine the Planck's constant using Photo-Cell.
2. Study the variation of Magnetic Field along the axis of a solenoid coil using Stewart - Gee's apparatus.
3. Draw the Frequency Response curves of L-C-R Series and Parallel Circuits.
4. Determine the Time Constant for a C-R Circuit.
5. Determine the Band Gap of a Semi conductor using a p-n junction diode.
6. Study of Characteristic curves (I/V) of a Zener diode to determine its Breakdown voltage.
7. Determine the Hall Coefficient of a Semiconductor.
8. Draw the characteristic curves and determine the Thermoelectric coefficient of a Thermistor
9. Study the Seebeck and Peltier - Thermoelectric Effects and to determine Coefficients and Thermo Electric Effect using Thermocouple.
10. Draw the Characteristic curves of a p-i-n and Avalanche Photo Diodes.
11. Determination of Numerical Aperture and Bending losses of an Optical Fiber.

Manual Cum Record Books :

1. Manual cum Record for Engineering Physics Lab- II, by Prof.Sri M. Rama Rao, Acme Learning..
2. Lab manual - II, of Engineering Physics by Dr. Y.Aparna and Dr.K.Venkateswara Rao (VGS Books links, Vijayawada)

CHEMISTRY LAB – II**1. PRODUCTION OF BIODIESEL. INTRODUCTION TO BIO FUELS**

The teacher has to perform the transesterification reaction of FATTY ACID and the Biodiesel thus produced can be used for analysis. (Please give priority to production of Biodiesel from waste cooking oil)

2. Estimation of properties of oil:

- a. Acid Number
- b. Viscosity
- c. Saponification value
- d. Aniline point
- e. Flash and Fire points
- f. Pour and Cloud point

3. PREPARATION OF PHENOL–FORMALDEHYDE RESIN**4. SOIL ANALYSIS:**

pH, Determination of Zinc, Iron, Copper.

5. FOOD ANALYSIS:

Determination Saturated and Unsaturated Fatty Acids, pH, etc.

All the teachers are requested to focus on bio fuels, soil analysis and food analysis as these are the need of 21st century and these experiments are so designed to encourage students to carry out lab to land process.

Lab Manual : Engineering chemistry laboratory manual & record By Srinivasulu . D. Parshva publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

I Year B. Tech Mining Engineering – II Sem.

ENGLISH - COMMUNICATION SKILLS LAB -2

UNIT-6

Dialogues

UNIT-7

Interviews

UNIT-8

Effective Telephonic Interviews

UNIT-9

Group Discussions

UNIT-10

Presentations

UNIT-11

Debates

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**I Year B. Tech Mining Engineering – II Sem.****IT WORKSHOP****Objectives:**

The IT Workshop for engineers is a 6 training lab course spread over 45 hours.

The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including (word processor, spread sheet, presentation sw) Word, spread sheet Excel, Power Point and Publisher.

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

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

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

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

PC Hardware

Task 1: Identification of the peripherals of a computer.

To prepare a report containing the block diagram of the CPU along with the configuration of each peripheral and its functions.

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

Task 3 : Installation of MS windows and LINUX on a PC.

Task 4 : Exposure to Basic commands and system administration in Linux including: Basic Linux commands in bash, Create hard and symbolic links.

Task 5 :**Hardware Troubleshooting (Demonstration):**

Students have to be given a PC which does not boot due to improper assembly or defective peripherals. Identification of a problem and fixing it for getting to working condition.

Software Troubleshooting (Demonstration): Students have to be given a malfunctioning CPU due to system software problems. Identification of a problem and fixing it for getting to working condition.

Internet & World Wide Web

Task 6 : Orientation & Connectivity Boot Camp and surfing the Web using Web Browsers : Students should get connected to their Local Area Network and access the Internet. In the process they should configure the TCP/IP setting and demonstrate how to access the websites and email. Students customize their web browsers using bookmarks, search toolbars and pop up blockers.

Task 7: Search Engines & Netiquette : Students should know what search engines are and how to use the search engines.

A few topics would be given to the students for which they need to search on Google.

Task 8 : Cyber Hygiene (Demonstration) : Awareness of various threats on the internet. To install an anti virus software and to configure their personal firewall and windows update on their computers.

LaTeX and Word

Word Orientation : Importance of LaTeX and MS/ equivalent (FOSS) tool Word as word Processors.

Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.

Task 9 : Using LaTeX and word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Task 10: Creating project : Abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction,

Cell alignment, Footnote, Hyperlink, Symbols, Spell Check , Track Changes, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs.

Excel

Excel Orientation : The mentor needs to tell the importance of MS/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel –

Accessing, overview of toolbars, saving excel files, Using help and resources

Task 11 : Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

LOOKUP/VLOOKUP

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

LaTeX and MS/equivalent (FOSS) tool Power Point

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

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

REFERENCES :

- 1 Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008
- 2 The Complete Computer upgrade and repair book, 3/e, Cheryl A Schmidt, Dreamtech

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**II Year B. Tech. Mining Engineering – I Sem.****ENGINEERING MECHANICS****UNIT – I**

Introduction to Engg. Mechanics – Basic Concepts.

Systems of Forces : Coplanar Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems.

UNIT – II

Equilibrium of Systems of Forces : Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. Lami's Theorem, Graphical method for the equilibrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition of equilibrium.

UNIT – III

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

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

UNIT – IV

Area moments of Inertia : Definition – Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia. Mass Moment of Inertia : Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.

UNIT – V

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 Curvelinear motions – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion.
Kinetics : Analysis as a Particle and Analysis as a Rigid Body in Translation – Central Force Motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies.

UNIT – 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

Friction : Introduction , limiting friction and impending motion, coulomb's laws of dry friction , coefficient of friction, cone of friction. Applications of friction- impending motion of connected bodies , relative motion, ladder friction, wedges, screw friction.

TEXT BOOKS:

1. Engg. Mechanics ,Timoshenko & Young.
2. Engg. Mechanics, R.K. Bansal , Laxmi publications

REFERENCES:

1. Engineering Mechanics , Fedinand . L. Singer , Harper – Collins.
2. Engineering Mechanics statics and dynamics , A Nelson , Mc Gra Hill publications
3. Engg. Mechanics Umesh Regl, Tayal.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**II Year B. Tech. Mining Engineering – I Sem.****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 fraction 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. Fundamentals of Thermodynamics – Sonntag, Borgnakke and van Wylen / John Wiley & sons (ASIA) Pte Ltd.

REFERENCES :

1. Engineering Thermodynamics – Jones & Dugan
2. Thermodynamics – An Engineering Approach – Yunus Cengel & Boles /TMH
3. Thermodynamics – J.P.Holman / McGrawHill

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**II Year B. Tech. Mining Engineering – I Sem.****FLUID MECHANICS AND HYDRAULIC MACHINERY****UNIT I**

Fluid statics: Dimensions and units: physical properties of fluids-specific gravity, viscosity surface tension- vapor pressure and their influence on fluid motion- atmospheric gauge and vacuum pressure – 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, and irrotational flows-equation of continuity for one dimensional flow.

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: pilot tube, venturimeter, and orifice meter, Flow nozzle, Turbine flow meter (Ref.4)

UNIT IV

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 V

Hydroelectric power stations: Elements of hydro electric power station-types-concept of pumped storage plants-storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area; heads and efficiencies.

UNIT VI

Hydraulic Turbines: classification of turbines, 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 – manometric head- losses and efficiencies- specific speed- pumps in series and parallel-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.

REFERENCE BOOKS:

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.
4. Instrumentation for Engineering Measurements by James W. Dally, William E. Riley, John Wiley & Sons Inc. 2004 (Chapter 12 – Fluid Flow Measurements)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**II Year B. Tech. Mining Engineering – I Sem.****ELECTRICAL AND ELECTRONICS ENGINEERING****Part-A Electrical Engineering****UNIT - I**

ELECTRICAL CIRCUITS: Basic definitions, Types of network elements, Ohm's Law, Resistive networks, Kirchhoff's Laws, Inductive networks, capacitive networks, Series, Parallel circuits and Star-delta and delta-star transformations.

UNIT - II

DC MACHINES : Principle of operation of DC Generator – emf equation - types – DC motor types –torque equation – applications – three point starter.

UNIT - III

TRANSFORMERS : Principle of operation of single phase transformers – emf equation – losses –efficiency and regulation

UNIT - IV

AC MACHINES : Principle of operation of alternators – regulation by synchronous impedance method –Principle of operation of induction motor – slip – torque characteristics – applications.

TEXT BOOKS:

1. Basic Electrical Engineering by Nagsarkar, Sukhija, Oxford Publications, 2nd edition

REFERENCE BOOKS:

1. Basic Electrical Engineering by M.S.Naidu and S.Kamakshiah, TMH Publications
2. Fundamentals of Electrical Engineering by Rajendra Prasad, PHI Publications, 2nd edition

Part – B Electronics Engineering**UNIT V**

DIODE AND ITS CHARACTERISTICS: PN Junction Diode, Symbol, V-

I Characteristics, Diode Applications, Rectifiers – Half wave, Full wave and Bridge Rectifiers (Problems)

UNIT VI

TRANSISTORS: PNP and NPN Junction Transistor, Transistor as an Amplifier, Single Stage CE Amplifier, Frequency Response of CE Amplifier, Concepts of Feedback Amplifier, Necessary conditions for Oscillators, SCR Characteristics and applications

UNIT VII

INDUCTION HEATING: Theory of Induction Heating, Application to Industries

DIELECTRIC HEATING: Theory of Dielectric Heating and its Industrial Applications

ULTRASONICS: Generation, Flow detection and other Applications

UNIT VIII

TRANSDUCERS AND MEASURING INSTRUMENTS: Principles of Strain Gauge, LVDT, Thermocouples, Thermistors, Piezo-electric transistors, CRO Principles and application, Voltage, Current and Frequency Measurements, Digital Multimeters.

TEXT BOOKS:

1. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky, 9th edition, PEI/PHI 2006.
2. Industrial Electronics by G.K. Mittal, PHI

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**II Year B. Tech. Mining Engineering – I Sem.****MINING GEOLOGY - I****Unit-I**

Engineering Properties of rocks & Soils: Physical and Mechanical properties, methods of determination, numerical values and engineering uses of important rocks.

Unit-II

Genesis of Mineral Deposits: Definition of ore, gangue, tenor and grade of ore, processes and formation of ore deposits including coal, petroleum and atomic minerals.

Unit-III

Mineral Resources of India: Major and Minor mineral resources of India, origin, environment and distribution of mineral deposits of India.

Unit-IV

Mineral Exploration: Geological, Geophysical and Geochemical exploration of mineral deposits.

Unit-V

Mineral Reserves: Estimation and determination of mineral reserves by different methods.

Unit-VI

Rock and Soil slopes: modes of slope failures, causes and effects of slope failures, methods of slope stabilizations.

Unit-VII

Geology of Tunnels: Engineering geological investigations to drive tunnels in soft ground and hard ground, stand up time and geology of some well known Indian Tunnels, Gases in tunnels.

Unit-VIII

Geology of Bore-hole drilling and Excavation: Ease of drillability, importance of geology in drilling soft rocks, hard and deformed rocks. Ease of excavation of different earth materials and rocks.

