

ACADEMIC REGULATIONS COURSE STRUCTURE AND DETAILED SYLLABUS

MINING ENGINEERING

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



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

Academic Regulations 2009 for B. Tech (Regular)

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

1. Award of B.Tech. Degree

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

- i. Pursued a course of study for not less than four academic years and not more than eight academic years.
- ii. Register for 200 credits and secure 200 credits

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

3. Courses of study

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

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

XVI. Mechanical Engineering (Production).

XVII. Mechanical Engineering.

XVIII. Metallurgy and Material Technology.

XIX. Mining Engineering

XX. Mining Machinery

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

4. Credits

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

5. Distribution and Weightage of Marks

- i. The performance of a student in each semester / I year shall be evaluated subject-wise with a maximum of 100 marks for theory and 75 marks for practical subject. In addition, Industry oriented mini-project, seminar and project work shall be evaluated for 50, 50 and 200 marks respectively.
- ii. For theory subjects the distribution shall be 25 marks for Internal Evaluation and 75 marks for the End-Examination.
- iii. For theory subjects, during the semester there shall be 2 mid term examinations. Each mid term examination consists of one objective

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

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

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

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

- iv. For practical subjects there shall be a continuous evaluation during the semester for 25 sessional marks and 50 end examination marks. Out of the 25 marks for internal, day-to-day work in the laboratory shall be evaluated for 15 marks and internal examination for practical shall be evaluated for 10 marks conducted by the concerned laboratory teacher. The end examination shall be conducted with external examiner and laboratory teacher. The external examiner shall be appointed from the cluster of colleges as decided by the University examination branch.
- v. For the subject having design and / or drawing, (such as Engineering Graphics, Engineering Drawing, Machine Drawing) and estimation, the distribution shall be 25 marks for internal evaluation (15 marks for day-to-day work and 10 marks for internal tests) and 75 marks for end examination. There shall be two internal tests in a Semester and the better of the two shall be considered for the award of marks for internal

tests. However in the I year class, there shall be three tests and the average of best two will be taken into consideration.

- vi. There shall two training program schedules (Industrial Training) of 30 days each, one in the summer period between II & III years and the other in the summer period between III & IV years. The first training programme shall be evaluated in III year I Semester for 25 marks, and the second training programme shall be evaluated in IV year I Semester for 25 marks, based on the two individual training reports submitted by each student. The total shall be evaluated for 50 marks with a weightage of 2 credits and the same shall be posted in the IV year II Semester marks sheet of the student. The Training Report Evaluation Committee consists of an external examiner, head of the department, the supervisor of Training Programme and a senior faculty member of the department. There shall be no internal marks for industry training.
- vii. There shall be a seminar presentation in IV year II Semester. For the seminar, the student shall collect the information on a specialized topic and prepare a technical report, showing his understanding over the topic, and submit to the department, which shall be evaluated by the Departmental committee consisting of Head of the department, seminar supervisor and a senior faculty member. The seminar report shall be evaluated for 50 marks. There shall be no external examination for seminar.
- vii. There shall be a Comprehensive Viva-Voce in IV year II semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of (i) Head of the Department (ii) two Senior Faculty members of the Department. The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he / she studied during the B.Tech course of study. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There are no internal marks for the Comprehensive viva-voce.
- ix. Out of a total of 200 marks for the project work, 50 marks shall be for Internal Evaluation and 150 marks for the End Semester Examination. The End Semester Examination (viva-voce) shall be conducted by the same committee appointed for industry oriented mini project. In addition the project supervisor shall also be included in the committee. The topics for industry oriented mini project, seminar and project work shall be different from each other. The evaluation of project work shall

be conducted at the end of the IV year. The Internal Evaluation shall be on the basis of two seminars given by each student on the topic of his project.

- x. Laboratory marks and the sessional marks awarded by the College are not final. They are subject to scrutiny and scaling by the University wherever necessary. In such cases, the sessional and laboratory marks awarded by the College will be referred to a Committee. The Committee will arrive at a scaling factor and the marks will be scaled as per the scaling factor. The recommendations of the Committee are final and binding. The laboratory records and internal test papers shall be preserved in the respective institutions as per the University norms and shall be produced to the Committees of the University as and when the same is asked for.

6. Attendance Requirements:

- i. A student shall be eligible to appear for University examinations if he acquires a minimum of 75% of attendance in aggregate of all the subjects.
- ii. **Shortage of Attendance below 65% in aggregate shall in NO case be condoned.**
- iii. Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester or I year may be granted by the College Academic Committee.
- iv. A student will not be promoted to the next semester unless he satisfies the attendance requirement of the present semester / I year, as applicable. They may seek re-admission for that semester / I year when offered next.
- v. Students whose shortage of attendance is not condoned in any semester / I year are not eligible to take their end examination of that class and their registration shall stand cancelled.
- vi. A stipulated fee shall be payable towards condonation of shortage of attendance.

7. Minimum Academic Requirements:

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

- i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory or practical design or drawing subject or project if he secures not less than 35% of marks in the end examination and a minimum of 40% of marks in the sum total of the internal evaluation and end examination taken together.
 - ii. A student shall be promoted from II to III year only if he fulfils the academic requirement of 37 credits from one regular and one supplementary examinations of I year, and one regular examination of II year I semester irrespective of whether the candidate takes the examination or not.
 - iii. A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of total 62 credits from the following examinations, whether the candidate takes the examinations or not.
 - a. Two regular and two supplementary examinations of I year.
 - b. Two regular and one supplementary examinations of II year I semester.
 - c. One regular and one supplementary examinations of II year II semester.
 - d. One regular examination of III year I semester.
 - iv. A student shall register and put up minimum attendance in all 200 credits and earn the 200 credits. Marks obtained in all 200 credits shall be considered for the calculation of percentage of marks.
 - v. Students who fail to earn 200 credits as indicated in the course structure within eight academic years from the year of their admission shall forfeit their seat in B.Tech course and their admission shall stand cancelled.
- #### 8. Course pattern:
- i. The entire course of study is of four academic years. The first year shall be on yearly pattern and the second, third and fourth years on semester pattern.
 - ii. A student eligible to appear for the end examination in a subject, but absent at it or has failed in the end examination may appear for that subject at the supplementary examination.

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

9. Award of Class:

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

Class Awarded	% of marks to be secured	From the aggregate marks secured for the best 200
First Class with Distinction	70% and above	
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

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

10. Minimum Instruction Days:

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

11. There shall be no branch transfers after the completion of admission process.
12. There shall be no place transfer within the Constituent Colleges and Units of Jawaharlal Nehru Technological University Hyderabad.
13. **General:**
- Where the words "he", "him", "his", occur in the regulations, they include "she", "her", "hers".
 - The academic regulation should be read as a whole for the purpose of any interpretation.
 - In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.
 - The University may change or amend the academic regulations or syllabi at any time and the changes or amendments made shall be applicable to all the students with effect from the dates notified by the University.

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

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

- The Students have to acquire 150 credits from II to IV year of B.Tech. Program (Regular) for the award of the degree.
Register for 150 credits and secure 150 credits.
- Students, who fail to fulfil the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seat.
- The same attendance regulations are to be adopted as that of B. Tech. (Regular).
- Promotion Rule:**
A student shall be promoted from third year to fourth year only if he fulfils the academic requirements of 37 credits from the examinations.
 - Two regular and one supplementary examinations of II year I semester.
 - One regular and one supplementary examinations of II year II semester.
 - One regular examination of III year I semester.
- Award of Class:**
After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of B. Tech. Degree he shall be placed in one of the following four classes:

First Class with Distinction	70% and above	From the aggregate marks secured for 150 Credits. (i.e. II year to IV year)
First Class	Below 70% but not less than 60%	
Second Class	Below 60% but not less than 50%	
Pass Class	Below 50% but not less than 40%	

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

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

MALPRACTICES RULES

DISCIPLINARY ACTION FOR / IMPROPER CONDUCT IN EXAMINATIONS

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

		work and shall not be permitted to appear for the remaining examinations of the subjects of that Semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.

4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
6.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in-charge or any person on duty in or outside the examination	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining

	hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	examinations of the subjects of that semester/year. The candidates also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations

		in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.

10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.TECH. MINING ENGINEERING
I YEAR COURSE STRUCTURE

Code	Subject	L	T/P/D	C
51001	English	2	-	4
51002	Mathematics - I	3	1	6
51003	Engineering Mechanics	3	1	6
51004	Engineering Physics	2	1	4
51005	Engineering Chemistry	2	-	4
51006	Computer Programming & Data Structures	3	-	6
51007	Engineering Drawing	2	3	4
51672	Computer Programming Lab	-	3	4
51673	Engineering Physics & Engineering Chemistry Lab	-	3	4
51674	English Language Communication Skills Lab	-	3	4
51675	Engineering Workshop / IT Workshop	-	3	4
	Total	17	18	50

II YEAR I SEMESTER

COURSE STRUCTURE

Code	Subject	L	T/P/D	C
53013	Environmental Studies	3	0	3
53014	Probability and Statistics	3	1	3
53015	Elements of Electrical and Electronics Engineering	4	1	4
53050	Mechanical Technology	4	0	4
53051	Fundamentals of Geology	3	1	3
53052	Development of Mineral Deposits	4	0	4
53636	Electrical and Electronics Engineering Lab	0	3	2
53637	Geology Lab	0	3	2
	Total	21	9	25

II YEAR II SEMESTER COURSE STRUCTURE

Code	Subject	L	T/P/D	C
54018	Numerical Methods	3	1	3
54016	Mechanics of Fluids and Hydraulic Machines	4	0	4
54054	Machine Drawing and Computer Aided Graphics	0	5	3
54055	Mechanics of Solids	3	1	3
54056	Mining Geology	4	1	4
54057	Drilling and Blasting	4	1	4
54636	Mechanics of Fluids and Hydraulic Machines Lab	0	3	2
54637	Mechanics of Solids Lab	0	3	2
	Industrial Training - I (Summer)			
	Total	18	15	25

III YEAR I SEMESTER

COURSE STRUCTURE

Code	Subject	L	T/P/D	C
55015	Managerial Economics and Financial Analysis	4	0	4
55081	Mine Surveying-I	3	1	3
55082	Mine Environmental Engineering-I	3	1	3
55083	Surface Mining Technology	4	2	4
55084	Underground Coal Mining Technology	4	2	4
55085	Mine Mechanisation-I	3	1	3
55638	Mine Surveying-I Lab	0	3	2
55639	Mine Environmental Engineering Lab	0	3	2
	Total	21	13	25

