J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY (JBIET)
UGC AUTONOMOUS
Bhaskar Nagar, Moinabad, Hyderabad – 500075, Telangana, India

ACADEMIC REGULATIONS FOR B.TECH. REGULAR STUDENTS

WITH EFFECT FROM THE ACADEMIC YEAR 2016-17 (R-16)

1.0 Under-Graduate Degree Programme in Engineering & Technology (UGP in E&T)

1.1 JBIET offers a 4-year (8 semesters) **Bachelor of Technology** (B.Tech.) degree programme, under Choice Based Credit System (CBCS) with effect from the academic year 2016-17 in the following branches of Engineering:

Sl. No.	Branch
1	Civil Engineering
2	Electrical and Electronics Engineering
3	Mechanical Engineering
4	Electronics and Communication Engineering
5	Computer Science and Engineering
6	Information Technology
7	Electronics and Computer Engineering
8	Mining Engineering

2.0 Eligibility for Admission

2.1 Admission to the under graduate programme shall be made either on the basis of the merit rank obtained by the qualified candidate in entrance test conducted by the Telangana State Government (EAMCET) or on the basis of any other order of merit approved by the University, subject to reservations as prescribed by the government from time to time.

2.2 The medium of instructions for the entire under graduate programme in E&T will be **English** only.

3.0 B.Tech. Programme structure

3.1 A student after securing admission shall pursue the under graduate programme in B.Tech. in a minimum period of **four** academic years (8 semesters), and a maximum period of **eight** academic years (16 semesters) starting from the date of commencement of first year first semester, failing which student shall forfeit seat in B.Tech course.

Each semester is structured to provide 24 credits, totalling to 192 credits for the entire B.Tech. programme. Each student shall secure 192 credits (with CGPA ≥ 5) required for

the completion of the under graduate programme and award of the B.Tech. degree.

3.2 UGC/ AICTE specified definitions/ descriptions are adopted appropriately for various terms and abbreviations used in these academic regulations/ norms, which are listed below.

3.2.1 Semester scheme

Each under graduate programme is of 4 academic years (8 semesters) with the academic year being divided into two semesters of 22 weeks (≈ 90 instructional days) each, each semester having - '**Continuous Internal Evaluation (CIE)**' and '**Semester End Examination (SEE)**'. **Choice Based Credit System (CBCS)** and **Credit Based Semester System (CBSS)** as indicated by UGC and curriculum / course structure as suggested by AICTE are followed.

3.2.2 Credit courses

All subjects/ courses are to be registered by the student in a semester to earn credits which shall be assigned to each subject/ course in an L: T: P: C (lecture periods: tutorial periods: practical periods: credits) structure based on the following general pattern.
1. One credit for one hour/ week/ semester for theory/ lecture (L) courses.
2. One credit for two hours/ week/ semester for laboratory/ practical (P) courses or Tutorials (T).

Courses like Environmental Studies, Professional Ethics, Gender Sensitization lab are identified as **mandatory courses**. These courses **will not carry any credits**.

3.2.3 Subject Course Classification

All subjects/ courses offered for the under graduate programme in E&T (B.Tech. degree programmes) are broadly classified as follows. JBIET has followed almost all the guidelines issued by AICTE/UGC.

S. No.	Broad Course Classification	Course Group/ Category	Course Description
1	Foundation Courses (FnC)	BS – Basic Sciences	Includes mathematics, physics and chemistry subjects
2		ES - Engineering Sciences	Includes fundamental Engineering subjects
3		HS – Humanities and Social sciences	Includes subjects related to humanities, social sciences and management
4	Core Courses (CoC)	PC – Professional Core	Includes core subjects related to the parent discipline/ department/ branch of Engineering.
5		Project Work	B.Tech. project or UG project or UG major project
6		Industrial training/	Industrial training/ Internship/ UG Mini-project/Mini-project

		Mini- project	
7		Seminar	Seminar/ Colloquium based on core contents related to parent discipline/ department/ branch of Engineering.
8	Elective Courses (E&C)	PE – Professional Electives	Includes elective subjects related to the parent discipline/ department/ branch of Engineering.
9		OE – Open Electives	Elective subjects which include interdisciplinary subjects or subjects in an area outside the parent discipline/ department/ branch of Engineering.
10	Mandatory Courses (MC)	-	Mandatory courses (non-credit)

4.0 Course registration

4.1 A 'faculty advisor or counsellor' shall be assigned to a group of 15 students, who will advise student about the under graduate programme, its course structure and curriculum, choice/option for subject s/ courses, based on their competence, progress, pre-requisites and interest.

4.2 The academic section of the college invites '**registration forms**' from students before the beginning of the semester through 'on-line registration', ensuring 'date and time stamping'. The on-line registration requests for any 'current semester' shall be **completed before the commencement of SEEs (Semester End Examinations) of the 'preceding semester'**.

4.3 A student can apply for **on-line** registration, **only after** obtaining the '**written approval**' from faculty advisor/counsellor, which should be submitted to the college academic section through the Head of the Department. A copy of it shall be retained with Head of the Department, faculty advisor/ counsellor and the student.

4.4 A student may be permit ted to register for the subjects/ courses of **choice** with a total of 24 credits per semester (minimum of 20 credits and maximum of 28 credit s per semester and permitted deviation of ± 17%), based on **progress** and SGPA/ CGPA, and completion of the '**pre-requisites'** as indicated for various subjects/ courses, in the department course structure and syllabus contents. However, a **minimum** of 20 credits per semester must be registered to ensure the '**studentship**' in any semester.

4.5 Choice for 'additional subjects/ courses' to reach the maximum permissible limit of 28 credits (above the typical 24 credit norm) must be clearly indicated, which needs the specific approval and sig nature of the faculty advisor/ counsellor.

4.6 If the student submits ambiguous choices or multiple options or erroneous entries during **on-line** registration for the subject(s) / course(s) under a given/ specified course group/ category as listed in the course structure, only the first mentioned subject/ course in that category will be taken into consideration.

4.7 Subject/ course options exercised through **on-line** registration are fin al and **cannot** be changed or inter-changed; further, alternate choices also will not be considered. However, if the subject/ course that has already been listed for registration b y the Head of the Department in a semester could not be offered due to any unforeseen or unexpected reasons, then the student shall be allowed to have alternate choice either for a new subject (subject to offering of such a subject), or for another existing subject (subject to availability of seats). Such alternate arrangements will be made by the head of the department, with due notification and time-framed schedule, within the **first week** after the commencement of class-work for that semester.

4.8 Dropping of subjects/ courses may be permitted, only after obtaining prior approval from the faculty advisor/ counsellor (subject to retaining a minimum of 20 credits), '**within a period of 15 days**' from the beginning of the current semester.

4.9 Open electives: The students have to choose one open elective (OE -I) in III year I semester, one (OE-II) in III year II semester, and one (OE-III) in IV year II semester, from the list of open electives given. However, the student cannot opt for an open elective subject offered b y their own (parent) department, if it is already listed under any category of the subjects offered by parent department in any semester.

4.10 Professional electives: students have to choose professional elective (P E-I) in III year II semester, Professional electives II, III, and IV (PE-II, III and IV) in IV year I semester, Professional electives V, and VI (PE-V and VI) in IV year II semester, from the list of professional electives given. However, the students may opt for professional elective subjects offered in the related area.

5.0 Subjects/courses to be offered

5.1 A typical section (or class) strength for each semester shall be 60.

5.2 A subject/ course may be offered to the students, **only if** a minimum of 20 students (1/3 of the section strength) opt for it. The maximum strength of a section is limited to 80 (60 + 1/3 of the section strength).

5.3 More than **one faculty member** may offer the **same subject** (lab/ practical may be included with the corresponding theory subject in the same semester) in any semester. However, selection of choice for students will be based on - '**first com e first serve** basis and CGPA criterion' (i.e. the first focus shall be on early **on-line entry** from the student for registration in that semester, and the second focus, if needed, will bee on CGPA of the student).

5.4 If more entries for registration of a subject come into picture, then the Head of Department concerned shall decide, whether or not to offer such a subject/ course for **two (or multiple) sections**.

6.0 Attendance requirements:

6.1 A student shall be eligible to appear for the semester end examinations, if student acquires a minimum of 75% of attendance in aggregate of all the subjects/ courses (excluding attendance in mandatory courses Environmental Science, Professional Ethics, Gender Sensitization Lab, NCC/ NSO and NSS) for that semester.

6.2 Shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each semester may be condoned by the college academic committee on genuine and valid grounds, based on the student's representation with supporting evidence.

6.3 A stipulated fee shall be payable towards condoning of shortage of attendance.

6.4 Shortage of attendance below 65% in aggregate shall in **no** case be condoned.

6.5 **Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examinations of that semester. They get detained and their registration for that semester shall stand cancelled. They will not be promoted to the next semester.** They may seek re-registration for all those subjects registered in that semester in which student was detained, by seeking re-admission into that semester as and when offered; in case if there are any professional electives and/ or open electives, the same may also be re-registered if offered. However, if those electives are not offered in later semesters, then alternate electives may be chosen from the **same** set of elective subjects offered under that category.

6.6 A student fulfilling the attendance requirement in the present semester shall not be eligible   for readmission into the same class.

7.0 Academic requirements

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

7.1 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course, if student secures not less than 35 % marks (26 out of 75 marks) in the semester end examination, and a minimum of 40% of marks in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together; in terms of letter grades, this implies securing **'C'** grade or above in that subject/ course.

7.2 A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to UG mini-project and seminar, if student secures not less than 40% marks (i.e. 40 out of 100 allotted marks) in each of them. The student would be treated as failed, if student (i) does not submit a report on UG mini-project, or does not make a presentation of the same before the evaluation committee as per schedule, or (ii) does not present the seminar as required in the IV year I Semester, or (iii) secures less than 40% marks in UG mini-project/ seminar evaluations.

Student may reappear once for each of the above evaluations, when they are scheduled again; if student fails in such 'one reappearance' evaluation also, student has to reappear for the same in the next subsequent semester, as and when it is scheduled.

7.3 Promotion Rules

S. No.	Promotion	Conditions to be fulfilled
1	First year first semester to first year second semester	Regular course of study of first year first semester.
2	First year second semester to second year first semester	i. Regular course of study of first year second semester. ii. Must have secured at least 24 credits out of 48 credits i.e., 50% of credits up to first year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Second year first semester to second year second semester	Regular course of study of second year first semester.
4	Second year second semester to third year first semester	i. Regular course of study of second year second semester. ii. Must have secured at least 58 credits out of 96 credits i.e., 60% of credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Third year first semester to third year second semester	Regular course of study of third year first semester.
6	Third year second semester to fourth year first semester	i. Regular course of study of third year second semester. ii. Must have secured at least 86 credits out of 144 credits i.e., 60% of credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
7	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester.

7.4 A student shall register for all subjects covering 192 credits as specified and listed in the course structure, fulfils all the attendance and academic requirements for 192 credits, 'earn all 192 credits' by securing SGPA ⊐ 5.0 (in each semester) and CGPA (at the end of each successive semester) ⊐ 5.0 to successfully complete the under graduate programme.

7.5 After securing the necessary 192 credits as specified for the successful completion of the entire under graduate programme, the student can avail exemption of two subjects up to 6 credits, that is, one open elective and one professional elective subject or two professional elective subjects for optional drop out from these 192 credits earned;

resulting in 186 credits for under graduate programme performance evaluation, i.e., the performance of the student in these 186 credits shall alone be taken into account for the calculation of 'the final CGPA (at the e nd of under graduate programme, which takes the SGPA of the IV year II semester into account)' , and shall be indicated in the grade card of IV year II semester. However, the performance of student in the earlier individual semesters, with the corresponding SGPA and CGPA for which grade cards have already been given will not be altered.

7.6 If a student registers for some more '**extra subjects**' (in the parent department or other **departments**/branches of Engineering.) other than those listed subjects totalling to 192 credits as specified in the course structure of his department, the performances in those '**extra subjects**' (although evaluated and graded using the same procedure as that of the required 192 credits) will not be taken into account while calculating the SGPA and CGPA. For such '**extra subjects**' registered, % of marks and letter grade alone will be indicated in the grade card as a performance measure, subject to completion of the attendance and academic requirements as stated in regulations 6 and 7.1 – 7.5 above.

7.7 A student eligible to appear in the end semester examination for any subject/ course, but absent from it or failed (thereby failing to secure **'C'** grade or above) may reappear for that subject/ course in the supplementary examination as and when conducted. In such cases, CIE assessed earlier for that subject/ course will be carried over, and added to the marks to be obtained in the SEE supplementary examination for evaluating performance in that subject.

7.8 A student **detained in a semester due to shortage of attendance, may be re-admitted when the same semester is offered in the next academic year for fulfilment of academic requirement s**. The academic regulations under which student has been readmitted shall be applicable. However, no grade allotments or SGPA/ CGPA calculations will be done for the entire semester in which student has been detained.

7.9 A student detained **due t o lack of credits, shall be promoted to the next academic year only after acquiring the required academic credits.** The academic regulations under which student has been readmitted shall be applicable to him.

8.0 Evaluation - Distribution and Weightage of marks

8.1 The performance of a student in every subject/course (including practicals and UG major project) will be evaluated for 100 marks each, with 25 marks allotted for CIE (Continuous Internal Evaluation) and 75 marks for SEE (Semester End-Examination).

8.2 For theory subjects, during a semester, there shall be two mid-term examinations. Each mid-term examination consists of one objective paper, one descriptive paper and one assignment. The objective paper and the essay paper shall be for 10 m arks each with a total duration of 1 hour 20 minutes (20 minutes for objective and 60 minutes for essay paper). The objective paper is set with 20 bits of multiple choice, fill-in the blanks and matching type of questions for a total of 10 marks. The essay paper shall contain 4 full

questions out of which, the student has to answer 2 questions, each carrying 5 marks. While the first mid-term examination shall be conducted on 50% of the syllabus, the second mid-term examination shall be conducted on the remaining 50% of the syllabus. Five marks are allocated for assignments (as specified by the subject teacher concerned). The first assignment should be submitted before the conduct of the first mid-examination, and the second assignment should be submitted before the conduct of the second mid-examination. The total m arks secured by the student in each mid-term examination are evaluated for 25 marks, and the average of the two mid-term examinations shall be taken as the final marks secured by each student in internals/sessionals. If any student is absent from any subject of a mi d-term examination, an on-line test will be conducted for him by the university. The details of the question paper pattern are as follows,

- The end semester examinations will be conducted for 75 marks consisting of two parts viz. i) **Part- A** for 25 marks, ii) **Part - B** for 50 marks.
- Part-A is compulsory question which consists of ten sub-questions. The first five sub-questions are from each unit and carry 2 marks each. The next five sub-questions are one from each unit and carry 3 marks each.
- Part-B consists of five questions (numbered from 2 to 6) carrying 10 marks each.
- Each of these questions is from one unit and may contain sub-questions. For each question there will be an "either" "or" choice, which means that there will be two questions from each unit and the student should answer either of the two questions.

8.3 For practical subjects there shall be a continuous internal evaluation during the semester for 25 sessional marks and 75 semester end examination marks. Out of the 25 marks for internal evaluation, day-to-day work in the laboratory shall be evaluated for 15 marks and internal practical examination shall be evaluated for 10 marks conducted by the laboratory teacher concerned. The semester end examination shall be conducted with an external examiner and th e laboratory teacher. The external examiner s hall be appointed from the clusters of colleges which are decided by the examination branch of the university

8.4 For the subject having de sign and/or drawing, (such as engineering graphics, engineering drawing, machine drawing) and estimation, the distribution shall b e 25 marks for continuous internal evaluation (15 marks for day-to-day work and 10 m arks for internal tests) and 75 marks for semester end examination. There shall be two internal tests in a semester and the average of the two shall be considered for the award of marks for internal tests.

8.5 There shall be an UG mini-project, in collaboration with an industry of their specialization. Students will register for this immediately after III year II semester examinations and pursue it during summer vacation. The UG mini -project shall be submitted in a report form and presented before the committee in IV year I semester. It shall be evaluated for 100 marks. The committee consists of an external examiner, Head

of the Department, supervisor of the UG mini-project and a senior faculty member of the department. There shall b e no internal marks for UG mini-project

8.6 There shall be a seminar presentation in IV year I semester. For the seminar, the student shall collect the information on a specialized topic, prepare a technical report and submit it to the department. It s hall 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 100 marks. There shall be no semester end examination for the seminar.

8.7 Out of a total of 100 m arks for the UG major project, 25 marks shall be allotted for internal evaluation and 75 marks for the end semester examination (viva voce). The end semester examination of the UG major project shall be conducted by the same committee as appointed for the UG mini-project. In addition, the UG major project supervisor shall also be included in the committee. The topics for UG mini project, seminar and UG major project shall be different from one another. The evaluation of U G major project shall be made at the end of IV year II semester. The internal evaluation shall be on the basis of two seminars given by each student on the topic of UG major project.

8.8 The laboratory marks and the sessional marks awarded by the college 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 accordingly. 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 rules and produced before the committees of the university as and when asked for.

8.9 For mandatory courses viz. environmental studies, professional ethics and gender sensitization lab, a student has to secure 40 marks out of 100 marks (i.e. 40% of the marks allotted) in the continuous internal evaluation for passing the subject/course.

