CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)
Kandlakoya, Hyderabad – 501 401

ACADEMIC REGULATIONS R 15 FOR CBCS & OUTCOME BASED B.TECH. REGULAR PROGRAMMES

(Effective for the students admitted into I year from the Academic Year 2015-16 and onwards)

1.0 Under-Graduate Degree Programme in Engineering & Technology

CMR College of Engineering & Technology Hyderabad offers 4 Years (8 Semesters) Bachelor of Technology (B.Tech.) degree Programme, under Choice Based Credit System (CBCS), with effect from the Academic Year 2015 - 16 and onwards, in the following Branches of Engineering …

S.No.	Branch
I.	Civil Engineering
II.	Electrical & Electronics Engineering
III.	Mechanical Engineering
IV.	Electronics & Communication Engineering
V.	Computer Science & Engineering

1.1. The B. Tech. degree of Jawaharlal Nehru Technological University Hyderabad shall be conferred on candidates who are admitted to the program and who fulfil all the requirements for the award of the degree.

2.0 Admission Procedure

2.1. Admissions will be done as per the norms prescribed by the Government of Telangana. The Government orders in vogue shall prevail.

2.2. The candidate should have passed the qualifying examination,

intermediate or equivalent.

2.3. Seats in each programme in the college are classified into Category–A (70% of intake), and Category-B (30% of intake) besides Lateral Entry. Category -A seats in each programme will be filled by the Convener, EAMCET Admissions. Category - B seats in each programme will be filled by the College as per the guidelines of the Competent Authority.

2.4. Lateral Entry seats for 20% of the candidates from the approved strength of the course shall be admitted into the II Year I Semester (III Semester) directly based on the rank secured by the candidate in Engineering Common Entrance Test (ECET) in accordance with the instructions received from the Convener, ECET / Competent Authority.

3.0 B.Tech. Programme (UG PROGRAMME) Structure

3.1 The B.Tech. Programme of CMR College of Engineering & Technology are of Semester Pattern, with 8 Semesters constituting 4 Academic Years, each Academic Year having two Semesters (First/Odd and Second/Even Semesters). Each Semester shall be of 22 Weeks duration (inclusive of examinations), with a minimum of 90 Instructional Days per Semester.

3.2 UGC/ AICTE specified Definitions/ Descriptions are adopted appropriately for various terms and abbreviations used in these Academic Regulations/ Norms, which are as listed below.

3.2.1 Semester Scheme

Each UG Programme is of 4 Academic Years (8 Semesters), with the year being divided into two Semesters of 22 weeks (≥ 90 Instructional days), each Semester having 'Continuous Internal Evaluation (CIE)' and 'Semester End Examination (SEE)'. Choice Based Credit System (CBCS) and Credit Based Semester System (CBSS) as denoted by UGC, and Curriculum/ Course Structure as suggested by AICTE are followed.

3.2.2 Credit Courses

All Courses are to be registered by the student in a Semester to earn Credits. Credits shall be assigned to each

Course in a L: T: P: C (Lecture Periods: Tutorial Periods: Practicals Periods : Credits) Structure, based on the following general pattern .

- One Credit - for One hour/ Week for Theory/ Lecture (L) Courses; and,
- One Credit - for Two hours/ Week for Laboratory/ Practical (P) Courses or Tutorials (T).

Other student activities like NCC, NSS, NSO, Study Tour, Guest Lecture etc., and identified Mandatory Courses will not carry Credits.

3.2.3 Course Classification

All Courses offered for the UG Programme are broadly classified as

(a) Foundation Courses (Fn C),
(b) Core Courses (Co C), and
(c) Elective Courses (Eℓ C).

- **Foundation Courses** (Fn C) are further categorized as
  - (i) HS (Humanities and Social Sciences)
  - (ii) BS (Basic Sciences)
  - (iii) ES (Engineering Sciences)
- **Core Courses** (Co C) and **Elective Courses** (Eℓ C) are categorized as PS (Professional Courses), which are further subdivided as –
  - (i) PC (Professional Core) Courses
  - (ii) PE (Professional Electives)
  - (iii) OE (Open Electives)
  - (iv) Project Works (PW)
- **Minor Courses** (1 or 2 Credit Courses, belonging to HS/ BS/ ES/ PC as per relevance); and
- **Mandatory Courses** (MC - Non-credit oriented).

3.2.4 Course Nomenclature:

The Curriculum Nomenclature or Course-Structure Grouping for the each of the UG PROGRAMME E&T (B.Tech. Degree Programmes), is as listed below:

Broad Course Classification	*Course Group/ Category*	*Course Description*	*Range of Credits*
Foundation Courses (Fn C)	**BS – Basic Sciences**	Includes - Mathematics, Physics and Chemistry Courses	**15% - 20%**
	HS – Humanities and Social Sciences	Includes Courses related to Humanities, Social Sciences and Management	**5% - 10%**
	ES - Engineering Sciences	Includes fundamental engineering Courses	**15% - 20%**
Core Courses (Co C)	**PC – Professional Core**	Includes core Courses related to the Parent Discipline/ Department/ Branch of Engg.	**30% - 40%**
Elective Courses (Eℓ C)	**PE – Professional Electives**	Includes Elective Courses related to the Parent Discipline/ Department/ Branch of Engg.	**10% - 15%**
	OE – Open Electives	Elective Courses which include inter-disciplinary Courses or Courses in an area outside the Parent Discipline/ Department/ Branch of Engg.	**5% - 10%**
Project Work	**Project Work**	B.Tech. Project or UG Project or UG Major Project	**10% - 15%**
	Industrial Training/ Mini- Project	Industrial Training/ Internship/ UG Mini-Project/ Mini-Project	
	Seminar	Seminar/ Colloquium based on core contents related to Parent Discipline/ Department/ Branch of Engg.	
	Comprehensive Viva-Voce	Comprehensive Viva-Voce	
	Minor Courses	1 or 2 Credit Courses (subset of HS)	-
	Mandatory Courses (MC)	Mandatory Courses (non-credit)	**included**
	Total Credits for B. Tech. Programme		**192 (100%)**

4.0 Course Work

4.1 A student, after securing admission, shall pursue the B.Tech. UG Programme in a minimum period of 4 Academic Years, and a maximum period of 8 Academic Years (starting from the Date of Commencement of I Year).

4.2 Each student shall Register for and Secure the specified number of Credits required for the completion of the UG Programme and for Award of the B.Tech. degree in the respective Branch of Engineering.

4.3 Each Semester is structured to provide 24 Credits, totaling to 192 Credits for the entire B.Tech. Programme.

5.0 Course Registration

5.1 A 'Faculty Advisor or Counselor' shall be assigned to each student, who will advise the student about the UG Programme, its Course Structure and Curriculum, Choice/Option for Courses, based on his competence, progress, pre-requisites and interest.

5.2 Academic Section of the College invites 'Registration Forms' from students apriori (before the beginning of the Semester), through 'on-line submissions', 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'.

5.3 A Student can apply for On-Line Registration, only after obtaining the 'Written Approval' from his Faculty Advisor, which should be submitted to the College Academic Section through the Head of Department (a copy of the same being retained with Head of Department, Faculty Advisor and the Student).

5.4 A Student may be permitted to Register for his Course(s) of choice with a typical total of 24 Credits per Semester (Minimum being 20 Credits and Maximum being 28 Credits) based on his progress and SGPA/ CGPA, and completion of the 'Pre-Requisites' as indicated for various 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.

5.5 Choice for 'additional 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 of the Faculty Advisor/ Counselor.

5.6 If the Student submits ambiguous choices or multiple options or erroneous entries - during On-Line Registration for the Course(s) under a given/ specified Course Group/ Category as listed in the Course Structure, such discrepancy if any will be considered and disposed by the Head of the Department.

5.7 Course Options exercised through On-Line Registration are final and cannot be changed/ inter-changed; further, alternate choices will also not be considered. However, if the Course that has already been listed for Registration (by the Head of 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 Course (Course to offering of such a Course), or for another existing Course (Course to availability of seats), which may be considered. Such alternate arrangements will be made by the Head of Department, with due notification and time-framed schedule, within the first week from the commencement of Class-work for that Semester.

Dropping of Courses may be permitted, only after obtaining prior approval from the Faculty Advisor (Course to retaining a minimum of 20 Credits), 'within one week of time' from the beginning of the current Semester.

5.8 For Mandatory Courses like NCC/ NSS/ NSO etc., a 'Satisfactory Participation Certificate' from the concerned authorities for the relevant Semester is essential. No Marks or Grades or Credits shall be awarded for these activities.

6.0 Courses to be offered

6.1 A typical Section (or Class) Strength for each Semester shall be 60.

6.2 An elective Course may be offered to the Students, ONLY IF a Minimum of 20 Students (1/3 of the Section Strength) opt for the same. The Maximum Strength of a Section is limited to 80 (60 + 1/3 of the Section Strength).

6.3 More than one teacher may offer the same Course (Lab./ Practicals may be included with the corresponding Theory Course in the same Semester) in any Semester.

6.4 If more entries for Registration of a Course come into picture, then the concerned Head of Department shall take necessary action, whether to offer such a Course for TWO (or multiple) sections or NOT .

6.5 In case of options coming from Students of other Departments/ Branches/ Disciplines (not considering open electives), priority shall be given to the student of the 'Parent Department' first.

7.0 Attendance Requirements

7.1 A student shall be eligible to appear for the Semester End Examinations, if he acquires a minimum of 75% of attendance in aggregate of all the Courses (excluding Non-Credit Courses) for that Semester.

7.2 Condoning of shortage of attendance in aggregate up to 10% (65% and above, and below 75%) in each Semester may be granted by the College Academic Committee on genuine and valid grounds, based on the student's representation with supporting evidence.

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

7.4 Shortage of Attendance below 65% in aggregate shall in NO case be condoned.

7.5 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 Courses registered in that Semester in which he got detained, by seeking re-admission for 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 Courses offered under that category.

8.0 Academic Requirements

The following Academic Requirements have to be satisfied, in addition to the Attendance Requirements mentioned in Item No.**7.**

8.1 A student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to each Course, if he secures not less than 35% marks (25 out of 70 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 P Grade or above in that Course. A student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to main project, if he secures not less than 40% marks in internal evaluation as well as external evaluation. This implies securing P Grade or above in the main project.

8.2 A student shall be deemed to have satisfied the Academic Requirements and earned the Credits allotted to - Mini-Project/ Seminar/ Comprehensive Viva, if he secures not less than 40% of the total marks to be awarded for each. The student would be treated as failed, if he -

(i) does not submit a report on his Mini-Project, or does not make a presentation of the same before the Evaluation Committee as per schedule, or Does not appear for Comprehensive Viva

(ii) does not present the Seminar as required in the VII Semester, or

(iii) secures less than 40% of total marks in Mini-Project/ Seminar evaluations/Comprehensive Viva.

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

8.3 A Student will not be promoted from I Year to II Year, unless he fulfils the Attendance and Academic Requirements and secures a minimum of total 24 Credits of I Year, from

all the relevant regular and supplementary examinations, whether he takes those examinations or not.

8.4 A Student will not be promoted from II Year to III Year, unless he fulfils the Attendance and Academic Requirements and secures a minimum of total 57 Credits up to IV Semester, from all the relevant regular and supplementary examinations, whether he takes those examinations or not.

8.5 A Student will not be promoted from III Year to IV Year, unless he fulfils the Attendance and Academic Requirements and secures a minimum of total 86 Credits up to VI Semester, from all the relevant regular and supplementary examinations, whether he takes those examinations or not.

8.6 A Student shall - register for all Courses covering 192 Credits as specified and listed (with the relevant Course/ Course Classifications as mentioned) in the Course Structure, put up all the Attendance and Academic requirements for 192 Credits securing a minimum of P Grade (Pass Grade) or above in each Course, and 'earn All 192 Credits securing SGPA ≥ 5.0 (in each Semester), and CGPA (at the end of each successive Semester) ≥ 5.0, to successfully complete the UG Programme.