III YEAR II SEMESTER

COURSE STRUCTURE

Code	Subject	L	T/P/D	C
56016	Industrial Management	4	0	4
56086	Mine Surveying-II	3	1	3
56087	Underground Metal Mining Technology	3	2	4
56088	Mine Environmental Engineering-II	3	2	3
56089	Mine Mechanisation-II	3	1	4
56090	Mine Economics	3	1	3
56643	Mine Surveying -II Lab	0	3	2
56644	Advanced English Communication Skills Lab	0	3	2
	Industrial Training - II (Summer)			
	Total	19	13	25

IV YEAR I SEMESTER

COURSE STRUCTURE

Code	Subject	L	T/P/D	C
57143	Mineral Processing	3	1	3
57144	Rock Mechanics	3	1	4
57145	Mine Systems Engineering	4	0	4
57146	Mine Legislation	3	1	4
	Elective-I	3	1	3
57147	Rock Slope Engineering			
57148	Mine Subsidence Engineering			
57149	Rock Excavation Engineering			
57150	Rock Fragmentation Engineering			
	Elective-II	3	1	3
57151	Computer Applications in Mining			
57152	Mine Construction Engineering			
57153	Tunneling Engineering			
57154	Strata Control Technology			
57637	Mineral Processing Lab	0	3	2
57638	Rock Mechanics Lab	0	3	2
	Total	19	11	25

IV YEAR II SEMESTER

COURSE STRUCTURE

Code	Subject	L	T/P/D	C
58108	Mine Ground Control	3	1	3
	Elective-III	3	0	3
58109	Planning of Surface Mining Project *			
58110	Planning of Underground Coal Mining Project			
58111	Planning of Underground Metal Mining Project			
58112	Mine Electrical Engineering			
	Elective-IV	3	0	3
58113	Geological & Technological factors of Coal Gasification CBM, Shale Gas			
58114	Mine Health & Safety Engineering			
58115	Maintenance & Reliability Engineering			
58116	Deep Seam Mining			
58673	Industrial Training	0	0	2
58674	Seminar	0	6	2
58675	Project work	0	15	10
58676	Comprehensive Viva	0	0	2
	Total	9	22	25

Note : All End Examinations (Theory and Practical) are of three hours duration.

T- Tutorial

P - Practical/Drawing

L - Theory

C - Credits

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

I Year B.Tech. Mining Engg.

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

(51001) ENGLISH

1. INTRODUCTION:

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

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

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

2. OBJECTIVES:

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To equip the students to study academic subjects with greater facility through the theoretical and practical components of the English syllabus.
- To develop the study skills and communication skills in formal and informal situations.

3. SYLLABUS:

Listening Skills:

Objectives

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

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

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

Speaking Skills:

Objectives

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

Reading Skills:

Objectives

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

2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

- Skimming the text
- Understanding the gist of an argument
- Identifying the topic sentence
- Inferring lexical and contextual meaning
- Understanding discourse features
- Recognizing coherence/sequencing of sentences

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

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill
2. To equip them with the components of different forms of writing, beginning with the lower order ones.
 - Writing sentences
 - Use of appropriate vocabulary
 - Paragraph writing
 - Coherence and cohesiveness
 - Narration / description
 - Note Making
 - Formal and informal letter writing
 - Editing a passage

4. TEXTBOOKS PRESCRIBED:

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

For Detailed study

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

For Non-detailed study

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

A. STUDY MATERIAL:

Unit-I

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

Unit-II

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

Unit-III

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

Unit-IV

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

and Lives", Published by Maruthi Publications, Guntur

Unit-V

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

Unit-VI

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

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

Unit-VII

Exercises on

Reading and Writing Skills

Reading Comprehension

Situational dialogues

Letter writing

Essay writing

Unit-VIII

Practice Exercises on Remedial Grammar covering

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

Vocabulary development covering

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

REFERENCES:

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

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(51002) MATHEMATICS-I

UNIT-I

Sequences – Series

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

UNIT-II

Functions of Single Variable

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

UNIT-III

Application of Single variables

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

UNIT-IV

Integration & its applications

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

UNIT-V

Differential equations of first order and their applications

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

UNIT-VI

Higher Order Linear differential equations and their applications

Linear differential equations of second and higher order with constant

coefficients, RHS term of the type $f(X) = e^{ax}$, $\sin ax$, $\cos ax$, and $x^n e^{ax} V(x)$, $x^n V(x)$, method of variation of parameters. Applications bending of beams, Electrical circuits, simple harmonic motion.

UNIT-VII

Laplace transform and its applications to Ordinary differential equations

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

UNIT-VIII

Vector Calculus

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

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

TEXT BOOKS:

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

REFERENCES:

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

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(51003) ENGINEERING MECHANICS

UNIT-I

Introduction to Engineering. Mechanics – Basic Concepts.

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

UNIT-II

Equilibrium of Systems of Forces : Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. 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 moment of Inertia : Definition – Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia : Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.

UNIT-V

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

UNIT-VI

Kinematics : Rectilinear and Curvilinear motions – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion.

Kinetics : Analysis as a Particle and Analysis as a Rigid Body in Translation – Central Force Motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies.

UNIT-VII

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

UNIT-VIII

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

TEXT BOOKS :

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

REFERENCES :

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

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(51004) ENGINEERING PHYSICS

UNIT-I

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

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

UNIT-II

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

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

UNIT-III

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

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

UNIT-IV

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

Hole.

UNIT-V

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

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

UNIT-VI

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

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

UNIT-VII

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

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

UNIT-VIII

14. Acoustics of Buildings & Acoustic Quieting: Basic Requirement of Acoustically Good Hall, Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time (Qualitative Treatment), Measurement of Absorption Coefficient of a Material, Factors Affecting The Architectural Acoustics and their Remedies. Acoustic Quieting: Aspects of Acoustic Quieting, Methods of Quieting, Quieting for Specific Observers, Mufflers, Sound-proofing.

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

TEXT BOOKS:

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

REFERENCES:

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

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(51005) ENGINEERING CHEMISTRY**UNIT I:**

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

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

UNIT II:

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

UNIT III:

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

Elastomers – Buna-s, Butyl rubber, Thiokol rubbers, Fibers – polyester, fiber reinforced plastics (FRP), applications

UNIT IV:

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

UNIT V:

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

UNIT VI:

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

UNIT VII:

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

UNIT VIII:

Materials Chemistry: Cement: composition of Portland cement, manufacture of port land Cement, setting & hardening of cement (reactions). Lubricants: Criteria of a good lubricant, mechanism, properties of lubricants: Cloud point, pour point, flash & fire point, Viscosity. Refractories: Classification, Characteristics of a good refractory. Insulators & conductors: Classification of insulators characteristics of thermal & electrical insulators and applications of Superconductors (Nb-Sn alloy, $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$), applications.

TEXT BOOKS:

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

REFERENCE BOOKS

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

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(51006) COMPUTER PROGRAMMING AND DATA STRUCTURES
UNIT - I

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

UNIT - II

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

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

UNIT - III

Designing Structured Programmes, Functions, basics, user defined functions, inter function communication,

Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Preprocessor commands, example C programmes

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

UNIT - IV

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

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

examples.

UNIT - V

Derived types – Structures – Declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit fields, enumerated types, C programming examples.

UNIT - VI

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

UNIT - VII

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

UNIT - VIII

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

TEXT BOOKS :

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

REFERENCES:

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, PHI/Pearson Education
3. C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press

4. Programming in C – Stephen G. Kochan, III Edition, Pearson Education.
5. C for Engineers and Scientists, H.Cheng, Mc.Graw-Hill International Edition.
6. Data Structures using C – A.M.Tanenbaum, Y.Langsam, and M.J. Augenstein, Pearson Education / PHI
7. C Programming & Data Structures, E. Balagurusamy, TMH.
8. C Programming & Data Structures, P. Dey, M Ghosh R Thereja, Oxford University Press
9. C& Data structures – E V Prasad and N B Venkateswarlu, S. Chand&Co.

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(51007) ENGINEERING DRAWING**UNIT – I**

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

- a) Conic Sections including the Rectangular Hyperbola – General method only.
- b) Cycloid, Epicycloid and Hypocycloid
- c) Involute.
- d) Scales: Different types of Scales, Plain scales comparative scales, scales of chords.

UNIT – II**DRAWING OF PROJECTIONS OR VIEWS ORTHOGRAPHIC PROJECTION IN FIRST ANGLE**

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

UNIT – III

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

UNIT – IV

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

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

UNIT - V

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

UNIT - VI

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

UNIT - VII

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

UNIT - VIII

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

TEXT BOOK :

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

REFERENCES:

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

(51672) COMPUTER PROGRAMMING LAB**Objectives:**

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

Recommended Systems/Software Requirements:

- 1 Intel based desktop PC
- 1 ANSIC Compiler with Supporting Editors

Week 1.

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

Week 2.

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

$$\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- b) Write a C program to find the roots of a quadratic equation.

Week 3

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

- iii) To solve Towers of Hanoi problem.

Week 4

- a) The total distance travelled by vehicle in 't' seconds is given by distance $= ut + \frac{1}{2}at^2$ 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)

Week 5

- a) Write a C program to find both the largest and smallest number in a list of integers.
- b) Write a C program that uses functions to perform the following:
- Addition of Two Matrices
 - Multiplication of Two Matrices

Week 6

- a) Write a C program that uses functions to perform the following operations:
- To insert a sub-string in to a given main string from a given position.
 - To delete n Characters from a given position in a given string.
- b) Write a C program to determine if the given string is a palindrome or not

Week 7

- a) Write a C program that displays the position or index in the string S where the string T begins, or - 1 if S doesn't contain T.
- b) Write a C program to count the lines, words and characters in a given text.

Week 8

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

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

Week 9

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

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

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

Print x, n, the sum

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

Week 10

- a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
- b) Write a C program to convert a Roman numeral to its decimal equivalent.

Week 11

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

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

(Note: represent complex number using a structure.)

Week 12

- a) Write a C program which copies one file to another.
- b) Write a C program to reverse the first n characters in a file.

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

Week 13

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

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

Week 14

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

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

Week 15

Write C programs that implement stack (its operations) using

- i) Arrays ii) Pointers

Week 16

Write C programs that implement Queue (its operations) using

- i) Arrays ii) Pointers

Week 17

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

- i) Converting infix expression into postfix expression
ii) Evaluating the postfix expression

Week 18

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

- i) Bubble sort
ii) Selection sort

Week 19

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

- i) Linear search ii) Binary search

Week 20

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

- i) Quick sort

Week 21

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

- i) Merge sort

Week 22

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

Week 23

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

Week 24

Write C programs to implement Trapezoidal and Simpson methods.