8.10 For mandatory courses NCC/ NSO and NSS, a **'satisfactory participation certificate'** shall be issued to the student from the authorities concerned, only after securing ≥ 65% attendance in such a course.

8.11 No marks or letter grade shall be allotted for all mandatory/non-credit courses.

9.0 Grading procedure

9.1 Marks will be awarded to indicate the performance of student in each theory subject, laboratory / practicals, seminar, UG mini project and UG major project. Based on the percentage of marks obtained (Continuous Internal Evaluation plus Semester End Examination, both taken together) as specified in item 8 above, a corresponding letter grade shall be given.

9.2 As a measure of the performance of student, a 10-point absolute grading system using the following letter grades (as per UGC/AICTE guidelines) and corresponding percentage

of marks shall be followed:

% of Marks Secured in a Subject/Course (Class Intervals)	Letter Grade (UGC Guidelines)	Grade Points
Greater than or equal to 90%	O (Outstanding)	10
80 and less than 90%	A+ (Excellent)	9
70 and less than 80%	A (Very Good)	8
60 and less than 70%	B+ (Good)	7
50 and less than 60%	B (Average)	6
40 and less than 50%	C (Pass)	5
Below 40%	F (FAIL)	0
Absent	Ab	0

9.3 A student obtaining '**F'** grade in any subject shall be deemed to have '**failed'** and is required to reappear as a 'supplementary student' in the semester end examination, as and when offered. In such cases, internal marks in those subjects will remain the same as those obtained earlier.

9.4 A student who has not appeared for examination in any subject, '**Ab'** grade will be allocated in that subject, and student shall be considered '**failed'**. Student will be required to reappear as a 'supplementary student' in the semester end examination, as and when offered.

9.5 A letter grade does not indicate any specific percentage of marks secure d by the student, but it indicates only the range of percentage of marks.

9.6 A student earns grade point (GP) in each subject/ course, on the basis o f the letter grade secured in that subject/ course. The corresponding 'credit points' (CP) are computed by multiplying the grade point with credits for that particular subject/ course.

Credit points (C P) = grade point (GP) x credits …. For a course

9.7 The student passes the subject/ course only when **GP ⬛ 5 ('C' grade or above)**

9.8 The semester grade point average (SGPA) is calculated by dividing the sum of credit

points ($\sum$ CP) secured from all subjects/courses registered in a semester, by the total numbers of credits registered during that semester. SGPA is rounded off to **two** decimal places. SGPA is thus computed as

$$\text{SGPA} = \left\{\sum_{i=1}^{N} C_i G_i\right\} \Big/ \left\{\sum_{i=1}^{N} C_i\right\} \dots \text{ For each semester.}$$

Where 'i' is the subject indicator index (takes into account all subjects in a semester), 'N' is the no. of subjects **'registered'** for the semester (as specifically required and listed under the course structure of the parent department). G_i is the no. of credits allotted to the ith subject, and G_i represents the grade points (GP) corresponding to the letter grade awarded for that i^{th} subject.

9.9 The cumulative grade point average (CGPA) is a measure of the overall cumulative performance4 of a student in all semesters considered for registration. The CGPA is the ratio of the total credit points secured by a student in all registered courses in all semesters, and the total number of credits registered in all the semesters. CGPA is rounded off to two decimal places. CGPA is thus computed from the I year II semester onwards at the end of each semester as per the formula

$$\text{CGPA} = \left\{\sum_{j=1}^{M} C_j G_j\right\} \Big/ \left\{\sum_{j=1}^{N} C_j\right\} \dots \text{ For all S semester registered}$$
(i.e., up to and inclusive of S semester, S $\geq$ 2),

Where '**M**' is the total no. of subjects (as specifically required and listed under the course structure of the parent department) the student has **'registered'** i.e., from the 1st semester onwards up to and inclusive of the 8th semester, **'j'** is the subject indicator index (takes Into account all subjects for 1 to 8 semesters), C_j is the no. of credits allotted to the jth subject, and G_j represents the grade points (GP) corresponding to the letter grade awarded for the jth subject. After registration and completion of first year first semester, the SGPA of that semester itself may be taken as the CGPA, as there are no cumulative effects.

Illustration of calculation of SGPA

Course/Subject	Credits	Letter Grade	Grade Points	Credit Points
Course 1	4	A	8	4 x 8 = 32
Course 2	4	O	10	4 x 10 = 40
Course 3	4	C	5	4 x 5 = 20
Course 4	3	B	6	3 x 6 = 18
Course 5	3	A+	9	3 x 9 = 27
Course 6	3	C	5	3 x 5 = 15
	21			152

SGPA = 152/21 = 7.24

Illustration of calculation of SGPA:

Course/Subject	Credits	Letter Grade	Grade Points	Credit Points
I Year I Semester				
Course 1	4	A	8	4 x 8 = 32
Course 2	4	A+	9	4 x 9= 36
Course 3	4	B	6	4 x 6 = 24
Course 4	3	O	10	3 x 10 = 30

Course 5	3	B+	7	3 x 7 = 21
Course 6	3	A	8	3 x 8 = 24
I Year II Semester				
Course 7	4	B+	7	4 x 7 = 28
Course 8	4	O	10	4 x 10= 40
Course 9	4	A	8	4 x 8 = 32
Course 10	3	B	16	3 x 6= 18
Course 11	3	C	5	3 x 5 = 15
Course 12	3	A+	9	3 x 9 = 27
	Total Credits= 42			Total Credit Points=327

CGPA = 327/42 = 7.79

9.10 For merit ranking or comparison purposes or any other listing, **only** the '**rounded off'** values of the CGPAs will be used.

9.11 For calculations listed in regulations 9.6 to 9.9, performance in failed subjects/ courses (securing **F** grade) will also be taken into account, and the credits of such subjects/ courses will also be included in the multiplications and summations. After passing the failed subject(s) newly secured letter grades will be taken into account for calculation of SGPA and CGPA. However, mandatory courses will not be taken into consideration.

10.0 Passing standards

10.1 A student shall be declared successful or 'passed' in a semester, if student secures a GP ≥ 5 ('C' grade or above) in every subject/course in that semester (i.e. when student gets an SGPA ≥ 5.00 at the en d of that particular semester); and a student s hall be declared successful or 'passed' in the entire under graduate programme, only when gets a CGPA ≥ 5.00 for the award of the degree as required.

10.2 After the completion of e ach semester, a grade card or grade sheet (or transcript) shall be issued to all the registered students of that semester, indicating the letter grades and credits earned. It will show the details of the courses registered (course code, title, no. of credits, and grade earned etc.), credits earned, SGPA, and CGPA.

11.0 Declaration of results

11.1 Computation of SGPA and CGPA are done using the procedure listed in 9.6 to 9.9.

11.2 For final percentage of marks equivalent to the computed final CGPA, the following formula may be used.

% of Marks = (final CGPA – 0.5) x 10

12.0 Award of degree

12.1 A student who registers for all the specified subjects/ courses as listed in the course structure and secures the required number of 192 credits (with CGPA ≥ 5.0), within 8 academic years from the date of commencement of the first academic year, shall be

declared to have '**qualified'** for the award of the B.Tech. degree in the chosen branch of Engineering as selected at the time of admission.

12.2 A student who qualifies for the award of the degree as listed in item 12.1 shall be placed in the following classes.

12.3 Students with final CGP A (at the end of the under graduate programme) ≥ 8.00, and fulfilling the following conditions -

    (i) Should have passed all the subjects/courses in '**first appearance'** within the first 4 academic years (or 8 sequential semesters) from the date of commencement of first year first semester.

    (ii) Should have secured a CGPA ≥ 8.00, at the end of each of the 8 sequential semesters, starting from first year first semester onwards.

    (iii) Should not have been detained or prevented from writing t he end semester examinations in any semester due to shortage of attendance or any other reason, shall be placed in '**first class with distinction'**.

12.4 Students with final CGP A (at the end of the under graduate program me) ≥6.50 but < 8.00, shall be placed in '**first class'**.

12.5 Students with final CGP A (at the end of the under graduate program me) ≥ 5.50 but < 6.50, shall be placed in '**second class'**.

12.6 All other students who qualify for the award of the degree (as per item 12.1), with final CGPA (at the end of the under graduate programme) ≥ 5.00 but < 5.50, shall be placed in '**pass class**'.

12.7 A student with final CGP A (at the end of the under graduate programme) < 5.00 will not be eligible for the award of the degree.

12.8 Students fulfilling the conditions listed under item 12.3 alone will be eligible for award of '**First Rank**' and '**Gold Medal**'.

13.0 Withholding of results

13.1 If the student has not pa id the fees to the university/ college at any stage, or has dues pending due to any reason whatsoever, or if any case of indiscipline is pending, the result of the student may be withheld, and student will not be allowed to go into the next higher semester. The award or is sue of the degree may also be withheld in such cases.

14.0 Transitory regulations

14.1 A student who has discontinued for any reason, or has been detained for want of attendance or lack of required credits as specified, or who has failed after having undergone the degree programme, may be considered eligible for re admission to the same subjects/ courses (or equivalent subjects/ courses, as the case may be), and same professional electives/ o pen electives (or from set/category of elective s or equivalents suggested, as the case m ay be) as and when they are offered (within the

time-frame of 8 years from the date of commencement of student's first year first semester).

15.0 Student transfers

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

15.2 There shall be no transfers from the college/stream to another college.

16.0 Scope

16.1 The academic regulations should be read as a whole, for the purpose of any interpretation.

16.2 In case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Head of the Institution is final.

16.3 The institution may change or amend the academic regulations, course structure or syllabi at any time if necessary, and the changes or amendments made shall be applicable to all students with effect from the date notified by the JBIET authorities.

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UGC AUTONOMOUS
Bhaskar Nagar, Moinabad, Hyderabad – 500075, Telangana, India

Academic Regulations for B.Tech. (Lateral Entry Scheme) w.e.f the A Y 2017-18

1. **Eligibility for award of B. Tech. Degree (LES)**

   The LES students after securing admission shall pursue a course of study for not less than three academic year s and not more than six academic years.

2. The student shall register for 144 credits and secure 144 credits with CGPA ≥ 5 from II year to IV year B.Tech. programme (LES) for the award of B.Tech. degree. **Out of the144 credits secured, the student can avail exemption up to 6 credits**, that is, one open elective subject and one professional elective subject or two professional elective subjects resulting in 138 credits for B.Tech programme performance evaluation**.**

3. The students, who fail to fulfil the requirement for the award of t he degree in six academic years from the year of admission, shall forfeit their seat in B.Tech.

4. The attendance requirements of B. Tech. (Regular) shall be applicable to B.Tech. (LES).

5. **Promotion Rule:**

S. No	Promotion	Conditions to fulfilled
1	Second year first semester to second year second semester	Regular course of study of second year first semester.
2	Second year second semester to third year first semester	(i) Regular course of study of second year second semester. (ii) Must have secured at least 29 credits out of 48 credits i.e., 60% of credits up to second year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
3	Third year first semester to third year second semester	Regular course of study of third year first semester.
4	Third year second semester to fourth year first semester	(i) Regular course of study of third year second semester. (ii) Must have secured at least 58 credits out of 96 credits i.e., 60% of credits up to third year second semester from all the relevant regular and supplementary examinations, whether the student takes those examinations or not.
5	Fourth year first semester to fourth year second semester	Regular course of study of fourth year first semester.

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

MALPRACTICES RULES

DISCIPLINARY ACTIO N FOR / IMPROPER CONDUCT IN EXAMINATIONS

S.No.	Nature of Malpractice/Improper conduct	Punishment
	If the student:	
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 student is appearing but has not made use of (material shall include any marks on the body of 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 student orally or by any other body language methods or communicates through cell phones with any student or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in the subject only of all the students 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 student is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The hall ticket of the student is to be cancelled and sent to the university.
3.	Impersonates any other student in connection with the examination.	The student who has impersonated shall be expelled from examination hall. The student is also debarred and forfeits the seat. The performance of the original student, who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and UG major project) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The student is also

		debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of sea. If the imposter is and 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 our 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 the subject and all the other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester year. The student is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the student 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 organizers a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or writer or by signs or by 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	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 student(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The students 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.

	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.	
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any 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 student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred for two consecutive semesters from class work and all university examinations. The continuation of the course by the student 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 performance in that subject and all other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred and forfeiture of seat.
9.	If student of the college, who is not a student 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 the other subjects the student has already appeared including practical examinations and UG major project and shall not be permitted for the remaining examinations of the subjects of that semester/year. The student is also debarred and forfeiture of 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 performance in that subject and all other subjects the student has already appeared including practical examinations and UG major project 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 performance in that subject and all other subjects the student has appeared including practical examinations and UG major project 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 will be further investigated through a committee and suitable punishment will be given to the students as mentioned by the University guidelines.

J.B. INSTITUTE OF ENGINEERING AND TECHNOLOGY
(UGC Autonomous)

B.Tech. Course Structure – R16
MINING ENGINEERING

I Year I Semester

S. No	COURSE CODE	COURSE TITLE	L	T-P-D	C
1	E110A	Mathematics-I	3	1-0-0	3
2	E110G	Mathematics-II	4	1-0-0	4
3	E110H	Engineering Physics	3	0-0-0	3
4	E115A	Computer Programming in C	3	0-0-0	3
5	E113A	Engineering Mechanics	3	1-0-0	3
6	E113B	Engineering Graphics	2	0-0-4	4
7	E1103	Engineering Physics Lab	0	0-3-0	2
8	E1104	Computer Programming in C Lab	0	0-3-0	2
9	E110E	*Environmental Studies	2	0-0-0	0
		Total	**20**	**3-6-4**	**24**

I Year II Semester

S. No	COURSE CODE	COURSE TITLE	L	T-P-D	C
1	E120D	Applied Physics	3	0-0-0	3
2	E120G	Engineering Chemistry	4	0-0-0	4
3	E120C	Mathematics-III	4	1-0-0	4
4	E120H	Professional Communication in English	3	0-0-0	3
5	E122A	Basic Electrical & Electronics Engineering	4	0-0-0	4
6	E1201	Engineering Chemistry Lab	0	0-3-0	2
7	E1204	English Language Communication Skills Lab	0	0-3-0	2
8	E1205	Engineering Workshop	0	0-3-0	2
9	E120F	*Professional Ethics	2	0-0-0	0
		Total	**20**	**1-9-0**	**24**

*Mandatory Course

Note: All End Examinations (Theory and Practical) are of 3 hours duration.

L – Lecture   T – Tutorial   P – Practical   D – Drawing   C – Credits.

II B.Tech – I Semester

Sl. No	COURSE CODE	COURSE TITLE	L	T-P-D	C
1	E210A	Numerical Techniques and Transforms	3	1-0-0	3
2	E218A	Drilling& Blasting	4	0-0-0	3
3	E213E	Mechanical Technology	4	1-0-0	4
4	E218B	Fundamentals of Geology	4	0-0-0	4
5	E218C	Development of Mineral Deposits	4	1-0-0	4
7	E2127	Basic Electrical and Electronics Lab	0	0-3-0	2
8	E2128	Geology Lab-I	0	0-3-0	2
9	E2129	Development of Mineral Deposits Lab	0	0-3-0	2
		Total	**19**	**3-9-0**	**24**

II B.Tech – II Semester

Sl. No	COURSE CODE	COURSE TITLE	L	T-P-D	C
1	E228A	Mine Systems Engineering	3	1-0-0	3
2	E223D	Mechanics of Fluids and Hydraulic Machinery	4	1-0-0	4
3	E228B	Mine Surveying-I	4	0-0-0	4
4	E228C	Mining Geology	3	1-0-0	3
5	E228D	Underground Coal Mining Technology	4	0-0-0	4
6	E2224	Mechanics of Fluids and Hydraulic Machinery Lab	0	0-3-0	2
7	E2225	Geology Lab - II	0	0-3-0	2
8	E2226	Mine Surveying –I Lab	0	0-3-0	2
9	E2227	*Gender sensitization	0	0-2-0	0
		Total	**18**	**3-11-0**	**24**

Note: All End Examinations (Theory and Practical) are of 3 hours duration.

L – Lecture   T – Tutorial   P – Practical   D – Drawing   C – Credits.

III B.Tech – I Semester

Sl. No	COURSE CODE	COURSE TITLE	L	T-P-D	C
1		Mechanics of Solids	3	1-0-0	4
2		Mine Health & Safety Engineering	3	0-0-0	3
3		Mine Ventilation	3	1-0-0	4
4		Surface Mining Technology	3	0-0-0	3
5		Mine Mechanization - I	3	0-0-0	3
6	**Open Elective - I**		3	0-0-0	3
		Tunneling Engineering			
		Maintenance and Reliability Engineering			
7		Mechanics of Solids Lab	0	0-3-0	2
8		Mine Ventilation Lab	0	0-3-0	2
		Total	18	2-6-0	24

III B.Tech – II Semester

Sl. No	COURSE CODE	COURSE TITLE	L	T-P-D	C
1		Machine Drawing & Computer Aided Graphics	1	0-0-3	3
2		Mine Surveying II	3	0-0-0	3
3		Underground Metal Mining Technology	3	0-0-0	3
4		Mine Environmental Engineering	3	0-0-0	3
5		Mine Mechanization-II	3	0-0-0	3
	*Substitute Course				
		Rock Slope Engineering	3	0-0-0	3
6	**Professional Elective - I**		3	0-0-0	3
		Planning of Surface Mining Project			
		Planning of Underground Metal Mining Project			
7		Mine Environmental Engineering Lab	0	0-3-0	2
8		Mine Surveying II Lab	0	0-3-0	2
9		Industrial Training	0	0-0-0	2
		Total	16	0-6-3	24

Note: All End Examinations (Theory and Practical) are of 3 hours duration.