TEXT BOOKS:

1. Hommes.A.Principles of physical geology (Nelson & sons)
2. Dana E.S and Ford, WEA text books of mineralogy (John wiley & sons)

REFERENCE BOOKS:

1. Mining Geology by Arogya Swamy.
2. Mineral Resources of India by Krishna Swamy.
3. Mining Geology by Mc Kinstry.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Mining Engineering – I Sem.

COMPUTER AIDED ENGINEERING DRAWING PRACTICE

PART A:

UNIT – I

PROJECTIONS OF PLANES & SOLIDS : Projections of Regular Solids inclined to both planes – Auxiliary Views. Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

UNIT – II

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

Interpenetration of Right Regular Solids – Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT – III

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.

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

UNIT – IV

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

PART B:

UNIT – V

Introduction to Computer aided Drafting: Generation of points, lines, curves, polygons, dimensioning.

UNIT – VI

Types of modeling : object selection commands – edit, zoom, cross hatching, pattern filling, utility commands, 2D wire frame modeling, 3D wire frame modeling,.

UNIT – VII

View points and view ports: view point coordinates and view(s) displayed, examples to exercise different options like save, restore, delete ,joint , single option.

UNIT-VIII

Computer aided Solid Modeling: Isometric projections, orthographic projections of isometric projections ,Modeling of simple solids, Modeling of Machines & Machine Parts.

TEXT BOOKS :

1. Engineering Graphics, K.C. john, PHI Publications
2. Machine Drawing, K.LNarayana ,P. Kannaiah and K.venkata reddy / New age international publishers.

REFERENCES:

1. Autocad 2009 , Galgotia publications , New Delhi
2. Text book of Engineering Drawing with Auto-CAD , K.venkata reddy/B.S . publications.
3. Engineering drawing by N.D Bhatt , Charotar publications.

Mode of examination for Computer Aided Engineering Graphics Practice

The syllabus in respect of the subject “Computer Aided Graphics Practice” for II B Tech I sem (Mech, Civil, Automobile, Aeronautical, Mining Engg) students consists of two major portions

Part A: Unit I to IV - conventional drawing pattern

Part B: Unit V to VIII - computer lab pattern using any drafting packages

Classwork - 6 hrs per week & Credits - 4

Max Marks - 100 Internal Marks: 25 & External Marks: 75

It is suggested that the examination in respect of the above may be conducted on par with lab by the concerned college with the following pattern:

Mid Exam: I Mid Exam from Part A (first Four Units) - Conventional Drawing Exam

II Mid Exam Part B (from last Four Units) - In Computer Lab

End Exam: Duration - 4 hrs

Part A - Conventional Drawing test in Drawing Hall from Part A (first FOUR Units) - 2 hrs duration.

Part B - Exam in Computer Lab using any drafting package Part B (last four units) - 2 hrs duration.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**II Year B. Tech. Mining Engineering – I Sem.****ELECTRICAL & ELECTRONICS ENGG. LAB****PART A: Electrical Engineering Lab:**

The following experiments are required to be conducted as compulsory experiments :

1. Swinburne's test on D.C. Shunt machine. (Predetermination of efficiency of a given D.C. Shunt machine working as motor and generator).
2. OC and SC tests on single phase transformer (Predetermination of efficiency and regulation at given power factors)
3. Brake test on 3-phase Induction motor (Determination of performance characteristics)
4. Regulation of alternator by Synchronous impedance method.
5. Speed control of D.C. Shunt motor by
 - a) Armature Voltage control
 - b) Field flux control method
6. Brake test on D.C Shunt Motor

Section B: Electronics Engineering:

1. Transistor CE Characteristics (Input and Output)
2. Full wave Rectifier with and without filters.
3. CE Amplifiers.
4. RC Phase Shift Oscillator
5. Class A Power Amplifier
6. Micro Processor

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Mining Engineering – I Sem.

FLUID MECHANICS & HYDRAULIC MACHINERY 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. Turbine flow meter.

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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Mining Engineering – I Sem.

**ENGLISH COMMUNICATION PRACTICE
LIFE, LANGUAGE AND CULTURE EXPLORATIONS-I**

Purpose of the Course: English for Semesters 3 is designed to provide the learners an opportunity to enhance their language skills through a reading of literary texts which will also help them relate themselves to different cultures vis-à-vis their own. Independent reading is also expected to increase spontaneity in expression among the learners.

Objectives: The Course aims at exposing the learners to nuances in culture, inculcating the habit of independent reading which provides the learners an opportunity to develop critical thinking and analytical skills that can be applied to any subject.

Content of the course: The literary pieces are carefully chosen from across cultures as samples of contemporary life and issues of global interest. This is meant to encourage students to relate language to personality development. In all, five stories have been selected for English Communication Practice.

Topics: Culture and traditions, philosophy, familial relationships, ethics, inter-personal relationships, ability to face disaster and poverty, tolerance.

Time frame/Hours of instruction: 2hrs per week (for pre-reading and post reading tasks of the lessons). Total number of hours per semester - 32.

Time Allocation: Reading of the text should be done at home. The class hours are meant for discussion, analysis and related activities. Project should be completed in consultation with the teacher.

Evaluation: The learner will be assessed on a continuous basis by way of projects and work-sheets given at the end of each story.

Stories selected for English Communication Practice

Life, Language and Culture:

1. The Cop and the Anthem by O. Henry

2. The Festival of the Sacred Tooth Relic in Sri Lanka

(based on the Travelogues of FA Hien Compiled by Ashok Jain Assisted by Dhurjjati Sarma) **3. The Hawk and the Tree** by Mohammad Azam Rahnaward Zaryab

4. To Be or Not To Be by Zaheda Hina

5. Bade Bhai Saab(My Elder Brother) by Munshi Premchand

Recommended Book: Life, Language and Culture Explorations-I, Cengage Learning India Pvt. Ltd., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Mining Engineering – I Sem.

‘PROFESSIONAL ETHICS AND MORALS -I

UNIT - I

What is profession? - Engineering and Professionalism - Two models of Professionalism - Three Types of Ethics or Morality – The Negative face of Engineering Ethics - The Positive Face of Engineering Ethics - Responsibility in Engineering - Engineering Standards - The Standard Care – Blame-Responsibility and causation

UNIT - II

Engineering Ethics – Variety of moral issues – types of inquiry moral dilemmas – moral autonomy – The problems of Many Hands – Kohlburg’s theory – Gilligan’s theory Impediments to Responsible Action

UNIT - III

Engineering as social experimentation – Framing the problem – Determining the facts codes of ethics – clarifying Concepts – Application issues – Common Ground – General principles – Utilitarian thinking respect for persons

UNIT - IV

Engineer’s Responsibility for Safety – Social and Value dimensions of Technology - Technology Pessimism – The Perils of Technological Optimism – The Promise of Technology – Computer Technology Privacy and Social Policy – Risk Benefit Analysis – Collegiality and loyalty–

BOOKS:

1. Mike Martin and Roland Schinzinger, “Ethics in Engineering” McGraw Hill
2. Charles E Harris, Micheal J Rabins, “Engineering Ethics, Cengage Learning”.
3. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers, Oxford University Press.
4. PSR Murthy, “Indian Culture Values and Professional Ethics”, BS Publications

5. Caroline Whitback< Ethics in Engineering Practice and Research, Cambridgs University Press,.
6. Mike Martin and Roland Schinzinger, "Ethics in Engineering" McGraw Hill.
7. Charles D Fleddermann, "Engineering Ethics", Prentice Hall.
8. George Reynolds, "Ethics in Information Technology", Cengage Learning.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Mining Engineering – II Sem.

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 Russel – 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 and Mechanisms-S.S.Rattan, Tata McGraw Hill Publishers
2. Theory of Machines R.S Khurmi & J.K Gupta

REFERENCES :

1. Theory of Machines by Thomas Bevan/ CBS
2. Theory of Machines / R.K Bansal
3. Theory of Machines Sadhu Singh Pearsons Edn

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**II Year B. Tech. Mining Engineering – II Sem.****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, Cu-Sn and Fe-Fe₃C.

UNIT -IV

Cast Irons and Steels : Structure and properties of White Cast iron, Malleable Cast iron, grey cast iron, Spheroidal 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. Avenner.
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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Mining Engineering – II Sem.

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 shear force 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, pinjointed, 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 by Bhavikatti, Lakshmi publications.
2. Solid Mechanics, by Popov

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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
II Year B. Tech. Mining Engineering – II Sem.

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS
Common to all Branches (w.e.f.2010 batch)

UNIT I

Introduction to Managerial Economics:

Introduction to Managerial Economics & Demand Analysis: Definition of Managerial Economics, Characteristics and Scope – Managerial Economics and its relation with other subjects- Basic economic tools in Managerial Economics

Demand Analysis: Meaning- Demand distinctions- Demand determinants- Law of Demand and its exceptions.

UNIT II

Elasticity of Demand & Demand Forecasting: Definition -Types of Elasticity of demand - Measurement of price elasticity of demand: Total outlay method, Point method and Arc method- Significance of Elasticity of Demand.

Demand Forecasting: Meaning - Factors governing demand forecasting - Methods of demand forecasting (survey of buyers' Intentions, Delphi method, Collective opinion, Analysis of Time series and Trend projections, Economic Indicators, Controlled experiments and Judgmental approach) - Forecasting demand for new products- Criteria of a good forecasting method.

UNIT III

Theory of Production and Cost Analysis: Production Function- Isoquants and Isocosts, MRTS, Law of variable proportions- Law of returns to scale- Least Cost Combination of Inputs, Cobb-Douglas Production function - 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.-

Determination of Break-Even Point (simple problems) - Managerial Significance and limitations of BEP.

UNIT IV

Introduction to Markets, Managerial Theories of the Firm & Pricing Policies: Market structures: Types of competition, Features of Perfect Competition, Monopoly and Monopolistic Competition. Price-Output Determination under Perfect Competition, Monopoly, Monopolistic Competition and Oligopoly Managerial theories of the firm - Marris and Williamson's models.

Pricing Policies: Methods of Pricing-Marginal Cost Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Bundling Pricing, and Peak Load Pricing. Internet Pricing Models: Flat rate pricing, Usage sensitive pricing, Transaction based pricing, Priority pricing, charging on the basis of social cost, Precedence model, Smart market mechanism model.

UNIT V

Types of Industrial Organization & Introduction to business cycles: Characteristic features of Industrial organization, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, State/Public Enterprises and their types.

Introduction to business cycles: Meaning-Phases of business cycles-Features of business cycles.

UNIT VI

Introduction to Financial Accounting: Introduction to Double-entry system, Journal, Ledger, Trial Balance- Final Accounts (with simple adjustments)- Limitations of Financial Statements.

UNIT VII

Interpretation and analysis of Financial Statement: Ratio Analysis – Liquidity ratios, Profitability ratios and solvency ratios – Preparation of changes in working capital statement and fund flow statement.