8.7 After securing the necessary 192 Credits as specified for the successful completion of the entire UG Programme, an exemption up to 8 secured Credits (in terms of two of their corresponding Courses) may be permitted for optional drop out from these 192 Credits earned; resulting in 184 Credits for UG Programme performance evaluation, i.e., the performance of the Student in these 184 Credits shall alone be taken into account for the calculation of 'the final CGPA (at the end of UG Programme, which takes the SGPA of the VIII Semester into account), and shall be indicated in the Grade Card of VIII Semester; however, the Student's Performances in the earlier individual Semesters, with the corresponding SGPA and CGPA for which already Grade Cards are given, will not be altered. Further, optional drop out for such 8 secured Credits shall not be allowed for Courses listed Table-1 below.

Table-1

S. No.	Course Particulars
1	All Practical Courses
2	Industry Oriented Mini Project
3	Comprehensive Viva-Voce
4	Seminar
5	Project Work

8.8 If a Student registers for additional courses (in the parent Department or other Departments/Branches of Engineering) other than those listed Courses totaling to 192 Credits as specified in the Course Structure of his Department. A student having the CGPA of $\geq$ 7.0 and having passed all previously registered courses are only allowed to register such additional course from the offered open electives. The performances in those additional Courses (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 'additional courses' registered, % marks and Letter Grade alone will be indicated in the Grade Card, as a performance measure, Course to completion of the Attendance and Academic Requirements as stated in Items 7 and 8.1 – 8.7 above.

8.9 Students who fail to earn 192 Credits as per the Course Structure, and as indicated above, within 8 Academic Years from the Date of Commencement of their I Year shall forfeit their seats in B.Tech. Programme and their admissions shall stand cancelled.

8.10 When a Student is detained due to shortage of attendance in any Semester, he may re-register for that Semester, as and when offered, with the Academic Regulations of the Batch into which he re-registers. However, no Grade Allotments or SGPA/ CGPA calculations will be done for that entire Semester in which he got detained.

8.11 When a Student is detained due to lack of Credits in any year, he may be re-register for the next year, after fulfilment of the Academic Requirements, with the Academic Regulations of the Batch into which he re-registers.

8.12 A student eligible to appear in the Semester End Examination in any Course, but absent at it or failed (thereby failing to secure P Grade or above), may reappear for that Course at the supplementary examination as and when conducted. In such cases, his Internal Marks (CIE) secured earlier for that Course will be carried over, and added to the Marks to be obtained in the SEE supplementary examination, for evaluating his performance in that Course.

9.0 Evaluation - Distribution and Weightage of Marks

9.1 The performance of a student in each Semester shall be evaluated Course-wise (irrespective of Credits assigned) with a maximum of 100 marks for Theory or Practicals or Seminar or Drawing/Design or Mini-Project or Minor Course, etc; however, the B.Tech. Project Work (Major Project) will be evaluated for 200 Marks. These evaluations shall be based on CIE (Continuous Internal Evaluation) and SEE (Semester End Examination), and a Letter Grade corresponding to the percentage marks obtained shall be given.

9.2 For Theory Courses 30 marks are allocated for Continuous Internal Evaluation. Continuous Internal Evaluation during a semester is based on two internal examinations conducted during the semester and attendance put in by the student in that semester. 70 marks are allocated for the Semester End Examination (SEE).

(a) Internal evaluation for 30 marks in each course consists of two internal examinations (for 20 marks), two assignments (for 5 marks) and attendance in that course (for 5 marks).

(b) Internal examination question paper consists of Part-A and Part-B. Part-A consists of 5 short answer questions of 1 mark each, Part-B consists of 5 descriptive questions out of which 3 are to be answered, each question carrying 5 marks. The duration of internal examination is 1 hour 30 minutes.

(c) Out of the two Assignments, the first Assignment should be submitted before the conduct of the first internal examination and second Assignment should be submitted before the

conduct of the second internal examination. Each Assignment consists of 5 questions, each question carries 1 mark.

(d) The final marks (for total of 25) secured by the student in 'Internal Examination and the Assignment' for the semester are arrived at by giving a weightage of 70% to the best secured 'internal examination and Assignment' and 30% weightage to the least secured 'internal examination and Assignment'. A student who is absent from any assignment/ internal examination for any reason what so ever shall be deemed to have secured 'zero' marks in the test/ examination and no makeup test/ examination shall be conducted.

(e) Five marks in each course are allocated for the attendance of the student during the semester in that course. The allocation of the marks for attendance is as follows.

% of Attendance	Marks allocated
Below 75%	Nil
75% to 85%	2
85% to 95%	4
>95%	5

9.3 For Practical Courses, there shall be a Continuous Internal Evaluation (CIE) during the Semester for 40 internal marks, and 60 marks are assigned for Lab./Practical Semester End Examination (SEE). Out of the 40 marks for internals, day-to-day work in the laboratory shall be evaluated for 30 marks; and for the remaining 10 marks - internal practical test shall be conducted by the concerned laboratory teacher. The end semester examination SEE for practicals shall be conducted with an external examiner and the laboratory teacher.

9.4 For the Courses of design and / or drawing, (such as Engineering Graphics, AutoCAD, Engineering Drawing, Machine Drawing, Estimation etc.,) the internal evaluation carries 40 marks (the distribution is 15 marks for day-to-day work, 20 marks for internal examination and 5 marks for end semester attendance). There shall be 60 marks for semester end examination. Internal exam marks

will be awarded from two internal examinations conducted in a semester, with a weightage of 70% of the best secured internal examination and 30% of the least secured internal examination.

Question paper pattern

Internal Exam- Maximum Marks: 20

Part- A of internal exam contains short answer questions for five marks.

Part-B contains three questions with internal choice, following judicious distribution of questions, unit wise. Each question carries five marks.

Semester End Examination (SEE) – Maximum Marks: 60

Part-A of SEE contains 10 short answer questions of 1 mark each.

Part-B contains five questions with internal choice, following judicious distribution among five units. Each question carries 10 marks.

9.5 **Open Electives:** Students are to choose One Open Elective (OE-I) during VII Semester, one (OE-II) and one (OE-III) in VIII Semester from the list of Courses offered under Open Electives.

9.6 There shall be a Mini-Project, to be taken up in the college or industry during the summer vacation after VI Semester End Examination. The mini project shall be evaluated during the VII Semester. The mini project shall be submitted in a report form along with the project model if any and should be presented before a committee, which shall evaluate for 100 marks. The committee consists of Head of the Department, the supervisor of mini project, a senior faculty member of the department and an external examiner. There shall be no internal marks for Mini-project. The external examiner shall be appointed by the Controller of Examinations from a panel of three members submitted by the Head of the Department.

9.7 There shall be a Seminar presentation in VIII Semester. For the Seminar, the student shall collect the information on a specialized topic related to his branch other than the project topic and prepare a technical report and submit to the department. The presentation demonstrating understanding of the topic and technical report shall be evaluated by a Departmental committee consisting of the Head of the department, Seminar supervisor and a senior faculty member from the department. The seminar will be evaluated for 100 marks. There shall be no internal marks for the seminar.

9.8 There shall be a Comprehensive Viva-Voce in VIII Semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of the Head of the Department and three Senior Faculty members of the Department. The Comprehensive Viva-Voce is intended to assess the student's understanding in various Courses he studied during the B.Tech. course of study. The Comprehensive Viva-Voce is evaluated for 100 marks by the Committee. There shall be no internal marks for the Comprehensive Viva-Voce.

9.9 The **main project** shall be evaluated for 200 marks out of which 80 marks are for internal evaluation and 120 marks are for Semester End Evaluation. The project work shall be taken up in the beginning of VIII semester and shall be completed by the end of VIII semester. Internal evaluation shall be conducted by Head of the Department and the project supervisor for 80 marks. The Semester End Examination shall be based on the report submitted and a viva-voce exam for 120 marks by committee comprising of the Head of the Department, project supervisor and an external examiner. The external examiner shall be appointed by the Controller of Examinations from a panel of three members submitted by the Head of the Department.

10. 0. Semester End Examination

10.1. Theory Courses

The Semester End Examination will be conducted for 70 marks

which consist of Part-A and Part-B. The examination is of 3 hours duration. Question paper pattern is as follows.

Part-A: 20 Marks
There shall be 10 questions each carrying 2 Marks. (Two questions from each Unit)

Part-B: 50 Marks
There shall be 5 questions with internal choice, each question carrying 10 marks. One question from each unit of the syllabus should be framed.

10.2. Practical Courses

Each lab course is evaluated for 60 marks. The examination shall be conducted by the laboratory teacher and an external examiner. External examiner will be appointed by the Controller of Examinations from other institutions or industry.

10.3. Supplementary Examinations

The schedule for supplementary examinations shall be as notified by the institute from time to time.

10.4 For NCC/ NSS/ NSO types of Courses, and/or any other Mandatory Non-Credit Course offered in a Semester, a 'Satisfactory Participation Certificate' shall be issued to the Student from the concerned authorities, only after securing ≥ 65% attendance in such a Course. No marks or Letter Grade shall be allotted for these activities and it will not be part of calculation of CGPA.

11.0. Grading Procedure

11.1. Marks will be awarded to indicate the performance of each student in each Theory Course, or Lab/Practicals, or Seminar, or Project, or Mini-Project, etc., based on the % marks obtained in CIE + SEE (Continuous Internal Evaluation + Semester End Examination). As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades (UGC Guidelines) and corresponding percentage of marks shall be followed.

% of Marks Secured (Class Intervals)	*Letter Grade (UGC Guidelines)*	*Grade Points*
100% or below but not less than 85% (≥ 85% , <= 100%)	**O (Excellent)**	**10**
Below 85% but not less than 70% (≥ 70% , < 85%)	**A (Very Good)**	**9**
Below 70% but not less than 60% (≥ 60% , < 70%)	**B (Good)**	**8**
Below 60% but not less than 55% (≥ 55% , < 60%)	**C (above Average)**	**7**
Below 55% but not less than 50% (≥ 50% , < 55%)	**D (Average)**	**6**
Below 50% but not less than 40% (≥ 40% , < 50%)	**P (Pass)**	**5**
Below 40% (< 40%)	**F (FAIL)**	**0**

11.2 A student obtaining F Grade in any Course shall be considered 'failed' and will be required to reappear as 'Supplementary Candidate' in the End Semester Examination (SEE), as and when offered. In such cases, his Internal Marks (CIE Marks) in those Course(s) will remain same as those he obtained earlier.

11.3. A Letter Grade does not imply any specific % of Marks.

11.4. In general, a student shall not be permitted to repeat any Course/ Course (s) only for the sake of 'Grade Improvement' or 'SGPA/ CGPA Improvement'. However, he has to repeat all the Courses pertaining to that Semester, when he is detained (as listed in Items 8.10- 8.11).

11.5. A student earns Grade Point (GP) in each Course/ Course, on the basis of the Letter Grade obtained by him in that Course/ Course (excluding Mandatory non-credit Courses). Then the corresponding 'Credit Points' (CP) are computed by multiplying the Grade Point with Credits for that particular Course/ Course.

Credit Points (CP) = Grade Point (GP) x Credits …. For a Course

11.6. The Student passes the Course/ Course only when he gets GP ≥ 5 (P Grade or above).

11.7. The Semester Grade Point Average (SGPA) is calculated by dividing the Sum of Credit Points (ΣCP) secured from all Courses registered in a Semester, by the Total Number of Credits registered during that Semester. SGPA is rounded off to TWO Decimal Places. SGPA is thus computed as

SGPA = $\{ \sum_{i=1}^{N} C_i G_i \} / \{ \sum_{i=1}^{N} C_i \}$ …. For each Semester,

where **'i'** is the Course indicator index (takes into account all Courses in a Semester), 'N' is the no. of Courses 'REGISTERED' for the Semester (as specifically required and listed under the Course Structure of the parent Department), C_i is the no. of Credits allotted to the **i**th Course, and G_i represents the Grade Points (GP) corresponding to the Letter Grade awarded for that **i**th Course.