L – Lecture   T – Tutorial   P – Practical   D – Drawing   C – Credits.

IV B.Tech – I Semester

Sl. No	COURSE CODE	COURSE TITLE	L	T-P-D	C
1		Management Science for Engineers	3	0-0-0	3
2		Mineral Processing	3	0-0-0	3
3		Rock Mechanics	3	0-0-0	3
4		Mine Legislation	3	0-0-0	3
5	**Professional Elective - II**		3	0-0-0	3
		Advanced Mining			
		Rock Excavation Engineering			
		Mine Subsidence Engineering			
6	**Professional Elective - III**		3	0-0-0	3
		Rock Fragmentation Engineering			
		Strata Control Technology			
		Prospecting, Mineral Exploration & Reserve Estimation			
		Mine Construction Engineering			
7		Mineral Processing Lab	0	0-3-0	2
8		Rock Mechanics Lab	0	0-3-0	2
9		Soft Skills Lab - I	0	0-3-0	2
		Total	**18**	**0-9-0**	**24**

IV B.Tech – II Semester

Sl. No	COURSE CODE	COURSE TITLE	L	T-P-D	C
1		Mine Ground Control	3	0-0-0	3
2	**Professional Elective - IV:**		3	0-0-0	3
		Mineral Economics			
		Mine Planning and Design			
		Mine Electrical Engineering			
3	**Professional Elective - V:**		3	0-0-0	3
		Planning of Underground Coal Mining Project			
		Computer Application in Mining			
4	E4225	Project Work	0	0-15-0	10
5	E4223	Industry Oriented Mini Project	0	0-0-0	2
6	E4224	Technical Seminar	0	0-6-0	1
7		Soft Skills Lab II	0	0-3-0	2
		Total	**9**	**0-24-0**	**24**

Note: All End Examinations (Theory and Practical) are of 3 hours duration.

L – Lecture   T – Tutorial   P – Practical   D – Drawing   C – Credits.

B.Tech. MIE	L	T-P-D	C
I Year - I Semester	3	1-0-0	3

(E120D) MATHEMATICS- I
Linear Algebra and Differential Equations (Common to All Branches)

UNIT–I
Initial Value Problems and Applications
Exact differential equations - Reducible to exact. Linear differential equations of higher order with constant coefficients: Non homogeneous terms with RHS term of the type e^{ax} , sin ax, cos ax, polynomials in x, e^{ax} V(x), xV(x)-Operator form of the differential equation, finding particular integral using inverse operator, Wronskian of functions, method of variation of parameters. Applications: Newton's law of cooling, law of natural growth and decay, orthogonal trajectories, Electrical circuits.

UNIT–II
Linear Systems of Equations
Types of real matrices and complex matrices, rank, echelon form, normal form, consistency and solution of linear systems (homogeneous and Non-homogeneous) - Gauss elimination, Gauss Jordon and LU decomposition methods- Applications: Finding current in the electrical circuits.

UNIT–III
Eigen values, Eigen Vectors and Quadratic Forms
Eigen values, Eigen vectors and their properties, Cayley - Hamilton theorem (without proof), Inverse and powers of a matrix using Cayley - Hamilton theorem, Diagonalization, Quadratic forms, Reduction of Quadratic forms into their canonical form, rank and nature of the Quadratic forms – Index and signature.

UNIT–IV
Partial Differentiation
Introduction of partial differentiation, homogeneous function, Euler's theorem, total derivative, Chain rule, Taylor's and McLaurin's series expansion of functions of two variables, functional dependence, Jacobian.
Applications: maxima and minima of functions of two variables without constraints and Lagrange's method (with constraints)

UNIT-V
TEXT BOOKS:
1. A first course in differential equations with modeling applications by Dennis G. Zill, Cengage Learning publishers.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.

REFERENCE BOOKS:
1. Advanced Engineering Mathematics by E. Kreyszig, John Wiley and Sons Publisher.
2. Engineering Mathematics by N. P. Bali, Lakshmi Publications.

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B.Tech. MIE	**L**	**T-P-D**	**C**
I Year - I Semester	**4**	**1-0-0**	**4**

(E110G) MATHEMATICS- II
Advanced Calculus
(Common to ME, CE & MIE)

UNIT–I

Laplace Transforms: Laplace transforms of standard functions, Shifting theorems, derivatives and integrals, properties- Unit step function, Dirac's delta function, Periodic function, Inverse Laplace transforms, Convolution theorem (without proof).
Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

UNIT-II

Beta and Gamma Functions: Beta and Gamma functions, properties, relation between Beta and Gamma functions, evaluation of integrals using Beta and Gamma functions.
Applications: Evaluation of integrals.

UNIT–III

Multiple Integrals: Double and triple integrals, Change of variables, Change of order of integration.
Applications: Finding areas, volumes& Center of gravity (evaluation using Beta and Gamma functions).

UNIT–IV

Vector Differentiation: Scalar and vector point functions, Gradient, Divergence, Curl and their physical and geometrical interpretation, Laplacian operator, Vector identities.

UNIT–V

Vector Integration: Line Integral, Work done, Potential function, areas, surface and volume

TEXT BOOKS:
1. Advanced Engineering Mathematics by R K Jain & S R K Iyengar, Narosa Publishers
2. Engineering Mathematics by Srimanthapal and Subodh C. Bhunia, Oxford Publishers

REFERENCE BOOKS:
1. Advanced Engineering Mathematics by Peter V. O. Neil, Cengage Learning Publishers.
2. Advanced Engineering Mathematics by Lawrence Turyn, CRC Press

B.Tech. MIE	**L**	**T-P-D**	**C**
I Year - I Semester	**3**	**0-0-0**	**3**

(E110H) ENGINEERING PHYSICS
(Common to ME, CE & MIE)

UNIT-I
Interference: Coherence, division of amplitude and division of wave front, interference in thin films (transmitted and reflected light), Newton's rings experiment.

Diffraction: Distinction between Fresnel and Fraunhoffer diffraction, diffraction due to single slit, N-slits, Diffraction grating experiment.

UNIT-II
Polarization: Introduction, Malus's law, double refraction, Nicol prism, Quarter wave and half wave plates.

Lasers: Characteristics of lasers, spontaneous and stimulated emission of radiation, Einstein coefficients, population inversion, ruby laser, helium – neon laser, semi-conductor laser, applications of lasers

UNIT-III
Fiber Optics: Principle of optical fiber, construction of fiber, acceptance angle and acceptance cone, numerical aperture, types of optical fibers: step index and graded index fibers, attenuation in optical fibers, applications of optical fibers in medicine and sensors**.**

UNIT-IV
Crystallography: Space lattice, unit cell and lattice parameters, crystal systems, Bravais lattices, atomic radius, co-ordination number and packing factor of SC, BCC, FCC, HCP and diamond, Miller indices, crystal planes and directions, inter planar spacing of orthogonal crystal systems.

UNIT-V
X-ray Diffraction and Defects in Crystals: Bragg's law, X-ray diffraction methods: Laue method, powder method; point defects: vacancies, substitutional, interstitial, Frenkel and Schottky defects, line defects (qualitative) and Burger's vector, surface defects: stacking faults, twin, tilt and grain boundaries.

TEXT BOOKS:
1.   Physics Vol. 2, Halliday, Resnick and Kramer John wiley and Sons, Edition 4.
2.   Modern Engineering Physics, K. Vijaya Kumar and S. Chandra Lingam, S. Chand and Co. Pvt. Ltd.

REFERENCE BOOKS:
1.   Introduction to Solid State Physics, Charles Kittel, Wiley Student edition.
2.   X-Ray Crystallography, Phillips, John Wiley publishers.
3.   Waves, Frank S Crawford Jr, Berkeley Physics course, Volume 3.

B.Tech. MIE	L	T-P-D	C
I Year - I Semester	3	0-0-0	3

(E115A) COMPUTER PROGRAMMING IN C
(Common to ME, CE & MIE)

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development, algorithms and flowcharts , Number Systems - Binary, Decimal, Hexadecimal and Conversions, storing integers and real numbers.
Introduction to C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators(Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements(making decisions) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

UNIT - II

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs.
Arrays – Concepts, using arrays in C, inter function communication, array applications- linear search, binary search and bubble sort, two – dimensional arrays, multidimensional arrays, C program examples.

UNIT - III

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.
Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

UNIT - IV

Enumerated, Structure ,and Union Types– The Type Definition (typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures-Nested structures, structures containing arrays, structures containing pointers, arrays of structures, structures and functions, Passing structures through pointers, self-referential structures, unions, bit fields, C programming examples, command–line arguments, Preprocessor commands.

UNIT – V

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions(standard library input / output functions for files), file status functions (error handling),
Positioning functions (fseek ,rewind and ftell), C program examples.

TEXT BOOKS:

1.   Computer Science: A Structured Programming Approach Using C, B.A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
2.   Programming in C. P. Dey and M Ghosh , Second Edition, Oxford University Press.

REFERENCE BOOKS:

1.   The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.

2.   Programming with C, B. Gottfried, 3rd edition, Schaum's outlines, McGraw Hill Education (India) Pvt Ltd.
3.   C From Theory to Practice, G S. Tselikis and N D. Tselikas, CRC Press.

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B.Tech: MIE   **L**   **T-P-D**   **C**

I Year - I Semester   **3**   **1-0-0**   **3**

(E113A) ENGINEERING MECHANICS
(Common to all Branches)

UNIT–I: **Introduction to Engineering Mechanics**–Basic Concepts. Systems of Forces: Coplanar Concurrent Forces–Forces in Space–Moment of Force and its Application–Couples and Resultant of Force Systems.

Equilibrium of Force Systems: Free Body Diagrams, Equations of Equilibrium - Equilibrium of planar Systems -Equilibrium of Spatial Systems.

UNIT–II: 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–III: 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.

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

UNIT–V: **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.

TEXT BOOKS:
1. Engineering. Mechanics / Timoshenko & Young.
2. Engineering Mechanics, Basudev Bhattacharya, Oxford Univ. Press, New Delhi, Second Edition, 2014.

REFERENCES:
1. Engineering Mechanics / Fedinand . L. Singer / Harper–Collins
2. Engineering Mechanics / S.S. Bhavikatti & J.G. Rajasekharappa 3.Engineering Mechanics / Irving. H. Shames Prentice–Hall.

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B.Tech. MIE	**L**	**T-P-D**	**C**
I Year - I Semester	**2**	**0-0-4**	**4**

(E113B) ENGINEERING GRAPHICS
(Common to ME, CE & MIE)

UNIT – I : INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Drawing and their Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions.

SCALES: Different types of Scales, Plain scales, Vernier Scale, Digonal Scale, Scales of chords.

CONSTRUCTION OF CURVES USED IN ENGINEERING PRACTICE:

Conic Sections ; Ellipse-General, Concxentric Circle, Arcs of circle and Oblong Method,Parabola- General, Tangent and Rectangle Methods, Hyperabola-General, Point/Rectangle Method

Cycloid, Epicycloid and Hypocycloid

Involute for Circle, Rectangle and Triangle

UNIT – II : PROJECTIONS OF POINTS AND LINES: Principles of Orthographic Projections – Conventions – First and Third Angle, Projections of Points and Lines inclined to planes, True lengths, Traces.

UNIT – III : PROJECTIONS OF PLANES: Projections of regular Planes, auxiliary planes and Auxiliary projection inclined to both planes.

PROJECTIONS OF SOLIDS: Projections of Regular Solids inclined to both planes, Section of right regular solids,-Prism, Cylinder, Pyramid and Cone.

UNIT – IV: DEVELOPMENT OF SURFACES: Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramid Cone.

UNIT – V: 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.

ORTHOGRAPHIC PROJECTIONS: Conversion of Isometric Views to Orthographic Views – Conventions.

TEXT BOOKS :
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.

B.Tech. MIE	L	T-P-D	C
I Year – I Semester	0	0-3-0	2

(E1103) ENGINEERING PHYSICS LAB
(Common to ME, CE &MIE)

Cycle-I

EXPERIMENT-1: Dispersive power of the material of a prism – Spectrometer.

EXPERIMENT-2: Torsional pendulum – Rigidity modulus.

EXPERIMENT-3: Newton's Rings – Radius of curvature of Plano convex lens.

EXPERIMENT-4: Melde's experiment – Transverse and longitudinal modes.

EXPERIMENT-5: Charging, discharging and time constant of an R-C circuit.

EXPERIMENT-6: L-C-R circuit – Resonance & Q-factor.

Cycle-II

EXPERIMENT-7: Magnetic field along the axis of current carrying coil – Stewart and Gees method and to verify Biot – Savart's law.

EXPERIMENT-8: Study the characteristics of LED and LASER diode.

EXPERIMENT-9: Bending losses of fibers & Evaluation of numerical aperture of a given fibre.

EXPERIMENT-10:. Energy gap of a material of p-n junction.

EXPERIMENT-11: Determination of wavelengths of white source – Diffraction grating.

EXPERIMENT-12: Wavelength of light, resolving power and dispersive power of a diffraction grating using laser.

EXPERIMENT-13: Dielectric constant of a material / V-I characteristics of a solar cell.

Note: Minimum 10 experiments must be performed.

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B.Tech. MIE   **L   T-P-D   C**

I Year - I Semester   **0   0-3-0   2**

(E1104)COMPUTER PROGRAMMING IN C LAB
(Common to ME, CE & MIE)

1.   **a)** Write a C program to find the factorial of a positive integer.

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

2.   **a)** Write a C program to determine if the given number is a prime number or not.

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.

3.   **a)** Write a C program to construct a pyramid of numbers.

b)   Write a C program to calculate the following Sum: $Sum=1-x^2/2! +x^4/4!-x^6/6!+x^8/8!-x^{10}/10!$

4.   **a)** The least common multiple (lcm) of two positive integers a and b is the smallest integer that is evenly divisible by both a and b. Write a C program that reads two integers and calls lcm (a, b) function that takes two integer arguments and returns their lcm. The lcm (a, b) function should calculate the least common multiple by calling the gcd (a, b) function and using the following relation:

LCM (a,b) = ab / gcd (a,b)

b)   Write a C program that reads two integers n and r to compute the ncr value using the following relation:

ncr (n,r) = n! / r! (n-r)! . Use a function for computing the factorial value of an integer.

5.   **a)** Write C program that reads two integers x and n and calls a recursive function to compute xn

b)   Write a C program that uses a recursive function to solve the Towers of Hanoi problem.

c)   Write a C program that reads two integers and calls a recursive function to compute ncr value.

6.   **a)** Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user using Sieve of Eratosthenes algorithm.

b)   Write a C program that uses non recursive function to search for a Key value in a given list of integers. Use linear search method.

choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.

b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers. Use binary search method.

8. **a)** Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.

b) Write a C program that reads two matrices and uses functions to perform the following:

i)   Addition of two matrices

ii)   Multiplication of two matrices

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

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

ii)   to delete n characters from a given position in a given string.

b) Write a C program that uses a non recursive function to determine if the given string is a Palindrome or not.

10. **a)** Write a C program to replace a substring with another in a given line of text.

b)   Write a C program that reads 15 names each of up to 30 characters, stores them in an array, and uses an array of pointers to display them in ascending (ie. alphabetical) order.

11. **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 positive integer to a roman numeral. Ex. 11 is converted to XI.

12. **a)** Write a C program to display the contents of a file to standard output device.

b)   Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.

13. **a)** Write **a C** program to count the number of times a character occurs in a text file. The file name and the character are supplied as command-line arguments.

b)   Write a C program to compare two files, printing the first line where they differ.

14. **a)** Write a C program to change the nth character (byte) in a text file. Use fseek function.

b)   Write a C program to reverse the first n characters in a file. The file name and n are specified on the command line. Use fseek function.

15. **a)** Write a C program 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).

b)   Define a macro that finds the maximum of two numbers. Write a C program that uses the macro and prints the maximum of two numbers.

Reference Books:

1.   Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

2.   Computer Programming in C, V. Rajaraman, PHI.

3.   Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.

4.   C++: The complete reference, H. Schildt, TMH Publishers.

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B.Tech. MIE	**L**	**T-P-D**	**C**
I Year - I Semester	**2**	**0-0-0**	**0**

(E11OE) ENVIRONMENTAL STUDIES
(Common to CSE,ME,MIE& IT)

UNIT-I:

Ecosystems , Natural Resources&Biodiversity: concept, Classification of Resources:Water resources, Land resources, Forest resources, Mineral resources , Energy resources. Concept of ecosystem, Classification of ecosystem, Functions of ecosystem. Biodiversity, levels,hotspots, values of biodiversity, threats to biodiversity, conservation of biodiversity.