UNIT VIII

Capital and Capital Budgeting: Meaning of capital budgeting, Need for capital budgeting – Capital budgeting decisions (Examples of capital budgeting) - Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR), IRR and Net Present Value Method (simple problems)

TEXT BOOKS:

1. **J.V.Prabhakar Rao:** Managerial Economics and Financial Analysis, Maruthi Publications, 2011
2. **N. Appa Rao. & P. Vijaya Kumar:** 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi, 2011

REFERENCES:

1. A R Aryasri - Managerial Economics and Financial Analysis, TMH 2011
2. Suma damodaran- Managerial Economics, Oxford 2011
3. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age International Publishers, 2011.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**II Year B. Tech. Mining Engineering – II Sem.****SURFACE MINING****UNIT-I:**

Introduction: General consideration for the applicability of opencast mining, limits of open cast mining and its advantages and disadvantages. Method of opening box cut, selection of site for box cut.

UNIT-II:

Open Pit Layout and Design: Planning the layout and open pit mine with special reference to large mechanized mines. Optimum dimensions of open pit mines. Removal of over burden and disposal, open cast bench- number, height, width and slope angle of the bench. Factors affecting the stability of the slope. Various types of slope failures, problems on slope failures. Ground water control.

UNIT-III:

Drilling and Blasting: Drillability, mechanics of drilling, major types of drilling machines, basics of mechanics of blasting, principles of fragmentation.

UNIT-IV:

Design of blasting: with special reference to heavy blasting, air blasting, ground vibration, fly rocks novel methods of drilling, smooth blasting and pre-splitting.

UNIT-V:

Surface Mining Methods: Casting, strip, quarrying and Placer Mining.

UNIT-VI:

Excavation and loading: Shovels, Dragline, Front-end loader, Stackers, Graders.

UNIT-VII:

Non-Cyclic Surface Mining: Bucket Wheel Excavators and Continuous surface miners.

UNIT-VIII:

Transport Equipments: Dumpers, Aerial ropeways-monocable and bical

btypes and their constructional details. Shovel – dumper combination, high angle conveyor and in-pit crusher. Selection of equipments.

TEXT BOOKS

1. Surface Mining Technology by S. K. Das, Lovely Prakashan, Dhanbad, 1994.
2. Surface Mining by G. B. Mishra, Dhanbad Publishers, 1978.

REFERENCE BOOKS:

1. Elements of Mining Technology, Vol. – I, D. J. Deshmukh, 6th Edition, Central Techno Publications, Nagpur, 1998.
2. Opencast Mining – R. T. Deshmukh, M. Publications, Nagpur, 1996.
3. Latest Development of Heavy Earth Moving Machinery Amithosh De, Annapurna Publishers, Dhanbad, 1995.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**II Year B. Tech. Mining Engineering – II Sem.****MINING GEOLOGY - II****UNIT – I :**

Structural Geology: Definition and scope – primary and secondary structure: Bending, lineation, foliation, cleavage, Attitude of beds determination of strike and dip of formation; thickness of beds; structures of intrusive bodies.

UNIT – II :**Description and recognition of major structural elements**

- a) **Folds:** Introduction, parts of fold, nomenclature of folds, Anticline, syncline, symmetrical fold, asymmetrical fold, overturned fold, recumbent fold, isoclinal fold, homocline, closed and open folds, drag folds.
- b) **Joints:** Introduction, definition, geometrical classification of joints.
- c) **Faults:** Introduction, general characteristics, translational and rotational movements, relative movements, normal and reverse faults, throw and heave, types of faults, dip fault, strike fault, diagonal/oblique fault, bending fault, parallel faults, step faults, Normal and Graben.

UNIT – III :

Unconformities: Introduction, kinds of unconformities., Recognition of unconformities.

UNIT – IV:

Ground Water: Introduction, scope, utilization of ground water, hydrological cycle, origin and occurrence of ground water, vertical distribution of ground water, water table.

UNIT – V :

Table Aquifers: Types of aquifers confined aquifers, unconfined aquifers. Perched aquifers, porosity and permeability of rocks.

UNIT – VI :

Economic Geology: Aim and scope of economic geology, definition of ore and gangue, simple ore, complex, ores, tenor and grade of ore. Processes and formation of ore deposits, sygentric deposits, Epigenetic deposits. Secondary mineral deposits: Oxidation and supergene enrichment deposits-Mechanical concentration deposit, residual/concentration deposits.

UNIT – VII :

Occurrence and distribution of important metallic mineral deposits in india: Iron copper-lead and zinc manganese-Aluminium-chromium. Occurrence and distribution of important metallic asbestos Kyanite and simillimanite.

UNIT – VIII :

Petroleum: Origin, migration and accumulation of petroleum, Reservoir and cap rocks structural and stratigraphic traps, distribution oil fields in india. Uranium, thorium, and beryllium.

TEXT BOOKS:

1. Economic mineral deposit by Betman
2. Mineral deposits by Sinha & Sharma

REFERENCES:

1. Surface Mining by Dr.G.B.Mishra
2. Stratigraphy – Rabindra Kumar
3. Mining Geology- Mackinstrey

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Mining Engineering – II Sem.

GEOLOGY LAB

List of Experiments:

1. Identification and physical properties of important rock-forming and ore-forming minerals.
2. Identification and distinguish characteristics of important igneous, sedimentary and metamorphic rocks.
3. Determination of strike and dip of planar features by clinometer compass.
4. Study of models pertaining to folds, faults and unconformities.
5. Study and interpretation of Topographic Maps.
6. Study of Geological Maps of Andhra Pradesh & India.
7. Study of Geomorphologic Map of India and Tectonic Map of India.
8. Study of Seismotectonic Atlas of India.
9. Vertical Electrical sounding Survey to determine depth to water table & bed rock.
10. Determination of unconfined compressive strength of important rocks.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Mining Engineering – II Sem.

MECHANICS OF SOLIDS & METALLURGY LAB

(A) 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

(B) 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. Hardeneability of steels by Jominy End Quench Test.
7. To find out the hardness of various treated and untreated steels.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Mining Engineering – II Sem.

ENGLISH COMMUNICATION PRACTICE-2

Name of the Course: *Explorations II*

Life, Language and Culture

Purpose of the Course: English for Semester 4 is designed to provide the learners an opportunity to enhance their language skills through a reading of literary texts which will also help them relate themselves to different cultures vis-à-vis their own. Independent reading is also expected to increase spontaneity in expression among the learners.

Objectives: The Course aims at exposing the learners to nuances in culture, inculcating the habit of independent reading which provides the learners an opportunity to develop critical thinking and analytical skills that can be applied to any subject.

Content of the course: The literary pieces are carefully chosen from across cultures as samples of contemporary life and issues of global interest. This is meant to encourage students to relate language to personality development. In all, five literary pieces for Explorations II have been selected and another showcasing a holistic approach to life that can help one develop into better individuals and professionals.

Topics: Culture and traditions, philosophy, familial relationships, ethics, inter-personal relationships, ability to face disaster and poverty, tolerance.

Time frame/Hours of instruction: 2 hrs per week (for pre-reading and post reading tasks of the lessons). Total number of hours per semester - 32.

Time Allocation for each unit: Reading of the text should be done at home. The class hours are meant for discussion, analysis and related activities. Project should be completed in consultation with the teacher.

The title of the book

Explorations- II Life, Language and Culture

The stories included are

1. Morning Bells by Jayashree Mohanraj
2. The Power of the Plate of Rice by Ifeoma Okoye
3. Famadihana and the Other Rituals by Jayashree Mohanraj
4. Dial “000” by Barry Rosenberg
5. Tsunami Religion by Anjali Prashar

1. Prescribed Textbook

Life, Language and Culture : Explorations -2 , Cengage Learning India Pvt. Ltd., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B. Tech. Mining Engineering – II Sem.

PROFESSIONAL ETHICS AND MORALS -II

UNIT - I

Human Values - Morals, Values, and Ethics – Integrity - Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Spirituality – Character

UNIT - II

Engineering Ethics – consensus – controversy – Models of Professional Roles – theories about right action – Self – interest – customs and religion – uses of ethical theories

UNIT - III

Engineer's Responsibility for Rights - respect for authority – conflicts of interest- Occupational crime – professional rights and employee rights – Communicating Risk and Public Policy- collective bargaining

UNIT - IV

Global Issues- Multinational Corporations – Environmental Ethics – Engineers as Managers , Advisors, and experts witnesses – moral leadership sample code of ethics like ASME, ASCE, IEEE, IETE, Institute of Engineers – Problem of Bribery, Extortion and Grease payments – Problem of Nepotism, Excessive Gifts – Paternalism – Different business practices – Negotiating Taxes.

BOOKS:

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering" McGraw Hill
2. Charles E Harris, Micheal J Rabins, "Engineering Ethics, Cengage Learning".
3. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers, Oxford University Press.
4. PSR Murthy, "Indian Culture Values and Professional Ethics", BS Publications

5. Caroline Whitback< Ethics in Engineering Practice and Research, Cambridgs University Press,.
6. Mike Martin and Roland Schinzinger, "Ethics in Engineering" McGraw Hill.
7. Charles D Fleddermann, "Engineering Ethics", Prentice Hall.
8. George Reynolds, "Ethics in Information Technology", Cengage Learning.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**III Year B. Tech. Mining Engineering – I Sem.****UNDERGROUND COAL MINING TECHNOLOGY****UNIT - I**

Introduction: Coal mining in major coal producing countries, Growth of coal mining industry in India, Grading and analysis of coal, Opening of Coal Seams: Access by audits, Opening up of coal seams by surface drifts on incline, vertical shafts, Division of mine into blocks.

UNIT - II

Choice Of Coal Mining Methods: Basic Mining Methods, Board and Pillar, Longwall and Shortwall, Factors influencing choice of mining methods.

UNIT - III

Board And Pillar Mining: Board and Pillar Mining System. Design of Board and Pillar workings, Mining Processes, Development of Panels, Extraction of Pillars and Examples of Pillar extraction techniques.

UNIT - IV

Room And Pillar Mining: Applicability, Merits and Demerits. Variants of Room and Pillar Mining Method. Simple Problems.

UNIT - V

Longwall Mining: Elements of a Longwall face, Classification of Modern Longwall faces, Planning of Longwall Mining System, Development of Panel and faces, face support system, Power supply, material supply and face organization. Strata mechanics around Longwall panel.

UNIT - VI

Thin Seam Mining By Longwall Method: Method of working thin, medium thick and thick seams by Longwall Mining with case studies of Indian and foreign Mines. Simple Problems.

UNIT - VII

Thick Seam Mining: Problems of Mining Thick Coal Seams, Choice of Method of Mining Thick Coal Seams, Inclined Slicing, Horizontal Slicing, Diagonal Slicing, Transversely Inclined Slicing, Sublevel Caving, Working

Steep and Moderately Thick Seams, The Velenjee Method, Descending Shield Method of Mining.

UNIT - VIII

Special Methods Of Mining: Inseam Mining and Horizon Mining, Hydraulic Mining, Blasting Gallery Method, Coal Bed Methane. Goaf Control: Caving, strip packing or solid stowing, Hydraulic Stowing etc. Procurement of stowing materials and its transportation, theoretical aspects and case studies.