Text Books

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

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(51673) ENGINEERING PHYSICS/ENGINEERING CHEMISTRY LAB

ENGINEERING PHYSICS LAB

(Any twelve experiments compulsory)

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

ENGINEERING CHEMISTRY LAB

List of Experiments (Any 12 of the following):

Titrimetry:

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

Mineral Analysis:

2. Determination of percentage of copper in brass
3. Estimation of manganese dioxide in pyrolusite.

Instrumental Methods:

4. Colorimetry:

Determination of ferrous iron in cement by colorimetric method.
(Or) Estimation of Copper by Colorimetric method.

5. Conductometry:

Conductometric titration of strong acid Vs strong base.
(or) Conductometric titration of mixture of acids Vs strong base.

6. Potentiometry:

Titration of strong acid Vs strong base by potentiometry.
(or) Titration of weak acid Vs strong base by potentiometry.

Physical Properties:

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

Identification and Preparations:

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

Kinetics:

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

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

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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(51674) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

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

Objectives:

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

SYLLABUS:

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

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

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

Minimum Requirement:

The English Language Lab shall have two parts:

- i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
- ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component):

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

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

Suggested Software:

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

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

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

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

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Paper:

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-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 year-end Examination shall be conducted by an external examiner/ or the teacher concerned with the help of another member of the staff of the same department of the same institution.

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(51675) ENGINEERING WORKSHOP/IT WORKSHOP

1. TRADES FOR EXERCISES:

At least two exercises from each trade;

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring
6. Foundry
7. Welding
8. Power tools in construction, wood working, electrical engineering and mechanical Engineering.
9. IT Workshop-I : Computer hard ware , identification of parts , Disassembly, Assembly of computer to working condition, Simple diagnostic exercises.
10. IT workshop-II : Installation of Operating system windows and Linux , simple diagnostic exercises.

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine Shop
3. Metal Cutting (Water Plasma)

TEXT BOOK:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual by Venkat Reddy

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(53013) ENVIRONMENTAL STUDIES

UNIT-I:

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

UNIT-II:

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

UNIT-III:

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

UNIT-IV:

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

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

UNIT-V:

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

UNIT-VI:

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

UNIT-VII:

ENVIRONMENTAL POLICY, LEGISLATION, RULES AND REGULATIONS

National Environmental Policy, Environmental Protection act, Legal aspects Air (Prevention and Control of pollution) Act- 1981, Water (Prevention and Control of pollution) Act-1974, Water pollution Cess Act-1977, Forest

Conservation Act. Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules.

UNIT: VIII

TOWARDS SUSTAINABLE FUTURE

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

SUGGESTED TEXT BOOKS:

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

REFERENCE BOOKS:

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

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(53014) PROBABILITY AND STATISTICS

UNIT-I:

Probability

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

UNIT-II:

Distributions

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

UNIT-III:

Testing of Hypothesis I

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

UNIT-IV:

Testing of Hypothesis II

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

UNIT-V: Small samples

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

UNIT-VI

Correlation & Regression

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

UNIT-VII**Queuing Theory**

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

UNIT-VIII**Stochastic processes**

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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(53015) ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING**UNIT - I**

ELECTRICAL CIRCUITS: Basic definitions, Types of 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.

UNIT - V

INSTRUMENTS : Basic Principle of indicating instruments – permanent magnet moving coil and moving iron instruments.

UNIT - VI

DIODE AND IT'S CHARACTERISTICS : P-n junction diode, symbol, V-I Characteristics, Diode Applications, Rectifiers – Half wave, Full wave and Bridge rectifiers (simple Problems)

UNIT - VII

TRANSISTORS : PNP and NPN Junction transistor, Transistor as an amplifier, SCR characteristics and applications

UNIT - VIII

CATHODE RAY OSCILLOSCOPE : Principles of CRT (Cathode Ray Tube),

Deflection, Sensitivity, Electrostatic and Magnetic deflection, Applications of CRO - Voltage, Current and frequency measurements.

TEXT BOOKS:

1. Essentials of Electrical and Computer Engineering by David V. Kerns, JR. J. David Irwin/Pearson.
2. Principles of Electrical and Electronics Engineering by V.K.Mehta, S.Chand & Co.

REFERENCE BOOKS:

1. Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ.
2. Basic Electrical Engineering by Kothari and Nagarath, TMH Publications, 2nd Edition.

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(53050) MECHANICAL TECHNOLOGY

Unit-I

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-II

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-III

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-IV

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.

Unit-V

IC Engines: IC Engine components and basic engine nomenclature, classification of IC Engines, otto cycle, diesel cycle, two stroke and four stroke cycle spark ignition and compression ignition engines.

Unit-VI

Application of IC Engines study of fuel supply systems in SI and CI Engines, study of fuel ignition, cooling and lubrication systems. Simple calculations of indicated power, brake power, mechanical efficiency, thermal efficiency and fuel consumption. Coal diesel, coal water, slurries as alternate fuels. Simple maintenance techniques.

Unit-VII

Compressed air generation and applications. Types of air compressors, reciprocating and rotary compressors like roots blower, vane type, centrifugal, axial flow, screw type. Equation for kg of air compressed with and without clearance volume in a reciprocating air compressor, two stage air compressor with inter cooling, simple problems.

Unit-VIII

Distribution of compressed air, application of compressed air, in Mining machinery, maintenance of compressed air, distribution systems.

TEXT BOOKS:

1. Turbomachines – Prof. Yahya.
2. Mining Technology (Vol- I & II) – Prof. D.J. Deshmukh

REFERENCE BOOKS:

1. IC Engines by V. Ganeshan
2. Theory Machines by Rattan.
3. Thermal Engineering – R.S. Khurmi & J.K. Gupta.
4. I.C. Engines by Heywood, McGraw Hills.

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(53051) FUNDAMENTALS OF GEOLOGY**Unit-I**

General Geology: origin, age, internal structure and composition of Earth.

Landforms: Origin or mode of development, characteristic features and engineering considerations of landforms developed by Rivers, Wind, Glaciers, Oceans and Volcanoes.

Unit-II

Mineralogy: Physical properties, chemical composition and mode of occurrence of important rock-forming and ore-forming minerals.

Unit-III

Petrology: Distinguish characteristic features, mode of formation and mode of occurrence of important igneous, sedimentary and metamorphic rocks.

Unit-IV

Structural Geology: Strike and Dip, Fundamental types, characteristic features and mechanics of folds, faults, joints (fractures) and unconformities. Foliation and Lineation.

Unit-V

Stratigraphy: Principles of stratigraphy, geological time scale, stratigraphic succession, description and mineral wealth of archeans, proterozoic basins, Gondwanas, Deccan traps and Himalayas.

Unit-VI

Groundwater: Hydrological cycle, vertical distribution of groundwater. Types of aquifers, geological formations as aquifers, springs, engineering considerations of groundwater and groundwater exploration.

Unit-VII

Earthquakes: Mode of propagation of seismic energy, causes, effects and distribution of earthquakes, seismic Zoning Map of India.

Unit-VIII

Geology and Mineral Resources of Andhra Pradesh.

REFERENCE BOOKS:

1. Fundamentals of Engineering Geology by F.G. Bell (1982) Butterworth Publication.
2. Principles of Physical Geology by Arthur Holmes.
3. A Text Book of Geology by P.K. Mukherjee.

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(53052) DEVELOPMENT OF MINERAL DEPOSITS**UNIT-I**

Distribution of mineral deposits in India and other countries, mining contributions to civilization, mining terminology, stages in the life of the mine, introduction to underground and surface mining methods.

UNIT-II

Introduction to drilling and drilling equipment.

Fundamentals of Explosive and blasting techniques.

UNIT-III

Objectives and limitations of mine supports, materials used for supports. Friction and hydraulic props, Roof bolts, chock supports

UNIT-IV

Roadway support, face supports, side supports, junction supports, supports in special conditions, setting and withdrawal of supports, systematic supporting

UNIT-V

Modes of entry into deposits for underground mining- shafts, inclines, adits etc – their fields of applications.

UNIT-VI

Drivage of drifts, organization and cycle of operations, modern methods of drifting and tunneling, roadheaders, tunnel boring.

UNIT-VII

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 debris and water, ventilation and lighting, temporary and permanent lining.

UNIT-VIII

Widening and deepening of shafts, special methods of shaft sinking : piling.

caisson, freezing and cementation method of shaft sinking. Modern techniques of shaft sinking.

TEXT BOOKS

1. Introductory mining engineering- wiley India (P) Ltd, Howard I. Hartman, Jan M. Mutmanský
2. Elements of mining technology Vol-I - D.J. Deshmukh

REFERENCE BOOKS:

1. Roy Pijush Pal, Blasting in ground excavations and mines, Oxford and IBH, 1st ed 1993
2. C.P. Chugh, Drilling technology handbook, Oxford and IBH, 1st ed, 1977

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(53636) ELECTRICAL AND ELECTRONICS ENGINEERING LAB

Section A: Electrical Engineering:

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. In addition to the above four experiments, any one of the experiments from the following list is required to be conducted :
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

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(53637) 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.

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(54018) NUMERICAL METHODS

UNIT-I: Roots of Non linear equations

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

UNIT-II: Solution of linear equations:

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

UNIT-III: Interpolation:

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

UNIT-IV: Least squares method:

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

UNIT – V: Numerical differentiation and integration

Numerical differentiation and integration Trapezoidal rule, Simpson's 1/3 rule and 3/8th rule.

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

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

UNIT-VII: Boundary values & Eigen value problems

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

UNIT-VIII: Solution of partial differential equations

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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4 -/- 4

(54016) MECHANICS OF FLUIDS AND HYDRAULIC MACHINES**UNIT I**

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

UNIT II

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

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

UNIT III

Closed conduit flow: Reynold's experiment- Darcy Weisbach equation- Minor losses in pipes- pipes in series and pipes in parallel- total energy line- hydraulic gradient line. Measurement of flow: pitot tube, venturimeter, and orifice meter, Flow nozzle

UNIT IV

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

UNIT V

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

UNIT VI

Hydraulic Turbines : Classification of turbines, Heads and efficiencies.

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

UNIT VII

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

UNIT VIII

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

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

TEXT BOOKS :

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

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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. Mining Engg. II-Sem.