UNIT-II:

Global Environmental Probelems And Global Efforts: Deforestation Green house effect, Global Warming, Sea level rise, Ozone depletion. International conventions/protocols green-belt-development, Concept of Green Building, Clean Development Mechanism(CDM).

Environmental Impact Assessment (Eia) And Environmental Management Plan: definition of Impact, classification of impacts, methods of baseline data acquisition. Impacts on different components: such as human health resources, air, water, flora, fauna and society, impact assessment methodologies. Environmental management plan (EMP)

UNIT-III:

Environmental Policy, Legislation, Rules And Regulations & Towards Sustainable Future: Concept of Sustainable Development, Threats to Sustainability, Strategies for achieving Sustainable development, Environmental Ethics, Environmental Economics, Concept of Green Computing.

Text Books:
1. Text Book Of Environmental Science and Technology by M.Anji Reddy 2007
2. Principles of Environmental Science and Engineering by P.Venugopal Rao
3. Introduction to Environmental Studies by K.Mukkanti
4. Text book of Envirtonmental Studies by Kaushik&Anubha Kaushik

Reference Books:
1. Tata McgrawHill : Introduction to Environmental Studies by Benny Joseph
2. Environmental studies by ErachBharucha 2005, University Grants Commission, University Press

B.Tech. MIE	L	T-P-D	C
I Year - II Semester	3	0-0-0	3

(E120D) APPLIED PHYSICS
(Common to ME,CE & MIE)

UNIT - I

Elastic properties: stress and strain, Hooke's law, elastic behavior of a material, factors affecting elasticity, three moduli of elasticity, work done for unit volume in deforming a body, relation between three moduli of elasticity, determination of rigidity modulus – torsional pendulum.

UNIT - II

Acoustics of buildings and acoustic quieting: Introduction, basic requirement for the acoustically good halls, reverberation and time of reverberation, transmission of sound and transmission loss, factors affecting the architectural acoustics and their remedy, sound absorbing materials, sabine formulae, absorption coefficients, stadium seating, movie theater, acoustic quieting,

UNIT - III

Ultrasonics: Introduction, production of ultrasonic waves, magneto striction method, piezo electric method, detection of ultrasonic waves, properties of ultrasonic waves, use of ultrasonics for nondestructive testing, applications of ultrasonics.

UNIT - IV

Dielectric Properties: Electric dipole, dipole moment, dielectric constant, polarizability, electric susceptibility, displacement vector, electronic, ionic and orientation polarizations and calculation of their polarizabilities, internal field, Clausius-Mossotti relation, Piezoelectricity, pyroelectricity and ferroelectricity-$BaTiO_3$ structure.

UNIT - V

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, hysteresis curve based on domain theory, soft and hard magnetic materials, properties of anti-ferro and ferri-magnetic materials. Superconductivity: Superconductivity phenomenon, Meissner effect, applications of superconductivity.

Text books:
1. Solid State Physics, A. J. Dekkar, MacMillan publishers
2. Fundamentals of Physics, Alan Giambattisa, BM Richardson and Robert C Richardson, Tata McGraw hill Publishers
3. Fundamentals of Acoustics, Kinster and Frey, John Wiley and Sons.

Reference Books:
1. Solid state physics, Charles Kittel, Wiley student edition
2. University Physics, Francis W. Sears, Hugh D. Young, Marle Zeemansky and Roger A Freedman, Pearson Education.
3. Introduction to Magnetic Materials, B.D. Cullity, C.D.Graham, A John Wiley & Sons, Inc., Publication.
4. Elastic and Inelastic Stress Analysis, Irving H. Shames, Francis A. Cozzarelli, Taylor, & Francis Group.

B.Tech.   MIE   **L   T/P/D   C**

I Year – II Semester   **4   0-0-0   4**

(E12OG) ENGINEERING CHEMISTRY
(Common to ME, CE &MIE)

UNIT-I:

Water and its treatment: Introduction – hardness of water – causes of hardness – types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Numerical problems. Potable water and its specifications- Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and

Ozonation. Defluorination – Nalgonda technique - Determination of F^- ion by ion- selective electrode method.

Boiler troubles:

Sludges, scales and Caustic embrittlement. Internal treatment of Boiler feed water (Calgon conditioning – Phosphate conditioning - Colloidal conditioning) .Softening of water by ion-exchange processes. Desalination of water – Electrodialysis & Reverse osmosis. Numerical problems.

UNIT-II:

Electrochemistry and Batteries:

Electrochemistry: Electrode- electrode potential, standard electrode potential, types of electrodes – Construction and functioning of Standard hydrogen electrode, calomel, Quinhydrone and glass electrode. Nernst equation - electrochemical series and its applications. Electrochemical cells: Daniel cell – cell notation, cell reaction and cell emf – Potentiometric titrations and Applications- Determination of pH and EMF. Concept of concentration cells-electrolyte concentration cell. Numerical problems.

Batteries: Cell and battery - Primary battery (dry cell, alkaline cell and Lithium cell) and Secondary battery (lead acid, Ni-Cd and lithium ion cell), **Fuel cells:** Hydrogen –oxygen, phosphoric acid and methanol-oxygen fuel cells – Applications.

UNIT-III:

Polymers: Definition – Classification of polymers with examples – Types of polymerization –

addition and condensation polymerization with examples. **Plastics:** Definition and characteristics-thermoplastic and thermosetting plastics, compounding and fabrication of plastics (compression and injection molding). Preparation, Properties and engineering applications of PVC and Bakelite.

Fibers: Characteristics of fibers – preparation, properties and applications of Nylon-6, 6 and Dacron. Kevlar- Liquid crystal polymers-Applications.

Rubbers: Natural rubber and its vulcanization.

Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

Biodegradable polymers: Concept and advantages - Polylactic acid and poly vinyl alcohol and

UNIT-IV:

Fuels and Combustion: Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking – types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol
- Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG.
Combustion: Definition, Calorific value of fuel – HCV, LCV-Dulongs Formula; Calculation of air quantity required for combustion of a fuel.

UNIT-V

Engineering Materials and applications:

Lubricants-Classification of lubricants with examples-characteristics of a good lubricants – mechanism of lubrication-properties of lubricants.

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

Nanomaterials: Introduction, Preparation-Top down & bottom up process-sol gel method and self-assembly process. Applications of nanomaterials.

Composites: Introduction- Constituents of composites – advantages, classification and constituents of composites. Fiber reinforced plastics (FRP). Applications of composites.

Text books:

1.   Engineering Chemistry by P.C. Jain and M. Jain, Dhanpatrai Publishing Company, New Delhi

2.   Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, New Delhi

3.   Engineering Chemistry by Shashi Chawla, Dhanpatrai and Company (P) Ltd. Delhi

Reference Books:

1.   Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi

2.   Engineering Chemistry by Thirumala Chary and Laxminarayana, Scitech Publishers, Chennai

3.   Engineering Chemistry by Andhra Naidu. B.S Publications.

4.   Chemistry of Engineering Materials by CV Agarwal, C.P Murthy, A.Naidu, BS Publications.

B.Tech. MIE	**L**	**T-P-D**	**C**
I Year - II Semester	**4**	**1-0-0**	**4**

(E120C) Mathematics - III
Statistical and Numerical Methods
(Common to All Branches)

UNIT – I

Random variables and Distributions:

Introduction, Random variables, Discrete random variable, Continuous random variable, Probability distribution function, Probability density function, Expectation, Moment generating function, Moments and properties. Discrete distributions: Binomial and geometric distributions. Continuous distribution: Normal distributions.

UNIT – II

Sampling Theory: Introduction, Population and samples, Sampling distribution of means (σ Known)-Central limit theorem, t-distribution, Sampling distribution of means (σ unknown)-Sampling distribution of variances – χ^2 and F- distributions, Point Estimation, Maximum error of estimate, Interval estimation.

UNIT – III

Tests of Hypothesis: Introduction, Hypothesis, Null and Alternative Hypothesis, Type I and Type II errors,

Level of significance, one tail and two-tail tests, Tests concerning one mean and proportion, two means

-proportions and their differences-ANOVA for one-way classified data.

UNIT – IV

Algebraic and Transcendental Equations & Curve Fitting: Introduction, Bisection Method, Method of False position, Iteration methods: fixed point iteration and Newton Raphson methods. Solving linear system of equations by Gauss-Jacobi and Gauss-Seidal Methods.

Curve Fitting: Fitting a linear, second degree, exponential, power curve by method of least squares.

UNIT – V

Numerical Integration and solution of Ordinary Differential equations: Trapezoidal rule- Simpson's 1/3rd and 3/8th rule- Solution of ordinary differential equations by Taylor's series, Picard's method of successive approximations, Euler's method, Runge-Kutta method (second and fourth order)

Text Books:

1.   Probability and Statistics for Engineers by Richard Arnold Johnson, Irwin Miller and John E. Freund, New Delhi, Prentice Hall.
2.   Probability and Statistics for Engineers and Sciences by Jay L. Devore, Cengage Learning.
3.   Numerical Methods for Scientific and Engineering Computation by M. K. Jain, S. R.
4.   Iyengar and R. K. Jain, New Age International Publishers

References:

1.   Fundamentals of Mathematical Statistics by S. C. Guptha & V. K. Kapoor, S. Chand.
2.   Introductory Methods of Numerical Analysis by S. S. Sastry, PHI Learning Pvt. Ltd.
3.   Mathecs for engineers and scientists by Alan Jeffrey, 6th edition, CRC press.

B.Tech. MIE	L	T/P/DC

I Year – II Semester   3   0-0-03

(E120H) PROFESSIONAL COMMUNICATION IN ENGLISH
(Common to ME, CE &MIE)

Reading Skills: Objectives:

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

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

3.   Skimming and Scanning the text

4.   Intensive and Extensive Reading

5.   Reading for Pleasure

6.   Identifying the topic sentence

NOTE: The students will be trained in reading skills using the prescribed texts for detailed study. They will be tested in reading comprehension of different 'unseen' passages which may be taken from 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 create an awareness in students about the components of different forms of writing, beginning with the lower order ones through;

3.   Writing of sentences

4.   Use of appropriate vocabulary

5.   Paragraph writing

6.   Coherence and cohesiveness

7.   Narration / description

8.   Note Making

9.   Formal and informal letter writing

10.   Describing graphs using expressions of comparison

In order to improve the proficiency of the students in the acquisition of language skills mentioned

UNIT –I:

Chapter entitled '*Presidential Address" by Dr. A.P.J. Kalam* from *"Fluency in English– A Course book for Engineering Students"* published by Orient BlackSwan, Hyderabad.

Vocabulary: Word Formation -- Root Words --The Use of Prefixes and Suffixes– Collocations– Exercises for Practice.

Grammar: Punctuation – Parts of Speech- Articles -Exercises for Practice.

Reading: *Double Angels* by David Scott-Reading and Its Importance- Techniques
                  for Effective Reading- Signal Words- Exercises for Practice

Writing: Writing Sentences- Techniques for Effective Writing-- Paragraph Writing-Types, Structure and Features of a Paragraph-Coherence and Cohesiveness: Logical, Lexical and Grammatical Devices - Exercises for Practice

UNIT –II:

Chapter entitled *Satya Nadella: Email to Employees on his First Day as CEO* from *"Fluency in English– A Course book for Engineering Students"* Published by Orient BlackSwan, Hyderabad.

Vocabulary: Synonyms and Antonyms – Homonyms, Homophones, Homographs- Exercises for Practice (Chapter 17 *'Technical Communication- Principles and Practice".*
Third Edition published by Oxford University Press may also be followed.)

Grammar: Verbs-Transitive, Intransitive and Non-finite Verbs – Mood and Tense— Gerund – Words with Appropriate Prepositions – Phrasal Verbs - Exercises for Practice

Reading: Sub-skills of Reading- Skimming, Scanning, Extensive Reading and Intensive Reading - *The Road Not Taken* by **Robert Frost** -- Exercises for Practice

Writing: Letter Writing –Format, Styles, Parts, Language to be used in Formal Letters-Letter of Apology – Letter of Complaint-Letter of Inquiry with Reply – Letter of Requisition –- Exercises

UNIT –III:

From the book entitled *'Technical Communication- Principles and Practice".* *Third Edition* published by Oxford University Press.

Vocabulary: Introduction- A Brief History of Words – Using the Dictionary and Thesaurus– Changing Words from One Form to Another – Confusables (From Chapter
17 entitled '*Grammar and Vocabulary Development*')

Grammar: Tenses: Present Tense- Past Tense- Future Tense- Active Voice – Passive Voice- Conditional Sentences – Adjective and Degrees of Comparison. (From Chapter 17 entitled '*Grammar and Vocabulary Development*')

Reading: Improving Comprehension Skills – Techniques for Good Comprehension- Skimming and Scanning- Non-verbal Signals – Structure of the Text – Structure of Paragraphs – Punctuation – Author's viewpoint (Inference) – Reader
Anticipation: Determining the Meaning of Words – Summarizing- Typical Reading Comprehension Questions. (From Chapter 10 entitled '*Reading Comprehension*')

Writing: Introduction- Letter Writing-Writing the Cover Letter- Cover Letters Accompanying Resumes- Emails. (From Chapter 15 entitled '*Formal Letters, Memos, and*

UNIT –IV:

Chapter entitled '*Good Manners"* by **J.C. Hill** from *Fluency in English – A Course book for Engineering Students"* published by Orient Blackswan, Hyderabad.

Vocabulary: Idiomatic Expressions –One- word Substitutes --- Exercises for Practice
(Chapter 17 *'Technical Communication- Principles and Practice". Third*
Edition published by Oxford University Press may also be followed.)

Grammar: Sequence of Tenses- Concord (Subject in Agreement with the Verb) – Exercises for Practice

Reading: *'If"* poem by **Rudyard Kipling**--Tips for Writing a Review --- Author's Viewpoint – Reader's Anticipation-- Herein the Students will be required to Read and Submit a Review of a Book (Literary or Non-literary) of their choice
– Exercises for Practice.

Writing: Information Transfer-Bar Charts-Flow Charts-Tree Diagrams etc.,-- Exercises for Practice.

Introduction - Steps to Effective Precis Writing – Guidelines- Samples (Chapter
12 entitled '*The Art of Condensation*' from *Technical Communication- Principles and Practice.*

UNIT –V:

Chapter entitled „*Father Dear Father*" **by Raj Kinger** from *Fluency in English – A Course book for Engineering Students"* Published by Orient BlackSwan, Hyderabad

Vocabulary: Foreign Words—Words borrowed from other Languages- Exercises for Practice

Grammar: Direct and Indirect Speech- Question Tags- Exercises for Practice

Reading: Predicting the Content- Understanding the Gist – SQ3R Reading Technique- Study Skills – Note Making - Understanding Discourse Coherence – Sequencing Sentences. (From Chapter 10 entitled **'Reading Comprehension'**

-

Technical Communication- Principles and Practice. Third Edition published by Oxford University Press.)

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports –Formats- Prewriting – Structure of Reports (Manuscript Format) - Types of Reports - Writing the Report. (From Chapter 13 entitled **'Technical Reports'** - *Technical Communication- Principles and Practice. Third Edition* published by Oxford University Press.)

Text Books :

1. *"Fluency in English – A Course book for Engineering Students"* by Board of Editors**: Hyderabad: Orient BlackSwan Pvt. Ltd. 2016. Print.**

2. Raman, Meenakshi and Sharma, Sangeeta*. "Technical Communication- Principles and Practice".* **Third Edition. New Delhi: Oxford University Press. 2015. Print.**

Reference Books :

1. Green, David. *Contemporary English Grammar –Structures and Composition.* MacMillan India. 2014 (Print)

2. Rizvi, M. Ashraf. *Effective Technical Communication*. Tata Mc Graw –Hill. 2015 (Print)

B.Tech. MIE	**L**	**T-P-D**	**C**
I Year - II Semester	**4**	**0-0-0**	**4**

(E122A) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to ME, CE &MIE)

UNIT – I: Electrical circuits:
R-L-C Parameters, voltage and current, Independent and Dependent Sources, Source Transformation-V-I relationship for passive elements, Kirchhoff's Laws, Network reduction techniques-series, parallel, series-parallel, star-to-delta, delta-to-star transformation, Nodal Analysis .

Single Phase AC Circuits : R.M.S. and Average values, Form Factor, steady state analysis of series, parallel and series-parallel combinations of R, L and C with sinusoidal excitation, concept of reactance, impedance, susceptance and admittance –phase and phase difference, concept of power factor, phasor notation, complex and polar forms ofrepresentation.

UNIT-II: Resonance:
Series and parallel resonance circuits, concept of bandwidth and Q factor, Locus Diagrams for RL, RC and RLC Combinations for various parameters.

Network Theorems: Thevenin's, Norton's, Maximum power Transfer, Superposition, Reciprocity, Tellegen's, Milliman's and Compensation theorems for DC and AC excitations.

UNIT-III: P-N Junction Diode:
P-N junction as a Diode, Symbol, Diode equation, volt-Ampere characteristics, Temperature dependence, Ideal versus practical Diode, static and dynamic resistances, Diffusion and Transition Capacitances.