TEXT BOOKS:

1. **Principles and Practices of Modern Coal Mining** – R. D. Singh, New Age International, 1997.
2. **Modern Coal Mining Technology** – S. K. Das, 2nd edition, Lovely Prakashan Publishers, 1994,

REFERENCE BOOKS:

1. **Underground Coal Mining Methods** – J. G. Singh, Braj Kalpa Publishers, Varnasi, 2000.
2. **Coal Mining** – I.C.F. Statham, Vol. I, II, III and Vol. III. The Caxton Publishing Company Ltd. Inc. 1958.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Mining Engineering – I Sem.

MINE ENVIRONMENT ENGINEERING - I

UNIT - I

MINE AIR: Atmospheric air – its composition, mine air – its composition and variation, origin, occurrence, physical, chemical and physiological properties and monitoring of mine gases.

UNIT - II

STUDY ON DAMPS: various types of dams. Sampling and analysis of mine air. Methane degree and layering of gases.

UNIT - III

MINE CLIMATE: Heat and Humidity. Sources of heat in mines, effects of heat and humidity, psychometry, kata thermometer, methods of improving of cooling power of mine air. Air conditioning basic vapour cycle, representative layout.

UNIT - IV

AIR FLOW THROUGH MINE OPENINGS: Laws of air flow, resistance of airways, equivalent orifice, Distribution of air and flow control devices.

NATURAL VENTILATION: Calculation of NVP from air density, artificial aids to natural ventilation.

UNIT - V

MECHANICAL VENTILATION: Principal types of mine fans and their suitability, efficiencies and characteristic, selection of mine fan, fan testing and output control of a mine fan. Series and parallel operation of mine fans, Ventilation of advancing haedingauxiliary.

UNIT - VI

Fan, duct matching of fan to the duct system. Reversal of air current. Fan drift, evasee, diffuser, booster fans.

UNIT – VII

VENTILATION PLANNING: Standard of ventilation including permissible air velocities. Ascensional, descensional, homotropical, anti – tropical

ventilation. Central and boundary ventilation – layouts and comparisons. Quantity and pressure requirement.

UNIT – VIII

Ventilation layout for coal mining and metal mining. Calculation of air quantity and total mine head required for ventilating a mine. Introduction to Network analysis, Hardy – Cross method, Ventilation survey.

TEXT BOOKS:

1. **Elements of Mining Technology** - Vol II- D. J. Deshmukh, 9th Edition, Central Techno Publication
2. **Mine Environment and Ventilation** – G. B. Mishra, Oxford University Press, 1994.

REFERENCES:

1. **Mine ventilation and air conditioning** – Howard L. Hartman. Wiley International, 1976.
2. **Environmental Engineering in Mines** – Vutukuri & Lama, Cambridge University Press, Cambridge,
3. **Legislation in Indian mines a critical appraisal** Vol. I and Vol. II – Prasad and Rakesh. Vivek Publications, Varanasi 1999.
4. **Mine Ventilation** Vol. – II, S. Ghatak, Coalfield Publishers, 1993.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**III Year B. Tech. Mining Engineering – I Sem.****ELECTRICAL EQUIPMENT IN MINES****UNIT - I**

Mine power supply: Choice of voltage, surface and underground supply
: Tariff

Computation : Mine Cables- Construction, installation, fault location,
Gate-end boxes and switch gears,

UNIT - II

Earthing Methods, protective devices, overload, under-voltage earth
leakage, D.C. Supply- rectifiers, storage batteries .

UNIT - III

Mining cables – types, constructional details; layout of cables through
shaft and other locations.

Principles of flame-proof enclosures.

UNIT - IV

Electrical Equipment: Mining transformer, lighting transformer, A.C. and
D.C. Motors speed-torque characteristics, starting, braking, speed control,
drives for haulage.

UNIT - V

ventilation fans, pumps, compressors, electrical locomotives, winders,
Introduction to thyristor device, flame proof and intrinsic safety .

UNIT - VI

Control and instrumentation: Open and closed loop system, remote control,
sequence control, winder control of open cast mine equipment, sensor for
measurement of various operational, environmental and safety parameters
in underground and open cast mines.

UNIT - VII

Communication and data transmission : Mine telephone system, signaling
system, LAN.

UNIT - VIII

Intrinsically – safe circuit – methods of attaining intrinsic safety, zeener safety barriers and their application.

Indian electricity rules as applied to mines.

TEXT BOOK:

1. Electrical equipment in Mines by H.Cotton

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**III Year B. Tech. Mining Engineering – I Sem.****MINE SURVEYING****UNIT I:**

Correlation: Correlation by different methods; measurement of depth of shaft. Correlation of mine survey to the national grid. Gyrotheodolite survey.

UNIT II:

Triangulation correlation of surface & U/G Surveys, verticality of shafts. Measurement of Depth of Shaft. Setting out of curves for surface & U/G, Stope surveying, Open-PIT surveying, mine plans, sections, projections & their statutory requirements, Mine Models.

UNIT III:

Curve ranging: Types of curves, simple and compound curves ranging curves by linear and angular methods on surface and in the underground.

UNIT IV:

Special Mine surveys-survey of installations of Mine, EDM & ITS Application, Gps or total station, surveys for connecting National Grid.

UNIT V:

Photographic Surveying: General principles, Elements of photogrammetry; orientation of photographs, finding heights and distances of ground points from photographs.

UNIT VI:

Field Astronomy: Astronomical terms and definitions. Determination of the meridian Longitude and latitude of a place.

UNIT VII:

Elements of Photogrammetry, field astronomy : Principles & Definitions, Determination of true Meridian, Latitude & Longitude & Time.

UNIT VIII:

Problems in mine surveying. Dip & fault problems. Mine plans & sections,

Types of plans, preparation and preservation of plans and sections.
Regulations pertaining to mine plans and sections and mine surveying.

TEXT BOOKS:

1. Dr.L.O.Punimia “Surveying” Vol II & III
2. Kanetakar & Kulkarni “Surveying and leveling” Vol – II

REFERENCES:

- 1 JJ.Holland K.wardell “Coal mines series editor E.Mason”. Vol – II
- 2 Statham “Coal Mining Practice” Vol- IV
- 3 Basak “Surveying & Levelling”
- 4 Ghatak “Mine Surveying and Levelling”

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**III Year B. Tech. Mining Engineering – I Sem.****MINE DEVELOPMENT****UNIT - I**

Various types of development openings shape and size, Selection of suitable type for actual situations

UNIT - II

Raises, winzes or passes, ore chutes. single or multiple level winding, Shaft stations pit top and pit bottom layouts.

UNIT - III

Location of shaft shape and size, incline and vertical shafts. Surface arrangements for sinking shafts , tools and equipments ordinary methods of sinking drilling , blasting removal of baris and water.

UNIT - IV

Ventilation and lighting, temporary and permanent lining widening and deepening of shafts.

Special methods of shaft sinking pilling, caisson, freezing and cementation method of shafty sinking

UNIT - V

Modern techniques of shaft sinking. Design of shafts inserts and pit bottoms.

UNIT -VI

Classification and properties of explosive, detonators. Detonating cords, and detonating fuse and nonel detonator.

UNIT -VII

Drivage of drifts, organization and cycle of operations, drilling blasting load transport , support , drainage, ventilation and lighting. Mechanized drifting, road heading and tunnel boring.

UNIT -VIII

Blasting systems , electrical and non electrical methods , delay blasting

techniques . Blasting in open pit mines blasting underground coal and metal mines . Mechanics of blasting.

TEXT BOOKS

1. Surface Mining by Dr. G.B.Mishra
2. 2. EMT Volume-I

REFERENCES

1. SME Hand Book
2. Blasting Manual- Sandhu & Pradhan .

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Mining Engineering – I Sem.

MINE MECHANIZATION

UNIT - I

Rope haulage: Construction of the wire ropes, rope haulages - gravity, direct, balanced direct, main & tail, endless, reversible endless, suitability of these haulages and their limitations, safety appliances in haulage road signaling, statutory requirements of haulages.

UNIT - II

Track laying: Rails, joints, crossings, plates, turn tables, and curves, track extension. Aerial Ropeways: Types, construction, application and operation.

UNIT - III

Mine Locomotives: types, constructional features of compressed air, diesel, battery and electrical trolley-wire locomotives, comparison of various locomotive haulages, comparison of rope and locomotive haulages.

UNIT - IV

Conveyors: Principle types and their operations, installations, shifting, maintenance and applicability, shuttle cars, stage loaders, bridge conveyors, capacity.

UNIT - V

Drills for Coal and stone: Various types, their construction and maintenance, Jumbo drills.

UNIT - VI

Mine winders: koepe and drum winders and their applications, head gear, head gear pulley, shaft fitting- keps, rope guides, shaft sinking and bells, capping and recapping, cage and suspension gear .winding drums and construction, safety devices in winders over speed and over wind preventers, slow breaking, depth indicator, methods of counter balancing ropes.

UNIT - VII

Face Machinery: SDL & LHD - Their applications, capacity, operation, fitting control and maintenance. Cutter loaders - Shearers, Coal plough

and Continuous miners-their constructional features, applications capacity and maintenance. Layout of faces with Power loader working under varied conditions. Shuttle cars.

UNIT - VIII

Pumps: Types, construction, operation, characteristics and application. Calculation of size, efficiencies and capacities. Layout of drainage systems. Opencast Machinery: Blast Hole Drill, Ripper, Shovel, Drag line, Dumper, Bucket wheel Excavator, Continuous Miners—their basic construction, Applications and operation.

TEXT BOOKS:

1. Das S.K. Modern coal mining Technology, Lovely Prakashan, Dhanbad 1994
2. Singh, T.N & Dhar B.B Thick Seam mining Problems & Issues , Oxford & IBH Publishers 1992
3. Mathur, S.P mining Planning for Coal ,M.G consultants Bilaspur 1993

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**III Year B. Tech. Mining Engineering – I Sem.****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:

- i) Gather ideas and information, to organise ideas relevantly and coherently.
- ii) Engage in debates.
- iii) Participate in group discussions.
- iv) Face interviews.
- v) Write project/research reports/technical reports.
- vi) Make oral presentations.
- vii) Write formal letters.
- viii) Transfer information from non-verbal to verbal texts and vice versa.
- ix) 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:

- i) 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.
- ii) 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:

- i) Functional English - starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.
- ii) Vocabulary building – synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.
- iii) Group Discussion – dynamics of group discussion , intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
- iv) Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.
- v) Resume' writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skill-sets, summary, formats and styles, letter-writing.
- vi) Reading comprehension – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading.
- vii) Technical Report writing – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.