11.8. The Cumulative Grade Point Average (CGPA) is a measure of the overall cumulative performance of a student over 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 Second Semester onwards, at the end of each Semester, as per the formula

CGPA = $\{ \sum_{j=1}^{M} C_j G_j \} / \{ \sum_{j=1}^{M} C_j \}$ … for all S Semesters registered
(ie., upto and inclusive of S Semesters, S ≥ 2),

where 'M' is the TOTAL no. of Courses (as specifically required and listed under the Course Structure of the parent Department) the Student has 'REGISTERED' from the 1st Semester onwards up to and inclusive of the Semester S (obviously M > N), '**j**' is the Course indicator index (takes into account all Courses from 1 to S Semesters), C_j is the no. of Credits allotted to the **j**th Course, and G_j represents the Grade Points (GP) corresponding to the Letter Grade awarded

for that **j**th Course. After registration and completion of I Year I Semester however, the SGPA of that Semester itself may be taken as the CGPA, as there are no cumulative effects.

11.9. For Merit Ranking or Comparison Purposes or any other listing, ONLY the 'ROUNDED OFF' values of the CGPAs will be used.

11.10. For Calculations listed in Item 11.5– 11.8, performance in failed Courses (securing F Grade) will also be taken into account, and the Credits of such Courses will also be included in the multiplications and summations. However, Non-Credit Courses will not be taken into consideration.

12.0. Pass Criterion

12.1**.** A student shall be declared successful or 'passed' in a Semester, only when he gets a SGPA ≥ 5.00 (at the end of that particular Semester); and a student shall be declared successful or 'passed' in the entire UG PROGRAMME, only when he gets a CGPA ≥ 5.00; Course to the condition that he secures a GP ≥ 5 (P Grade or above) in every registered Course/ Course in each Semester (during the entire UG programme) for the Degree Award, as required.

12.2. A Student shall be declared successful or 'passed' in any Non-Credit Course/ Course, if he secures a 'Satisfactory Participation Certificate' for that Mandatory Course.

12.3. After the completion of each 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, Grade Earned etc.), Credits earned, SGPA, and CGPA.

13.0. Declaration of Results

13.1 Computation of SGPA and CGPA are done using the procedure listed in 11.5 – 11.9.

13.2. For Final % of Marks equivalent to the computed final CGPA, the following formula may be used …

% of Marks = (final CGPA – 0.5) x 10

14.0. Award of Degree

14.1 A Student who registers for all the specified Courses as listed in the Course Structure, satisfies all the Course Requirements, and passes all the examinations prescribed in the entire UG E&T Programme (UG PROGRAMME), 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.

14.2. A Student who qualifies for the Award of the Degree as listed in Item 14.1, shall be placed in the following Classes …

14.3**.** Students with final CGPA (at the end of the UG PROGRAMME) ≥ 8.00, and fulfilling the following conditions -

(i) should have passed all the Courses/Courses in 'FIRST APPEARANCE' within the first 4 Academic Years (or 8 Sequential Semesters) from the Date of Commencement of his First Academic Year,

(ii) should have secured a CGPA ≥ 8.00, at the end of each of the 8 Sequential Semesters, starting from the I Year I Semester onwards,

(iii) should not have been detained or prevented from writing the End Semester Examinations in any Semester due to shortage of attendance or any other reason,

Shall be placed in 'FIRST **CLASS with DISTINCTION'**.

14.4 (a) Students having final CGPA (at the end of UG PROGRAMME) ≥ 8.00 , but not fulfilling the conditions of 14.3 (i), (ii) and (iii) shall be placed in 'FIRST CLASS'.

(b) Students with final CGPA (at the end of the UG PROGRAMME) ≥ 6.50 but < 8.00, shall be placed in 'FIRST CLASS'.

14.5 Students with final CGPA (at the end of the UG PROGRAMME) ≥ 5.50 but < 6.50, shall be placed in 'SECOND CLASS'.

14.6 All other Students who qualify for the Award of the Degree (as per Item 14.1), with final CGPA (at the end of the UG PROGRAMME) ≥ 5.00 but < 5.50, shall be placed in 'PASS CLASS'.

14.7 A student with final CGPA (at the end of the UG PROGRAMME) < 5.00 will not be eligible for the Award of the Degree.

15.0. Withholding of Results

15.1 If the student has not paid fees to College at any stage, or has pending dues against his name due to any reason whatsoever, or if any case of indiscipline is pending against him, the result of the student may be withheld, and he will not be allowed to go into the next higher Semester. The Award or issue of the Degree may also be withheld in such cases.

16.0 Transitory Regulations

16.1 The Student who has discontinued for any reason, or has been detained for want of attendance may be considered eligible for re-admission to the same course in next academic year or subsequent academic years. The student who has been detained for lack of credits can be readmitted to the next semester only on obtaining minimum required credits.

16.2. After re-admission the student is required to study the course as prescribed in the new regulations for the re-admitted programme at that level and thereafter.

16.3. In case the courses offered in subsequent semesters are repetitive, equivalent courses for replacement of completed courses by the students will be established /identified by the BOS comparing the earlier course in which he studied as per the new regulation in which he has taken re-admission into the course. The students will be suggested the course and to register the said substitute subjects in the new regulation.

16.4. The marks /credits are transferred for all such cleared equivalent subjects and treated as successfully cleared in the new prescribed program course structure.

16.5. For not cleared subjects in the previous course also equivalent course will be identified by the BOS for pursuing the course. The students will be suggested to purse the course and to register the said substitute subjects in the new regulation and to qualify in examinations.

16.5. Marks obtained in the courses completed in previous regulations (in case of change in regulation) are to be converted in to grades and CGPA and memos may be re-issued with the CGPA.

17.0 Student Transfers

17.1 There shall be no Branch transfers after the completion of Admission Process.

17.2 Transfer of candidates from other Institutions will be governed by the regulations of Telangana State Government issued from time to time.

18.0 Scope

i) Where the words "he", "him", "his", occur in the write-up of regulations, they include "she", "her", "hers".

ii) Where the words "Course" or "Courses", occur in these regulations, they also imply "Course" or "Courses".

iii) The Academic Regulations should be read as a whole, for the purpose of any interpretation.

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

v) The College may change or amend the Academic Regulations, Course Structure or Syllabi at any time, and the changes or amendments made shall be applicable to all Students with effect from the dates notified by the College Authorities.

ACADEMIC REGULATIONS R15 FOR B. TECH. (LATERAL ENTRY SCHEME)

(Applicable for the students admitted into II year B. Tech. (Lateral Entry Scheme) from the Academic Year 2016-17 and onwards)

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

1.1. The LES candidates shall pursue a course of study for not less than three academic years and for not more than six academic years.

1.2. The candidate shall register for 144 credits and secure 144 credits from II to IV year B.Tech. Programme (LES) for the award of B.Tech. degree. They are exempted from the courses of I year offered to regular entry students.

1.3. The students, who fail to fulfill the requirement for the award of the degree in 6 consecutive academic years from the year of admission, shall forfeit their seats.

1.4. The attendance regulations of B. Tech. (Regular) shall be applicable to B.Tech. (LES) also.

2. **Promotion Rule**

A student shall be eligible for promotion in B.Tech programme, if he/she acquires the minimum number of credits as given below:

2.1. A student shall be promoted from II Year to III Year only if he/she fulfills the academic requirements of 24 credits up to IV Semester, from all the examinations, whether or not the candidate takes the examinations.

2.2. A student shall be promoted from III year to IV year only if he/she fulfills the academic requirements of 48 credits up to VI Semester from all the examinations, whether or not the candidate takes the examinations.

2.3. Students who fail to earn 144 credits as indicated in the course structure within six academic years from the year of their admission shall forfeit their seat in B.Tech. Course and their admission stands cancelled.

3. **Award of Class**

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

CGPA	**Class Awarded**	**From the CGPA secured from 144 credits**
≥ 7.5	First Class with Distinction	
≥ 6.5 to < 7.5	First Class	
≥ 5.5 to < 6.5	Second Class	
≥ 5.0 to < 5.5	Pass Class	

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

MALPRACTICE RULES

Disciplinary Action for Malpractices/Improper Conduct in Examinations

	Nature of Malpractices/ Improper conduct	Punishment
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 Course of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the Course of the examination)	Expulsion from the examination hall and cancellation of the performance in that Course only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that Course only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the Course of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that Course and all other Courses the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the Courses of that Semester/year. The Hall Ticket of the candidate is to be cancelled.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred and forfeits the seat. The performance of the original candidate Who has been impersonated, shall be

		cancelled in all the Courses of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the Remaining Courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all end semester examinations. The continuation of the course by the candidate is Course to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.
4.	Smuggles the answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination	Expulsion from the examination hall and cancellation of performance in that Course and all the other Courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the Courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all end semester Examinations. The continuation of the course by the candidate is Course 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 Course
6.	Refuses to obey the orders of the Chief Superintendent/Assistant–Superintendent / any officer on duty or misbehaves or creates disturbance	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance

	of any kind in and around the or organizes a walk out or instigates others **to** examination hall 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 written or by signs or by visible representation, assaults the officer- in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	in that Course and all other Courses the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the Courses of that semester/year. The candidates are also debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that Course and all the other Courses the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the Courses of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is Course to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that Course and all other Courses the candidate has

		already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the Courses of That semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	If the student belongs to the college, expulsion from the examination performance in that Course and all other Courses shall and cancellation of the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the Courses of that semester/year. The candidate is also debarred and forfeits the seat. Person(s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that Course and all other Courses the candidate has already appeared including practical examinations and project work and shall not be permitted for other remaining examinations of the Courses of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that Course and all other Courses the candidate has appeared including practical examinations and project work of that semester/year.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the College Academic Committee for further action to award suitable punishment.	

Malpractices identified by squad or special invigilators

Punishments to the candidates as per the above guidelines.

Malpractice identified at Spot center during valuation

The following procedure is to be followed in the case of malpractice cases detected during valuation, scrutiny etc. at spot center.

1) Malpractice is detected at the spot valuation. The case is to be referred to the malpractice committee. Malpractice committee will meet and discuss/question the candidate and based on the evidences, the committee will recommend suitable action on the candidate.
2) A notice is to be served to the candidate(s) involved through the Principal to his address and to the candidate(s) permanent address regarding the malpractice and seek explanations.
3) The involvement of staff who are in charge of conducting examinations, invigilators valuing examination papers and preparing / keeping records of documents relating to the examinations in such acts (inclusive of providing in correct or misleading information) that infringe upon the course of natural justice to one and all concerned at the examinations shall be viewed seriously and recommended for award of appropriate punishment after thorough enquire.
4) Based on the explanation and recommendation of the committee action may be initiated.
5) **Malpractice committee:**

i.	Controller of Examinations	Chairman
ii.	Assistant Controller of Evaluation	Member
iii.	Chief Examiner of the Course/ Course expert	Member
iv.	Concerned Head of the Department	Member
v	Concerned Invigilator	Member

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CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)

DEPARTMENT OF CIVIL ENGINEERING

Institute Vision:

To be a premier academic institution striving continuously for excellence in technical education, research and technological services to the nation.

Institute Mission:

1. Create and sustain a community of learning in which students acquire knowledge and learn to apply it professionally with a concern for the society.
2. Pursue and disseminate research findings and offer knowledge-based technological services to satisfy the needs of society and the industry.
3. Promote professional ethics, leadership qualities and social responsibilities.

Department Vision:
To evolve as a centre of academic excellence and advanced research in Civil engineering and related areas**.**

Department Mission:
To inculcate students with profound understanding of fundamentals related to discipline, attitudes, skills and their application in solving real world problems, with an inclination towards societal issues and research.

Programme Educational Objectives (PEOs)

PEO1: Excel in their professional career and higher education in their relative fields.
PEO 2: Exhibit professionalism through leadership, communication skills and team work.
PEO3: Adapt to emerging trends for sustained growth and exhibit social responsibility and professional ethics.

Programme Outcomes (POs)

PO1: Ability to apply knowledge of mathematics, science, and engineering for solving complex engineering problems.