L	T/P/D	C
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(54054) MACHINE DRAWING AND COMPUTER AIDED GRAPHICS

Machine Drawing Conventions :

Need for drawing conventions – introduction to IS conventions

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

I. Drawing of Machine Elements and simple parts

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

- a) Popular forms of Screw threads, bolts, nuts, stud bolts, tap bolts, set screws.
- b) Keys, cottered joints and knuckle joint.
- c) Rivetted joints for plates
- d) Shaft coupling, spigot and socket pipe joint.
- e) Journal, pivot and collar and foot step bearings.

II. Assembly Drawings:

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

- a) Engine parts – stuffing boxes, cross heads, Eccentrics, Petrol Engine connecting rod, piston assembly.
- b) Other machine parts - Screws jacks, Machine Vices Plummer block, Tailstock.
- c) Valves : Steam stop valve, spring loaded safety valve, feed check valve and air cock.

III Introduction to Computer Aided Graphics:

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

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

to provide working drawings of actual parts.

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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II Year B.Tech. Mining Engg. II-Sem.

L	T/P/D	C
3	1/-	3

(54055) 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, pin jointed, perfect trusses by (i) method of joints and (ii) method of sections. Analysis of various types of cantilever & simply-supported trusses-by method of joints, method of sections & tension coefficient methods.

UNIT - VI

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

UNIT - VII

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

UNIT - VIII

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

TEXT BOOKS :

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

REFERENCE BOOKS :

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

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. Mining Engg. II-Sem.**

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

(54056) MINING GEOLOGY**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.

REFERENCE BOOKS:

1. Mining Geology by Arogya Swamy.
2. Mineral Resources of India by Krishna Swamy.
3. Mining Geology by Mc Kinstry.
4. Engineering Geology & Geotechnics by Krynine and Hudd.

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

(54057) DRILLING AND BLASTING

Unit-I

Exploratory Drilling: Drilling for exploration and other purposes; various types of drilling equipment – their merits, demerits and limitations; core recovery – single and double tube core barrels, wire line drilling; directional drilling, fishing tools; borehole surveying; borehole logging; novel and special drilling techniques, Horizontal and directional drilling.

Unit-II

Production Drilling: Production drilling; Various methods of drilling – percussive, rotary, rotary percussive.

Unit-III

Drillability: Factors affecting drilling - thrust, r.p.m., flushing, etc.; mechanics of drilling; drillability and drilling index; micro-bit drilling; physico-mechanical properties affecting drillability; design and selection of drills; bit wear; reconditioning of drill bits; drill hole economics; case studies.

Unit-IV

Explosives: Types of explosives – small diameter, large diameter. Permitted, bulk slurry, SMS, EMS, ANFO, HANFO, LOX, boosters, blasting agents. mechanics of blasting, alternatives to explosives.

Unit-V

Accessories and Tools: Accessories-detonators, safety fuses, detonating cords, relays, NONEL, exploders, sequential blasting machines and other shot firing tools, testing of explosives, storage, transportation and handling of explosives.

Unit-VI

Underground Blasting: Drill patterns for underground excavations, shafts, blast patterns designs, smooth blasting, induced blasting, charge ratios, rock fragmentation, dangers associated with underground blasting, blasting economics, gallery blasting, statutory requirement, computer design of underground blast, precautionary measures, misfires, solid blasting.

Unit-VII

Open Pit Blasting: Methods of blasting in opencast mines, blast design, primary and secondary blasting, fragmentation studies, accidents due to blast in opencast and preventive measures, environmental impact due to blasting, ground vibrations, fly rocks, dust, fumes, water pollution, dimensional stone blasting, controlled blasting, statutory requirements, computer design of opencast blast.

Unit-VIII

Blasting for Civil Constructions and Trenches: Blasting for road constructions, trench cutting in soft and hard rocks, demolition of building etc., underwater blasting

TEXT BOOKS:

1. Roy Pijush Pal, Blasting in ground excavations and mines, Oxford and IBH, 1st ed 1993
2. C.P. Chugh, Drilling technology handbook, Oxford and IBH, 1st ed, 1977

REFERENCE BOOKS:

1. Roy Pijush Pal, Rock blasting effect and operation, A.A. Balkema, 1st ed, 2005
2. D.J. Deshmukh, Elements of mining technology, Vol-1, Central techno, 7th ed, 2001
3. B.Hemphill Gary, Blasting operations, Mc-graw Hill, 1st ed 1981
4. R.D. Singh, Principles and practices of modern coal mining, New age International, 1st ed, 1977.
5. S.K.Das, Explosive and blasting practices in mines, Lovely prakashan, 1st ed, 1993
6. P.K.Rajameny, A Joshi and S. Bhandari, Blast design and Practice, Himanshu Publications, Udaypur, 2006

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II Year B.Tech. Mining Engg. II-Sem.

L	T/P/D	C
0	-3/-	2

(54636) MECHANICS OF FLUIDS AND HYDRAULIC MACHINES LAB

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

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

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II Year B.Tech. Mining Engg. II-Sem.

L	T/P/D	C
0	-/3/-	2

(54637) MECHANICS OF SOLIDS LAB

1. Tension test
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges
12. Continuous beam – deflection test.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

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

L	T/P/D	C
4	0/-/-	4

(55015) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Unit I

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

Unit II

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

Unit III

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

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

Unit IV

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

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

Unit V

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

Unit VI

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

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

Unit VII

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

Unit VIII

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

TEXT BOOKS:

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

REFERENCES:

1. Raghunatha Reddy & Narasimhachary: Managerial Economics & Financial Analysis, Scitech, 2009.
2. V.Rajasekarn & R.Lalitha, Financial Accounting, Pearson Education, New Delhi, 2010.
3. Suma Damodaran, Managerial Economics, Oxford University Press, 2009.

4. Domnick Salvatore: Managerial Economics in a Global Economy, 4th Edition, Cengage, 2009.
5. Subhash Sharma & M P Vittal, Financial Accounting for Management, Text & Cases, Machmillan, 2008.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2008.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2009.
8. Dwivedi: Managerial Economics, Vikas, 2009.
9. M.Kasi Reddy, S.Saraswathi: Managerial Economics and Financial Accounting, PHI, 2007.
10. Erich A. Helfert: Techniques of Financial Analysis, Jaico, 2007.

Prerequisites: Nil

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

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

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

Each question should not have more than 3 bits.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. Mining Engg. I-Sem.**

L	T/P/D	C
3	1/-/	3

(55081) MINE SURVEYING – I**Unit – I**

Introduction: overview of Plane Surveying (Chain, compass, and plane table), Objectives, Principles and classifications, use of Field Books.

Unit-II

Distance and Directions: Distance measurements conventions and methods. Use of chain and compass, electronic distance measurements, meridians, Azimuths and Bearings, declination, computation of angles.

Unit-III

Levelling: Levelling Instruments – component parts, Temporary and Permanent adjustments – methods of levelling – Fly levelling, Differential levelling, Reciprocal levelling.

Unit-IV

Computation of Areas and Volumes: Areas from field notes, computation of Areas along irregular boundaries and regular boundaries. Embankments and cuttings, determination of capacity of reservoir, volume of borrow pits.

Unit-V

Contouring: Characteristics and uses of contours, methods of conducting contour surveys – their plotting. L.S. and C.S. Surveying – their plotting.

Unit-VI

Theodolite Surveying: Theodolite – description – parts, Temporary and Permanent Adjustments, Measurement of horizontal and vertical angles, Principles of Electronic Theodolite, Trigonometric levelling

Unit-VII

Traversing: Principles of Traversing, open traverse and closed traverse using chain /compass / theodolite, Bowditch correction.

Unit-VIII

Triangulation: Principles of triangulation survey, triangulation using chain, campus and theodolite.

TEXT BOOKS:

1. Surveying (Vol-1,2 & 3) by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain-Laxmi Publications (P) Ltd., New Delhi.
2. DUGGALS K "Surveying (Vol-1 &2), Tata McGraw Hill Publishing Co. Ltd., New Delhi, 2004
3. Text book of surveying by C. Venkataramaiah, Universities Press.
4. Surveying (Vol 1 & 2) - Kanitkar

REFERENCE BOOKS:

1. Arthur R. Benton and Philip J Taetly, Elements of Plane Surveying, McGraw Hill-2000
2. Arora K R Surveying Vol 1 & 2 & 3, Standard Book House, Delhi, 2004.
3. Chandra A M, Plane Surveying, New age International Pvt. Ltd., Publishers, New Delhi, 2002.
4. Chandra A M, Higher Surveying, New age International Pvt. Ltd., Publishers, New Delhi, 2002.
5. Surveying and Levelling by R Subramanian, Oxford University Press, New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. Mining Engg. I-Sem.**

L	T/P/D	C
3	1/-	3

(55082) MINE ENVIRONMENTAL ENGINEERING - I**Unit-I**

Atmospheric air-its composition, mine air – its composition and variation, origin, occurrence, physical, chemical and physiological properties and monitoring of mine gases, various types of damp. Sampling and analysis of mine air. Methane drainage and methane layering of gases.

Unit-II

Heat and humidity: Sources of heat in mines, effect of heat and humidity, psychometric, kata thermometer, methods of improving of cooling power of mine air. Air conditioning basic vapour cycle, representative layout.

Unit-III

Air flow through mine openings: Laws of air flow, resistance of airways, equivalent orifice, distribution of air, flow control devices.

Unit-IV

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, merits, limitation, efficiency and characteristics. Selection of mine fan, fan testing, output control in fans, series and parallel operation of mine fans.

Unit-VI

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

Unit-VII

Ventilation planning: Standard of ventilation including permissible air velocities.

Ascensional, descensional, homotropical, anti-tropical ventilation. Central and boundary ventilation – layouts and comparison.

Unit-VIII

Quantity and pressure requirement. 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.

Suggested Text Books:

1. Mine Environment and Ventilation – G.B. Misra
2. Mine Ventilation and Air Condition – H.L. Hearlman

Reference Books

1. Vatukuri V.S. & Lama R.D. – Environmental Engineering in Mines.
2. Dhar B.B. – Mining and Environment.

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

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

(55083) SURFACE MINING TECHNOLOGY

Unit-I

Basic concept of Surface Mining: Status of surface mining in India. Selection between surface mining and underground mining. Preliminary evaluation of surface mining prospects; stripping ratio – concepts and significance, mine life.

Unit-II

Opening up of deposits with Box Cut: Factors affecting selection of site of box-cut, Production benches – formation parameters and factors affecting their selection.

Unit-III

Preparation for Excavation: Working principle of ripper and Scraper—their cycle of operation, application and limitation. Drilling, types of blast hole drills, performance parameters of drills, estimation of number of drill for a given mine production. Problems associated with drilling and blasting.