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:

- iii) P – IV Processor
 - a) Speed – 2.8 GHZ
 - b) RAM – 512 MB Minimum
 - c) Hard Disk – 80 GB
- iv) Headphones of High quality

5. Suggested Software:

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

Suggested Software:

- i) **Clarity Pronunciation Power – part II**
- ii) **Oxford Advanced Learner’s Compass, 7th Edition**
- iii) **DELTA’s key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- iv) **Lingua TOEFL CBT Insider**, by Dreamtech
- v) **TOEFL & GRE**(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

The following software from ‘train2success.com’

- i) **Preparing for being Interviewed,**
- ii) **Positive Thinking,**
- iii) **Interviewing Skills,**
- iv) **Telephone Skills,**
- v) **Time Management**
- vi) **Team Building,**
- vii) **Decision making**

English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

6. Books Recommended:

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

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

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 KAKINADA**III Year B. Tech. Mining Engineering – I Sem.****MINE SURVEYING LAB**

1. Triangulation survey.
2. Study of theodolite in detail - practice for measurement of horizontal and vertical angles.
3. Measurement of horizontal angles by method of repetition and reiteration.
4. Trigonometric Leveling - Heights and distance problem
5. Heights and distance using Principles of tacheometric surveying
6. Curve setting – different methods.
7. Setting out works for buildings & pipe lines.
8. Determine of area using total station
9. Traversing using total station
10. contouring using total station
11. Det of remote height using total station
12. State-out using total station
13. Distance, gradient, Diff, height between tow inaccessible points using total stations

EQUIPMENT TO BE USED:

1. Theodolites, and leveling staffs.
2. Tachometers.
3. Total Station.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**III Year B. Tech. Mining Engineering – I Sem.****INTELLECTUAL PROPERTY RIGHTS AND PATENTS – I****UNIT I**

Introduction to Intellectual Property Law – The Evolutionary Past - The IPR Tool Kit- Para -Legal Tasks in Intellectual Property Law – Ethical obligations in Para Legal Tasks in Intellectual Property Law - Introduction to Cyber Law – Innovations and Inventions Trade related Intellectual Property Right

UNIT II

Introduction to Trade mark – Trade mark Registration Process – Post registration Procedures – Trade mark maintenance - Transfer of Rights - Inter partes Proceeding – Infringement - Dilution Ownership of Trade mark – Likelihood of confusion - Trademarks claims – Trademarks Litigations – International Trade mark Law

UNIT III

Introduction to Copyrights – – Principles of Copyright Principles -The subjects Matter of Copy right – The Rights Afforded by Copyright Law – Copy right Ownership, Transfer and duration – Right to prepare Derivative works – Rights of Distribution – Rights of Perform the work Publicity Copyright Formalities and Registrations - Limitations - Copyright disputes and International Copyright Law – Semiconductor Chip Protection Act

UNIT IV

Introduction to Trade Secret – Maintaining Trade Secret – Physical Security – Employee Limitation - Employee confidentiality agreement - Trade Secret Law - Unfair Competition – Trade Secret Litigation – Breach of Contract – Applying State Law

BOOKS:

1. Deborah E.Bouchoux: “Intellectual Property”. Cengage learning , New Delhi
2. Kompal Bansal & Parishit Bansal "Fundamentals of IPR for Engineers", BS Publications (Press)

3. Cyber Law. Texts & Cases, South-Western's Special Topics Collections
4. Prabhuddha Ganguli: 'Intellectual Property Rights' Tata Mc-Graw – Hill, New Delhi
5. Richard Stim: "Intellectual Property", Cengage Learning, New Delhi.
6. R. Radha Krishnan, S. Balasubramanian: "Intellectual Property Rights", Excel Books. New Delhi.
7. M.Ashok Kumar and Mohd.Iqbal Ali: "Intellectual Property Right" Serials Pub.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**III Year B. Tech. Mining Engineering – II Sem.****INDUSTRIAL MANAGEMENT****UNIT - I**

Concepts of Management and Organization – Functions of Management – Evolution of Management Thought : Taylor's Scientific Management, Fayol's Principles of Management, Douglas Mc - Gregor's Theory X and Theory Y, Mayo's Hawthorne Experiments, Hertzberg's Two Factor Theory of Motivation, Maslow's Hierarchy of Human Needs – Systems Approach to Management.

UNIT - II

Designing Organizational Structures: Basic concepts related to Organization - Departmentation and Decentralization, Types of mechanistic and organic structures of organization (Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organization, Cellular Organization, team structure, boundary less organization, inverted pyramid structure, lean and flat organization structure) and their merits, demerits and suitability.

UNIT - III

Plant location, definition, factors affecting the plant location, comparison of rural and urban sites-methods for selection of plant- Matrix approach. Plant Layout – definition, objectives, types of production, types of plant layout – various data analyzing forms-travel chart.

UNIT - IV

Work study - Definition, objectives, method study - definition, objectives, steps involved- various types of associated charts-difference between micro-motion and memo-motion studies. Work measurement- definition, time study, steps involved-equipment, different methods of performance rating- allowances, standard time calculation. Work Sampling – definition, steps involved, standard time calculations, differences with time study.

UNIT - V

Materials Management-Objectives, Inventory – functions, types, associated costs, inventory classification techniques-ABC and VED analysis. Inventory Control Systems-Continuous review system-periodical review system.

Stores Management and Stores Records. Purchase management, duties of purchase of manager, associated forms.

UNIT - VI

Introduction to PERT / CPM : Project management, network modeling-probabilistic model, various types of activity times estimation-programme evaluation review techniques- Critical Path-probability of completing the project, deterministic model, critical path method (CPM)-critical path calculation-crashing of simple of networks.

UNIT - VII

Inspection and quality control, types of inspections - Statistical Quality Control-techniques-variables and attributes-assignable and non assignable causes- variable control charts, and R charts, attributes control charts, p charts and c charts. Acceptance sampling plan- single sampling and double sampling plans-OC curves. Introduction to TQM-Quality Circles, ISO 9000 series procedures.

UNIT - VIII

Introduction to Human Resource Management, Functions of HRM, Job Evaluation, different types of evaluation methods. Job description, Merit Rating,- difference with job evaluation, different methods of merit ratings, wage incentives, different types of wage incentive schemes. Marketing, marketing vs selling, marketing mix, product life cycle.

TEXT BOOKS:

1. Amrine, Manufacturing Organization and Management, Pearson, 2nd Edition, 2004.
2. Industrial Engineering and Management O.P. Khanna Dhanpat Rai.

REFERENCES:

1. Stoner, Freeman, Gilbert, *Management*, 6th Ed, Pearson Education, New Delhi, 2005.
2. Panner Selvam, Production and Operations Management, PHI, 2004.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Mining Engineering – II Sem.

MINERAL ENGINEERING & FUEL TECHNOLOGY

UNIT - I

Introduction to the subject . Principle of comminution and liberation. Theory and practice of crushing and grinding. Conventional units and their performance and choice.

UNIT - II

Particle size determination . Laboratory sizing, interpretation and plotting of data. Industrial screening and its capacity and efficiency.

Unit - III

Movement of solids in fluids. F.S.R. and H.S.R. classifiers, their performance and choice. Heavy media separation, jigging, principle & application .

UNIT - IV

Flowing film concentration and tabling, methods and equipment used. Froth floatation-physico-chemical principles, floatation reagents, floatation equipment and circuits.

UNIT - V

Application to common sulphides, oxides and oxidised minerals. Electrostatic and magnetic separation . flow charts of mineral beneficiation plants for common minerals.

UNIT - VI

Coal washing and washability curve.

UNIT - VII

Classification of fuels. Solid fuels: Properties and test of coal, manufacturing methods of coke, tests.

UNIT -VIII

Liquid fuels: Properties and tests, Gaseous fuel- classification, production, properties and uses.

TEXT BOOKS

1. Fundamental of mineral dressing- Chinmaya Mohapatra
2. Mineral Dressing by Guddin

REFERENCES

3. Hand book of mineral dressing-by Taggart
4. Mineral processing- B.A. Wills
5. Fuels- J.D. Gilchrist .

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**III Year B. Tech. Mining Engineering – II Sem.****MINE ENVIRONMENT ENGINEERING – II****UNIT - I**

Mine Fires: Classification, surface and underground fires, prevention and control of underground fires, fire fighting, study of atmosphere behind sealed off area, re-opening of sealed off area.

UNIT - II

Spontaneous Heating: Mechanism, factors governing spontaneous heating, stages of spontaneous heating, symptoms of spontaneous heating in underground mines, detection and prevention of spontaneous heating, interpretation of mine air samples, Graham's Index, Problems on Graham's Index.

UNIT - III

Explosives: Types, mechanism, ignition temperature, lag on ignition, causes and coal dust and fire damp explosions. Stone dusting, stone dust barriers and water barriers, investigation after the explosion.

UNIT - VI

Inundation: Causes, measures against inundations. Dams: types, design, construction of water dams. Dewatering water logged workings, precautions to be taken when approaching old water logged workings, safety boring apparatus.

UNIT - V

Mine Illumination: Technical terms in lighting and photometry, Underground lighting, Electric safety lamp, different types of portable lamps, Methods of illumination in underground mines- fixed system, mobile system.

UNIT - VI

Mine Lighting in Opencast mines: Lighting in opencast mines, standards for mine lighting, Illumination survey, Luminance calculations, and luminance calculations.

UNIT - VII

Mine Rescue: Mine Rescue and equipment, short distance apparatus, self contained breathing apparatus, self rescuers, organization of rescue

UNIT - VIII

Mine Recovery: recovery work in connection with fires, explosions and inundations.

TEXT BOOKS:

1. Mine Disasters and Mine Rescue, M.A. Ramulu, Oxford & IBH Publishing Co. Ltd., 1991.
2. Elements of Mine Technology Vol. II by D.J.Deshmukh, 6th Edition, Central Techno Publications, Nagpur.

REFERENCE BOOKS:

1. Fires in Coal Mines L.C. Kaku, 2nd Edition Oriental Publishers, 1985.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**III Year B. Tech. Mining Engineering – II Sem.****MINING MACHINERY****UNIT – I**

Prime mover for mining machinery, I.C. Engine, Hydraulic power, pneumatic power, Element of mechanical power transmission gears, coupling, clutch and brake.

UNIT – II

Belt conveyors, rope haulage and locomotive their constructional features, power calculation and safety appliances.

UNIT – III

Locomotive haulage: types of locomotive ; battery diesel electric compressed air driven locomotives.

UNIT – IV

Construction, limitation, operational features. Hazards and their prevention, locomotive haulage calculation.

UNIT – V

Conveyors: Different types, Constructional details application; operation, maintenance, hazards and safety devices, AFC and their applications, Belt and chain conveyors; Calculations; recent developments.

UNIT – VI

Longwall face equipment: Shearer, plough: their construction and operation; power supports, stage loader, lump breakers; safety devices.

UNIT – VII

Wire rope and winding system. Mine hoist : Different types of winders, their constructional features, kinematics, torque and power calculation, speed control, safety devices, cage, skip, headgear structure, cage guide, shaft fittings. Man riding system in mine.

UNIT – VIII

Application of compressor in mine, mine pump and drainage.

TEXT BOOKS:

1. Mine transport by N.T. Kerelin,
2. EMT Vol-III by Deshmukh .

REFERENCES:

1. Karelin “Mine Transportation”
2. John pipenger and Tyler Hicks “Industrial Hydraulics”

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**III Year B. Tech. Mining Engineering – II Sem.****UNDERGROUND METAL MINING TECHNOLOGY****UNIT - I**

Introduction to Metal Mining: Peculiarities of Metaliferous deposits, scope and limitations of u/g metal mining.

UNIT - II

Mine Developments: Methods of developments, factors affecting the choice of level interval, Block size, shaft station, ore bin and ore pass. Shape and size of drive, cross cut, raise, winze and their position in relation ore body.