PO2: Ability to design and conduct experiments, as well as to analyze and interpret data to reach substantiated conclusions.

PO3: Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.

PO4: Ability to use research-based knowledge and research methods including design of experiments to provide valid conclusions.

PO5: Ability to learn and apply appropriate modern tools for engineering solutions.

PO6: Ability to assess societal, health, safety, legal and cultural issues and the consequent responsibilities and follow them in professional practice.

PO7: Ability to understand the impact of the professional practices on environment, society and its sustainable development.

PO8: Ability to understand professional and ethical responsibilities.

PO9: Ability to function an individual and in multidisciplinary teams.

PO10: Ability to communicate effectively.

PO11: Ability to understand engineering and management principles and apply them to one's own work, as a member and leader in a team, to manage projects.

PO12: Ability to engage in lifelong learning.

R02 COURSE STRUCTURE: B.TECH (CIVIL ENGINEERING)

I Semester

Course Code	CAT	Course	L	T	P	C
A2001	HS	English	3	0	0	3
A2007	BS	Engineering Mathematics-I	3	1	0	3
A2012	BS	Engineering Physics-I	3	0	0	3
A2016	BS	Applied Chemistry-I	2	1	0	2
A2008	BS	Engineering Mathematics-II	3	1	0	**3**
A2306	ES	Graphic Science	2	0	4	4
A2002	ES	English Language Communication Skills Lab	0	0	3	2
A2018	HS	Engineering Chemistry Lab	0	0	3	2
A2305	BS	Engineering Workshop	0	0	3	2
			16	2	13	**24**

II Semester

Course Code	CAT	Course	L	T	P	C
A2009	BS	Engineering Mathematics-III	3	1	0	**3**
A2013	BS	Engineering Physics-II	3	0	0	**3**
A2017	BS	Applied Chemistry-II	2	1	0	**2**
A2101	ES	Applied Mechanics	3	1	0	**3**
A2501	ES	Computer Programming Through 'C'	3	1	0	**3**
A2307	ES	Graphic Science & AutoCAD	2	0	4	**4**
A2014	BS	Engineering Physics Lab	0	0	3	**2**
A2549	ES	Computer Programming Lab	0	0	3	**2**
A2551	ES	IT Workshop	0	0	3	**2**
			16	4	13	**24**

III Semester

Course Code	CAT	Course	L	T	P	C
A2102	PC	Strength of Materials - I	4	1	0	**4**
A2103	ES	Fluid Mechanics	3	1	0	**3**
A2104	ES	Surveying	4	1	0	**4**
A2021	HS	Managerial Economics & Financial Analysis	3	1	0	**3**
A2105	ES	Building Materials and Construction	3	1	0	**3**
A2019	HS	Environmental Studies	3	0	0	3
A2106	PC	Strength of Materials Lab	0	0	3	**2**
A2107	ES	Surveying Lab – I	0	0	3	**2**
			20	6	6	**24**

IV Semester

Course Code	CAT	Course	L	T	P	C
A2011	BS	Probability and Statistics	3	1	0	**3**
A2108	PC	Strength of Materials – II	4	1	0	**3**
A2109	PC	Hydraulics & Hydraulic Machinery	3	1	0	**3**
A2110	PC	Structural Analysis	3	1	0	**3**
A2111	PC	Building Planning and Drawing	3	1	0	**3**
A2254	ES	Basic Electrical & Electronics Engineering	3	1	0	**3**
A2112	PC	Fluid Mechanics & Hydraulic Machinery Lab	0	0	3	**2**
A2113	PC	Surveying Lab - II	0	0	3	**2**
A2114	PW	Surveying Camp	0	0	0	**2**
A2004	MC	Soft Skills and Professional Ethics	2	0	0	0
A2023	HS	Gender Sensitization	0	0	3	**2**
			21	6	6	**26**

V Semester

Course Code	CAT	Course	L	T	P	C
A2115	PC	Concrete Technology	3	1	0	**3**
A2116	PC	Design and Drawing of RCC Structures	4	1	0	**4**
A2117	PC	Geotechnical Engineering – I	4	1	0	**4**
A2118	PC	Water Resources Engineering – I	3	1	0	**3**
A2119	ES	Engineering Geology	3	1	0	**3**
A2120	PC	Transportation Engineering-I	3	1	0	**3**
A2121	PC	Concrete Technology Lab	0	0	3	**2**
A2122	ES	Engineering Geology and Transportation Materials Lab	0	0	3	**2**
A2005	MC	Analytical Skills-I	2	0	0	**0**
			22	6	6	**24**

VI Semester

Course Code	CAT	Course	L	T	P	C
A2123	PC	Design and Drawing of Steel Structures	4	1	0	**4**
A2124	PC	Geotechnical Engineering – II	4	1	0	**4**
A2125	PC	Environmental Engineering-I	3	1	0	**3**
A2126	PC	Water Resources Engineering – II	3	1	0	**3**
Professional Elective-I			3	1	0	**3**
A2127	*PE*	*Advanced Structural Design*				
A2128	*PE*	*Design of Bridge Structures*				
A2129	*PE*	*Prestressed Concrete*				
Professional Elective-II			3	1	0	**3**
A2130	*PE*	*Construction Project Management*				
A2131	*PE*	*Urban Transportation Planning*				
A2132	*PE*	*Pavement Analysis and Design*				
A2002	HS	Advanced English Communication Skills Lab	0	0	3	**2**
A2133	PC	Geotechnical Engineering Lab	0	0	3	**2**
A2006	MC	Analytical Skills-II	2	0	0	**0**
			22	6	6	**24**

VII Semester

Course Code	CAT	Course	L	T	P	C
Professional Elective-III			3	1	0	**3**
A2134	**PE**	*Irrigation Design and Drawing*				
A2135	**PE**	*Water Resources Systems Analysis*				
A2136	**PE**	*Watershed Management*				
Professional Elective-IV			3	1	0	**3**
A2137	**PE**	*Advanced Structural Analysis*				
A2138	**PE**	*Finite Element Methods*				
A2139	**PE**	*Earth Quake Engineering*				
Professional Elective-V			3	1	0	**3**
A2142	**PE**	*Environmental Engineering-II*				
A2147	**PE**	*Advance Foundation Engineering*				
A2148	**PE**	*Ground Improvement Techniques*				
A2140	PC	Transportation Engineering-II	3	1	0	**3**
A2141	PC	Estimation and Costing	3	1	0	**3**
Open Elective: I			3	0	0	**3**
A2143	PC	Auto CAD and STAAD PRO	0	0	3	**2**
A2144	PC	Environmental Engineering Lab	0	0	3	**2**
A2145	PW	Industry Oriented Mini Project	0	0	0	**2**
			18	5	6	**24**

VIII Semester

Course Code	CAT	Course	L	T	P	C
A2149	***PE***	*Management Science*	4	**0**	**0**	**4**
Open Elective: II			3	0	0	**3**
Open Elective: III			3	**0**	**0**	**3**
A2150	PW	Seminar	0	0	3	**2**
A2151	PW	Project work	0	12	6	**10**
A2152	PW	Comprehensive Viva-Voce	0	0	0	**2**
			10	13	9	**24**

Open electives - I

Course Code	Course Name	Prerequisite	L	T	P	C
A2241	Renewable Energy Sources	BEE	3	0	0	3
A2362	Material Science	Nil	3	0	0	3
A2452	Principles of Electronic Communications	Basic Electronics	3	0	0	3
A2509	Java Programming	C Programming	3	0	0	3

Open electives - II

Course Code	Course Name	Prerequisite	L	T	P	C
A2256	Modern Control Theory	BEE	3	0	0	3
A2363	Elements of Mechanical Engineering	Nil	3	0	0	3
A2422	Electronic Measurements & Instrumentation	BEE	3	0	0	3
A2510	Database Management Systems	C Programming	3	0	0	3

Open Electives - III

Course Code	Course Name	Prerequisite	L	T	P	C
A2246	Power System Engineering	BEE	3	0	0	3
A2364	Elements of Automobile Engineering	Nil	3	0	0	3
A2453	Industrial Electronics	BEE	3	0	0	3
A2517	Information Security	Nil	3	0	0	3

T – Tutorial L – Theory P – Practical C – Credits
Group: HS: Humanities & Social Sciences, BS: Basic Sciences, ES: Engineering Sciences, PC: Professional Core, PE: Professional Elective, OE: Open Elective, MC: Mandatory Non-credit Course, PW: Project Work

DETAILED SYLLABUS
B.TECH(CIVIL ENGINEERING)

I SEMESTER

(A2001) ENGLISH

B. Tech. (CE) I-Semester

L	T	P	C
3	0	0	3

Course objectives:

- To improve the language proficiency of the students in English with an emphasis on **LSRW** skills.
- To equip the students with skills to study academic subjects more effectively.
- To develop communication skills in formal and informal situations.

Skills-wise objectives:

Listening Skills:

- To equip them to identify the main ideas and the supporting details.
- To be able to identify different organizational patterns and use these ideas while speaking and writing.

Speaking Skills:

- To make students aware of the role of speaking in English and its contribution to their success.
- To enable students to express themselves fluently and appropriately in social and professional contexts.

Reading Skills:

- To develop a global understanding of the text by paying adequate attention to the details. To identify the main idea of the text.
- To identify their note – making skills through reading for specific speaking and writing purposes.

Writing Skills:

To enable them to write coherent paragraphs of different forms that include…..

- Problem – Solution
- Extended definition
- Compare and Contrast
- General description/discussion
- Cause and effect

- To enable them to write from notes made.

Unit –I

Chapter entitled '**Advances in Science and Technology'** from **'Skills Annexe'** Published by Orient Black Swan, Hyderabad.

- L-Conversations – Listening for the theme.
- S- Apologizing and interrupting.
- R- Read a Report on Seminar on pure science at the Pravasi Bharathiya Divas Event in Kochi - Why pure Science in India lags behind.
- W- Descriptions of Objects and Events
- G- Types of Verbs; Transitive, Intransitive and Linking.
- V- Adjective and Adverb Suffixes.

Unit –II

Chapter entitled **'Mokshagundam Visvesvaraya'** from "**Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad.

- L-Conversations – Introducing each other, Talking about a course.
- S- Opinion based questions
- R- Reading for Subject/ Theme - The Palm island
- W- Writing Paragraphs
- G- Joining ideas by conjunctions, Adverbs
- V- Prefixes and suffixes

Unit –III

A. Chapter entitled '**Risk Management'** from "**Skills Annexe** - Functional English for Success" Published by Orient Black Swan, Hyderabad

- L – for main points and sub-points for note taking
- S – giving instructions and directions; Speaking of hypothetical situations
- R – reading for details
- W – note-making, information transfer, punctuation
- G – present tense
- V – synonyms and antonyms
- Report writing
- Information Transfer

B. Chapter entitled '**Leela's Friend'** by R.K. Narayan from "**Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad

- L – for main points and sub-points for note taking
- S – Presentations
- R – reading for details
- W – note-making, information transfer, punctuation
- V – Guessing the words, using an appropriate word, Phrasal verbs

Unit –IV

Chapter entitled '**Sports and Health'** from "**Skills Annexe** -Functional English for Success" Published by Orient Black Swan, Hyderabad

- L- Critical Listening and Listening for speaker's tone/ attitude
- S- Group discussion and Making presentations
- R- Critical reading, reading for reference
- W-Project proposals; Technical reports, Project Reports and Research Papers
- G- Adjectives, prepositions and concord
- V- Collocations and Technical vocabulary Using words appropriately

Unit –V

Chapter entitled '**The Convocation Speech**' by N. R. Narayana Murthy' from "**Epitome of Wisdom"**, Published by Maruthi Publications, Hyderabad

- L- Speech on 'How do you make a teacher great?'
- S- Role play – Interviewing famous personalities
- R- Critical reading, reading for reference – 'What is meant by Entrepreneurship?'
- W-Essay writing
- G- Focusing with passive voice
- V- One word substitutes

Textbooks

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following text books and course content, are prescribed:

1. A Text book entitled **"Skills Annexe", -Functional English to Success** Published by Orient Black Swan, Hyderabad
2. A text book entitled, **"Epitome of Wisdom",** Published by Maruthi Publications, Hyderabad.