Unit-IV

Excavation and Transportation: Cyclic methods—shovel-dumper, pay-loader, dragline.

Continuous methods – bucket wheel excavator, bucket chain excavator, continuous surface miner, conveyors. Principle and operation of these machines, their advantages and limitations capacity calculations, maintenance.

Unit-V

Other equipments-dozer, grader, loader, scraper, dumper, maintenance of open pit equipment crusher.

Unit-VI

Design and organization: Basic design principle of large opencast mines and their organizational structure. Mechanical quarries over underground developed zones.

Unit-VII

Placer Mining and Sea bed Mining: Ground sluicing, Hydra licking and Dredging Exploitation systems of ocean mineral resources.

Unit-VIII

Relevant provisions of coal mines and metalliferous mines regulation; Environmental problems due to surface mining and their remedial measures. Recent developments in the deployment of heavy earth moving machineries in the surface mines.

Text Books:

1. Surface Mining Technology S K Das.
2. Surface Mining – GB Misra
3. Introductory Mining Technology – HL HearlMan

Reference Books:

1. Singh R.D. – Principles and Practices & Modern Coal Ming
2. Mathur S.P. – Mine Planning For Coal.

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

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(55084) UNDERGROUND COAL MINING TECHNOLOGY
Unit-I

Introduction to Mine Planning; Size of mining property, reserves and production capacity.

Opening of Deposits; Developments of mine for in-seam mining and horizon mining (including shaft pillar and their comparison, advantages and disadvantages), division into levels and districts.

Unit-II

Development; General principle of Bord & Pillar Development, their choice, suitability, advantages and disadvantages, layout of Bord & Pillar panel, size of panel, statutory provisions, manual and mechanized system of development; conditions suitable for application of mechanized loader and continuous miners; factor affecting the selection of equipment.

Unit-III

Pillar Extraction: preparatory arrangement for depillaring operation, statutory provision for depillaring, principle and designing of pillar extraction, size of a district.

Unit-IV

Factors, affecting choice of pillar extraction, depillaring with caving, stowing, mechanized depillaring operation, organization and safety.

Unit-V

Layout for required outputs, types of machines, personnel and working of thick seams and blasting gallery method.

Unit-VI

Longwall mining: Longwall methods of working, their choice, suitability, advantages and disadvantages.

Unit-VII

Layout of the workings for the required output, length and orientation of longwall faces, Shape & size of development roadways and gate roads and

their maintenance. Mechanized longwall face organization.

Unit-VIII

Mechanized extraction of longwall panel with shearer and plough trepanner; support systems of longwall face and gate roads.

Text Books

1. R.D. Singh – Principles and Practices & Modern Coal Mining, New Age International Publication.
2. Singh, T.N. Singh – Underground Mining & Coal Oxford Publication.
3. Das S.K. – Modern Coal Mining Technology, Lovely Prakasan publication.

Reference Books

1. Peng S.S., Chiang H/S. – Longwall mining, John Willey Publication.
2. Mathur S.P. – Mine Planning for Coal, M.J Consultant Publication.

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

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3	1/-/-	3

(55085) MINE MECHANISATION-I

Unit-I

Prime Mover for Mining Machinery: O.C. engine, hydraulic power, pneumatic power, elements of mechanical power transmission – gear, belt, chain, coupling, clutch and brake.

Unit-II

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.

Unit-III

Dimension of ropes, drums and pulleys, care and maintenance of ropes, changing of haulage ropes, rope splicing, safety appliances in haulage road, signaling, Statutory requirements of haulages.

Unit-IV

Track Laying; Rail, joints, crossings, plates, turn tables and curves, track extension

Unit-V

Aerial Ropeways: Types, construction, Application and operation.

Unit-VI

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

Unit-VII

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

Unit-VIII

Drills for Coal and Stone: Various types, their construction and maintenance.

Jumbo drills.

Text Books

1. Elements of Mining Technology Vol. III, D.J. Deshmukh
2. Mason Coal Mining Services Vol. I & II
3. Mine Transport – Karelin

Reference Books:

1. Mining and Transport – Walker.
2. Introduction to Mining Engineers – Hartman. H.L.

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

L	T/P/D	C
0	-/3/-	2

(55638) MINE SURVEYING LAB

1. Ranging a line, measuring the distance between two points, pacing.
2. Chain triangulation, booking, calculation of areas and plotting.
3. Traversing with compass.
4. Introduction to levels.
5. Fly leveling & Reduction of level.
6. Profile leveling and plotting the section.
7. Contouring
8. Measurement of Horizontal angle.
9. Measurement of vertical angle.
10. Theodolite traversing
11. Finding distance between two inaccessible points.

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

L	T/P/D	C
0	-/3/-	2

(55639) MINE ENVIRONMENTAL ENGINEERING LAB

1. Detection of mine gases
2. Orsat/Haldane apparatus for gas analysis
3. Measurement of relative humidity by hygrometer.
4. Kata thermometer.
5. Constructional features of centrifugal and axial flow fans.
6. Characteristic curves for fans.
7. Operation of fans in series and parallel.
8. Design of various ventilation devices, Airshaft, Evasee, Doors crossing regulators.
9. Reversal of Ventilation system.
10. Measurement of air quantity by anemometer velometer and smoke tube.
11. Measurement of relative humidity by hygrometer.
12. Study and analysis ventilation network circuit.
13. Study of mine air-conditioning plant.
14. Constructional features of a flame safety lamp and cap lamp.
15. Layout of lamp room.

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III Year B.Tech. Mining Engg. II-Sem.

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

(56016) INDUSTRIAL MANAGEMENT

Unit I:

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

Unit II:

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

Unit III:

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

Unit IV:

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

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

Unit V:

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

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

Unit VI:

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

Unit VII:

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

Unit VIII:

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

7. Schermerhorn: *Management*, Wiley, 2009.
8. Parnell: *Strategic Management*, Biztantra, 2009.
9. L.S.Srinath: *PERT/CPM*, Affiliated East-West Press, 2009.
10. William J. Stevenson & Ceyhun Ozgur: *Introduction to Management Science*, TMH, 2007.

Pre-requisites: Managerial Economics

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

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

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

Each question should not have more than 3 bits.

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

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(56086) MINE SURVEYING – II

Unit-I

TACHEOMETRIC SURVEYING: Use of the Theodolite for tacheometric Surveying – Principles, Stadia and tangential methods, measurements of heights and distances by tacheometry, Distance and Elevation formulae for Staff vertical position.

Unit-II

SETTING OUT CURVES: types of curves, curve ranging, design and setting out, simple and compound curves, surface and underground curves.

Unit-III

PHOTOGRAMMETRY: Principles of photogrammetry, Aerial Photographs, scale of vertical photographs, Terrestrial Photogrammetry, Mapping.

Unit-IV

GEODETIC ASTRONOMY: Latitude, Longitude, Meridian Transits, satellites and cameras, Errors – Theory of errors, adjustments.

Unit-V

MINE SURVEYS: Verticality of shafts, measurement of depth of shafts, Surveys for connecting national grid, survey of installations of mine structures.

Unit-VI

GLOBAL POSITIONING SYSTEMS: Introduction to Global Information system (GIS), Remote Sensing – basic Principles, Integration of RS and GIS.

Unit-VII

TOTAL STATION : Description, users, Types of Surveys by Total station, Mapping of sites by Total Station Surveys – Elementary exercises only.

Unit-VIII

MISCELLANEOUS: EDM and modern instruments, slope and open pit surveys, Statutory requirements, GIS Softwares.

Text Book:

1. "surveying (Vol – 1, 2 & 3), by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain – Laxmi Publications (P) Ltd., New Delhi.
2. Duggal S.K. "Surveying (Vol 1, 2 & 3) Tata Mc.Graw Hill Publishing Co.Ltd. New Delhi, 2004
3. Text book of surveying by C. Venkataramaiah, Universities Press.

REFERENCES:

1. Arthur R Benton and Philip J Taety, Elements of Plane Surveying, McGraw Hill-2000
2. Arora K R "Surveying (Vol 1, 2 & 3), standard Book House, Delhi, 2004.
3. Chandra A M. "Plane Surveying" New age International Pvt. Ltd. Publisher, New Delhi, 2002
4. Chandra A M. "Higher Surveying" New age International Pvt. Ltd. Publisher, New Delhi, 2002
5. Surveying and leveling by R. Subramanian, Oxford University Press, New Delhi.

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(56087) UNDERGROUND METAL MINING TECHNOLOGY**Unit-I**

Development; Mine development for working veins, lodes and tabular deposits, shape, size and position of the development working in relation to the ore body

Unit-II

Layout of the drifts, cross-cut, raises and winze in ore body.

Unit-III

Different types of raising methods and their merits and demerits.

Unit-IV

Classification of stoping methods, factors influencing the choice of stoping method.

Stoping Methods:

- Room & Pillar
- Sublevel Open Stopping
- Shrinkage method of Stopping
- Cut & Fill method of Stopping

Unit-V

- Sublevel Caving
- Block Caving

Unit-VI

- Special methods of working of thin deposits

Unit-VII

Applicability of methods, stope layout stope layout, stope development, ground breaking, mucking, ventilation, support, haulage and dumping.

Unit-VIII

Productivity and cost of mining of ores. Principles of in-situ leaching, scope and limitation of in-situ leaching.

Text Books:

1. Woore S.C. Methods of working Coal & Metal Mines Vol-III
2. Peele – mining Engineers handbook Vol.I & II
3. Popov- Working of Mineral deposits.

Reference Books

1. Underground Mining Methods handbook
2. Underground Mining Methods and Technology – Elsevier Science publication.
3. Karmakar H. – Mine working Vol. I & II, Lovely Prakasan, Dhanbad.

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(56088) MINE ENVIRONMENTAL ENGINEERING-II**Unit-I**

Spontaneous Combustion: Various theories, factors, various indices for determination of susceptibility of coal to spontaneous heating, control measures.

Mine Fires: Survey of various causes of mine fires with statistical data of Indian mines, various methods adopted to combat fires and their advantages and disadvantages.

Unit-II

Advances in fire fighting techniques and equipments, rescue operations in fire zones. Reopening of Selected off areas; Factors to be considered, methods, precautions.

Unit-III

Reopening of sealed-off areas: Factors to be considered, methods, precautions. Mine Explosions: Causes of firedamp explosion with statistical data of Indian mines, preventive measures against firedamp explosion.