UNIT - III

Stoping: Classification of stoping methods, factors affecting choice of stoping methods like depth, dip,width, grade of the ore, physio mechanical characteristics of ore and wall rocks.

UNIT - IV

Stoping methods: Open stoping, Overhand, Underhand, Breast stoping. Stoping with supports; Shrinkage stoping, Cut and fill method of stoping, square set stoping. Caving methods:Top slicing, sub level caving and block caving.

UNIT - V

Trends of new methods: Sub level stoping, long hole stoping, blast hole stoping, V.C.R. stoping, in-situ leaching, biomineral engineering, hydraulic mining.

UNIT - VI

Special methods: Extraction of remnant pillars, Shaft pillars and contiguous reefs, their supporting system and special precaution during extraction.

UNIT - VII

Deep mining: Introduction to deep mining problems and stoping method in deep mining,

UNIT - VIII

Applications: Tunnel and Shaft boring machines and their applications.

TEXT BOOKS:

1. Introductory Mining Engineering-Hartman. John Wiley and Sons Inc.1987.
2. Elements of Mining Engineering - D.J.Deshmukh, Central techno publishers,

REFERENCE BOOKS:

1. Deep Mining-Jack Spalding, Mining publication Ltd.Inc.1949.
2. SME Mining Engineering Hand Book-Hartman, Society for Mining, Metallurgy and exploration.Inc.1992.
3. U/G Mining Method - Hustrulid, Society for Mining, Metallurgy & Exploration.Inc.1982.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**III Year B. Tech. Mining Engineering – II Sem.****MINE SYSTEMS ENGINEERING****UNIT – I**

Development – Definition– Characteristics and Phases – Types of models – 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 – 2 X 2 games – 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.

UNIT – VII

DYNAMIC PROGRAMMING : Introduction – Bellman's Principle of optimality – Applications of dynamic programming- capital budgeting problem – 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 – Simulation Languages.

TEXT BOOKS:

1. Operations Research / S.D.Sharma-Kedarnath
2. Introduction to O.R/Hiller & Libermann (TMH).

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. Operations Research / R.Pannerselvam, PHI Publications.
4. Operations Research / S.D Sharma-Kedarnath
5. O R Wayne L Winston/Thomson Brooks/cole
6. Introduction to O.R/Hiller & Libermann (TMH).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

III Year B. Tech. Mining Engineering – II Sem.

MINERAL ENGINEERING LAB

1. Crushing of Ore and finding the R.R. of the Jaws.
2. Determination R.R. of the ball mill , Critical speed & grindability index.
3. Laboratory screen Analysis for finding the average particle size .(Sieve Analysis)
4. Roll Crusher
5. Jigging
6. Electro Magnetic Separation .
7. Proximate Analysis of Coal .
8. Flash & Fire point of liquid fuel .
9. Viscosity measurement of liquid fuels.
10. Determination of Calorific value of fuels .

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**III Year B. Tech. Mining Engineering – II Sem.****ENVIRONMENTAL ENGINEERING LAB**

1. Determination of Co, CH₄, H₂S, SO₂, O₂, CO₂, Nitrous fumes by corresponding detectors.
2. Study and application of infrared gas analyser.
3. Detection of different gases by Gas – Chromatograph
4. Detection of methane by different types of methane meters & flame safety lamp.
5. Determination index of flammability of coal dust.
6. Study and uses of proto – IV, Proto – V. Dragger – BG – 174 self contained breathing apparatus
7. Study and uses of self rescuer Gas mask, smoke helmet.
8. Study and use of reviving apparatus
9. Study of Born-Side safety boning apparatus.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**III Year B. Tech. Mining Engineering – II Sem.****INTELLECTUAL PROPERTY RIGHTS AND PATENTS – II****UNIT I**

Intellectual Property Law Basics – Types of Intellectual Property – Agencies responsible for Intellectual Property Registration - Cyber crime and E-commerce – International Aspects of Computer and Online Crime

UNIT II

Introduction to Patent Law – Rights and Limitations – Rights under Patent Law – Patent requirements - Ownership - Transfer - Patents Application Process – Patent Infringement - Patent Litigation - International Patent Law – Double Patenting – Patent Searching – Patent Law Treaty - New developments in Patent Law - Invention Developers and Promoters

UNIT III

Introduction to Transactional Law: Creating Wealth and Managing Risk – The Employment Relationship in the Internet and Tech Sector – Contact for the Internet and Tech Sector - Business Assets in Information Age – Symbol and Trademark – Trolls and Landmines and other Metaphors

UNIT IV

Regulatory, Compliance and Liability Issues – State Privacy Law - Data Security – Privacy issues - Controlling Over use or Misuse of Intellectual Property Rights

BOOKS:

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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Mining Engineering – I Sem.

MINE ECONOMICS

UNIT I:

National mineral resources, national mineral policy

UNIT II:

Strategies for development of mining industry, resource conservation.

UNIT III:

Technology import, taxation, royalty and subsidies.

UNIT IV:

Mineral trade concept of derivatives in mineral trade, pricing mechanism of minerals.

UNIT V:

Sampling, estimation of reserves, valuation of mines and mineral properties.

UNIT – VI:

Life of a mining project, project evaluation.

UNIT VII:

Determination of optimum size of mine.

UNIT VIII:

Risk analysis in mineral investment decision.

TEXT BOOKS:

1. Alwyn E. Annels, mineral deposit evaluation: A practical approach, Chapman hall, 1991.
2. Deshmukh R.T. Mine and mineral economics, Emdee Publishers, 1986.

REFERENCES:

1. O.P.Khanna, Industrial engineering and management, Dhanpat Rai Delhi, 1993.
2. R.N.P.Arogyaswamy, courses in mining geology, Oxford and IBH pub. 2nd Edition, 1973.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**IV Year B. Tech. Mining Engineering – I Sem.****COMPUTER APPLICATIONS IN MINING****UNIT – I**

Introduction to structure terminology and peripherals, algorithms, flow charts, programs, dedicated systems. Application in mining.

UNIT - II

Exploration, rock topographic models, bore hole compositing, ore reserve calculation, interpolation, geostatical models, open pit design, ultimate pit design, introductory process control, underground mine design.

UNIT - III

Production scheduling: Operational simulation: Introduction, simulation overview, objective, understand the role of modeling.

UNIT - IV

Understanding the basic concept in simulation, example of simulation in mining aspects, simulation of machine repair problems.

UNIT - V

Concept of variability and prediction, example with dumping time problem, fitting distribution with chi – square test, random number generation, properties of random number, pseudorandom number, random variants generation.

UNIT – VI

Methods of random variants generation, inverse transform method, acceptance rejection method, composition method, empirical method and rectangular approximation.

UNIT - VII

Simulation languages, GPSS and SLAM, logical flow diagram of different mining activities, coding With GPSS and SLAM of different mining problems.

UNIT – VIII

Computer control, remote control, automatic control, applications and limitations of control.

TEXT BOOKS:

1. T.C. Bartee, digital computer fundamentals, Mc Graw Hill, 4th edition 1984.
2. P. Malvino and D.P. Leach digital principals and applications Mc Graw Hill 5th edition 1994.

REFERENCE:

1. R.V. Ramani, application of computer methods in the mineral industry.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**IV Year B. Tech. Mining Engineering – I Sem.****ROCK MECHANICS & GROUND CONTROL****UNIT – I**

Historical Development: Definition, scope and development of the science of Rock Mechanics. Analysis of stress and strain in three dimensions, principal stress, stress ellipsoid and stress directors surface; Determine of principal stress stress invariants Determination of maximum shearing stress, Octahedral stresses Homogeneous deformation Strain at a point principal axes of strains Differential equations of equilibrium. Compatibility equation of strains Compatibility equation in terms of stress components, stress function.

UNIT – II

Geo-Engineering Studies:- Underground geo-technical mapping. Physico – mechanical properties and strength indices of rock and their determination: density, Tensile Compressive and shear strength young's modulus, Poissin's ratio Impact strength and protodya Konov's strength index, point load index, Rock quality designation (RQD); Slack durability index. Rock mass rating (RMR) Cavability index Brinnels hard ness and contact strengths.

UNIT – III

Rock Behavior: Confining pressures, effect of water, time temperature In-situ stresses and their estimation, Horizontal stress and vertical stress, Intact rock strength and defomability; measuring devices Load, stress, strain Dynamic loading of rocks.

UNIT – IV

Photo – elastic experimental methods: Photo elastic stress measurement, circular Polariscope, Photo elastic stress determination, Determination of the principal stresses – Moire method Engineering classification of rocks. Theories of failure of rock and their applications.

UNIT – V

Definition and concept of ground control in mines, ground control practices in mines. Constraints on ground control design, characteristics of coal measures strata. Pre mining stresses. Theories of mechanics of strata behavior.

UNIT – VI

Roof supports: timber and steel supports, friction and hydraulic prop arches, shotcrete, roof truss, roof bolts, powered supports, stowing caving strip packing pump packing rock reinforcement.

UNIT – VII

Design of structures and rock, design of underground openings, design of pillars, design of open pit slopes, waste dumps and embankments. Design of stopes.

UNIT – VIII

Subsidence: theories of subsidence, factors affecting subsidence, prediction and measurement of subsidence. Damage and prevention of damage due to subsidence. Bumps and rock bursts –causes, occurrence and control.

TEXT BOOKS

1. Rock Mechanics & Ground control by Dr. B.S. Verma
2. Rock Mechanics by overl & Dual

REFERENCES

1. S. M. E
2. Coal Mine & ground control by s. Peng

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Mining Engineering – I Sem.

MINE LEGISLATION & GENERAL SAFETY

UNIT - I

General principles of mining laws, mines & Minerals (Regulation & Development), ACt.

UNIT - II

Mineral concession rules, principle provision of mine act.

UNIT - III

rules & regulation framed there under (CMR - 1957, MMR - 1961)

UNIT - IV

Indian Electricity rule, Mine rescue rule, industrial dispute Act.

UNIT - V

V-T rules, Pit Head Bath Rules, DGMS circular.

UNIT - VI

Cal mines regulations and metalliferous mines regulations

UNIT - VII

Introduction to rescue rules, vocational training rules, maternity benefit act and rules.

UNIT - VIII

Causes & Classification of Accidents, accidents statistics, Accidents investigation & Reports.

BOOK RECOMMENDED

1. Mine Act - 52 by B. K. Kejriwal
2. DGMS Circulars
3. Mines Act, Mine regulations, Mine rules Govt. of India Publication
4. Legislation In Indian Mines - Critical Appraisal by Prasad & Rakesh

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Mining Engineering – I Sem.

ROCK SLOPE ENGINEERING
(Departmental Elective – I)

UNIT - I

Introduction economic implications

UNIT - II

Geological investigation, data interpretation for slope stability analysis.

UNIT - III

Basic mechanisms of slope failure: planar, wedge, rotational shear , toppling, buckling and rock fall.

UNIT - IV

Mechanism of failure of jointed rock mass. Determination of shear strength of discontinuities.

UNIT - V

Influence of ground water on slope and techniques of depressurization, remedial and corrective measures.