Rectifiers and Filters:
Diode rectifier: Half wave Rectifier, Ripple Factor-Full Wave Rectifier, Bridge Rectifier, Rectifiers with Filters: Inductive Filters, Capacitive Filters, L-section Filters, π- section Filters.

UNIT-IV: Bipolar Junction Transistor (BJT):
Symbol, Construction, principle of Operation, Current Components in a junction transistor Common Emitter, Common Base and Common Collector configurations.

Transistor Biasing -Operating point, DC and AC load lines, Fixed Bias, Collector to Base bias, Self Bias (Voltage divider bias), Bias stability, Stabilization against variations in V_{BE} , β, and I_{CO}.

Small signal Transistor Analysis, h- Parameters, Definitions, Determination of h- parameters from CE transistor characteristics, Analysis of CE, CB and CC configurations using h-parameters and their Comparison.

UNIT-V: Junction Field Effect Transistor
Construction, Principle of Operation, pinch-off voltage, Volt-Ampere characteristics, comparison of BJT and JFET, small signal Model, MOSFET: Depletion and Enhancement FETs-construction characteristics.

Special Purpose Devices: Breakdown Mechanisms in semi-Conductor Diodes, Zener diode characteristics, Zener diode as a simple regulator, principle of operation and Characteristics of Tunnel Diode (with help of Energy band diagram) Varactor Diode, Principle of operation of SCR.

TEXT BOOKS:
1　　　　Millman's Electronic Devices and circuits –J.Millman and C.Halkias, McGraw Hill Mc Graw Hill
2.　　　　Micro Electronics by David bell
3.　　　　Network Theory by Sudhakar, Shyam Mohan Palli, TMH.

REFERENCES:
1.　　　　Network Theory by N.C.Jagan and C.Lakshminarayana, B.S.Publications.

2.　　　　Electronic Devices and Circuits- R.L.Boylestad and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.

3.　　　　Engineering circuit analysis-by William Hayt and Jack E.Kemmerly, Mc Graw Hill Company, 6th edition.

4.　　　　Linear circuit analysis (time domain phasor and Laplace transform approaches)-2nd edition by Raymond A.DeCarlo and Pen-Min-Lin, Oxford University Press-2004.

B.Tech. MIE	**L**	**T-P-D**	**C**
I Year - II Semester	**0**	**0-3-0**	**2**

(E1201) ENGINEERING CHEMISTRY LAB
(Common to all Branches)

Cycle-I

Experiment-1: Determination of Conc. of KMnO4 by colorimetric method.

Experiment-2: Estimation of copper by colorimetric method.

Experiment-3: Conductometric titration of mixture of acids vs strong base.

Experiment-4: Titration of strong acid vs strong base by potentiometry.

Experiment-5: Determination of pH of the given solution.

Experiment-6: Determination of viscosity of sample oil by redwood viscometer

Experiment-7: Preparation of Fe nanoparticles

Cycle-II

Experiment-7: Estimation of hardness of water by EDTA method.

Experiment-8: Estimation of manganese dioxide in pyrolusite.

Experiment-9: Determination of Surface tension of lubricants

Experiment-10: Preparation of Aspirin

Experiment-11: Preparation of Thiokol rubber

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B.Tech. MIE   **L   T/P/D   C**

I Year - II Semester   **0   0-3-0   2**

(E1204) ENGLISH LANGUAGE COMMUNICATION SKILLS (ELCS) LAB
(Common to ME, CE &MIE)

Exercise – I CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs- Consonant Clusters- Past Tense Marker and Plural Marker.

Testing Exercises

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II CALL Lab:

Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Sentence Stress – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Sentence Stress – Intonation.

Testing Exercises

ICS Lab:

Understand: Features of Good Conversation – Strategies for Effective Communication.

Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III CALL Lab:

Understand: Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation.

Testing Exercises

ICS Lab:

Understand: Descriptions- Narrations- Giving Directions and Guidelines.

Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise – IV CALL Lab:

Understand: Listening for General Details. *Practice:* Listening Comprehension Tests. *Testing Exercises*

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication-Presentation Skills.

Practice: Making a Short Speech – Extempore- Making a Presentation.

Exercise – V CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests.

Testing Exercises

ICS Lab:

Understand: Group Discussion- Interview Skills.

Practice: Group Discussion- Mock Interviews.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. **Computer Assisted Language Learning (CALL) Lab:**

The Computer Assisted Language Learning Lab has to accommodate 40 students with

40 systems, with one Master Console, LAN facility and English language learning software for self-study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

Computers with Suitable Configuration High Fidelity Headphones

2. **Interactive Communication Skills (ICS) Lab:**

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio and video system and camcorder etc.

Lab Manuals:

1) A book entitled –*ELCS Lab Manual – A Workbook for CALL and ICS Lab Activities"* by Board of Editors: Hyderabad: Orient BlackSwan Pvt. Ltd. 2016. Print.

2) Hart, Steve; Nair, Aravind R.; Bhambhani, Veena. *"EMBARK- English for undergraduates"* Delhi: Cambridge University Press. 2016. Print.

Suggested Software:

1) Cambridge Advanced Learners' English Dictionary with CD.

2) Grammar Made Easy by Darling Kindersley.

3) Punctuation Made Easy by Darling Kindersley.

4) Oxford Advanced Learner's Compass, 8th Edition.

5) English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.

6) English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.

7) TOEFL and GRE (KAPLAN, AARCO and BARRONS, USA, Cracking GRE by CLIFFS).

References:

1) Jayashree Mohanraj. *Let Us Hear Them Speak*. New Delhi: Sage Texts. 2015. Print. Hancock, M. *English Pronunciation in Use. Intermediate Cambridge*: Cambridge University Press. 2009. Print.

B.Tech. : MIE	**L**	**T-P-D**	**C**
I Year - II Semester	**0**	**0-3-0**	**2**

(E1205) ENGINEERING WORKSHOP
(Common to ME, CE & MIE)

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

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B.Tech. MIE	**L**	**T-P-D**	**C**
I Year – I1 Semester	**2**	**0-0-0**	**0**

(E12OF) PROFESSIONAL ETHICS
(Common to CSE, IT, ME & CIV)

UNIT - I:
Basic Concepts

Introduction, Ethics-Ethical Dilemma-Morals, , emotional, intelligence, Indian and western thoughts on ethics, value education, domains of learning, human values, attitudes, Basic Ethical Principles. Meaning of profession, professionalism, professional's roles and professional risks, professional accountability, successful professional, engineering professionals, engineering ethics, roles of engineers,

UNIT - II:
Global issues and safety

Introduction, current scenario, business ethics, environmental ethics, computer ethics, ethical hacking and its dilemma, ethics in research, intellectual property rights, patents, trademarks, managers and engineer's responsibility , Engineering ethics.

UNIT - III
Ethical codes and audits

Introduction need and types of professional ethical codes, sample standard codes, ethical codes for corporate entities and non-profit organization, charitable institutions, limitations of the codes, need for ethical audit, ethical profile of organizations

Reference Books:
1. **Professional ethics** and human value by D.R.Kiran, Tata McGraw Hills education.
2. **Ethics in engineering** by Mike W. Martin and Roland Schinzinger, Tata McGraw Hills education.
3. **Fundamental of Ethics** by Edmund G Seebauer and Robert L.Barry, Oxford university press.
4. **Professional ethics** and human values by R.S.Nagarajan, New age international.
5. **Professional ethics** by R. Subramanian, Oxford press.

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B.Tech. MIE   **L   T/P/D   C**

II Year - I Semester   **3   1-0-0   3**

(E210A) Numerical Techniques and Transforms (Common to ME. MIE & CE)

UNIT–I:
Finite Differences and Interpolation
Finite Differences- Differences of Polynomial- Factorial Notation-Relation between the operators-To find one or more missing terms- Newtons interpolation formulae- Central Difference interpolation Formulae-Gauss interpolation Formulae-Interpolation with unequal intervals-Lagrange's interpolation

UNIT–II:
Numerical Solution of Partial Differential Equations
Introduction-Classification of second order equations-Finite approximation to derivatives-Elliptic Equations-Solution of Laplace equations-Solutions Poisson's equation-Parabolic Equations-Solution of heat equation-Hyperbolic equations-Solution of Wave equation

UNIT–III:
Applications of Derivatives :
Radius, center and circle of curvature, evolutes and envelopes. Tracing of curves in Cartesian, and polar forms.

UNIT–IV:
Fourier Series
Introduction-Euler's Formulae-Conditions foe Fourier Expansion-Functions having points of Discontinuity-change of interval-Odd and Even function-Expansions of Odd or Even periodic functions-Half range series

UNIT-V:
Z-Transforms
Introduction-Definition-Some standard Z-Transforms-Linearity Property-Damping Rule-some standard result-Shifting u_n to the right and to the left Multiplication by n- Two basic theorems (Initial and Final) – Some useful Z-transforms-Some useful inverse Z-transforms-Convolution Theorem-Convergence of Z-Transforms-Two side Z- Transform-Evaluation of Z-Transforms-Applications to Difference Equations

Text Books:

 1. Higher Engineering Mathematics by Dr. B. S. Grewal, KhannaPublishers.
 2. Advanced Engineering Mathematics by E. Kreyszig, John Wiley and Sons Publisher
References:
 1. Engineering Mathematics by N. P. Bali, Lakshmi Publications.
 2. Introductory methods of Numerical analysis by S.S.Sastry, PHI Learning Pvt. Ltd

B.TECH- MIE

II Year I Semester   L   T-P-D   C
                                                                     4   0-0-0   3

(E218A) DRILLING& 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, Bore hole surveying, Bore Hole Logging, Novel and special drilling techniques, Horizontal and Directional Drilling.
Production Drilling: Various methods of drilling-Percussion, Rotary and Rotary Percussive Drilling.

UNIT-II
Drillability: Factors affecting drilling-Thrust, RPM, Flushing etc., Mechanics of drilling:; Drillability and Drilling Index, Micro Bit Drilling, Physico-mechanical Properties effecting drillability, Design and Selection of Drills, Bit wear, Reconditioning of Drill Bits; Drill Hole Economics, Case Studies.

UNIT-III
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.
Accessories and Tools: Accessories, Detonators, Safety Fuses, Detonating Cords, Relays, NONEL, Exploders, sequential Blasting Machines and other Short Firing Tools, Testing Explosives, Storage, Transpiration and Handling of Explosives.

UNIT-IV
Under Ground Blasting: Drill Patterns for Underground Excavations, Shafts, Blast Pattern designs, Smooth Blasting, Induced Blasting, Charge Ratios, Rock Fragmentation, Dangers associated with under ground blasting, Blasting Economics, Gallery Blasting, Statutory Requirements, Computer Design of Underground blast, Precautionary Measures, Mis fires, Solid Blasting.

UNIT-V
Open Pit Blasting: Methods of blasting in Open Cast Mines, Blast Design, Primary and Secondary Blasting, Fragmentation Studies, Accidents due to Blast in Open Cast and Preventive Measures. Environmental Impact due to Blasting, Ground Vibrations, Fly Rocks, Dust, Fumes, Water Pollution, Dimensional Stone Blasting, Control Blasting, Statutory Requirements, Computer Design of Open Cast Blast.
Blasting for Civil Construction and Trenches: Blasting for Road Constructions, Trenches Cutting in soft and Hard Rocks, Demolition of Building Etc., Under Water Blasting.

TEXT BOOKS:

1. Roy Pijush Pal, Blasting in Ground Excavations and Mines, Oxford and IBH Publications, 1 Edition, 1993

2. C.P.Chugh, Drilling Technology hand Book, Oxford and IBH, 1 Edition, 1977.

REFERENCE BOOK:

1. Roy Pijjush Pal, Rock Blasting effect and operation, A.A.Balkema, 1 Edition, 2005.

2. D.J.Deshmukh, Elements of Mining Technology, Vol 1, Central Techno, 7th Edition, 2001.

3. B.Hamphill Gary, Blasting Operations, Mc Graw Hill, 1 Edition, 1981.

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B.TECH- Mining   L   T-P-D   C

II Year I SEMESTER   **3   1-0-0   3**

(E213E) 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.

Unit-II

Belt and Rope 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.

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.

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-IV

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

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.

Unit-V

Air compressors, Types of air compressors, reciprocating and rotary compressors like roots blower, vane type, centrifugal, axial flow, screw type. Two stage air compressor with inter cooling, simple problems.

Distribution and applications of compressed air in mining machinery.

TEXT BOOKS:
1.   Theory of machines by R.S KHURMI & Thermal Engineering 1 by PAKIRAPPA
2.   Theory of machines by R.K BANSAL & Thermal Engineering by R.K RAJPUT

REFERENCE BOOKS:

1. IC Engines by V. Ganeshan.
2. Theory Machines by Rattan.
3. Thermal Engineering – R.S Khurmi & J.K Gupta.

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	L	T-P-D	C
B.Tech- MIE	4	0-0-0	4
II Year I Semester			

(E218B) FUNDAMENTALS OF GEOLOGY

UNIT-I INTRODUCTION

Origin and age of earth: Solar system, origin of the earth: Evolutionary theories and catastrophic theories. Age of the Earth. Interior of the earth. Isostasy continental drift: evidences for Gondwana land. Evidence for Laurasia. Position of India. Breakup of Pangaea, plate tectonics: Crustal plates, plate boundaries plate margins, opening and closing of oceans. Convection current Hypothesis, theory of seafloor spreading and evidences.

UNIT-II MINEROLOGY

Definition and classification of minerals. Physical properties of minerals: Color, streak, Luster, Hardness, Habit, cleavages, Fracture, or feel, tenacity fluorescence, phosphorescence and magnetism. Specific gravity and its determination, chemical properties of minerals: Isomorphism, Polymorphism
AndPseudomorphism.
Silicate mineral structures: Nesoslicates, Sorosilicates, cycloSilicates (Ring Silicates)
InoSilicates (Chain silicates), phyllosilicates (sheet silicates). Tectosilicates {Frame silicates}
Important members of the following mineral groups
Feldspar, Pyroxene, Amphibole, Mica, Olivine, Garnet, Chlorite and Serpentine

UNIT-III PETROLOGY:

Igneous Rocks: Shells and its composition of the earth. Chemical composition of igneous rocks: Acidic Rocks and Basic Rocks.
Classification of igneous rocks based on relative silica content, kinds of feldspar, mafic minerals and texture. Tabular classification of igneous rocks. Textures & Structures of igneous rocks. Forms of igneous bodies: Extrusive and intrusive bodies: Batholith, Lopolith, Laccolith, phacolith, sill, dyke and Volcanic plug. Lava flows
Origin of igneous rocks. Acid magma and basic magma. Differentiation, liquid immiscibility, fractional crystallization, Gravity settling and gases transfer. Bowen's reaction series.
Important Igneous rocks: Granite, Syenite, Diorite, Gabbro, Lamprophyre, peridotite, Rhyolite, Trachyte, Andesite, Dolerite and Pegmatite

UNIT-IV - SEDIMENTARY AND METAMORPHIC ROCKS

Sedimentary Rocks: Weathering and erosion of preexisting rocks, sedimentation and Lithification and diagenesis. Classification of Clastic sedimentary rocks and non Clastic sedimentary rocks. Textures and structures of sedimentary rocks. Important sedimentary rocks: Sand stone, Siltstone, mudstone, Greywacke, shale and limestone.

METAMORPHIC ROCKS

Agents of Metamorphic rocks: Heat, uniform pressure, direct pressure, or stress and chemically

actives fluids. Types of metamorphism: Contact metamorphism, Plutonic metamorphism, Regional metamorphism and matasomatism (Granitisation). Metamorphic Facies. Textures and Structures of Metamorphic rocks. Important metamorphic rocks: Slate, phyllite, Schist and Gneiss, Quartzite, Marble and Hornfelse.

UNIT-V
PALAEONTOLOGY & STRATIGRAPHY
Definition and scope of Paleontology. Preservation of fossils –Index fossils – stratigraphic importance and uses of fossils. Description of a) Foraminifera b) Brachiopod c) Lamellibranches & d) Gastropoda. Significance of distribution of Gondwana flora of India.

Introduction, Principle of stratigraphy and correlations, Geologic timescale, Physiographic divisions of India. Dharwar Super Group of Mysore and its equivalent in southern Singhbhun region (Iron ore Series). Cuddapah Super Group, Vindhyan Super Group and Kurnool Group. Gondwana Super Group.

Text Books:
1. A text book of Geology by P.K Mukerjee (The World Press Publication Culkatta)
2. Principles of Engineering Geology by K.M Bangar. Standard Publishers distributors.

Reference Books:
1. Text book of Engineering Geology by N. Chenna Kesavulu (Publication Macmillan India Ltd.)
2. Geology of India by M.S Krishnan (Publications: Higginibothams)
3. Geology of India by Ravindra Kumar

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B.Tech- MIE   **L**   **T-P-D**   **C**
II Year I Semester   **4**   **1-0-0**   **4**
            (E218C) DEVELOPMENT OF MINERAL DEPOSITS

UNIT-I
Introduction to Mining: 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
Drilling: Introduction to drilling, factors affecting drilling, types of drilling, drillability, mechanics of drilling, directional drilling and drilling equipment – selection, their merits, demerits and limitations. Different drilling patterns, Core recovery-core barrels, **Blasting**: Fundamentals of Explosive and blasting mechanism, techniques- Primary and Secondary blasting, Solid blasting. Different types of explosives-their applications. Accessories in blasting – Detonators, safety fuse, detonating fuse, nonel, relays, exploder etc.