Unit-IV

Production, assessment and control of mine dust and associated hazards. Causes of coal dust explosion with statistical data of Indian mines, preventive measures against coal dust explosion.

Unit-V

Mine Inundation: Causes of inundation with statistical data of Indian mines. Precaution to be taken while approaching old workings, preventive measures of inundation.

Unit-VI

Noise and Vibrations: Causes and measurement of noise levels. Precautions, prevention and reduction of noise levels. Environmental aspects of blast induced vibration and noise.

Unit-VII

Mine illumination: Its effects on safety and efficiency, illumination standard,

common types of flame safety lamps, their use and limitations, electric-hand and cap lamp, their maintenance and examination, lamp room design and organization. Illumination arrangement of opencast and underground working.

Unit-VIII

Rescue and recovery work, equipment, short distance apparatus. Self contained oxygen-breathing apparatus. Rescue stations, principles of risk management.

Text / Reference Books:

1. Mine Fires, Explosi, Rescue, Recovery and Inundation – M.A. Ramulu.
2. Fires in Coal Mines – Kaku
3. Mine Environment & Ventilation – G.B. Misra.

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(56089) MINE MECHANISATION-II

Unit-I

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.

Unit-II

Winding Drum-types and construction, Safety devices in winders-over speed and over wind preventers, slow breaking, depth indicator, Methods of counter balancing rope. Duty cycle. Mechanical and electrical braking. Winding from different levels in shaft.

Unit-III

Man riding system in underground mines.

Unit-IV

Face Machinery: SDL & LHD – their applications, capacity, operation, fitting, control and maintenance.

Unit-V

Cutter loaders – Shearers, Coal plough and Continuous Miners – their constructional features, applications, capacity and maintenance.

Unit-VI

Layout of faces with Power loader working under varied condition, Shuttle cars.

Unit-VII

Pumps: Types, Construction, operation, characteristics and application, Calculation of size, efficiencies and capacities. Layout of drainage system.

Unit-VIII

Opencast Machinery: Blast Hole Drill, Ripper, Shovel, Dragline, Dumper, Bucket Wheel Excavator, Continuous Miners – their basic construction, applications and operation.

Text Books

1. Deshmukh D.J., Vol. I & II Elements of Mining Technology
2. Cherkasky B.M., Pumps Focus Compressors Walker winding & Transport

Reference Books

1. Alemgren, G. Kumar – Mine Mechanisation and Automation.
2. Mason – Coal Mining Series

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(56090) MINE ECONOMICS**Unit-I**

The Mineral Industry: Economic characteristics of the mineral industry in India and world, the place of minerals in the national and international economy.

Unit-II

Brief survey of India's mineral resources in the world setting with special reference to its need and deficiencies.

Unit-III

Mining companies and mine Accounts: Structure, formation and capitalization, principles of book keeping as applied to the mining industry presentation of accounts, balance sheets and profit and loss accounts. Depreciation DCF, IRR.

Unit-IV

Mine Valuation: Mineral reserves mining reserve and profit examination and report on mines.

Unit-V

Mineral property planning valuation of mines, Mine properties, mine investments. Project planning and project evaluation.

Unit-VI

Sampling: Principles of sampling, sampling methods, classification and description, statistical and geo statistical techniques in mine sampling, sampling and grading of coal.

Unit-VII

Assaying: Five methods of assaying for gold and silver cupellation Scarification, etc. wet assaying, theory, principle methods of wet assaying of copper aluminum, lead, zinc, Iron Manganese and Chromium ores. Insitu assay.

Unit-VIII

Preparation of Assay Plans: Longitudinal section, calculation of ore reserve.

Text books/References:

1. Deshmukh RT "Mineral Economics" Meera Publishers, Nagpur.
2. Chatterjee KK "Mineral Economics" Willey Estern.
3. Rubawsky "Mineral Economics" Elsevier Science pub.
4. Sharma N.L. "Mineral Economics".

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(56643) MINE SURVEYING – II LAB

1. Correlation by two shaft methods S/T
2. Correlation by two shaft methods U/T
3. Correlation by two shaft co-plantation methods
4. Correlation by single shaft weisbatch methods.
5. Correlation by single shaft weiss quadrilateral methods
6. Curve ranging offsets from long chord
7. Curve ranging Ranking methods
8. Curve Tacheometric methods
9. Curve ranging Tacheometric method
10. Finding the height of an in accessible object
11. Reading mine plans
12. Finding Horizontal & Vertical distance by Techometry

Suggested Text Books/Reference Books

1. Punimia "Surveying" Vol. II and III
2. Baska "Surveying and Levelling"
3. Ghatak "Mine Surveying an Levelling"

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(56644) ADVANCED ENGLISH COMMUNICATION SKILLS LAB
1. Introduction

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

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

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

2. Objectives:

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

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

3. Syllabus:

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

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

4. Minimum Requirement:

The English Language Lab shall have two parts:

- i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
- ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the

following specifications:

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

5. Suggested Software:

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

Suggested Software:

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

6. Books Recommended:

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

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

DISTRIBUTION AND WEIGHTAGE OF MARKS:

Advanced Communication Skills Lab Practicals:

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

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(57143) MINERAL PROCESSING

Unit-I

Introduction: Scope, objectives and limitations of mineral processing, liberation and beneficiation characteristics of minerals and coal.

Unit-II

Comminution: Theory and practices of crushing and grinding; different types of crushing and grinding equipments – their applications and limitations.

Unit-III

Size Separation: Laboratory size analysis and interpretation; settling of solids in fluids; industrial screens, mechanical classifiers and hydro cyclones.

Unit-IV

Gravity Concentration Methods: Jigging, Heavy media separation, flowing film concentrators – theory, applications and limitations.

Unit-V

Froth Floatation: Physico-chemical principles, reagents, machines, floatation of sulphides, oxides and coal.

Unit-VI

Electrical Methods of Concentration: Principles, fields of applications and limitations.

Unit-VII

Flow Sheets: Simplified flow sheets for coal, zinc, iron, and manganese ores.

Unit-VIII

Magnetic methods of concentration Principles, Fields of Application and Limitation.

Text Books:

1. Introduction to Mineral Processing – V. Malleswar Rao
2. Mineral Processing – Wills
3. Mineral Processing – S.K. Jain.

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(57144) ROCK MECHANICS

Unit-I

Physico-mechanical properties of rocks, Elastic and time dependent behavior, Rock mass classification.

Unit-II

Theories of rock failure, Stress analysis, Insitu stress and stress distribution around mine openings.

Unit-III

Ground failure and pressure on supports, Stability of wide openings, Design of supports in mine workings.

Unit-IV

Subsidence: Causes and impacts of subsidence, Mechanics of surface subsidence, discontinuous and continuous subsidence.

Unit-V

Monitoring, prediction, control and management of subsidence.

Unit-VI

Mechanics of rock burst and bumps, Stability of slopes.

Unit-VII

Instrumentation and measurement of insitu stresses and rock strength, Photoelasticity and scale model studies.

Unit-VIII

Basics of numerical methods in geomechanics with applications.

Text / Reference Books:

1. Coal Mining ground Control by Peng.
2. Rock Mechanics by Jumikis
3. Fundamental of Rock Mechanics by Jager & Cook.
4. Rock Mechanics – Brunden.

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(57145) MINE SYSTEMS ENGINEERING

UNIT-I

Introduction: Development – Definition – Characteristics and Phases – Types of operation Research models – applications.

Allocation : Linear Programming – Problem Formulation – Graphical solution – Simplex method – Artificial variables techniques – Two-phase method, Big-M method – Duality Principle.

UNIT-II

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

UNIT-III

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

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

UNIT-IV

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

UNIT-V

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

UNIT-VI

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

UNIT-VII

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

UNIT-VIII

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

TEXT BOOKS:

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

REFERENCES:

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

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(57146) MINE LEGISLATION**Unit-I**

Introduction to mining laws and legislation, General principles of mining laws, development of mining legislation of India. Acts, Rules and Regulations, Mines Act, Mines Rules.

Unit-II

Coal and matalliferous mines regulations, Bye-laws, Circulars, and standing orders,

Unit-III

Indian electricity rules, coalmines conservation and development act, Workman's compensation act., General provisions of Mines and Minerals Regulation and Development Act, Mineral Concession Rules.

Unit-IV

Vocational Training. Rules, crèche rules, Maternity benefit act, Payment of Wages Act, Gratuity and P.F. Rules, Explosives act, Rescue Rules, Factory Act, Environmental protection Act.

Unit-V

Safety organization; role of management, supervisors and workers; pit safety committees; workmen's inspector; role of safety officers.

Unit-VI

Classification of Accidents; Statistics, causes and prevention of accidents. Accidents rate in Indian mines. Accident enquiries and reports, health of workmen. Occupational disease in mining.

Unit-VII

International labor organization and its model code in the field of safety and accident prevention. Principles of management and organization. Industrial relations. Welfare organizations.

Unit-VIII

Development of safety consciousness; interest, publicity and propaganda for safety, audio-visual aids, safety drives campaigns.

Text Books

1. Principle Acts & Rules CMR and MMR

Reference Books:

1. Intent and Content of Mine Legislation – Prasad.

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(57147) ROCK SLOPE ENGINEERING

(Elective-I)

Unit-I

Introduction: economic implications, geological investigation, data interpretation for slope stability analysis.

Unit-II

Basic Mechanism of Slope Failure: Planer, wedge, rotational shear, toppling, buckling and rock fall.

Unit-III

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

Unit-IV

Influence of ground water on slopes and techniques of depressurization, remedial and corrective measures. Remedial measures for slope stabilization.

Unit-V

Monitoring and instrumentation techniques of rock slopes.

Unit-VI

Investigations of failed slopes.

Unit-VII

Numerical analysis of slopes.

Unit-VIII

Use of FLAC Software.

Text Books:

1. Rock Mechanics by Jumikis.
2. Fundamentals of Rock Mechanics by Jager & Cook.
3. Rock Mechanics by Brunden

4. Chowdary R.N. – Slope Analysis

Reference Books:

1. Cumming A.B. & Given I & V. & SME Vol. I & II, Society of Mining Engineers, USA.
2. Heartman H.L. – Introduction to Mining Engineering, John Willey & Sons.
3. Walker B.F. Fell. R. – Soil Slope Instability and Stabisation.

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(57148) MINE SUBSIDENCE ENGINEERING
(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 time on subsidence, example from long wall and bord and pillar working. Calculation of ground movement over time.