UNIT - VI

Remedial measures for slope stabilization

UNIT - VII

Monitoring and instrumentation techniques of rock slopes . investigation of failed slopes.

UNIT - VIII

Numerical analysis of slopes. Use of FLAC software.

TEXT BOOKS:

1. R. N. Chowdury, *Slope Analysis*, elseveir, 1978
2. E. Hoek and J. Bray, *Rock Slope Engineering*, The Inst. of Mining & Metallurgy, London, pp. 358, 1981

REFERENCE:

1. Rock Slope Engineering Duncan C. Wyllie, Chris Mah

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**IV Year B. Tech. Mining Engineering – I Sem.****MINE SUBSIDENCE ENGINEERING
(Departmental Elective – I)****UNIT - I**

Introduction: Strata Movement at the mining horizon, convergence in mine working, factors influencing convergence in mine working.

UNIT - II

Subsidence Mechanism: Zones of movement in the overlying beds, vertical and horizontal movement, subsidence trough, angle of draw, angle of break, sub- surface subsidence.

UNIT - III

Subsidence Prediction: Different methods of surface subsidence prediction - graphical, analytical, profile function, empirical and theoretical models.

UNIT - IV

Time Influence And Impact On Structures: Influence of item on subsidence, example from long wall and bord and pillar working.

UNIT - V

Calculation of ground movement over time. Types of stress on structures, stress-strain behavior of soils.

UNIT - VI

Mining damage to buildings, industrial installations, railway lines, pipes, canals, etc.,

UNIT - VII

Subsidence Control, Governing Laws And Standards: Measures to reduce mining damage, mining methods to minimize damage, laws governing mining damage.

UNIT - VIII

Different standards suggested for mining and building ground in respect of subsidence.

TEXT BOOKS

1. Kratzsch, H. Mining Subsidence Engineering, Springer Verlag Publications, Berlin, 1983
2. Whittaker, B.N. and Raddish, D.J. Subsidence, occurrence, Prediction and Control Elsevier Publications, Amsterdam, 1989.
3. Brauner, G. Subsidence due to underground Mining, Part I & II and III, U.S. Department of Interior, Bureau of Mines, 1973

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**IV Year B. Tech. Mining Engineering – I Sem.****ROCK FRAGMENTATION ENGINEERING****(Departmental Elective – I)****UNIT - I**

General theory of rock cutting, Selection of cutting tools for optimum penetration and wear characteristics.

UNIT - II

Mechanics of rotary, percussive and rotary - percussive drilling , short and long hole drilling equipment , different types of bits, bit wear, drilling in difficult formations, drillability of rocks, drilling performance and costs.

UNIT - III

Mechanism of Rock breaking machines, pneumatic and Hydraulic rock hammers. Mechanics of rock fragmentation and fracture by explosive action, explosives.

UNIT - IV

Blasting accessories, blasting parameters, design of blasting rounds for opencast and underground mines, blastability of rocks, blasting efficiency, mean fragment size.

UNIT - V

Computational models of blasting; transient ground motion, misfires, blown out shots, incomplete detonation - their causes and remedial measures.

UNIT - VI

Controlled blasting techniques, perimeter blasting, safety precautions, ground vibrations and air over pressure from blasting.

UNIT - VII

Instrumentation in blasting, Borehole pressure transducer, V.O.D Probe, vibration monitor, high speed Video Camera.

UNIT - VIII

Impact of ground vibration and sound on the neighboring structures and communities, and mitigative measures.

TEXT BOOKS

1. “Drilling & Blasting” Minetech by Pradhan G.K., Ghose A.K.
2. Advance in Drilling and Blasting by SASTRY V.R

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Mining Engineering – I Sem.

COMPUTER APPLICATION IN MINING LABORATORY

Part-A

Learning of the following commands using a CAD package.

Drawing Commands: Line, arc, circle, polygon, Donut, Solid, Spline Pline, Text, M Line, ellipse, dimensioning, object snaps point, Hatch, layers, Units.

Editing Commands: Limits, Erase, Array, Copy, Move, Offset, Stretch, Pedit, change properties, Trim, Extend, Fillet, Chamfer, Break, Mirror, Scale, Rotate, Zoom, Pan.

Enquiry Commands: Id, list, Dist, Area, DB list, Status Selection sets i.e. window, crossing, fence, W polygon. Plotting.

Part-B

8 exercises (mining drawing) using any of the above commands.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**IV Year B. Tech. Mining Engineering – I Sem.****ROCK MECHANICS LAB**

1. Preparation of rock sample.
2. Determination of uniaxial tensile strength by braillian method.
3. Determination of point load index of given sample.
4. To determination of point load index of given sample
5. To determine the strength index of supplied specimen by impact strength index (ISI) Appartus.
6. Determination of uniaxial compressive strength by uniaxial compressive testing machine.
7. Determination of slake-durability index of coal & rock.
8. Determination of Triaxial compressive strength by universal testing Machine & plotting of Mohr's circle.
9. Determination of Angle of Internal Friction.
10. Determination of Shear strength of Rock Sample or Soil.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Mining Engineering – I Sem.

INDUSTRIAL ROBOTICS

(Open Elective)

UNIT – I

Automation and Robots-Technology of Robots-Economics and social issues-General characteristics of Robots-Basic components-Robot configuration-Robot selection.

UNIT-II

Robot classification-Arm Geometry-Degree of Freedom-Power Sources-Types of Motion-Path control-Intelligence Level. Robot System Analysis-Robot Operation-Hierarchical Control Structure-Line Tracking-Dynamic Properties of Robots-Modular Robot Components. Robot End Effectors-Types of End Effectors-Mechanical Grippers-Gripper Force Analysis—Other Types of Grippers.

UNIT-III

Sensors-Robot sensors-Sensor Classification-Micro switches-Solid-State Switches-Proximity Sensors-Photoelectric Sensors-Rotary Position Sensors-Usage and Selection of Sensors-Signal Processing. Vision-Visual Sensing-Machine Vision-Machine Vision Applications.

UNIT-IV

Control Systems-Control System Correlation-Control System Requirements-Programmable Logic Controller-PLC Programming Terminals-Proportional-Integral-Derivative-Computer Numerical Control-Microprocessor Unit-Work cell Control.

UNIT-V

Programming-Robot Programming-Programming Methods-Programming Languages-Levels of Robot Programming-Motion Interpolation-Sample Programs.

UNIT-VI

Artificial Intelligence-Intelligent Systems-Elements of Artificial Intelligence-System Architecture-Applications of Advanced Robots-Fuzzy Logic controls- Advanced Concepts and Procedures-Future Developments.

UNIT-VII

Safety-Robot Safety-Safety standards-System Reliability-Human Factor
Issues-Safety Sensors and Monitoring-Safeguarding—Training-Safety
Guide lines-Definitions.

UNIT-VIII

Industrial Applications-Automation in Manufacturing-Robot Applications-
Material-Handling Applications-Processing Operations-Assembly
Operations-Inspection Operations-Evaluating The Potential of a Robot
Application-Future Applications-Innovations.

TEXT BOOKS:

1. Robot Technology Fundamentals by James G.Keramas, Cengage Learning.
2. Industrial Robotics by Mikell P.Groover, Weiss, Nagel, Odrey/McGrawHill

REFERENCE BOOKS:

1. Robotics, K.S Fu/McGrawHill
2. Introduction to Robotics, Mechanics & Control by John J.Craig/Pearson

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Mining Engineering – I Sem.

ENVIRONMENTAL IMPACT ASSESSMENT

(Open Elective)

UNIT – I

Introduction: Environmental Impact Assessment (EIA) – Environmental Impact Statement -EIA in Project Circle

UNIT – II

Legal and regulatory aspect in India according to Ministry of Environment and Forests.

UNIT – III

Types and limitations of EIA – Cross sectoral issues and terms of reference in EIA – Participation of Public and Non - Governmental Organizations in environmental decision making.

UNIT – IV

Components And Methods: Components of EIA – Processes - Screening - Scoping - Setting - Analysis - mitigation. Matrices - Networks - Checklists - Connections and combination of processes - Cost benefit analysis - Analysis of alternatives - Software packages for EIA- Expert systems in EIA.

UNIT – V

Prediction, Assessment of Impacts and Reporting: Prediction tools for EIA - Mathematical modeling for impact prediction - Assessment of impacts - Air - Water - soil - noise - biological - socio - cultural environments.

UNIT – VI

Environmental Management Plan - preparation, implementation and review – Mitigation and Rehabilitation Plans.

UNIT – VII

Policy and guidelines for planning and monitoring programmes - Post

project audit - Ethical and Quality aspects of Environmental Impact Assessment.

UNIT –VIII

Case Studies: Case studies related to the following sectors - Infrastructure - Mining - Industrial - Thermal Power - River valley and Hydroelectric - Nuclear Power.

TEXT BOOKS

1. Lawrence D.P., Environmental Impact Assessment – Practical solutions to recurrent problems, Wiley – Interscience, New Jersey.2003
2. Petts, J.Handbook of Environmental Impact Assessment, Vol - I and II, Blackwell Science London 1999.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**IV Year B. Tech. Mining Engineering – II Sem.****PRODUCTION PLANNING AND CONTROL****UNIT – I**

Introduction : Definition – Objectives of production Planning and Control – Functions of production planning and control – Elements of production control – Types of production – Organization of production planning and control department – Internal organization of department.

UNIT – II

Forecasting – Importance of forecasting – Types of forecasting, their uses – General principles of forecasting – Forecasting techniques – qualitative methods and quantitative methods.

UNIT – III

Inventory management – Functions of inventories – relevant inventory costs – ABC analysis – VED analysis – EOQ model – Inventory control systems – P-Systems and Q-Systems.

UNIT – IV

Introduction to MRP & ERP, LOB (Line of Balance), JIT inventory, and Japanese concepts.

UNIT – V

Routing – Definition – Routing procedure – Route sheets – Bill of material – Factors affecting routing procedure. Schedule – definition – Difference with loading

UNIT – VI

Scheduling Policies – Techniques, Standard scheduling methods,

UNIT – VII

Line Balancing, Aggregate planning, Chase planning, Expediting, controlling aspects.

UNIT – VIII

Dispatching – Activities of dispatcher – Dispatching procedure – followup – definition – Reason for existence of functions – types of followup,

applications of computer in production planning and control.

TEXT BOOKS:

1. Elements of Production Planning and Control / Samuel Eilon.
2. Modern Production/ operation managements / Baffa & Rakesh Sarin

REFERENCES:

1. Operations Management – S.N. Chary.
2. Inventory Control Theory and Practice / Martin K. Starr and David W. Miller.
3. Production Control A Quantitative Approach / John E. Biegel.
4. Production Control / Moore.
5. Operations Management / Joseph Monks.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Mining Engineering – II Sem.

DEEP SEA MINING
(Departmental Elective – II)

UNIT - I

Modern Exploration Techniques to Identify the Complex Coal Deposits.

UNIT - II

Classification of Coal Deposits Lying under Typical Geo - Mining Conditions.

UNIT - III

Challenges to improve Production and Productivity from Deep Seated Deposits / Challenges in Liquidation of Locked-up Pillars.