UNIT-III
Mine Supports: Necessity, Objectives and limitations of mine supports, materials used for supports. Friction and hydraulic props, Roof bolts, chock supports, Roadway support, face supports, side supports, junction supports, supports in special conditions, setting and withdrawal of supports, systematic supporting

UNIT-IV
Mine Development: Modes of entry into deposits for underground mining- shafts, inclines, adits etc – their fields of applications.
Drivage of drifts, organization and cycle of operations, modern methods of drifting and tunnelling, roadheaders, tunnel boring machine.

UNIT-V
Shafts: 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. 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 L.Hartman, Jan M.Mutmansky. 2)Elements of mining technology Vol-I - D.J. Deshmukh

Reference Books:

    1   Principles & Practices of Coal Mining, R.D.Singh

    2. Roy Pijush Pal, Blasting in ground excavations and mines, Oxford and IBH, 1st

ed 1993 3)C.P. Chugh, Drilling technology handbook, Oxford and IBH, 1st ed, 1977

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B.Tech. MIE	L	T-P-D	C

II Year - I Semester	0	0-3-0	2

(E2127) BASIC ELECTRICAL AND ELECTRONICS LAB

(Common to ME, MIE, CSE & IT)
PART-A

EXPERIMENT 1: Verification of KVL & KCL
EXPERIMENT 2: Verification of Thevinin's & Norton's Theorem
EXPERIMENT 3: Verification of Maximum power transfer theorem .Verification of DC & AC excitation with resistive & reactive loads.
EXPERIMENT 4: Verification of superposition theorem & RMS value of complex wave
EXPERIMENT 5: Verification of compensation theorem
EXPERIMENT 6: Verification of reciprocity & millman's theorem
EXPERIMENT 7: Series & parallel resonance - Timming, Resonant frequency, Bandwidth and Q-factor determination for RLC network

PART-B

EXPERIMENT 8: PN Junction diode characteristics kit **EXPERIMENT 9:** Zener diode characteristics kit **EXPERIMENT 10:** Half wave rectifier with and without filters kit
EXPERIMENT 11: Full wave rectifier with and without filters kit
EXPERIMENT12: CE Characteristics kit

EXPERIMENT 13: CB Characteristics kit
EXPERIMENT 14 : CE Amplifier

B.Tech. MIE	**L**	**T-P-D**	**C**
II Year - I Semester	**0**	**0-3-0**	**2**

(E2128) GEOLOGY LAB – I

EXPERIMENT 1: Study of the following physical properties.
    Color and streak
    Cleavage and fracture
    Luster, Habit (or from) and Feel
    Magnetism and specific gravity

EXPERIMENT 2 : Study of minerals exhibiting Mohs scale of hardness

EXPERIMENT 3: Megascopic study and identification of important rock forming mineral specimens.

EXPERIMENT 4: Megascopic study and identification of important metallic ores.

EXPERIMENT 5: Megascopic study and identification of important non metallic ores.

EXPERIMENT 6: Megascopic study and identification of important igneous rocks.

EXPERIMENT 7: Megascopic study and identification of important Sedimentary rocks.

EXPERIMENT 8: Megascopic study and identification of important metamorphic rocks.

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B.Tech- MIE	L	T-P-D	C
II Year I Semester	0	0-3-0	2

(E2129) DEVELOPMENT OF MINERAL DEPOSITS LAB

EXPERIMENT-1 : Study of Core Barrels
EXPERIMENT-2 : Study of Fishing tools
EXPERIMENT-3 : Study of various drlling pattern in drifting & Sinking
EXPERIMENT-4 : Study of detonators
EXPERIMENT-5 : Study of Exploders
EXPERIMENT-6 : Study of Friction Prop
EXPERIMENT-7 : Study of Hydraulic Prop
EXPERIMENT-8 : Study of Roof bolts and roof stitching
EXPERIMENT-9 : Study of Sylvester prop withdrawer
EXPERIMENT-10 : Permanent lining in shafts
EXPERIMENT-11: German and English tubbing in shafts

TEXT BOOKS
1.   Elements of mining technology Vol-I - D.J. Deshmukh
2.   Explosives and blasting practices in mine – S.K.Das, Lovely Prakashan Books
Publisher, Dhanbad

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B.Tech. MIE	**L T-P-D**	**C**
II Year II- Semester	**3 0-0-0**	**3**

(E228A) 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.

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

UNIT – II
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 – III
CPM: Importance and application of CPM, Networks, early and latest start times of activities. Critical path and critical activities, Project duration, crashing of networks.

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

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

TEXT BOOKS:

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

REFERENCES :

1.   Operations Research /A.M.Natarajan, P.Balasubramani, A. Tamilarasi/ Pearson Education.
2.   Operations Research: Methods & Problems / Maurice Saseini, Arhur Yaspan & Lawrence Friedman
3.   Introduction to O.R /Taha 8e/PHI

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B.Tech. MIE **L T-P-D C**
II Year - II Semester **4 1-0-0 4**
(E223D) MECHANICS OF FLUIDS AND HYDRAULIC MACHINERY

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 and unsteady, uniform and non-uniform, laminar and turbulent, rotational and 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
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 IV
Basics of turbo machinery : Hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work done and efficiency, flow over radial vanes.
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.
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 V
Centrifugal pumps : Classification, working, work done – barometric headlosses and efficiencies specific speed- performance characteristic curves,NPSH.
Reciprocating pumps : Working, Discharge, slip, indicator diagrams.

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

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

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B.**Tech. MIE**   **L T-P-D C**
II Year - II Semester   **4 1-0-0 4**
(E228B) MINE SURVEYING – I

Unit – I : Introduction to Surveying
Overview of Plane Surveying (Chain, compass, and plane table), Objectives, Principles and classifications, use of Field Books.
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-II : Levelling
Levelling: Levelling Instruments – component parts, Temporary and Permanent adjustments – methods of levelling – Fly levelling, Differential levelling, Reciprocal levelling.
Contouring: Characteristics and uses of contours, methods of conducting contour surveys – their plotting, contour gradient.

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

Unit-V : Triangulation & Traversing
Traversing: Principles of Traversing, open traverse and closed traverse using chain /compass / Theodolite, Plotting and its methods. Closing error-adjustments, different corrections- axis method, Bowditch method, graphical method, Transit method.
Triangulation: Principles of triangulation survey, procedure of triangulation, Base line measurement.

TEXT BOOKS:
1.   Surveying – Theory and Practice by S.S.Bavikatti
2.   Mine Surveying Vol.1,2 & 3 By S.Ghatak

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.

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B.Tech. MIE   **L T-P-D C**
II Year - II Semester   **4 1-0-0 4**
(E228C) MINING GEOLOGY

UNIT-I
Structural Geology. Definition and scope-Primary and secondary structures: Bedding, lineation, foliation, cleavage, Attitude of beds, Strike and dip of formation. Description and recognition of major structural elements, Folds: Introduction, parts of folds .Nomenclature of folds:
Folds: Anticline, Syncline, Symmetrical fold, asymmetrical fold, overturn fold, recumbent fold, Isoclinal fold, homoclinal fold, closed and open folds, drag folds.
Joints: Introduction, definition, Geometrical classification of Joints.
Faults: Introduction, general Characteristics, translational and rotational movements, relative movements, normal and reverse faults. Throw and Heave. Types of faults: Dip Fault, strike fault, diagonal/oblique fault, bedding fault, parallel fault, step fault. Horst and Graben.
Unconformities: Introduction, Kinds of unconformities, recognition of unconformities.

UNIT II
Economic Geology: Aim and scope of economic geology: Definition of ore and gangue. Simple ore, complex ores, tenor and grade of ore.
Processes and formation of ore deposits: Syngenetic deposits, epigenetic deposits.
Secondary mineral deposits: Oxidation and supergene enrichment deposits, - Mechanical concentration deposits, residual/concentration deposits.

UNIT III
Occurrence and distribution of important metallic mineral deposits in India: Iron – Copper, - Lead and Zinc – Manganese – Aluminum – Chromium.
Occurrence and distribution of important non metallic mineral deposits in India: Asbestos – kyanite – Sylliminite

UNIT - IV
Coal: Origin and formation, Distribution of important coal fields in India,
Petroleum: Origin, migration and accumulation of petroleum. Reservoir and caprocks. Structural and stratigraphic traps. Distribution of oilfields in India. **Occurrence and distribution of radioactive minerals in India:** Uranium, Thorium and beryllium.

UNIT V:
Guides for locating ore deposits: a) Physiographic b) Mineralogical c) Lithological d) stratigraphical and e) structural methods of prospecting. Geological, Geochemical, and geophysical prospecting.

Ground Water: Introduction, Hydrological Cycle, origin and occurrence of ground water, vertical distribution ground water, water table.

Aquifers: Types of aquifers, confined and unconfined aquifers, perched aquifers. Porosity and permeability of rocks, Darcy's law, experimental verification of Darcy's law. Determination of hydraulic conductivity: Laboratory methods and Tracer Tests and Auger hole Tests.

TEXT BOOKS:
1. Structural Geology – Billings, M.P. Prentice Hall.
2. Economic Mineral Deposits - By Batman, John Wiley & Sons.

REFERENCE BOOKS:
1. .Economic Mineral Deposits – By Jensen M.L and Batman A.M, John Wiley & Sons.
2. A Text Book of Geology: Mukharjee P.K., The World Press Pvt. Limited Culkatta.
3. Ground Water Hydrology – By David Keith Todd, Wiley India

B.Tech. MIE   **L T-P-D C**
II Year - II Semester   **4 1-0-0 4**

(E228D) 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.
Factors affecting choice of pillar extraction, depillaring with caving, stowing, mechanized depillaring operation, organization and safety.

UNIT-IV
Layout for required outputs, types of machines, personnel and working of thick seams and blasting gallery method.
Longwall mining: Longwall methods of working, their choice, suitability, advantages and disadvantages.

UNIT-V
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.
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.

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 Publicatio.
3.   Das S.K. – Modern Coal Mining Technology, Lovely Prakasan publication.

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B.Tech. MIE   L T-P-D C

II Year - II Semester   **0 0-3-0 2**

(E2224) MECHANICS OF FLUIDS AND HYDRAULIC MACHINERY LAB

List of experiments

Experiment-1: Impact of jets on Vanes.

Experiment-2: Performance Test on Pelton Wheel.

Experiment-3: Performance Test on Single Stage Centrifugal Pump.

Experiment-4: Performance Test on Multi Stage Centrifugal Pump.

Experiment-5: Performance Test on Reciprocating Pump.

Experiment-6: Calibration of Venturimeter.

Experiment-7: Calibration of Orifice meter.

Experiment-8: Determination of friction factor for a given pipe line.

Experiment-9: Determination of loss of head due to sudden contraction in a pipeline.

Experiment-10: Verification of Bernoulli's Theorems.

Experiment-11: Performance test on Francis Turbine.

Experiment-12: Performance test on kaplan turbine.

Note:Minimum of Ten experiments are to be conducted

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B.Tech. MIE   **L T-P-D C**

II Year - II Semester   **0 0-3-0   2**
(E2225) GEOLOGY LAB – II

Experiment-1: Description and interpretation of topographic maps.
Experiment-2: Determination of strike and dip of a planar body.
Experiment-3: Three-point problems
Experiment-4: Estimation of ore reserves.
Experiment-5: Determination of hydraulic conductivity by laboratory methods.

STUDY OF GEOLOGICAL MAPS FOR
Experiment-6: Drawing geological cross-sections for finding strike and dip
Experiment-7: Determination of true and vertical thickness of beds from geological cross sections.
Experiment-8: Interpretation of structures and geological history.

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II Year - II Semester   **0 0-3-0   2**

(E2226) MINE SURVEYING-I LAB

Experiment-1: Ranging a line, measuring the distance between two points, pacing.
Experiment-2: Chain triangulation, booking, calculation of areas and plotting.
Experiment-3: Traversing with compass.

Experiment-4: Calculation of RL's – Simple Leveling Technique .

Experiment-5: Fly levelling & Reduction of levels using Rise & Fall method and Height of instrument methods.
Experiment-6: Profile levelling and plotting the section.
Experiment-7: Contouring
Experiment-8: Calculation of volume of a dump using reduced levels.
Experiment-9: Measurement of Horizontal angle.
Experiment-10: Measurement of vertical angle.
Experiment-11: Theodolite traversing.

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(E2227) GENDER SENSITIZATION
(Common to ME,CE&MIE)

Unit-I – Gender: Why should we study it? Socialization: Making women, Making Men, Introduction, Preparing For Womanhood, Growing up male, First lessons in caste, Different masculinities.

Unit-II- Women's Work: Its Politics and Economics,
Fact and fiction, Unrecognized and unaccounted work, further reading: Wages and conditions of work, Domestic Violence: Speaking Out, Is home a safe place? When women unite [Film], Rebuilding lives, Further reading: New forums for justice.

Unit-III–Just Relationships: Being Together as Equals,
Mary kom and Onler, Love and acid just do not mix, Love letters, Mothers and fathers, Further Reading: Rosa Parks – The brave heart.

Text Books:
1. Towards a world of equals by A.SuneethaSusicTharu publication Telugu academy Hyderabad.

I B.Tech. Mining Engg.

III Year - I-Sem   L T/P/D   C
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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

REFERENCE BOOKS :
1. Strength of Materials – Ryder. G.H.; Macmillan Long Man Pub.
2. Strength of Materials – W.A. Nash, TMH
3.. Strength of Materials -By Jindal, Umesh Publications.
4.. Analysis of structures by Vazirani and Ratwani.
5. Mechanics of Structures Vol-III, by S.B. Junnarkar.
5. . Strength of Materials by Timoshenko

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MINE HEALTH & SAFETY ENGINEERING

Unit-I
Introduction to accidents prevention and health and safety in industry : Terminology, reasons for accidents and need of prevention of accidents.
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.
System engineering approach to safety, Techniques used in safety analysis, Generic approach to loss control within mining operations.

Unit-III Safety management and organization, Risk management, Risk identification, Risk estimation and evaluation, Risk calculator, Risk minimization techniques in mines. Risk analysis; health risk assessment. Statutory provisions related to safety management system and risk management .
Training, Human Behavioral approach in Safety, safety policies, safety audit and safety management in mines. Emergency organization for disaster management.

Unit-IV
Accidents in opencast mines: possible accidents, 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-V
Accidents due to blasting and explosives: Common causes and measures for prevention.
Accidents due to electricity: Common causes and measures for prevention.
Accidents due to Inundations: Dangers from surface and underground water.

Text / Reference Books:
1. Intent and content of Mine Legislation – Rakesh and Prasad.
2. S.K. Das, Mine Safety and Legislation. Lovely Prakashan, Dhanbad, 2002
3. B.K. Kejriwal, Safety in Mines, Lovely Prakashan, Dhanbad, 2002
4. N.J. Bahr, System Safety Engineering and Risk Assessment: A Practical Approach, Taylor and Francis, NY, 1997.

III Year I SEMESTER   **L T-P-D C**

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MINE VENTILATION

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 damps. 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 air ways, equivalent orifice, distribution of air, flow control devices. Natural Ventilation: Calculation of NVP from air density, artificial aids to natural ventilation.

Unit-IV

Mechanical ventilation: Principal type 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.

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

Unit-V

Ventilation planning: Standard of ventilation including permissible air velocities.

Ascensional, descensional, homotropal, anti-tropal ventilation. Center and boundary ventilation- layouts and comparison. 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.

Text Books:

1. Mine Environment and Ventilation-G.B.Misra

2. Mine Ventilation and Air Condition-HL Heartman

Reference Books:

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

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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.

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-II

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.

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

Unit-III

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

Unit-IV

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

Unit-V

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

Reference Books:
1. Singh R.D. – Principles and Practices & Modern Coal Ming
2. Mathur S.P. – Mine Planning For Coal.
3. Introductory Mining Technology – HL Heart Man

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

Unit-III

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

Unit-IV

Conveyors: Principle types and their operations, installation, shifting, maintenance and applicability, shuttle cars, stage loaders, bridge conveyors, capacity. Aerial Ropeways: Types, construction, Application and operation

Unit-V

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. 1 & II

Reference Books:

1. Mine Winding and Transport – SC Walker.
2. Introduction to Mining Engineering – Hartman. H.L.
3. Mine Transport – Kerlin

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TUNNELING ENGINEERING
(Open Elective)

Unit-I

Introduction to tunneling, geological concepts of tunneling. Influence of geological aspects on design and construction of tunnels.

Unit-II

Tunnelling method: Convectional and special drill and blast roadway driving machines, Tunnel Boring Machines (TBM).

Unit-III

Stresses and displacement associated with excavating tunnels, ground control or treatment in tunnelling and drivages.Design of supports of Tunnels; Steel supports, rock enforcements, New Australian Tunnelling Methods (NATM).

Unit-IV

Design of tunnels: Rock conditions, RMR, Q- System, RSR, rock mass behaviour, stress strain behaviour, and stress analysis of tunnels.