References

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. English Grammar Practice, Raj N Bakshi, Orient Longman.
3. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
4. Handbook of English Grammar& Usage, Mark Lester and Larry Beason, Tata McGraw –Hill.
5. Technical Communication, Meenakshi Raman, Oxford University Press
6. Objective English. Edgar Thorpe & Showick Thorpe, Pearson Education
7. Grammar Games, Renuvolcuri Mario, Cambridge University Press.
8. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
9. Everyday Dialogues in English, Robert J. Dixson, Prentice Hall India Pvt Ltd.,
10. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
11. Effective Technical Communication, M Ashraf Rizvi, Tata McGraw – Hill.
12. Basic Vocabulary in Use, Michael McCarthy

Course Outcomes

On completion of the course, students will be able to:

1. Use the marvels of science and technology
2. Discuss the role of Visvesvaraya as a true patriot and as an excellent engineer in solving complex, social problems.
3. Recognize the risk factors that are characteristic of factories in the South Asian region and explain safety measures to be taken to prevent them.
4. Explain extraordinary narrative techniques of R.K. Narayan with simple expressions
5. Deliver the speech effectually to inspire the gathering.
6. Explain how undaunted spirit turns the ordinary into the extraordinary and how sports contribute to sound health.

(A2007) ENGINEERING MATHEMATICS-I

B.Tech (CE) I Semester

L	T	P	C
3	1	0	3

Course Objectives:

1. Obtain and understand formation and solution of matrices. Solutions of linear systems through matrices.
2. Learn to find Eigen values, Eigen vectors and usage of Cayley-Hamilton Theorem. Understanding real & complex matrices and reduction to Canonical form.
3. Develop the skills pertinent to the practice of mathematics and to formulate problems on continuous and differentiable functions.
4. The areas of bounded regions can be found using methods of integrations.
5. In the diverse fields like electrical circuits, electronic communication, mechanical vibration and structural engineering, periodic functions naturally occur and hence their properties are very much required.

Unit-I: Linear Algebra-I

Matrices and Linear Systems of Equations: Real Matrices: Symmetric, Skew-symmetric, Orthogonal. Complex matrices: Hermitian, Skew-Hermitian and Unitary. Elementary row transformations- Rank – Echelon form, Normal form- Solution of Linear Systems – Direct Methods (Gauss Elimination, Gauss Jordan)-LU-Decomposition.

Unit-II: Linear Algebra-II

Eigen Values, Eigen Vectors- Properties, Cayley –Hamilton Theorem (without proof) – Inverse and Powers of a matrix by Cayley-Hamilton theorem- Linear Transformation- Orthogonal Transformation-Diagonalization of matrix. Calculation of Powers of matrix-Modal and spectral matrices. Quadratic forms- Reduction of quadratic form to canonical form-rank- positive, Negative definite-semi definite-Index-Signature.

Unit- III: Functions of Single & Several Variables

Rolle's Theorem –Lagrange's Mean value Theorem – Cauchy's Mean value theorem- Generalized Mean value theorem (all theorems without proof)

Functions of Several Variables- Functional dependence –Jacobian- Maxima and Minima of functions of two variables with constraints and without constraints.

Unit IV: Multiple Integrals

Double integrals – Change of variables – Change of order of integration and Triple integrals.

Unit-V: Fourier Series

Determination of Fourier coefficients – Fourier Series – even and odd function – Fourier Series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

Text Books

1. Kreyszig's Engineering Mathematics – I by Dr. A. Ramakrishna Prasad, 2014 yr Edition John Wiley Publications.
2. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.

References

1. Advanced Engineering Mathematics by Kreyszig, 8th Edition, John Wiley & Sons Publishers
2. Higher Engineering Mathematics by B.S. Grewal, 36th Edition, Khanna Publishers.
3. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
4. Mathematics for Engineering and Scientists. Alan Jeffrey, 6th Edi, 2013, Chapman & Hall / CRC
5. Engineering Mathematics – I by T.K.V. Iyengar, B. Krishna Gandhi & Others, 2013 Yr. Edition S.Chand.
6. Engineering Mathematics – I by D.S. Chandrasekhar, Prison Books Pvt. Ltd.
7. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.

Course Outcomes

On completion of the course students will be able to

1. Solve linear system of equations by using various methods of matrices.

2. Find eigenvalues, eigenvectors and diagonalization of a square matrix. Finds the nature of real and complex matrices by reducing to canonical form.
3. Verify mean value theorems and they can find maximum and minimum for multiple variable functions.
4. Calculate the length of arcs, surface area and the volumes of solid objects. Perform polar-to-cartesian and cartesian-to-polar conversions.
5. Expand the function by Fourier series and Fourier transforms.

(A2012) ENGINEERING PHYSICS-I

B.Tech (CE) I Semester

L	T	P	C
3	0	0	3

Course Objectives:

- To understand the phenomenon of interference, diffraction and polarization of light.
- To understand the bonding and structural properties of the crystals and their study using X-ray diffraction techniques.
- To understand the origin of different crystal defects and the basics of statistical mechanics.
- To understand the classical, quantum approach to explain the electrical properties of solids and also band theory of solids.
- To understand the properties of semi-conductors materials.

Unit-I

Optics: Interference: Principle of super position waves (qualitative), Interference, Conditions required for interference- Coherence- Interference due to Division of Wave front & Division of Amplitude – Stokes Principle- Interference in thin films (reflected light)& Conditions for interference maxima and minima, Newton rings – Formation of rings- Diameter of n^{th} bright & dark rings- Derivation of equation for wavelength of a monochromatic light- Calculation of refractive index of a liquid.

Diffraction: Diffraction (definition), Distinctions between Fraunhofer & Fresnel diffraction- Fraunhofer diffraction due to single slit, Conditions for Principle maxima, Secondary maxima and minima – Fraunhofer diffraction due to single slit, Double slitand N Parallel slits -Conditions for Principle maxima, Secondary maxima and minima -Construction of diffraction grating - Rayleigh criterion of resolving power-Resolving power of a grating.

Polarisation: Introduction, Representation of various polarized lights- Optic axis- Principle section- Malus law- Brewster's law-Double refraction, Construction and working of Nicol's prism, Polaroids, Quarter wave plate &Half wave plate. Circular & Elliptical polarization (qualitative)

Unit-II

Crystallography: Ionic bond, covalent bond, metallic bond, hydrogen bond, Vander-Waal's bond, cohesive energy of diatomic molecule, cohesive energy of ionic crystal, space lattice, basis, unit cell, lattice

parameters, seven crystal system, Bravais lattice, atomic radius, co-ordination number and packing factors of SC, BCC, FCC structures, Structures of NaCland CsCl.

Crystal planes and directions: Crystal directions- Crystal planes-Miller indices- Evaluation of Miller indices- Inter planar spacing of orthogonal crystal.

X-ray Diffraction: Introduction of X –rays, Bragg's law, Powder X- ray diffraction method, applications of X- ray diffraction.

Unit-III

Defects in Solids: Point defects; Vacancies, Schottky and Frenkel defects, Substitutional Impurities, Interstitial impurities -Line Defects; Edge and Screw dislocations, Burger's vector -Surface defects.

Statistical Mechanics: Micro state & Macro state – Phase Space - Maxwell-Boltzman, Bose-Einstein and Fermi-Dirac statistics (qualitative treatment), Concept of electron gas, Derivation of density of Energy States, Fermi distribution function, Concept of Fermi level - Effect of temperature on the Fermi distribution.

Unit-IV

Principles of Quantum Mechanics: Waves and particles- de-Broglie hypothesis-Matter waves- Wavelength of Matter Waves, Davisson and Germer's Experiment, G.P. Thomson Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function – Particle in a one dimensional potential box- Equation for energy and wave function of the particle . Extension for three dimensions (qualitative)

Band Theory of Solids: Assumptions of classical and quantum free electron theory of metals and their limitations, Origin of energy band formation in solids-Electron in a periodic potential: Bloch theorem, Kronig- Penny model (qualitative treatment), E-K curve, concept of effective mass of an electron, classification of materials into conductors, Semiconductors &Insulators.

Unit-V

Semiconductor Physics: Introduction, Intrinsic semiconductor – Concentration of electrons in the conduction band- concentration of holes in the valance band -Fermi level in intrinsic semiconductor- Law of mass action- Extrinsic semiconductors, N-Type semiconductor -Carrier concentration in N-Type semiconductor- P-Type semiconductor -Carrier concentration in P-Type semiconductors, Drift and diffusion current ,Hall effect

Physics of Semiconductor Devices: Formation of PN junction, Open circuit PN junction-I-V Characteristics of PN junction diode- Energy diagram of PN diode-Diode equation- Direct &Indirect band gap semiconductors, LED , working principle & Applications - Photo diode, working principle & Applications - Solar cells, working principle& Applications.

Text Books

1. Engineering Physics by PK Palani Samy, SciTech Publications.
2. Applied Physics for Engineers by Dr P. Madhusudana Rao, Academic Publishing Company.
3. Solid State Physics by S. O. Pillai (Main edition) – New Age Publishers.

References

1. Fundamentals of Physics, David Halliday, Robert Resnick, Jearl Walker by John Wiley & Sons
2. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
3. Engineering Physics by R.K.Gaur and S.L. Gupta; DhanpatRai and Sons.
4. Modern Physics by K. Vijaya Kumar, S. Chandralingam, S. Chand & Co.

Course Outcomes:

On completion of the course students will be able to

1. Explain the properties of light propagation and interaction of light with matter, such as interference, diffraction and polarization of light.
2. State the different types of bonds in solids and classify the solids into different crystal groups.
3. Explain how the X rays were employed to determine the structure of crystals.
4. Differentiate the crystal defects on the basis of their geometry.
5. Summarize different statistical distribution methods.
6. Analyse why the classical theory and quantum free electron theory failed to explain the electrical properties of solids and how the band theory overcomes these failures.
7. Distinguish various properties of semi-conductor materials, devices and their applications.

(A2016) APPLIED CHEMISTRY -I
(Common to Civil & Mechanical)

B.Tech (CE) I Semester

L	T	P	C
2	1	0	2

Course Objectives:

- Knowledge of purification techniques and various applications of soft water in industries.
- Understand electrochemistry which deals with the utilization of electrical energy of an external source for bringing about a physical or chemical change.
- Knowledge of "Corrosion engineering education" and Usage of polymers in modern world as an integral part of every human's life.
- Provide practices for the prevention for corrosion
- The course provides a comprehensive survey of the concepts involved in the study of phase and chemical equilibrium.

Unit I

Water Technology

Sources of water – Impurities in water – Hardness of water – Temporary and Permanent Hardness – Units. Estimation of temporary and permanent hardness of water – EDTA method; Numerical problems; Potable Water treatment – Specifications; Steps involved in treatment - Sedimentation – Coagulation – Filtration – Sterilisation – Desalination of Brackish Water – Reverse Osmosis and Electro dialysis.

Industrial water treatment – Boiler Troubles – Scales and Sludges ; Caustic Embrittlement; Boiler Corrosion; Priming and Foaming. Hot lime and Cold lime soda process ; Numerical Problems; Zeolite Process and Ion Exchange Process. Internal conditioning methods like – Phosphate, Carbonate ,Calgon, Colloidal, Radioactive, Electrical and Sodium aluminate conditioning.

Unit II

Battery Technology

Electrode Potential – Determination of Single Electrode Potential; galvanic cells; Primary Cell – Dry or Leclanche Cell, Daniel cell, Secondary Cell – Lead acid storage Cell ; Ni – Cd batteries, , Fuel Cell – Hydrogen Oxygen Fuel Cell. Methanol – Oxygen fuel cell.