Unit-V

Types of stress on structures, stress-strain behaviour of soils, mining damage to buildings, industrial installations, railway lines, pipes, canals, etc.,

Unit-VI**SUBSIDENCE CONTROL, GOVERNING LAWS AND STANDARDS**

Measures to reduce mining damage, mining methods to minimise damage.

Unit-VII

Laws governing mining damage, different standards suggested for mining and building ground in respect of subsidence.

Unit-VIII

Case studies of Mine subsidence

Text / Reference Book:

1. Whittaker B.N. Reddish D.J. - Subsidence occurrence prediction and control
2. B. Singh – Mine Subsidence
3. Peng .S. – Surface subsidence Engineering
4. Kratzsch. H.,- Mine Subsidence Engineering.

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(57149) ROCK EXCAVATION ENGINEERING
(Elective-I)
Unit-I

Scope and importance, Rock excavation engineering in mining and construction industries;

Unit-II

Physico-mechanical and geotechnical properties of rocks Vis-à-vis excavation method; selection of excavation method.

Unit-III

Drilling: Mechanics of rock drilling, design and operating parameters of surface and underground drilling, evaluation of drill performance, drillability of rocks, mechanism of bit Wear, bit selection, problems of drilling, economics of drilling.

Unit-IV

Blasting: mechanics of rock fragmentation by explosives, advances in explosives and their selection criteria for rock excavation, blast design for surface excavations and optimization.

Unit-V

Advanced blast initiation systems, blast performance evaluation, cast blasting, technoeconomic and safety aspects of surface and underground blasting.

Unit-VI

Advances in blast design for underground excavations, contour blasting, computer aided blast designs, review of tunnel blasting techniques in recent advances.

Unit-VII

Rock Cutting: Theories of rock tool interaction for surface excavation machinery – rippers, bucket wheel excavators, continuous surface miners; theories of rock tool interaction for underground excavation machinery-

Ploughs, Shearers, road headers, continuous miners

Unit-VIII

Tunnel boring machines, selection criteria for cutting tools; advanced rock cutting techniques – high pressure water jet assisted cutting.

Text / Reference Books

1. Clark G.B – Principles of Rock fragmentation, John Wiley & Sons.
2. Chugh C.P. – Diamond Drilling, Oxford Publication.

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

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3	1/-	3

(57150) ROCK FRAGMENTATION ENGINEERING
(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, explosive.

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 cases 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 / Reference Books:

1. Pradha G.K., Ghosh A.K. 'Drilling & Blasting' Mine Technology
2. Sastry V.R. – 'Advances in Drilling & Blasting'

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(57151) COMPUTER APPLICATIONS IN MINING
(Elective-II)

UNIT-I

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

UNIT-II

Application in mining, Exploration, rock topographic models, bore hole compositing, ore reserve calculation, interpolation and geostatistical models.

UNIT-III

Open pit design, Ultimate pit design, introductory process control, underground mine design, production scheduling.

UNIT-IV

Operational Simulation, Introduction, Simulation overview, objective, understand the role of modeling, Understanding the basic concept in simulation.

UNIT-V

Example of simulation in mining aspects, Simulation of machine repair problems, concepts of variability and prediction, example with dumping time problem, fitting distribution with chi-square test.

UNIT-VI

Random number generation, properties of random number, pseudorandom number, random variates generation, Methods of random variates generation, inverse transformed 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.

UNIT-VIII

Coding with GPSS and SLAM of different mining problems, Computer control,

Remote Control, automatic Control, application and limitations of control.

Text Books:

1. T.C. Bartee, Digital Computer Fundamentals, Mc Graw Hill, 4th Ed., 1984
2. P. Malvino and D.P. Leach, Digital Principles and applications Mc Graw Hill, 5th Ed., 1994

Reference Book:

1. R.V. Ramani, Application of Computer Methods in the Mineral Industry.

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

L	T/P/D	C
3	1/-	3

**(57152) MINE CONSTRUCTION ENGINEERING
(Elective-II)**

Unit-I

Size of mine Environment and ecology, selection criteria for site of the openings geological investigation.

Unit-II

Underground mine shaft sinking methods through alluvium, soft and hard rock, Mechanization, consolidation of loose ground shaft lining, ground pressure, thickness of lining.

Unit-III

Design and procedure of laying the lining, construction of shaft collar heapstead.

Unit-IV

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

Unit-V

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

Unit-VI

Surface inclines, drivage through soft and hard rock, construction and lining of inclines, lateral and vertical and vertical pressures. Under ground development, drivage of roads in stone and coal, mechanization support systems opening of faces.

Unit-VII

Surface layouts pit top circuits and coal handling and coal preparation plant, railway sifting and weigh bridges, surface and underground coal bunkers winding house substation, lamp room. Pit head bath, crèche dispensary:

office, work-shop, material handling stowing installations, bunker, water tanks, mixing chamber.

Unit-VIII

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

Suggested text book/Reference:

1. Pazdziora J. "design of Underground hard coal mine"
2. Popov "working of Mineral Deposits"
3. Bokey "Mining"
4. Rzhevsky Unit operations in open cast mines.

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

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(57153) TUNNELING ENGINEERING (Elective-II)

UNIT-I

Introduction to tunneling; geological concept of tunneling.

UNIT-II

Influence of geological aspects on design & construction of tunnels.

UNIT-III

Tunneling Methods: Conventional and special Drill & blast roadway drive 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 behaviour, stress strain behaviour, and stress analysis of tunnels.

UNIT-VII

Maintenance: Dewatering, ventilation and illumination drivages tunnels.

UNIT-VIII

Numerical techniques: Introductory use of FLAC, PLAXIS etc.

Text Books:

1. Richards E. Bullock – Tunnelling and Underground Construction Techniques
2. Stack Barbara – Hand Book of Mining and Tunnelling Machinery, John Wiley & Sons.

Reference Books

1. R.V. Proctor – Rock Tunneling with Steel Supports
2. J. Johnsen – Modern Trends in Tunneling and Blast Design.

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**(57154) STRATA CONTROL TECHNOLOGY
(Elective-II)**
Unit-I

Geo mining conditions: Geological factors contributing to strata control problems in mines, Geo mechanics classification of rocks.

Unit-II

Safety status: Status of safety in coal mines vis-à-vis strata control problems, Assessing the risk from the hazards of roof & side falls.

Unit-III

Design of support system: Design of support system for development and depillaring workings.

Unit-IV

Design of support system for long wall workings, application of modeling techniques to strata control problems.

Unit-V

Strata behaviour studies: Instrumentation for evaluation of strata condition in coal mines, Strata control techniques and its application to coal mining industry.

Unit-VI

Case studies on geotechnical instrumentation and strata control in coal mines.

Unit-VII

Demonstration of geotechnical instrumentation and computer softwares.

Unit-VIII

Organization of strata control cell: strata control cell in mines, Training needs of the first line supervisors for effective implementation of the latest strata control technologies.

Text Books:

1. Jeremic ML, Strata mechanics in coal mining, AABalkema, Rotterdam, Taylor and Francis, 1985, 566p
2. T. Bieniawski Ziti, Strata Control in Mineral Engineering, New York, John Wiley & Sons, 1 Feb 1987.

Reference Books:

1. T.N. Singh, Underground winning of Coal, Oxford and IBH New Delhi, 1992.
2. B.H.G. Brady and E.T. Brown, "Rock Mechanics for Underground Mining" George Allen and Unwin Ltd., 1992.
3. J.A. Hudson, "Comprehensive Rock Engineering", Pergamon Press, UK, 2000
4. Bieniawski Z.T. 1989, Engineering Rock Mass Classifications, Wiley, New York, 251
5. Peng S S and Chiang HS. Longwall mining, Wiley, New York, 708p.

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

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0	-3/-	2

(57637) MINERAL PROCESSING LABORATORY

1. Study of grab sampling and different sample division techniques like coning and quartering, riffle sampling techniques, etc.
2. Determination of crushing characteristics of a given mineral sample using jaw crusher
3. Determination of the grinding characteristics of a given mineral sample using ball mill
4. Sieve analysis of a given sample and to calculate (a) percentage sample retained on screens (b) average size of sample material and (c) to plot sizing curves
5. Concentration of a given mineral sample using mineraling
6. Concentration of a given mineral using Wilfley table
7. Concentration of a given mineral using froth flotation cell
8. concentration of a given mineral using magnetic separator
9. Study of wash ability characteristic of a coal sample using float and sink test.
10. Study of sedimentation characteristics of a given sample

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

L	T/P/D	C
0	-3/-	2

(57638) ROCK MECHANICS LABORATORY

1. Determination of RQD of rocks.
2. Determination of Protodyaknov index of a given rock sample
3. Determination of point load index strength of a given rock sample
4. Determination of porosity of rocks.
5. Determination of hardness of rocks
6. Determination of uniaxial compressive strength of a given rock sample
7. Determination of tensile strength of a given rock sample using Brazilian method
8. Determination of shear strength of rocks
9. Determination of modulus of elasticity of given rock sample using strain gauge.
10. Determination of triaxial strength of rock and drawing of Mohr's envelope
11. Determination of slake durability of rocks
12. Study of time dependent properties of rocks.
13. Study of drillability index of rocks.
14. Study of different types of supports used in mines
15. Study of stress and fracture patterns around underground model opening
16. Study of design of mine pillars.
17. Prediction of Subsidence.
18. Study of measurement of in situ stresses and strengths.
19. Determination of rock anchorage capacity of a rock bolt
20. Study of different types of roof convergence and other ground control instruments.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. Mining Engg. II-Sem.**

L	T/P/D	C
3	1/-/-	3

(58108) MINE GROUND CONTROL**Unit-I**

Definition and concept of ground control in Mines.

Unit-II

Ground control practice in Mines. Constraints on ground control design; characteristics of coal measure strata.

Unit-III

Modern concept of strata pressure redistribution. Manifestation of strata pressure, convergence, load on prop, creep, heave, roof fall and failure systems due to mining. In situ stress measurement, instrumentation.

Unit-IV

Roof support: Timber and steel supports, friction and hydraulic prop, Arches, shotcret, roof truss, roof bolts.

Unit-V

Powered supports, stowing, caving, strip packing, pump packing, rock reinforcement.

Unit-VI

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

Unit-VII

Subsidence: Theories of subsidence, factors affecting subsidence, prediction and measurement of subsidence. Damage and prevention of damage due to subsidence.

Unit-VIII

Bumps and rock bursts-causes, occurrence and control.

Text / Reference Books:

1. Obert & Duvall "Rock Mechanics and Design of structures in rock"
2. Jaeger and Cook "Fundamental of Rock Mechanics"
3. V. Singh & B.P. Khare "Rock Mechanics and Ground Control"
4. Richard "Rock Mechanics"
5. Peng "Coal Mining Ground Control"

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IV Year B.Tech. Mining Engg. II-Sem.