UNIT - IV

Innovative Technologies for Stability Analysis.

UNIT - V

Design and Development of Deep Seated Deposits.

UNIT - VI

Application of Numerical Modeling Techniques to Control Ground Problems of Complex Deposits.

UNIT - VII

Use of Modern Instruments for Strata Control of deep seated deposits.

UNIT - VIII

In-situ Gasification and Mineral Biotechnology for Complex Coal Deposits.

TEST BOOKS

1. R.D.Singh, Principals & Practices of Modern Coal Mining, New age international, New Delhi, 1997.
2. T.N.Singh, Underground winning of Coal, Oxford and IBH New Delhi, 1992.

REFERENCES

1. Prasad D, and Rakesh S, Legislation in Indian Mines - A Critical Appraisal, Niskam Press, New Delhi, 1883p.
2. S.P.Mathur, Coal Mining in India, M.S. Exterprises Bilaspur, 1999.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Mining Engineering – II Sem.

**MINE CONSTRUCTION
(Departmental Elective - II)**

UNIT-I

Size of mine. Environment and ecology, selection criteria for site of the openings geological investigation. Underground mine shaft sinking methods through alluvium, soft and hard rock, mechanization, consolidation of loose ground shaft lining, ground pressure.

UNIT – II

Thickness of lining, design and procedure of laying the lining. Construction of shaft collar heapstead.

UNIT – III

Design and construction of insets, shaft bottom, excavation for mechanized decking of cages, skip loading, pit bottom lay outs, installation of main haulages.

UNIT – IV

Main sump size, construction under ground substation, first aid room and office.

UNIT – V

Drivage of roads in stone and coal, mechanization support systems opening of faces.

UNIT – VI

Surface layouts pit top circuits and coal handling and coal preparation plant, railway siding and weigh bridges, surface and underground coal bunkers winding house substation, lamp room.

UNIT – VII

Pit head bath, creche, dispensary, office work - shop; material handling, Stowing installations, bunkers, water tanks, mixing chamber.

UNIT – VIII

Open pit mines opening out trenches, haul roads, construction of benches. Assembling and transportation of draglines , shovels etc. Scheduling for mine constructions PERT/CPM.

TEXT BOOKS

1. Pazdziora J. “Design of Underground hand coal mine”.
2. Popov “Working of mineral Deposits”

REFERENCES

1. Bokey “Mining”
2. Rzhovsky Unit operations in open cast mines

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**IV Year B. Tech. Mining Engineering – II Sem.****TUNNELING ENGINEERING
(Departmental Elective - II)****UNIT - I**

Introduction to tunneling geological concept of tunneling.

UNIT - II

Influence of geological aspects on design and construction of tunnels.

UNIT - III

Tunneling methods: soft ground, drill and blast, roadway drivage machines, tunnel boring machines (TBM).

UNIT - IV

Stresses and displacements associated with excavating tunnels. Ground control or treatment in tunneling and drivages.

UNIT - V

Design of supports of tunnels steel supports, rock enforcements, new Australian tunneling methods (NATM)

UNIT - VI

Design of tunnels rock conditions, RMR, Q-system, RSR, rock mass behavior, stress strain behavior, and stress analysis of tunnels.

UNIT - VII

Maintenance : Dewatering, ventilation and illumination of drivages and tunnels.

UNIT - VIII

Numerical techniques, Introductory use of FLAC, PLAXIS etc.

TEXT BOOKS:

1. Tunnel Engineering –Hand book - Thomas R.Kuesel , Elwyn H.King, John O.Bickel.
2. Harbor, Dock and Tunnel Engineering – by R.Srinivasan.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Mining Engineering – II Sem.

**PLANNING OF UNDERGROUND METAL MINING PROJECT
(Departmental Elective - III)**

UNIT - I

Planning and scheduling of insets, shaft bottoms.

UNIT - II

Winding and transportation systems.

UNIT - III

Surface layouts including mill and concentrator plants.

UNIT - IV

Determination of number and dimensions of stops.

UNIT - V

Planning and scheduling of a cycle of operations.

UNIT - VI

Concept of ore blending.

UNIT - VII

Overall planning and scheduling of activities in metal mining and processing.

UNIT - VIII

Case studies of planning of mining operations.

TEXT BOOK:

1. Agoshkov M., et. Al., Mining of Ores and Non – Metallic Minerals, Mir Publishers, Moscow, 1983

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Mining Engineering – II Sem.

**PLANNING OF UNDERGROUND COAL MINING PROJECT
(Departmental Elective - III)**

UNIT - I

Objective and Stages of Planning.

UNIT - II

Project Report.

UNIT - III

Determination of mine parameters planning of exploitations by Board and Pillar and Longwell Mining.

UNIT - IV

Selection of face and underground transport equipment.

UNIT - V

Exploitation of thick coal seams.

UNIT - VI

Planning and design layouts for ventilation, drainage and power supply.
Ventilation management.

UNIT - VII

Productivity and quality control, planning of deep underground coal mines.

UNIT - VIII

Automation in underground coal mines, Coal Seam Gas (CGS), Coal bed Methane (CBM), Global Energy Scenario.

TEXT BOOKS:

1. Longwall Mining by Peng.S.S.
2. Coal Mining by S.P.Mathur

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Mining Engineering – II Sem.

**PLANNING OF SURFACE MINING PROJECT
(Departmental Elective - III)**

UNIT - I

Preliminary investigations, Stages of Planning.

UNIT - II

Feasibility Report, Planning inputs, Monitoring of Projects.

UNIT - III

Estimation of mine life.

UNIT - IV

Open pit slope angles, Ultimate pit limit. Interrelation and planning of unit operations

UNIT - V

Transport and dumping subsystems, Ore blending, Equipment selection.

UNIT - VI

Design of haul roads, Extraction methods for beach sand deposits.

UNIT - VII

Mining of developed coal seams.

UNIT - VIII

Selective mining Estimation of profitability, productivity and quality control, Surface Mining of Tar Sands.

TEXT BOOKS:

1. Opencast Mining Unit Operations by Rzhevsky, V.V., Mir Publishers.
2. Opencast Mining Technology and Integrated Mechanizations by Rshensky V.V., Mir Publishers

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**IV Year B. Tech. Mining Engineering – II Sem.****MAINTENANCE AND RELIABILITY ENGINEERING
(Departmental Elective - IV)****UNIT – I**

Introduction: Need for maintenance, Facts and Figures, Modern maintenance, Problem and maintenance, Strategy for the 21st century, Engineering Maintenance objectives and maintenance in equipment life cycle, terms and definitions.

UNIT – II

Maintenance Management and control: Maintenance manual, maintenance, facility evaluation, functions of effective maintenance management, maintenance project control methods, Maintenance management control indices.

UNIT – III

Types of Maintenance :Preventive maintenance, elements of preventive, maintenance program, establishing, preventive maintenance program PM Program, evaluation and improvement, PM measures, PM models, corrective maintenance, corrective maintenance types, corrective maintenance steps and downtime components, corrective maintenance measures, corrective maintenance models.

UNIT – IV

Basic concepts of Reliability: Introduction, reliability and quality, failure and failure modes, causes of failure and reliability, maintainability and availability, history of reliability, reliability literature.

UNIT – V

Reliability mathematics: Introduction, random experiment, probability, random variables, distribution functions, discrete distribution, continuous distribution, numerical characteristics of random variables, laplace transform.

UNIT – VI

Component reliability & 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 – VII

System reliability models: Introduction, system with component with in series - System with parallel component – K – out – of - M systems - Non series parallel systems - system with - mixed - mode failure - fault – tree technique.

UNIT – VIII

Reliability management: Reliability programming-management policies and decisions -reliability management by objectives - reliability group-reliability data, acquisition analysis -management people for reliability.

TEXT BOOKS:

1. Reliability, maintenance and safety engineering by Dr.A.K.Gupta / Laxmi publications
2. Industrial safety management by L.M.Deshmukh / TMH
3. Reliability engineering – Balaguruswamy / TMH

REFERENCES:

1. Maintenance engineering and management by R.C.Mishra / PHI
2. Reliability engineering by Elsayed / Pearson
3. Engineering maintenance a modern approach, B.S Dhallon,2002, C.R.R. Publishers

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Mining Engineering – II Sem.

ROCK EXCAVATION ENGINEERING
(Departmental Elective – IV)

UNIT - I

Introduction: Concepts and historical developments in rock excavation, factors affecting rock fragmentation, mechanism of rock breakage and fractures.

UNIT - II

Rock Fragmentation: Method of rock fragmentation – explosive action, cutting, ripping and impacts.

UNIT - III

Properties of Rocks for Machine Process: Application of compression, tensile and multi – axial strength, index test and abrasivity, anisotropy, elasticity, porosity, lamination, bedding joints in rock fragmentation process.

UNIT - IV

Principles of Rock Cutting Technology: Drilling and its various types i.e., rotary, percussive, rotary – percussive mechanism of rock percussion, theory of single tool rock cutting, crack initiation and propagation, breakage pattern.

UNIT - V

Rock cutting pricks, discs and rolls cutter. Water jet cutting. Method of assessing drillability and cuttability of rock.

UNIT - VI

Principles of Excavation Machines: Roadheaders, TEMs' coalface cutters loaders, Bucket Wheel Excavators and Continuous Miners both surface and underground.

UNIT - VII

Rock Cutting Tools: Cutting tool material – different types relative application and their choice, tool shape and size, specific energy consumption, tool wear.

UNIT - VIII

Effect of operational parameters on tool performance, maintenance and replacement of cutting tools of excavating machines.

TEXT BOOKS:

1. Principles of Rock Fragmentation, G.B. Clark, John Wiley and Sons, New York, 1987.
2. Rock Mechanics and Design of Structures, Obert & Duvall, John Wiley and Sons, New York

REFERENCES

1. S.M.E. Mining Engineering Hand Book, Hartman, Society for Mining, Metallurgy and Exploration
2. Introductory Mining Engineering, Hartman, John Wiley International, 1976.
3. Diamond Drilling, C.P. Chugha, Oxford IBH, 1986.

Scheme of Exam: Total **EIGHT** questions are to be asked, **FOUR** from each part. The student has to answer any **FIVE** full questions selecting at least **TWO** from each part.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

IV Year B. Tech. Mining Engineering – II Sem.

MINE HEALTH AND SAFETY ENGINEERING
(Departmental Elective – IV)

UNIT - I

Main accidents.

UNIT - II

Planning for safety, safety analysis, safety prevention.

UNIT - III

Information system and safety audits.

UNIT - IV

Hazard Control - Engineering approach, systems approach, Hazard analysis

UNIT - V

Safety Management.

UNIT - VI

Economics of safety and cost – effectiveness.

UNIT - VII

Occupational hazards in mines.

UNIT - VIII

Occupational hygiene, occupational diseases.

TEXT BOOKS:

1. Ridley, J & C Channing, J: Safety at work : Butterworth – Heinemann, Oxford , 2001
2. Rodgers, W.P: Introduction of system safety Engineering; John Wiley & Sons Inc., NewYork, 1971.
3. Green A R; Safety in Mines Research; A.R. Balkena, Rotterdam, 1985.