Unit III

Corrosion and its Control

Causes and effects of corrosion. Theories of Corrosion – Chemical & Electrochemical corrosion; Types of corrosion (Galvanic, Waterline, Pitting and Inter granular); Pilling bed-worth Rule. Factors affecting rate of corrosion – Nature of metal and Nature of Environment – Corrosion control methods – Cathodic protection (sacrificial anodic and Impressed current).

Unit IV

Protective Coatings

Surface coatings: Metallic coatings & methods of application of metallic coating – Hot dipping (Galvanization & Tinning); Cementation, Metal Cladding; Electroplating (copper plating); Electroless plating (Ni Plating); Organic coatings – Paints – Constituents and their functions. Varnishes, Enamels& Lacquers.

Unit V

Phase Rule

Definitions of terms - Phase, Component and Degree of Freedom. Phase Rule Equation. Phase diagrams – One Component System – Water System; Two Component System – Silver Lead System; Cooling Curves. Iron – Carbon Phase Diagram; Heat treatment of steel. Hardening.Annealing, and Normalizing

Text Books;

1. Engineering chemistry by B.Rama Devi & Ch. VenkataRamana Reddy; Cengage Learning, 2012
2. Engineering Chemistry P.C. Jain and M. Jain, Dhanapat Rai& Sons
3. Engineering chemistry by Dr. Bharathikumari, Dr.Jyotsna
4. Engineering chemistry by Thirumalachary, E.Laxminyarana ,SCITECH Publications(India) P Ltd

References:

1. A Textbook of Engineering Chemistry, S.S.Dara, S.Chand & Co.
2. Textbook of Engineering Chemistry, Sashi Chawla, Dhanapath Rai& Sons

Course Outcomes:

At the end of the course students will be able to

1. Summerise the various methods involved in converting hard water to soft water
2. Recognise different types of Batteries for converting chemical energy to electrical energy.
3. Describe the factors related to corrosion and their mechanism.
4. Analyze the different techniques involved in protecting the metals from corrosion.
5. Describe the applications of phase rule in metallurgical industries.

(A2008) ENGINEERING MATHEMATICS-II

B.Tech (CE) II Semester	L	T	P	C
	3	1	0	3

Course Objectives

1. Solve Differential Equations of first order using various methods and their applications.
2. Solve Differential Equations of multiple orders using various methods and their applications.
3. Possible to transform from one form another form by using Laplace Transforms (Used in Signals and systems).
4. Evaluate Gradient – Divergence – Curl, Directional derivatives.
5. Evaluate multiple integrals (line, surface, volume integrals) and convert line integrals to area integrals and surface integrals to volume integrals.

Unit-I: Differential equations of first order and their applications

Over view of Differential equations – exact, Linear and Bernoulli's. Applications to Newton's Law of cooling, Law of Natural growth and decay, orthogonal trajectories.

Unit-II: Higher order linear differential equations and their applications

Linear differential equations of second and higher order with constant coefficients. RHS term of the type $f(x) = e^{ax}, \sin ax, \cos axandx^n, e^{ax}V(x), x^nV(x)$,method of variation of parameters. Applications to bending of beams, Electrical circuits.

Unit-III: Laplace Transform and its applications to Ordinary Differential Equations

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

Unit- IV: Vector Differential Calculus

Vector Differential Calculus: Scalar & vector point functions, Gradient – Divergence – Curl with geometrical & Physical interpretation. Directional derivatives, Vector differential operators & their related properties.

Unit-V: Vector Integral Calculus & Vector integral theorems

Vector Integral Calculus: Line integral – Work done – scalar potential function, surface integrals – Flux of Vector valued function, Volume integrals.

Vector integral theorems: Gauss's Divergence theorem, Green's theorem, Stoke's Theorem (Statement and their verification).

Text Books

1. Kreyszig's Engineering Mathematics – I by Dr. A. Ramakrishna Prasad, 2014yr Edition John Wiley Publications.
2. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.

References

1. Differential Equations with Applications & Historical Notes by George F Simmons, 2ndEdn ,Tata Mc.graw Hill Publishing Co Ltd.
2. Kreyszig's Mathematical Methods by Dr. A. Ramakrishna Prasad, 1st Edition John Wiley Publications.
3. Advanced Engineering Mathematics by Kreyszig, 8th Edition, John Wiley & Sons Publishers
4. Higher Engineering Mathematics by B.S. Grewal, 36th Edition, Khanna Publishers.
5. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
6. Mathematics for Engineering and Scientists. Alan Jeffrey, 6th Edi, 2013, Chapman & Hall / CRC
7. Engineering Mathematics – I by T.K.V. Iyengar, B. Krishna Gandhi & Others, 2012 Yr. Edition S. Chand.
8. Engineering Mathematics – I by D.S. Chandrasekhar, Prison Books Pvt. Ltd.
9. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.

Course Outcomes

On completion of the course, students will be able to

1. Understand the formation and evaluation of different differential equations by various methods.
2. Analyze certain physical problems (tank flow, mechanical and electrical vibration), set up their determining differential equations,

solve them using the techniques to answer questions about the physical system.

3. Solve linear, simultaneous equations to analyze voltages and currents in AC to DC (phase) circuits. Determine the average power dissipated in a circuit. Calculate voltages and currents in single phase circuit.
4. Evaluate Gradient – Divergence – Curl, Directional derivatives.
5. Evaluate multiple integrals (line, surface, volume integrals) and convert line integrals to area integrals and surface integrals to volume integrals.

(A2306) GRAPHIC SCIENCE
(Civil Engineering)

B.Tech (CE) I Semester

L	T	P	C
2	0	4	4

Course Objective: The objective of this subject is to provide the basic concepts about Engineering Drawing. Detailed concepts are given in projections, technical drawing, dimensioning and specifications.

Unit -I
Introduction to Engineering Drawing :
Principles of Engineering Graphics and their Significance, Conic Sections– Eccentricity method only.
Cycloid, Epi-cycloid and Hypocycloid. Involutes

Unit-II
Scales – Plain, Diagonal, Vernier and comparative scales.

Unit- III
Orthographic Projections:
Principles of Orthographic Projections – Conventions – **Projections of Points and Lines**, Traces of Lines
Projection of Planes (Excluding traces and auxiliary planes)p

Unit-IV
Projection of Solids: Projection of regular solids-cube, prisms, cylinder, pyramids, cone (Using solid rotation method only)

Unit-V
Projection of solids using auxiliary planes

Text Books:
1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing and Graphics Rane and Shah/ Pearson Edu.

Reference Books
1. A Text Book of Engineering Drawing / Dhawan R K / S. Chand
2. Engineering Graphics With Auto CAD / James D Bethune / Pearson Edu.

3. Engineering Graphics / K R Mohan / Dhanpat Rai.
4. Text book on Engineering Drawing / KL Narayana/ P Kannaih / Scitech

Course Outcomes:

By undergoing this course, students will be

1. Practice the conventions and the methods of engineering drawing.
2. Draw the projections of points, lines, planes and solids in different types of projections.

(A2002) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

B.Tech (CE) I Semester

L	T	P	C
0	0	3	2

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

Course Objectives:

- To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for public speaking

Syllabus:
English Language Communication Skills Lab shall have two parts:

a. **Computer Assisted Language Learning (CALL) Lab**
b. **Interactive Communication Skills (ICS) Lab**

The following course content is prescribed for the English Language Communication Skills Lab

Exercise – I

- **CALL Lab**: Introduction to Phonetics – Speech Sounds – Vowels and Consonants
- **ICS Lab**: Ice-Breaking activity and JAM session

Exercise – II

- **CALL Lab:** Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.
- **ICS Lab:** Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.

Exercise – III

- **CALL Lab**: Minimal Pairs- Word accent and Stress Shifts-
- **ICS Lab**: Descriptions – Place , Person, Object

Exercise – IV

- **CALL Lab**: Intonation and Common errors in Pronunciation.
- **ICS Lab**: Extempore- Public Speaking

Exercise – V

- **CALL Lab**: Neutralization of Mother Tongue Influence and Conversation Practice
- **ICS Lab**:- **Giving Directions**

Minimum Requirement of infra structural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab: The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners. R13 B.Tech I year syllabus System Requirement (Hardware component): Computer network with LAN with minimum 60 multimedia systems with the following specifications: i) P – IV Processor a) Speed – 2.8 GHZ b) RAM – 512 MB Minimum c) Hard Disk – 80 GB ii) Headphones of High quality
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., a digital stereo –audio & video system and camcorder etc.

Course Outcomes

By the end of the course students will be able to

1. Explain nuances of language through audio- visual experience and group activities
2. Neutralization of accent for intelligibility
3. Exhibit speaking ability with clarity and confidence to enhance their employability skills.

(A2018) ENGINEERING CHEMISTRY LAB

B.Tech (CE) I Semester

L	T	P	C
0	0	3	2

Course objectives

- Estimation of hardness of water is essential for drinking water and in industries to avoid boiler troubles.
- Knowledge of instrumentation in conducto-meter, potentiometer, calorimeter and p^H meter.
- Knowledge of preparation of aspirin and Thiokol rubber
- Knowledge of physical properties of chemical compounds
- To gain the knowledge on existing devices, materials.

Experiments

I Inorganic chemistry experiments by Analytical methods.

Water Analysis:

1. Estimation of Hardness of water by EDTA method
2. Estimation of Alkalinity of water.

II. Instrumentation.

3.Estimation of Copper by colorimetric Method.
4.Conductometric Titration of a strong acid vs a strong base
5.Potentiometric Titration of a strong acid vs a strong base

III. Identification and preparation of organic compounds

6.Preparation of ASPIRIN
7. Preparation of Thiokol Rubber

IV. Physical chemistry experiments

8.Determination of Viscosity of a Liquid.
9.Determination of Surface Tension of a liquid.
10.Adsorption of acetic acid on activated charcoal
11.Determination of melting point and Boiling point of given solids and liquids

V. Cement Analysis

12.Determination of Ferric iron in cement by Colorimetry

References

1. Engineering chemistry by B. Rama Devi & Ch. Venkata Ramana Reddy; Cengage Learning, 2012
2. A Textbook of Engineering Chemistry, Sashi Chawla, Dhanapath Rai& Sons
3. A Text book .Engineering Chemistry, B. K. Sharma Et al

Course outcomes:

At the end of the course the student will be able to

1. Predict the extent of hardness range present in water sample and its consequences if used for various industrial operations
2. Prepare drugs like Aspirin and polymers like Thiokol rubber
3. Estimate the strength of solutions ,p^H of various solutions
4. Evaluate the viscosity and surface tension of liquids
5. Employ the conductometric and potentiometric titrations
6. Describe the principles of adsorption phenomenon.

(A2305) ENGINEERING WORKSHOP
(COMMON TO ALL BRANCHES)

B.Tech (CE) I Semester

L	T	P	C
0	0	3	2

Course Objectives
To provide the students with hands on experience on different trades of Engineering like fitting, carpentry, foundry, smithy, house wiring and soldering**.**

I Trade for Exercise:
(Two experiments each from any six trades of the following)

1. Carpentry
2. Fitting
3. Tin-smithy
4. House-wiring
5. Foundry
6. Plumbing
7. Welding
8. Black smithy

II Trades for Demonstration and Exposure:

1. Power tools
2. Machine tools

Text book:

1. Workshop Manual, Second edition/ P Kannaiah and K L Narayana / Scitech publishers

Course Outcomes:
On completion of the course, students will be able to

1. Use tools and equipments in fitting, carpentry, house wiring, soldering, foundry and smithy.
2. Produce simple models in the above trades

(A2009) ENGINEERING MATHEMATICS-III

B.Tech (CE) III Semester

L	T	P	C
3	1	0	3

Course Objectives

1. Obtain an intuitive and working understanding of some Mathematical Methods for the basic problems of numerical analysis.
2. Develop some experience in the implementation of numerical methods in engineering applications by using a computer.
3. Solutions of Ordinary Differential Equations using numerical methods.
4. The aim at forming a partial differential equation (PDE) for a function with many variables and their solution methods. Two important methods for first order PDE's are learnt. While separation of variables technique is learnt for typical second order PDE's such as Wave, Heat and Laplace equations.
5. Evaluate the Fourier transform of a continuous function, and be familiar with its basic properties.