Unit-V

Maintenance: dewatering, ventilation, and illumination of drivages tunnels.
Numerical modelling techniques: Introductory use of FLAC, SPLAXIS 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 tunnelling with steel supports.
2. J.Johnson-Modern trends in Tunnelling and blast design.

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MAINTENANCE AND RELIABILITY ENGINEERING
(Open Elective)

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.

Maintenance management and control Maintenance Manual, Maintenance, facility Evaluation, Functions of Effective Maintenance Management, Maintenance Project Control Methods, Maintenance Management Control Indices.

Unit-II

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-III

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.

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

Unit-IV

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-V**

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

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

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

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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/Concrete
8. Impact Test
9. Shear Test
10. Verification of Maxwell's Reciprocal Theorem on Beams
11. Continuous Beam – Deflection Test

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Mine Ventilation Lab

1. Constructional Features of Flame safety lamp
2. Detection of mine gases by Flame safety lamp
3. Detection of mine gases by Methane Detector
4. Detection of mine gases by Multi gas Detector
5. Orsat/Haldane Apparatus for Gas Analysis
6. Measurement of relative humidity by Hygrometer
7. Kata Thermometer
8. Measurement of air quantity by Anemometer/Velometer/smoke tube
9. Study of cap lamps like Oldham cap lamps, LED lamps & LED head hold lamps
   Layout of lamp room.

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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) Riveted 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

REFERENCE BOOKS :

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

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MINE SURVEYING – II

Unit-I: TACHEOMETRY
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 and normal positions.

Unit-II: CURVES
Setting Out Curves: Types of curves, Elements of curves, design and setting out, simple and compound curves, surface and underground curves.

Unit-III: MINE SURVEY & CORRELATION
Mine Survey: Verticality of shafts, measurement of depth of shafts, Importance of national grid and its advantages, survey of installations of mine structures.

Correlation: Purpose and importance of correlation. Correlation methods- Co-planation method, Weiss triangle method, Weiss quadrilateral method, two shaft method, Correlation through drift

Unit-IV: ADVANCED SURVEYING TECHNIQUES
Total Station : Description, uses, different measurements by total station,types of Surveys by Total station, Mapping of sites by Total Station Surveys

Photogrammetry: Principles of photogrammetry, Aerial Photographs, scale of vertical photographs, Terrestial Photogrammetry, Mapping.**Global Positioning System**: Definition, Principle, operation and Applications.**Geographical Information System**: Definition, Principle, Components and Operation, Applications.**Remote Sensing** – basic Principles, Integration of RS and GIS, Applications

Unit-V: ASTRONOMY & THEORY OF ERRORS
Geodetic Astronomy: Latitude, Longitude, Declination, Altitude, Azimuth, Hour circle, hour angle, other terminology; Time conversion from degrees to hours and hours to degrees.

Theory of Errors – Classification of errors, terminology, different methods for adjustments of angles, levels – normal equation method, method of differences & method of correlates.

Text Book:
1. Surveying – Theory and Practice by S.S.Bhavikatti, I.K.International publishing House.
2. Surveying Vol.2,3 by S.Ghatak, Lovely Prakashan Book house

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

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UNDERGROUND METAL MINING TECHNOLOGY

Unit-I: Mine Development

Introduction: Formation of Ore Deposits, difference between underground coal mining and metal mining, Metal Mining terminology, Mineral resource and mineral reserve

Development: Stages of mineral development, Principles for mine development, Level interval, Different types of openings-primary, secondary & tertiary

Unit-II: Raise and raising methods

Different types of raising methods- Open raising, compartment raising, raising by jora lift, raising by longhole drilling, alimak raise climbing, raise borers and drop raising and their merits & demerits.

Unit-III : Stopes and stoping methods

Stope development – development of stopes, ore pass, ore chutes, finger raises, haulage requirements etc

Stoping methods: Classification of stoping methods, factors influencing the choice of stoping methods, Different stoping methods for different applications

☐Room & Pillar stoping, Sublevel Open Stopping☐☐Shrinkage method of Stoping

Cut & Fill method of Stoping, ☐Sublevel Caving,☐Block Caving – Applications, Stoping procedure , merits and demerits

Unit-IV : Special methods and Auxiliary operations

Special methods of working of thin deposits – Top Slicing,VCR method, Longwall method, Square set stoping and stull method.

Auxiliary operations in stoping operations - ground breaking, mucking, ventilation, supporting, haulage and dumping.

Dilution of ore in stoping operations, classification of dilution and the effects of dilution

Unit-V : Economics of metal mining & In-situ leaching

Economic analysis for the assessment of viability of a mineral deposit- feasibility report, Economic considerations of stoping operations .

In-situ leaching: Principles of in-situ leaching, procedure of recovery of minerals by ISL, scope and limitation of in-situ leaching.

Text Books:
1. Elements of Mining Technology Vol.2- D.J.Deshmukh, Lovely prakashan publishers
2. Introductory Mining Engineering – H.L.Hartman

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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MINE ENVIRONMENTAL ENGINEERING

Unit-I

Spontaneous Combustion: Various theories, factors, various indices for determination of susceptive of coal to spontaneous heating, control measures.Mine Fires: Survey of various causes of mine fires with statistical data of Indian mines, various methods adapted to combat fires and their advantages and disadvantages.

Advances in fire fighting techniques and equipments, rescue operations in fire zones.

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.

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.

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 /Books:

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

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MINE MECHANISATION-II

Unit-I

Mine Winders: Winding Drum-types and construction, 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

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. Face Machinery: SDL & LHD – their applications, capacity, operation, fitting, control and maintenance. Cutter loaders – Shearers, Coal plough and Continuous Miners – their constructional features, applications, capacity and maintenance.

Unit-IV

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

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

Unit-V

Opencast Machinery: Blast Hole Drill, Ripper, Shovel, Dragline, Dumper, Bucket Wheel Excavator, surface Miner – 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 Walkar wending & Transport

Reference Books

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

III Year B.Tech.

Mining Engg. I-Sem	L T-P-D	C
	3 0-0-0	3

ROCK SLOPE ENGINEERING

Unit-I
Introduction: economic implications, geological investigation, data interpretation for slope stability analysis. Basic Mechanism of Slope Failure: Planer, wedge, rotational shear, toppling, buckling and rock fall.

Unit-II
Mechanism of failure of jointed rock mass. Determination of shear strength of discontinuities.

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

Unit-IV
Monitoring and instrumentation techniques of rock slopes. Investigations of failed slopes.

Unit-V
Numerical analysis of slopes. Use of FLAC Software.

Text Books:
1. Rock Mechanics by Alfreds R. Jumikis.
2. Fundamentals of Rock Mechanics by Jager & Cook.

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

B.TECH- Mining
III Year II SEMESTER   **L T-P-D**   **C**
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PLANNING OF SURFACE MINING PROJECT
(Elective-I)

Unit-I

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

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

Unit-II

Haul roads maintenance and dust control measures Surface facilities provision of dump yards, material handling plants

Unit-III

Surface Workshops, Mine lighting, occupational diseases remedial measures

Unit-IV

Surface environment management planning, EIA, load reclamation methods.

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

Unit-V

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

   Reference Book:

3. G.B. Misra – Surface Mining
4. Haertman H.L. – Introduction to Mining Engineering.

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B.TECH- Mining
III Year II SEMESTER   **L T-P-D C**
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PLANNING OF UNDERGROUND METAL MINING PROJECT
(Elective –I)

Unit-I

Introduction: Status of Metalliferous Mining Industry in India, Scope and limitations of Underground Mining Development: Classification and choice of stopping methods, Choice of level interval and block length- shape, size, position.

Unit-II

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. Drivage of raise and winze.

Unit-III

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

Unit-IV

Stope design and production planning in the various methods of stopping ,Stope layouts, access development, shaft/hoisting haulages, cross cuts, inclined developments.
Stope and development support, mining cycles, efficiency, utilization and estimating equipment's requirements.

Unit-V

Division of Mining Area: Division of the mining area into working units on district and level pattern. Dimensions of panels and blocks.
Production and Cycle time estimates, Production Planning and Scheduling

Text 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.

Reference Book:

1. D.J. Deshmukh, Elements of Mining Technology, Vol.-II, Central Techno Publications, Nagpur, 2001.
2. Metal Mines Regulations -1961, Lovely Prakashan
3. Introductory Mining Engineering, Howard L. Hatman

III Year B.Tech. Mining Engg. II-Sem   **L   T/P/D**
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Mine Environmental Engineering Lab

List of Experiments

1. Study of Pressure Gauges used in Ventilation Systems
2. Study of Ventilation System in Bord & Pillar Dev. Panel
3. Study of Reversal of ventilation system
4. Study of operation of fans in series and parallel
5. Study and analysis of ventilation network circuit
6. Study of layout of lamp room
7. Study of reopening a sealed off area
8. Study of stone dust and water barriers
9. Study of bulk head doors & dams
10. Study of safety Boring apparatus

B.TECH- Mining
 III Year II SEMESTER   **L   T-P-D**
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MINE SURVEYING – II LAB

1.   Finding Horizontal & Vertical distance by Tachometry
2.   Curve ranging by offsets from long chord
3.   Curve ranging by Rankine method
4.   Curve ranging by Tachometric method
5.   Study of mine plans using signs and conventions in CMR 1957/MMR1961, statutory provisions
     of mine plans
6.   Finding the height of an in accessible object – Trigonometric levelling
7.   Correlation by co-planation method using Theodolite
8.   Correlation by single shaft Weisbach method using theodolite
9.   Correlation by single shaft Weiss quadrilateral method using theodolite
10. Measurement of REM, RDM by total station
11. Traversing by Total station
     Suggested Text Books/Reference Books
   1. Surveying – Theory and Practice by S S Bhavikatti, I K International publishing House
   2. Ghatak "Mine Surveying and Levelling Vol.2"
   3. Punimia "Surveying" Vol. II and III
   4. Basak "Surveying and Levelling"

B.TECH- Mining

	L	T-P-D	C
IV Year I SEMESTER	4	0-0-0	4

MANAGEMENT SCIENCE FOR ENGINEERS (MSE)
(Common to CIVIL, MECH, MINING)

UNIT I:
Introduction to Managerial Economics, Concepts of Managerial Economics:
Demand Analysis: Law of Demand, Elasticity of demand & Demand Forecasting.
Production and cost Analysis: Production functions, Laws of Returns, Economies of scale.
Cost Concepts: Different types of costs: Variable cost, Fixed cost, Marginal cost, Semi-variable cost. Break-even Analysis.

UNIT II:
Market Structures: Different types of Markets.
Pricing: Methods of Pricing and strategies, Skimming and Penetration Pricing.
Capital budgeting: Estimation of fixed and working capital, Methods & sources of raising capital. Methods of capital budgeting, Traditional and Discounted Techniques.
Financial accounting & Financial Analysis: Overview of financial Accounts, Journal, Subsidiary books, Ledger, Trial Balance and Preparation of Trading Account, Profit & Loss Account and Balance Sheet. Financial Analysis with the help of Ratios.

UNIT III:
Management: Functions of management. Taylor's scientific management theory, Fayol's principles of management.
Designing of organization structures: Different Methods with Merits and demerits and their suitability.
Human Recourse Management: Recruitment, Selection, Training and Development and Permanence Appraisal.

UNIT IV:
Operation Management: Types of plant layout, Methods of production, work, study-procedure involved in Methods study and work Measurement. Statistical quality control. $\overline{X}$, R, C & P charts.
Project Management: Programme Evaluation and Review Technique (P E R T), critical path method ,(C PM). Identification of critical path.

UNIT V:
Material Management: Objectives, Need for Inventory Control, EOQ, ABC Analysis, VED Analysis, Purchase procedure, stores Management.
Marketing: Functions, Marketing Mix, Marketing strategies based on product life cycle, channels of distributions.

TEXT BOOKS:
1. Managerial Economics& Financial Accounting – Prentice Hall of India: Dr.M.Kasi Reddy, Dr.S.Saraswathi
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
3.

REFERENCES:
1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi, 2009
2. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI, 2008.
3. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2008.

IV Year I SEMESTER	L	T-P-D	C
	4	0-0-0	4

MINERAL PROCESSING

Unit-I

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

Size Separation: Laboratory size analysis – particle size analysis, particle size and shape, sieve analysis and interpretation;

Unit-II

Comminution: Principles of Comminution, stages in Comminution, Theory and practices of crushing and grinding; different types of crushing and grinding equipment – their applications and limitations.

Industrial screening- screen performance, factors affecting screen performance, different types of screens;

Unit-III

Classification – Principles of classification, mechanical classifiers and hydro cyclones.

Gravity concentration- Principles of gravity concentration, Gravity Concentration Methods: Jigging, tables, gravity separators.

Dense media separation – dense medium, typical dense media separation – theory, applications and limitations, efficiency of DMS.

Unit-IV

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

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

Magnetic methods of concentration Principles, Fields of Application and Limitation, types of magnetic methods of concentration

Unit-V

Dewatering: Sedimentation- types, thickening, filtration and drying.

Tailing and disposal- Methods of tailing disposals

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

Text Books:

1. Mineral Processing – BA Wills
 2. Introduction to Mineral Processing – V. Malleswar Rao

Reference Book:

1. Mineral Beneficiation – A concise basic course by DV Subba Rao
2. Mineral Processing – S.K. Jain.
3. Principles of Mineral dressing – AM Gaudin

IV Year I SEMESTER		**L**	**T-P-D**	**C**
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ROCK MECHANICS

Unit-I
Physico-mechanical properties of rocks, Elastic and time dependent behaviour, Rock mass classification.

Unit-II
Theories of rock failure, Stress analysis, In-situ stress and stress distribution around mine openings.
Ground failure and pressure on supports, Stability of wide openings, Design of supports in mine workings.

Unit-III
Subsidence: Causes and impacts of subsidence, Mechanics of surface subsidence, discontinuous and continuous subsidence. Monitoring, prediction, control and management of subsidence.

Unit-IV
Instrumentation and measurement of In-situ stresses and rock strength, Photo-elasticity and scale model studies.

Unit-V
Mechanics of rock burst and bumps, Stability of slopes.
Basics of numerical methods in geomechanics with applications.

Text Books:
1. Coal Mining ground Control by Peng.
2. Rock Mechanics by Jumikis
   Reference Books:
3. Fundamental of Rock Mechanics by Jager & Cook.
4. Rock Mechanics – Brounden.

IV Year I SEMESTER   L   T-P-D   C
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MINE LEGISLATION

Unit-I
Introduction to mining laws and legislation, General principles of mining laws, development of mining legislation of India.
Mines Act 1952 – Definitions, Provisions related to committees, accidents, diseases, safety and welfare, Manager, Powers of inspectors

Unit-II
CMR/MMR – important provisions related to duties of manager/Asst manager, notice of accident and diseases, underground workings and opencast workings, Provisions related to blasting, ventilation and mine atmosphere, Safety management system, winding, haulage, machinery and mine lighting
IER-Indian electricity rules applicable to mines
MMDR- New amendments in 2015, restriction on undertaking prospecting and mining operations, provisions related to mining area, lease period, lease extension, transfer of mineral concessions , National mineral exploration trust(NMET) and District mineral foundation (DMF)
Workman's compensation act – Importance and necessity, Important provisions

Unit-III
Mineral Concession Rules. – Provision for procedure of granting and renewal of reconnaissance/prospecting/mining permit, environment protection measures
Mineral Conservation & Development Rules – Provisions related to reconnaissance /prospecting and mining operations, Environmental measures
Vocational Training Rules – Initial and refresher training provisions,
Important provisions of Mineral Auction Rules 2015, Payment of Wages Act, and Explosives act, Rescue Rules

Unit-IV
Different statutory permissions require to operate an underground and opencast mine.
Safety organization; role of management, supervisors and workers; pit safety committees; workmen's inspector; role of safety officers. First aid station and first aid room
Classification of Accidents; Statistics, causes and prevention of accidents. Accidents rate in Indian mines. Accident enquiries and reports, Occupational diseases in mining.

Unit-V
Sustainable development in mines.
Social Impact of mining and its management.
Development of safety consciousness; interest, publicity and propaganda for safety, audio-visual aids, safety drives campaigns.

Text Books
1. Mines Act 1952 by LC Kaku
2. CMR 1957/ MMR 1961
Reference Books:
1. MVTC Rules
2. DGMS circulars
3. Intent and Content of Mine Legislation – Rakesh and Prasad.

IV Year I SEMESTER	L	T-P-D	C
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ADVANCED MINING
(Elective-II)

Unit-I: Underground Coal Gasification (UCG):
Underground Coal Gasification (UCG) Concept; conditions suitable for UCG, Principles of UCG, Technology of UCG, Mining methods of UCG - Chamber method, Stream method, Borehole method, Blind bore hole method; Linkage Techniques- Percolation linkage, Electro linkage, Boring linkage, compressed-air-linkage, Hydraulic fracture linkage and CRIP. Merits and Demerits of UCG.