L	T/P/D	C
3	-/-	3

(58109) PLANNING OF SURFACE MINING PROJECT
(Elective-III)

Unit-I

Mining industry in comparison with other industries, Principles of Planning, Mater Plan, Feasibility Report.

Unit-II

Estimation, optimal Production, Life, requirement of surface equipment, selection of mining equipment

Unit-III

Haul roads maintenance and dust control measures

Unit-IV

Surface facilities, provision of dump yards, material handling plants

Unit-V

Surface Workshops, Mine lighting, occupational diseases remedial measures

Unit-VI

Surface environment management planning, EIA, land reclamation methods.

Unit-VII

Issues and challenges of Mine planning in future, mine closure planning.

Unit-VIII

Blast designing, applications of SME, Nonel limitation transport of Block explosive, electronic detonators.

Text / Reference Books:

1. R.T. Deshmukh – Open cast Mining, Lovely Prakash, Dhanbad.
2. Das S.K. – Surface mining Technology
3. G.B. Misra – Surface Mining
4. Haertman H.L. – Introduction to Mining Engineering.

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IV Year B.Tech. Mining Engg. II-Sem.

L	T/P/D	C
3	-/-	3

(58110) PLANNING OF UNDERGROUND COAL MINING PROJECT
(Elective-III)

Unit-I

Mining industry in comparison with other industries, Principles of Planning, Features and Mine Planning, Master Plan, Feasibility Report.

Unit-II

Geological factors affecting Mine Planning, Estimation of optional prediction Life. Coal extraction, different methods applicability advantages and disadvantages

Unit-III

Pillar extraction by continuous miner

Unit-IV

Pillar extraction by Blasting Gallery Methods.

Unit-V

Pillar extraction by deploying LHDS/SDLS

Unit-VI

Economics of different methods extraction.

Unit-VII

Gate Road devices and supports and extraction by longwall Advancing and retreating Methods.

Unit-VIII

Surface subsidence, measures for subsidence control, subsidence monitoring, Roof convergence measurements.

Text / Reference Books:

1. Peng SS – Longwall Mining.
2. R.D. Singh – Principles and Practices of Modern Coal Mining.
3. Mathur S.P. – Coal Mining in India.
4. Das S.K. Modern Coal Mining Technology.
5. BB Dhar, Singh T.N. – Thick Séance Mining Problems and Issues.

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(58111) PLANNING OF UNDERGROUND METAL MINING PROJECT
(Elective-III)
Unit-I

Introduction: Status of Metalliferous Mining Industry in India, Scope and limitations of Underground Mining.

Unit-II

Development: Classification and choice of stoping methods, Choice of level interval and block length- shape, size, position.

Unit-III

Excavation and equipping of shaft station, grizzly, ore/waste bin, main ore pass system, underground crushing and loading stations, underground chambers, sump and other subsidiary excavations, arrangements for dumping into main ore pass.

Unit-VI

Methods: Techno-economic analysis on choice of stopping methods, high productivity methods, blast hole stopping vertical retreat method of mining, block caving raise stopping, underground bench blasting.

Unit-V

Stope design and production planning in the various methods of stopping Stop layouts access development, shift/hosting haulages cross cuts, inclined developments.

Unit-VI

Stope and development support, mining cycles, shift times, efficiency, utilization and estimating equipments requirements.

Unit-VII

Division of Mining Area: Division of the mining area into working units on district and level pattern. Dimensions of panels and blocks.

Unit-VIII

Production and Cycle time estimates, Production Planning and Scheduling

Text / Reference Books:

1. Y.P. Chacharkar, A Study of Metalliferous Mining, Methods, Lovely Prakashan, Dhanbad, 1994.
2. B.C. Arthur, SME Mining Engineers Hand Book, American Institute of Mining, Metallurgical and Petroleum Engineers, New York, 1973.
3. D.J. Deshmukh, Elements of Mining Technology, Vol.-II, Central Techno Publications, Nagapur, 2001.
4. Meta Mines Regulations -1961, Lovely Prakashan
5. Introductory Mining Engineering, Howard L. Hatman.

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(58112) MINE ELECTRICAL ENGINEERING
(Elective-III)
Unit-I

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

Unit-II

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

Unit-III

Mining type circuit breakers – Air circuit breaker, vacuum and Hexa Sulfa Fluoride (SF_6) circuit breakers, Field switch, Transwitch Unit, Gate End Box, Drill Panel.

Unit-IV

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

Unit-V

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

Unit-VI

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

Unit-VII

Principles of flame proof enclosures. Intrinsically safe circuit methods of

attaining intrinsic safety, zeener safety barriers and their applications.

Unit-VIII

Indian electricity rules as applied to mines.

Text Books:

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

Reference Books:

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

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IV Year B.Tech. Mining Engg. II-Sem.

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**(58113) GEOLOGICAL & TECHNOLOGICAL FACTORS OF COAL
GASIFICATION CBM, SHALE GAS
(Elective -IV)**

Unit-I

Underground Coal Gasification (UCG) Concept; Chemistry, conditions suitable for UCG, Principles of UCG.

Unit-II

UCG Process Component factors: Technology of UCG, opening up of coal seam for UCG.

Unit-III

Mining methods of UCG: Chamber method, Stream method, Borehole procedure method, Blind bore hole method.

Unit-IV

Non-Mining methods of UCG: Level seams, Inclined seams.

Unit-V

Linkage Techniques : Precolation linkage, Electro linkage, Boring linkage, compressed-air-linkage, Hydraulic fracture linkage.

Unit-VI**Unit-VII**

Underground Coal Gasification at Great Depth, Merits and Demerits of Underground coal gasification.

Unit-VIII

Future Scope and Development: Innovations, Blind long-Borehole method, long-Borehole procedure method, Pre-shattering method.

Text / Reference Books:

1. Principles and Practices of Modern Coal Mining – R.D. SINGH
2. Underground Coal Mining Methods – J.G. SINGH
3. Winning and Working Coal in India Vol.II- R.T. Deshmukh and D.J. Deshmukh.

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IV Year B.Tech. Mining Engg. II-Sem.

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**(58114) MINE HEALTH & SAFETY ENGINEERING
(Elective -IV)**

Unit-I

Introduction to accidents prevention and health and safety in industry : Terminology, reason for preventing accidents – moral, cost, legal.

Safety scenario in Indian mines, Accidents in Indian mines, Measurement of safety performance, Statistical analysis of mine accidents.

Unit-II

Causes of Accidents, accident report, accident analysis and control, cost of accidents, statistical and economical analysis of accident data.

Unit-III

System Engineering approach to safety, Techniques used in safety analysis, Generic approach to loss control with in mining operations.

Unit-IV

Safety management and organization, Risk management, Risk identification, Risk estimation and evaluation, Risk minimization techniques in mines. Risk analysis using FTA, HAZOP, ETA etc; Risk analysis softwares; health risk assessment and epidemiological studied.

Unit-V

Training, Human Behavioral approach in Safety, safety polices, safety audit and safety management in mines.

Unit-VI

Emergency organization for disaster management.

Unit-VII

Accidents in opencast mines: Common causes and measures for prevention

Accidents due to ground movement:: Falls of roof and sides in underground coal mines

Accidents due to rope haulage: Common causes and measures for prevention.

Unit-VIII

Accidents due to explosives: Common causes and measures for prevention.

Accidents due to electricity: Common causes and measures for prevention.

Inundations: Dangers from surface and underground water

Text / Reference Books:

1. S.K. Das, Mine Safety and Legislation. Lovely Prakashan, Dhanbad, 2002
2. B.K. Kejriwal, Safety in Mines, Lovely Prakashan, Dhanbad, 2002
3. N.J. Bahr, System Safety Engineering and Risk Assessment: A Practical Approach, Taylor and Francis, NY, 1997.
4. DGMS CIRCULARS: MINES ACT
5. occupational Safety and Health in Industries and Mines by C.P. Singh
6. Indian Mining Legislation – A Critical Appraisal by Rakesh & Prasad.

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IV Year B.Tech. Mining Engg. II-Sem.

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(58115) MAINTENANCE AND RELIABILITY ENGINEERING
(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, Failures and failure modes, Causes of failures 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 and hazard models: Introduction, Component

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

Unit-VII

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

Unit-VIII

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

TEXT BOOKS;

1. Reliability, Maintenance and Safety Engineering - Dr. A.K. Gupta/ Laxmi Publications
2. Industrial Safety Engineering – by L.M. Deshmukh/TMH
3. Reliability Engineering – Balaguruswamy- TMH
4. Reliability Engineering- L.S.Srinath

REFERENCE BOOKS:

1. Maintenance Engineering & Management – RC Misra/ PHI
2. Reliability Engineering by Elsayed/Pearson.
3. Engineering Maintenance a Modern Approach, B.S.Dhillon, 2002 CRR Publications
4. Reliability Engineering- Patrick DTO-Wiley Conor-India.
5. Reliability Engineering and life testing –Naikan-PHI

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IV Year B.Tech. Mining Engg. II-Sem.

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3	-/-	3

(58116) DEEPSEAM MINING

(Elective – IV)

UNIT-I

Exploration: Modern Exploration Techniques to Identify the Complex Coal Deposits

UNIT-II

Classification: Classification of Coal Deposits Lying under Typical Geomining conditions.

UNIT-III

Challenges: Challenges to improve production and productivity from Deep Seated Deposits.

UNIT-IV

Challenges in Liquidation of Locked-up Pillars

Experimental Trials: Innovative Technologies for Stability Analysis.

UNIT-V

Design and Development of Deep Seated Deposits.

UNIT-VI

Modern Techniques: 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.

Text Books:

1. R.D. Singh, Principles & 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

Reference Books:

1. Peng S S and Chiang H S. Longwall mining, Wiley, New York, 708p
2. S.K. Das, Modern Coal Mining Technology, Lovely prakashan Dhanbad, 1992
3. Prasad D. and rakesh S, Legislation in Indian Mines-Acritical Appraisal, Niskam Press, New Delhi, 1883p
4. S.P. Mathur, Coal Mining in India, M.S. Enterprises Bilaspur, 1999

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	0	-/-	2

(58673) INDUSTRIAL TRAINING

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	0	-/6/-	2

(58674) SEMINAR

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	0	-/15/-	10

(58675) PROJECT WORK

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	0	-/-	2

(58676) COMPREHENSIVE VIVA