Unit – I: Solutions of Linear & Non-Linear equations

Introduction to Algebraic and Transcendental Equations, Bisection Method, Method of False Position (Regular – False Method), Iteration Method, Newton – Raphson's Method, Errors in Polynomial. Gauss Jacobi's iterative method, Gauss-Seidel Method.

Unit – II: Interpolation& Curve fitting

Forward, Backward & Central Differences, Symbolic Relations, Newton's Forward & Backward Interpolation, Gauss's Forward & Backward Interpolation, Lagrange's Interpolation & Problems.

Fitting straight line, Fitting Non-Linear curve, Curve fitting by sum of Exponentials, Non-Linear Weighted least squares approximation.

Unit –III: Numerical Differentiation, Integrations & Solutions of ODE

Numerical Differentiation & Integrations: Numerical Differentiation, Derivatives using forward & backward difference formula, Derivatives using central difference formula, Trapezoidal Rule, Simpson's 1/3 Rule,3/8 Rule.

Solutions of ODE: Introduction to Numerical solutions of ODE, Taylor's series method, Picard's method of Successive Approximations, Euler's method, Euler's Modified method, Runga-Kutta method , Predictor and

Corrector method, Milne's Predictor and Corrector method, Adams-Moulton method.

Unit – IV: Partial differential equations

Introduction and Formation of partial differential equation by elimination of arbitrary constants and arbitrary functions solutions of first order linear (Lagrange) equation and non-linear equations (Charpit's method).Method of separation of variables for second order equations – applications of Partial differential equations – Two dimensional wave equation, Heat equation.

Unit – V: Fourier transforms

Fourier integral theorem – Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – Inverse transforms – Finite Fourier transforms.

Text Books

1. Kreyszig's Mathematical Methods by Dr. A. Ramakrishna Prasad, 2014 yr Edition John Wiley Publications.
2. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.

Reference Books

1. Advanced Engineering Mathematics by Kreyszig, 8th Edition, John Wiley & Sons Publishers
2. Higher Engineering Mathematics by B.S. Grewal, 36th Edition, Khanna Publishers.
3. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
4. Mathematics for Engineering and Scientists. Alan Jeffrey, 6th Edi, 2013, Chapman & Hall / CRC
5. Introductory Methods of Numerical Analysis , S.S.Sastry, 4h Edition, Prentice Hall of India Pvt. Ltd.
6. Mathematical Methods by T.K.V. Iyengar, B. Krishna Gandhi & Others, 2013 Yr. Edition S. Chand.
7. Mathematical Methods by D.S. Chandrasekhar, Prison Books Pvt. Ltd.
8. Mathematical Methods by G. Shanker Rao & Others I.K. International Publications.

Course Outcomes

1. Compute root of nonlinear equations by using different types of numerical methods.

2. Explain different kinds of techniques for interpolating data
3. Solve ODE initial value problems using Euler's, Taylor's, Picard's & R-K methods,
4. Form the partial differential equation from the given function and solve partial differential equation for an unknown function with many independent variables.
5. Evaluate the Fourier transform of a function and list its basic properties.

(A2013) ENGINEERING PHYSICS-II

B.Tech (CE) II Semester

L	T	P	C
3	0	0	3

Course Objectives

1. To understand the introductory level concept of optical coherence, lasers and optical fiber characteristics.
2. To understand the basic principles of dielectric properties of solids.
3. To understand the physical principles underlying the magnetic and super conducting properties of solids.
4. To understand the fundamental concepts of electromagnetic fields and laws governing them.
5. To understand the basic principles of nanotechnology, ultrasonic and acoustics of buildings.

Unit-I

Lasers: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Einstein's Coefficients and relation between them, Population inversion, Lasing action in Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers.

Fiber Optics: Principle of Optical Fiber, Construction of optical Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers: Step Index Optical Fibers& Pulse Dispersion - Graded index Optical fibers& Pulse Dispersion, Attenuation in Optical Fibers, Optical Fiber Communication, Optical Fiber Sensors.

Unit-II

Dielectric Properties: Electric dipole, Dipole Moment, Relative Permittivity, Polarization and Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic, and Orientation, Polarization and derivation of their polarizabilities, Internal fields in Solids, Clausius - Mossotti Equation, Ferro electric, Piezo electric and pyro-electric materials.

Unit-III

Magnetic Properties & Superconducting Properties: Permeability, Field intensity, Magnetic field induction, Magnetization, Magnetic Permeability & Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para Ferro, Ferri and Anti-Ferro magnetic

materials on the basis of magnetic moment (qualitative), Domain theory of Ferro magnetism on the basis of Hysteresis curve, Soft and Hard Magnetic Materials.

Superconductivity: Introduction, Critical Field, Meissner effect, Effect of Magnetic field, Type-I and Type-II Superconductors, BCS Theory (qualitative), Applications of Superconductors.

Unit-IV

Electromagnetic Theory: Review of Gauss Law, Amperes law and Faraday's law, Steady and Varying Fields, Conduction and Displacement Current, Maxwell's Equations in Integral and Differential forms, Electromagnetic Wave Equations in free space, dielectric and conducting media, Poynting Theorem.

Unit-V

Nanotechnology: Origin of nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Properties that changes on Nano Scale, Physical Properties, Electrical Properties, Chemical Properties, Optical Properties.; Bottom-up Fabrication: Sol-Gel and combustion methods; Top-Down Fabrication: Physical Vapour Deposition, Pulsed Laser Vapour Deposition Methods, Characterization by XRD & TEM, Applications.

Acoustics: Basic Requirements of Acoustically Good Hall, Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time, Measurement of Absorption Coefficient of a Material, Factors Affecting the Architectural Acoustics and their Remedies.

Ultrasonic: Introduction, Production of Ultrasonic using Piezoelectric Method –Magnetostriction Method- applications.

Text Books

1. Engineering Physics by P K PalaniSamy, ScitechPublications.
2. Applied Physics for Engineers by Dr. P. Madhusudana Rao, Academic Publishing Company.
3. Solid State Physics by S.O. Pillai (Main edition) – New Age Publishers.

References

1. Fundamentals of Physics, David Halliday, Robert Resnick, Jearl Walker by John Wiley & Sons
2. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
3. Engineering Physics by R. K. Gaur and S. L. Gupta; DhanpatRai and Sons.

4. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co.

Course Outcomes

1. Explain the principle, construction, characteristics of laser and their applications in optical fiber communication
2. Describe various polarization processes in solids and classify different dielectric materials.
3. Classify the magnetic materials in to various classes depending upon their magnetic moment. They are also able to understand the basics principles of superconductivity.
4. Apply Maxwell's equations to solve EM problems.
5. Explain how the properties of the material changes on nano scale. He will also understand the characteristics and generation of ultrasonic.

(A2017) APPLIED CHEMISTRY -II
(Common to Civil & Mechanical)

B.Tech (CE) II Semester

L	T	P	C
2	1	0	2

Course Objectives

- To give the students a basic understanding on polymers, the peculiar properties of the macromolecules are emphasized.
- Understanding the significance of various Engineering materials like cement abrasives, adhesives and composites in structural enhancement of materials, Exposure to refractories and ceramics in industries and most recently, aerospace technology.
- A sustainable energy supply, is needed for promoting economic development as well as protecting the environment.
- Familiarize lubricants as a basic and fundamental necessity for the maintenance of any machines.
- To provide an overview of Industrial applications of surface chemistry.

Unit I: High Polymers

Types of polymerization (addition, condensation and copolymerization) .
Plastics: Thermoplastic and Thermosetting resins, Compounding and fabrication of plastics (compression and injection moulding). Preparation, properties, Engineering applications of PVC, Teflon and Bakelite.
Fibers: Characteristics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fibre Reinforced Plastics (FRP) – applications.
Rubbers: Natural rubber and its vulcanization. Elastomers: Buna – s, Butyl rubber and Thiokol rubber.
Conducting Polymers: Polyacetylene, Polyaniline, Mechanism of conduction doping, applications of conducting polymers.
Bio-degradable polymers: Preparation and applications of Polyvinyl acetate and Polylactic acid.

Unit II: Material Chemistry

Nanomaterials: Introduction, preparation by sol-gel and chemical vapour deposition methods. Applications of nanomaterials. Superconductors, Semiconductors, Insulators and its applications.
Cement – Chemical composition of cement, Manufacture of Portland cement, Setting and Hardening of cement, Various reactions involved

Unit III: Fuel Technology

Solid fuels- Coal; Classification of coal by rank-Analysis of coal-Proximate and Ultimate analysis and its significance; Coke - Manufacture of Coke- Beehive Oven and Otto Hoffmann's by Product Oven process.

Liquid fuels: Refining of Petroleum-Petroleum products used as Fuels-Gasoline-Knocking and Octane Number of Gasoline, Synthetic Petrol-Bergius and Fischer Tropsch method. Diesel – Cetane number ,High speed and Low speed diesel oils ; LPG and Natural gas.

Gaseous Fuels: Classification of fuels – characteristics of fuels-calorific value-units. Determination - Bomb calorimeter - Dulong's formula.

Unit VI: Lubricants

Classification with examples – Characteristics of a good lubricant, Mechanism of lubrication (thick film, thin film and extreme pressure); Properties of lubricants; Viscosity – Cloud point & pour point; Flash point & Fire point, Saponification number-Carbon residue, Emulsification number, Precipitation number, Neutralisation number

Unit VI : Surface Chemistry

Adsorption – Types of Adsorption, Isotherms – Freundlich and Langmuir adsorption isotherm, applications of adsorption.

Colloids: Classification of colloids; Mechanical – Brownian movement. Electrical – Electrophoresis, Electro-osmosis. Iso electric point. Optical – Tyndall effect. Micelles. Applications of colloids in industry.

Text Books:

1. Engineering chemistry by B.Rama Devi & Ch. Venkata Ramana Reddy; Cengage Learning, 2012
2. Engineering Chemistry P.C.Jain and M.Jain, Dhanapat Rai & Sons
3. Engineering Chemistry, B.K.Sharma.
4. A Textbook of Engineering Chemistry, Sashi Chawla, Dhanapath Rai & Sons

Reference Books:

1. A Textbook of Engineering Chemistry, S.S.DARA
2. A Textbook of Engineering Chemistry, Sashi Chawla, Dhanapath Rai & Sons

Course Outcomes:

At the end of the course student will be able to

1. Analyse why polymers are different than simple molecules. The different types of mechanisms involved in polymer synthesis, their properties & the various applications in engineering field.
2. Describe the preparation, applicability and greater efficiency of using materials at different engineering fields.
3. Categorise the types of fuels, their sources and purification techniques.
4. Select the lubricants in regard to their applications on various machines.
5. Evaluate what kind of interactions may occur on the surface of adsorbent and industrial applications of surface chemistry

(A2101) APPLIED MECHANICS

B.Tech (CE) II Semester	L	T	P	C
	3	1	0	3

Course Objectives

To enable the students,

1. To find the resultants of any force systems and determine equivalent for systems.
2. To solve the problems associated with frictional surfaces.
3. To obtain the centroid, first and second moment of an area.
4. To understand and analyze Kinematics and kinetics of a particle.
5. To understand and apply work energy principles to practical problems.
6. To understand the concepts of vibrations.

Unit - I

Introduction to Engineering Mechanics – Basic Concepts. **Resultants of Force System:** Parallelogram law – Forces and components – Resultant of coplanar Concurrent Forces – Components of forces in Space – Moment of Force – principle of moments – Coplanar Applications – Couples – Resultant of any Force System.

Equilibrium of Force Systems: Free body Diagrams, Equations of Equilibrium – Equilibrium of Planar Syatems – Equilibrium of Spatial Systems.

Unit – II

FRICTION: Introduction – Theory of Friction – Angle of friction – Laws of Friction – Static and Dynamic Frictions – Motion of Bodies: Wedge, Screw, Screw – Jack, and Differential Screw- Jack.