Unit-II: Coal Bed Methane (CBM)
Concept of CBM, Difference between CBM and UCG, Principles of CBM, Extraction, Properties and Suitability for application, well construction, advantages and disadvantages, Environmental impact

Unit-III: Highwall Mining (HWM)
Concept of Highwall Mining, Technology and machinery used in HWM, Safety features of the equipment, Factors considered for web pillars design, Key influences on operations, Advantages and disadvantages, statutory provisions for HWM.

Unit-IV: Conversion of Underground mine into Opencast & OC to UG
Factors affecting conversion process need of conversion of UG into OC, Procedure of converting an underground mine into OC, problems associated with conversion process and their mitigating measures. Statutory provisions for conversion of UG to OC.

Unit-V: Communication system in mines
Importance of communication system in mines, Existing communication systems in mines like telephone, wireless network, radio frequency based, trapped miner communication etc and the drawbacks in the existing communication systems, recent trends in communication systems like Zigbee, radio frequency identified tags (RFID), Through the Earth system (TTE) etc.

Text Books:
1. Introductory Mining Engineering – H.L.Hartman
2. Principles and Practices of Modern Coal Mining – R.D. SINGH

B.TECH- Mining

IV Year I SEMESTER	**L**	**T-P-D**	**C**
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ROCK EXCAVATION ENGINEERING
(Elective-II)

Unit-I

Scope and importance, Rock excavation engineering in mining and construction industries; Physico-mechanical and geotechnical properties of rocks Vis-à-vis excavation method; selection of excavation method.

Unit-II

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

Unit-III

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

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

Unit-IV

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

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

Unit-V

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

Text Books

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

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MINE SUBSIDENCE ENGINEERING
(Elective-II)

Unit-I

INTRODUCTION: Strata movement at the mining horizon, convergence in mine working, factors influencing convergence in mine working.

SUBSIDENCE MECHANISM: Zones of movement in the overlaying beds, vertical and horizontal movement, subsidence trough, angle of draw, angle of break, sub-surface subsidence.

Unit-II

SUBSIDENCE PREDICTION:

Different methods of surface subsidence prediction – graphical, analytical, profile function, empirical and theoretical models.

Unit - III

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-IV

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

SUBSIDENCE CONTROL, GOVERNING LAWS AND STANDARDS: Measures to reduce mining damage, mining methods to minimize damage.

Unit-V

Laws governing mining damage, different standards suggested fro mining and building ground in respect of subsidence. Case statues of Mine subsidence

Text Book:
1. Whiltaker B.N. Reddish D.J. - Subsidence occurrence prediction and control
2. B. Singh – Mine Subsidence

Reference Books:
3. Peng .S. – Surface subsidence Engineering
4. Kratzsch. H.,- Mine Subsidence Engineering.

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ROCK FRAGMENTATION ENGINEERING
(Elective-III)

Unit-I

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

Mechanics of rotary, percussive a 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-II

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

Unit-III

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

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

Unit-IV

Computational models of blasting, transient ground motion, misfires, blown out shots, incomplete detonation – their cases and remedial measures.

Instrumentation in blasting, Borehole pressure transducer, V.O.D probe, vibration monitor, high speed video camera.

Unit-V

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

Text Books:

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

B.TECH- Mining
IV Year I SEMESTER   L   T-P-D   C
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STRATA CONTROL TECHNOLOGY
(Elective-III)

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

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

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

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

Unit-IV Case studies on geotechnical instrumentation and strata control in coal mines
Demonstration of geotechnical instrumentation and computer software.

Unit-V 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 M L, Strata mechanics in coal mining, A Balkema, Rotterdam, Taylor and Francis, 1985, 566p
2. T. Bieniawski Ziti, Strata Control in Mineral Engineering, New York, John Wiley & Sons, 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, 2000Bieniawski Z.T. 1989, Engineering Rock Mass Classifications, Wiley, New York, 251.

B.TECH- Mining	L	T-P-D	C
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PROSPECTING, MINERAL EXPLORATION AND RESERVE ESTIMATION
(Elective – III)

Unit –I:
Introduction, definition, objectives and criteria for mineral exploration
Guides for ore search: physiographic, stratigraphic, Lithological, structural, mineralogical, geochemical geobotanical and hydro geological.
Reserve estimation: types of drilling, drill core sample logging, data compilation preparation of lithology of the bore hole-isochore and isopach maps, preparation of geological cross sections interpretation of the coal mining and exploration, deposit reserve estimation. Some case studies of coal mining and exploration.

Unit-II:
Geochemical exploration:
Introduction, geochemistry in mineral exploration, types of geochemical surveys
Geochemical environments.
Primary environment: distribution of elements in igneous rocks and minerals, primary haloes and primary dispersion**.**
Secondary environment: chemical weathering, mobility in secondary environment, displaced anomalies. Path finders and their application in geochemical exploration.

Unit-III:
Geophysical exploration: basic concepts of geophysical exploration. Methods of geophysical exploration, elementary principles of gravity survey, seismic survey and electrical resistivity survey methods of prospecting. Bore-hole logging -introduction.

Unit –IV
Remote sensing and photo-geology: introduction definition and scope, basic concepts of remote sensing and photo geology.
Photogrammetry application of remote sensing techniques to mineral exploration. Visual image interpretation land digital image analysis and interpretation of satellite data. Case studies of application of remote sensing for coal exploration.

Unit – V:
Geoengineering: introduction. definition and application of Geo Engineering studies in and development of mines, geo engineering studies for underground and opencast mines. Geotechnical log. Micro-logging rock quality designation (RQD)-underground sealing mapping; Rock Mass rating (RMR)-Caving index, determination of stress field, case studies in coal mines.

Text Books:
1. Introduction to Geophysical Exploration by Dobrin
2. Mineral Exploration by Kumara Swamy

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MINE CONSTRUCTION ENGINEERING
(Elective-III)

Unit-I

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

Underground mine shaft sinking methods through alluvium, soft and hard rock, Mechanization, consolidation of loose ground shaft lining , ground pressure, thickness of lining. Design and procedure of laying the lining, construction of shaft collar heap stead.

Unit-II

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

Main sump size, construction of underground substation, first aid room.

Unit-III

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

Unit-IV

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, construction of stowing plant - installations, bunker, water tanks, mixing chamber.

Unit-V

Open pit mines- opening out trenches/box cut, design and construction of haul roads, construction of benches. Shovel & dumper combination – dumper allocation to shovels, factors considered, match factor. Scheduling for mine constructions using PERT/CPM.

Suggested text book:
1. Principles and Practices of modern coal mining practices – R.D. Singh
2. Coal Mining Practice Vol.1 – Stratham
3. Elements of Mining Technology Vol.1 – D.J. Deshmukh

Reference books:
1. Pazdziora J. ―design of Underground hard coal mine‖
2. Popov ―working of Mineral Deposits‖
3. Bokey ―Mining‖

B.TECH- Mining

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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 crushing characteristics of a given mineral sample using secondary (roller) crusher

4. Determination of the grinding characteristics of a given mineral sample using ball mill

5. Sieve analysis of a given sample and to calculate (a) percentage sample retained on sieves (b) average size of sample material and (c) to plot sizing curves

6. Concentration of a given mineral sample using mineral jig.

7. Concentration of a given mineral using Wilfley table

8. Concentration of a given mineral using froth flotation cell

9. Concentration of a given mineral using magnetic separator

10. Study of washability characteristic of a coal sample using float and sink test.

11. Determination of Grindability index of coal sample

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ROCK MECHANICS LABORATORY

1. Determination of RQD of rocks.

2. Determination of Proto-dyakonov 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 triaxial strength of rock and drawing of Mohr's envelope

9. Determination of slake durability of rocks

10. Study of different types of supports used in mines

11. Determination of rock anchorage capacity of a rock bolt

12. Study of different types of roof convergence and other ground control instruments.

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IV Year I SEMESTER		0	0-3-0	2

SOFT SKILLS LAB- I
(Common to all Branches)
Activity Based

Activity I KNOW YOURSELF/ SELF DISCOVERY and SOFT SKILLS

- Introduction—Importance of Knowing Yourself

- Process of knowing yourself—SWOT analysis

- Benefits of SWOT analysis---Using SWOT analysis

- SWOT analysis grid—questions to complete the grid

- Introduction –What are soft skills?—importance of soft skills

- Selling your skills—Attributes regarded as soft skills—Soft Skills

- Social Soft Skills—Thinking Soft Skills—Negotiating –Exhibiting your Soft Skills

- Identifying your soft skills—Improving your soft skills –Train Yourself

- Top 60 soft skills—Practicing soft skills—Measuring Attitudes

Activity II Time and Stress Management

- Introduction—The 80-20 rule—take a good look at the people around you—Examine your work

- Sense of time management –around you—examine your work—sense of time management

- Time is money—features of time—three secrets of time management

- Time management matrix—analysis of time matrix—effective scheduling

- Grouping of activities—five steps to successful time management

- Difficulties in time management—evils of not planning—interesting facts about time

- Deal say of spending a day—time wasters—time savers—realizing the value of time

- Time circle planner.

- Introduction –Meaning—Effects , Kinds , and Sources of Stress

- Case study—spotting stress—stress management tips

Activity III Developing Positive Attitude

- Introduction—meaning –features of attitudes—attitude and human behavior : Passive, Aggressive and Behavior

- Formation of attitudes—change of attitudes—what can you do to change attitude?

- Ways of changing attitude in a person—attitude in a workplace

- Features of a good team player

- The power of positive attitude—developing positive attitude

- Obstacles in developing positive attitude—staying negative—examples of negative attitude
- Overcoming negative attitude—negative attitude and its results.

Activity IV   Body Language

- Introduction –body talk—Voluntary and involuntary body language
- Forms of body language—parts of body language—origin of body language
- Uses of body language—Body language in building interpersonal relations
- Body language in building interpersonal relations—reasons to study body language
- Improving your body language –types of body language—gender differences
- Body language—shaking hands
- Interpreting body language

Activity V Practice in Presentation Skills

- Types of Presentations
- Do's and Don'ts of Presentation Skills
- Body language in presentation skills
- Examples—Aspects, etc

TEXTBOOKS:

Soft Skills: Know Yourself and Know the World—Dr. K. Alex-S. Chand Publising-2010

REFERENCE BOOKS:

Managing Soft skills: K.R. Lakshmi narayanan & Murugavel, Scitech Publications-2010

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MINE GROUND CONTROL

Unit-I

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

Unit-II

Modern concept of strata pressure redistribution. Manifestation of strata pressure, convergence, loads on prop, creep, heave, roof fall and facture systems due to mining. Insitu stress measurement, instrumentation.

Unit-III

Roof support: Timber and steel supports, friction and hydraulic prop Arches, shotcrete, roof truss, roof bolts. Powered supports stowing caving strip packing pump packing rock reinforcement.

Unit-IV

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-V

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

Text Books:
1. Obert & Duvall "Rock Mechanics and Design of structures in rock"
2. Jaeger and cook "Fundamental of Rock Mechanics"

Reference Books:
1. V. Singh & B.P. Khare "Rock Mechanics and Ground Control"
2. Richard "Rock Mechanics"
3. Peng "Coal Mining Ground Control

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IV Year B.Tech. Mining Engg. II-Sem　　　　**L**　　**T/P/D**　**C**
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MINERAL ECONOMICS
(Elective – IV)

Unit I:
Mineral industry: Economics characteristics of the mineral industry of India and world. The place of minerals in the national and international economy. The specific or exclusive characteristics of minerals or mining industry.
Brief survey of India's mineral resources in the world setting with special reference to its need and deficiency's: Essential minerals, war minerals and strategic minerals.
National mineral policy

Unit II:
Mining companies and Mine Accounts:
Capital: Structure, formation, and capitalization. Principles of book keeping as applied to the mining industry. Presentation of accounts: Journal, ledger, and double entry in book keeping. Balanced sheets and profit and loss accounts with live examples from mining industry. Depreciation and IRR (Internal Rate of Return).

Unit III:
Sampling Design and estimation of ore reserves.
Sampling: Methods of sampling: Chip sampling, groove or channel sampling. grab sampling, bulk sampling, bore hole sampling. Statistical and geo statistical approach to sampling design and analysis. Student-t test, Kriging techniques.
Calculation of ore reserves
Extended area method: squire, rectangular. Triangular, polygonal, and isograde methods. Grade wise and block wise estimation in both FPS & CGS systems.
Reserve estimation examples from open cast and underground mines.
Preparation of assay plans, longitudinal section, calculation of ore reserves,

Unit IV:
Valuation of mines: Two common approaches to valuation of mines: 1. Discount Cash Flow (DCF) approach 2. Sales Comparison Approach (SCA). DCF is the very effective method in mine valuation is adopted here. DCF model is taught under the following sub headings
Process data diagram, discount rate. Mathematics: - (DCF), Hoskolds formula and subsequent development for calculation of Present Value Worth (PVW). Live examples. Project planning, project appraisal of mining companies.

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B.TECH- Mining

IV Year II SEMESTER	**L**	**T-P-D**	**C**
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MINE PLANNING AND DESIGN
(Elective –IV)

Unit I:
Mine Planning requirements, principles of mine planning, conceptual mine plan, long range plan, intermediate range plan, daily planning, strategic mine planning

Unit II:
Factors to be considered while opening surface or underground mines – production potential, mining costs, risk of accident, losses and dilution, psychological factors, techno-economic decision, final project appraisal
Determination of technical factors in mine planning, classification of planning information, geological and mineralogical information, structural information, economic information, determination of production parameters.

Unit III:
Considerations of risk of mine planning, mineral risk, project completion risk, capital cost and delay risk, operation risk, market conditions, supply and demand, Economic analysis, market analysis, legal analysis, environmental factors

Unit IV:
Planning of Surface Layouts – Factors affecting the design of layouts, winding, pit top layouts, layout of coal handling plant
Planning of Pit bottom layouts for skip winding and man, material winding.
Examples of layouts of underground workings

Unit V:
Stages of planning of new mines, feasibility report, selection of mine site and environment management plan, planning for ventilation system and transport system.

TEXTBOOKS/ REFERENCE BOOKS:
1. Principles of Mine planning by Jayanth Bhattacharya
2. Mine Planning by SP Mathur

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IV Year II SEMESTER	L	T-P-D	C
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MINE ELECTRICAL ENGINEERING
(Elective-IV)

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. 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-II

Mining type circuit breakers – Air circuit breaker, vacuum and Hexa Sulfa Fluoride (Sf6) circuit breakers, Field switch, Tran switch Unit, Gate End Box, Drill Panel.

Unit-III

Electrical power planning for mechanized longwall faces – general scheme of electrical power distribution, voltage drop problems and remedial measures; In bye 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-IV

Illumination planning for mines – underground roadway lighting system; intrinsically-safe lighting system for longwall faces, opencast mine lighting. Statutory provisions related to illumination

Unit-V

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.
Principles of flame proof enclosures. Intrinsically safe circuit methods of attaining intrinsic safety, Zener safety barriers and their applications. Indian electricity rules as applied to mines.

Text Books:

1. A Text Book on Power Systems Engineering – Soni Gupta, Bhatnagar, Chakarbarti, Dhanpat Rai & Sons.

2. Electrical Equipment in mines- H. Cotton.

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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B.TECH- Mining

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PLANNING OF UNDERGROUND COAL MINING PROJECT
(Elective –V)

Unit-I

Mining industry in comparison with other industries, Principles of Planning, Features and Mine Planning, Master Plan, Feasibility Report. Geological *factors* replacing Mine Planning, Estimation of optional prediction Life. Coal extraction, different methods applicability advantages and disadvantages

Unit-II

Pillar extraction by continuous miner, Pillar extraction by Blasting Gallery Methods, Pillar extraction by deploying LHDS/SDLS

Unit-III

Economics of different methods extraction.

Unit-IV

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

Unit-V

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

Text Books

1. Peng SS – Longwall Mining.
2. R.D. Singh – Principles and Practices of Modern Coal Mining
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Reference Books

3. Mathur S.P. – Coal Mining in India.
4. Das S.K. Modern Coal Mining Technology.
5. BB Dhar, Singh T.N. – Thick Seam Mining Problems and Issues.

B.Tech. Mining Engg.

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Computer Applications in Mining
(Elective IV)

Chapter : 1

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

Chapter : 2

Applications in mining, exploration, rock topographic models, bore hole composting, ore reserve calculations, interpretation and geo statistical models. Open Pit design, ultimate pit design introductory process control, underground mine design and production scheduling.

Chapter : 3

Application of computers to ventilation, ventilation – system component analysis, network analysis, on-line monitoring & control.

Chapter : 4

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.

Chapter : 5

Simulation languages, GPSS and SLAM, logistical flow of different mining problems, computer control, remote control, automatic control application and limitations of control.

TEXTBOOKS:

1. T.C. Bartee, Digital computer fundamentals, Mc. Graw Hill 4th Ed., 1984.

B.Tech. Mining Engg.

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SOFT SKILLS LAB- II
(Common to all Branches)

Activity I Group Discussion

- Dynamics of Group discussion—tips for Group Discussion—Traits tested in GD
- Non-verbal Communication in GD
- Body language in GD

Activity II Interview Skills

- Introduction—types of Interview—FAQ's in Interview—reasons for rejecting a candidate
- On the day of interview—common mistakes in interview—post interview etiquette
- Dress code and tips for job seekers at interview
- Body language in Interview skills

Activity III Mock Interview.