Unit - III

Centroids and Centers of Gravity: Introduction – Centroids and Centre of gravity of simple figures (from basic principles) – Centroids of Composite Figures – Theorem of Pappus – Center of gravity of bodies and centroids of volumes.

Moments of Inertia: Definition – Polar Moment of Inertia – Radius of gyration – Transfer formula for moment of inertia – Moments of Inertia for Composite areas – Products of inertia Transfer Formula for Product of Inertia.

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

Unit - IV

Kinematics of a Particle: Motion of a particle – Rectilinear motion – motion curves – Rectangular components of curvilinear motion – Kinematics of Rigid Body - Types of rigid body motion – Angular motion – Fixed Axis Rotation.

Kinetics of Particles: Translation – Analysis as a Particle and Analysis as a Rigid Body in Translation – Equations of plane motion – Angular motion – Fixed Axis Rotation – Rolling Bodies.

Unit - V

Work – Energy Method: Work energy Equations for Translation – Work – Energy Applications to Particle Motion – Work energy applied to Connected System – Work energy applied to Fixed Axis Rotation and Plane Motion. Impulse and Momentum.

Mechanical Vibrations: Definitions and Concepts – Simple Harmonic Motion – Free vibrations, simple and Compound Pendulums – Torsion Pendulum – Free vibrations without damping: General cases.

Text Books:

1. Engineering Mechanics – Statics and Dynamics by Ferdinand. L. Singer / Harper International Edition.
2. Engineering Mechanics/ S.Timoshenko and D.H.Young. Mc.Graw Hill Book Compan.

References:

1. Engineering Mechanics / Irving Shames / Prentice Hall.
2. A text of Engineering Mechanics / YVD Rao / K. Govinda Rajulu / M. Manzoor Hussain, Academic Publishing Company.
3. Engg. Mechanics / M.V. Seshagiri Rao and D. Rama Durgaiah / Universities Press.
4. Engineering Mechanics, Umesh Reg / Tayal.
5. Engg. Mechanics / KL Kumar / Tata McGraw Hill.
6. Engg. Mechanics / S.S. Bhavikati & K.G. Rajasekharappa.

Course Outcomes

By undergoing this course, students will be:

1. Able to find the resultants of any force systems.
2. Able to solve the problems associated with friction.
3. Able to obtain the centroid and first and second moment of an area.
4. Able to understand kinematics and kinetics of a particle.
5. Able to understand work energy principles to practical problems.
6. Able to understand the concepts of vibrations

(A2501) COMPUTER PROGRAMMING THROUGH C

B.Tech (CE) II Semester

L	T	P	C
3	1	0	3

Course Objectives

1. Understand computer basic's, algorithms, flowcharts and write simple 'C' programs, data types and operators and Console I/O functions.
2. Understand Decision making statements and loops.
3. Understand the concepts of functions and pointers.
4. Understand the concepts of strings and various string handling functions and Arrays.
5. Understand the concepts related to structures and able to differentiate between structure and union, Storing of large data using files.

Unit – I

Algorithm, flowchart, Structure of a C program, Simple C Program, Compiler, Linker, Pre-processor, Compilation process (program development).Identifiers, Data Types, Variables, Constants, Console I/O (printf, scanf), Operators(arithmetic, Relational, Logical, Conditional, Increment/decrement, Bitwise, Assignment, Conditional, Special), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Simple C Programming examples.

Unit-II

Decision Statements and loops- IF statement- (Simple IF Statement, the IF ELSE Statement, Nesting of IF ELSE Statement, The ELSE IF Ladder), Switch Statement, Repetition (Iteration) statements – (for, While, do-while), Jump statements-(break, continue, goto), Simple C Programming examples.

Arrays – Concepts, declaration, definition, accessing elements, storing elements, two– dimensional arrays, multidimensional arrays, array applications, Example C programs.

Unit-III

Functions: Defining functions, user defined functions, categories of Function, Standard functions, Passing arguments to functions, arrays and functions, Returning values from functions, function calls, storage classes-auto, static, extern, register, scope rules, recursion- recursive functions, Limitations of recursion, Comparison of Iteration and Recursion, header files, C pre-processor directives, Example C programs.

Unit-IV

Pointers – Introduction, declaration, definition, Accessing variable through pointer, Storing variable, Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function, array of pointers, pointers to pointers, compatibility, pointers to void, pointers to functions, Dynamic Memory Allocation, programming applications, Command line arguments.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions-(stringlenth, stringcopy, stringreverse, stringcompare, stringconcatenate, searching for a sub-sting), string / data conversion-(sting to data, data to string), Example C programs.

Unit-V

Structures and Union: Declaring and initializing a structure, Accessing the members of a structure, Nested structures, self referential structures, Array of structures, Using structures in functions, Pointers to structures, Declaring and initializing a union, Enumerated types, typedef, bit fields, Example C programs.

Files- Concept of a file, stream, text files and binary files, Differences between text and binary files, Modes 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(ftell,fseek,rewind), Example C programs.

Text Books:

1. C programming A Problem-Solving Approach by Behrouz A.Forouzan, E.V. Prasad, Richard F. Gilberg C How to Program Paul Deitel and Harvey Deitel, PH.
2. Kanetkar Yashavant, Let Us C, BPB.

Reference Books

1. Computer Programming and Data Structures by E Balagurusamy, Tata McGraw Hill.
2. The C Programming Language by Brain W.Kernighan, Dennis M.Ritchie.
3. Programming in C, 2/e By Ashok Kamthane.
4. Absolute beginner's guide to C, Greg M. Perry, Edition 2, Publisher: Sams Pub., 1994.
5. Schaum's Outline of Programming with C by Byron S. Gottfried,1996

Electronic Materials, Websites

- http://en.wikiversity.org/wiki/Topic:C
- www.cprogramming.com

Course Outcomes:

On completion of the course students will be able to

1. Explain the algorithms, flowcharts implementation of simple 'C' programs, data types and operators and Console I/O functions.
2. Implement the decision control statements, loop control statements and case control statements.
3. Declare and implement the pointers and functions.
4. Declare and implement the arrays and strings.
5. Describe the structures declaration, initialization and implementation, understand the file operations, Character I/O, String I/O, File pointers and importance of pre-processor directives.

(A2307) GRAPHIC SCIENCES & AUTO CAD

B.Tech (CE) II Semester

L	T	P	C
2	0	4	4

Objectives

1. The objective of this subject is to provide the basic concepts about Engineering Drawing. Detailed concepts are given in projections, technical drawing, dimensioning and specifications
2. It is ideal to master the fundamentals of engineering drawing first and later to use these fundamentals for a particular application, such as computer aided drafting. Engineering Drawing is the language of engineers, by studying this course engineering and technology students will eventually be able to prepare drawings of various objects being used in technology.

Unit – I

Sections and Sectional Views: Right regular solids - Prism, cylinder, pyramid, cone – use of Auxiliary views.

Development of Surfaces: Development of right, regular solids – prisms, cylinder, pyramids, cone and their parts, frustum of solids.

Unit-II

Intersection of Solids: Intersection of cylinder Vs cylinder, cylinder Vs prism, cylinder Vs cone.

Unit – III

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

Unit-IV

Transformation of Projections: Conversion of Isometric Views to Orthographic Views and Vice-versa.

Perspective Projections: Perspective views: points, lines and plane figures using visual ray method and vanishing point method (One and Two point methods only)

Unit-V

Computer Aided Drawing: Introduction, starting the software, types of coordinate systems, tool bars & menu bars, General Software commands, Orthographic & Isometric Projection -Simple drawings.
(Practice on AutoCAD; Examination on comprehension on commands and writing command sequence only)

Text Books

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing and Graphics Rane and Shah/ Pearson Edu.
3. Engineering Drawing And Graphics + AutoCAD, K Venugopal, New Age International.

Reference Books

1. A Text Book of Engineering Drawing / Dhawan R K / S. Chand
2. Engineering Graphics with Auto CAD / James D Bethune / Pearson Edu.
3. Engineering Graphics / K R Mohan / Dhanpat Rai.
4. Text book on Engineering Drawing / KL Narayana/ P Kannaih / Scitech
5. Computer Aided Engineering Drawing / S. Tryumbaka Murthy/ I.K. International

Outcomes:
By undergoing this course a student will be

1. Draw the surface sheath of solids by development of surfaces and prepare drawings of solids and their inter penetrations.
2. Represent in pictorial form and convert back to/ from orthographic views.
3. Prepare electronic drawings.

(A2014) ENGINEERING PHYSICS LAB

B.Tech (CE) II Semester

L	T	P	C
0	0	3	2

Course Objectives:

- This course on Physics lab is designed with 15 experiments in a semester. It is common to all branches of engineering.
- The objective of the course is that the student will have exposure to various experimental skills which is very essential for an engineering student.
- The experiments are selected from various area of Physics like Physical Optics, Lasers, Fiber Optics, Sound, Mechanics, Electricity & Magnetism and Basic Electronics.
- Also the student is exposed to various tools like Screw gauge, Vernier Callipers, Physical Balance, Spectrometer and Microscope.

(Any ten experiments compulsory)

1. Determination of wavelength of a source – Diffraction Grating.
2. Newton's Rings - Radius of curvature of plano convex lens.
3. Melde's experiment – Transverse and longitudinal modes.
4. Time constant of an R-C circuit.
5. L-C-R circuit.
6. Magnetic field along the axis of current carrying coil – Stewart and Gees method.
7. Bending losses of fibres & Evaluation of numerical aperture of a given fibre.
8. Energy gap of a material of p-n junction.
9. Torsional pendulum.
10. Wavelength of light –Diffraction grating using laser.
11. Sonometer-AC power supply.
12. Characteristics of a LED.
13. Characteristics of a photodiode.
14. Characteristics of a solar cell.
15. Determination of velocity of ultrasonic waves.

Laboratory Manual:

1. Laboratory Manual of Engineering Physics by Dr. Y. Aparna & Dr. K. Venkateswara Rao (V.G.S Publishers).

(A2549) COMPUTER PROGRAMMING LAB

B.Tech (CE) II Semester	**L**	**T**	**P**	**C**
	0	**0**	**3**	**2**

Course Objectives:

1. To understand the various steps in program development.
2. To understand the basic concepts in C Programming Language.
3. To understand different modules that includes conditional and looping expressions.
4. To understand how to write modular and readable C Programs.
5. To write programs in C to solve problems using arrays, structures and files.

Week	**Week Wise Programs**
Week1	(a)Write a simple C program to Print "Hello World" (b) Write a simple C program Declaring Variable and Printing its Value (c) Write a simple C Program to Calculate Area and Circumference of Circle (d)Write a simple C program to implement basic arithmetic operations - sum, difference, product, quotient and remainder of given numbers.
Week 2	Write C programs to demonstrate the following operators (a) Assignment Operator. (b) Relational and Logical Operator. (c) Increment and decrement operator. (d) Bitwise operators. (e) Ternary operator.
Week3	(a) Write a C programs - to find the largest and smallest of 2 numbers(if – else), to find the largest and smallest of 3 numbers(Nested if – else), roots of quadratic equation(else – if ladder). (b)The total distance travelled by vehicle in't' seconds is given by distance=$ut+1/2at^2$ where 'u' and 'a' are the initial velocity and acceleration. Write a c program to find the distance travelled at regular intervals of time given the Values of 'u' and 'a'. The program should provide the

	flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'. (c)Write a c program, which takes two integer operands and one operator from the user, performs the operation and the prints the result. (consider the operators +,-,*,/,% and use switch statement).
Week4	(a)Write a C program to find the sum of individual digits of a positive integer (b) A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1.Subsequent terms are found by adding the preceding two terms in the sequence .Write a c program to generate the first n terms of the sequence. (c) Write a c program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
Week5	(a)Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression: $1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$ (b) Write a C program to generate Pascal's triangle. (c) Write a C program to construct a pyramid of numbers
Week6	(a)Write a programs that use both recursive and non-recursive functions (i)To find the factorial of a given integer. (ii)To find the GCD of two given integers.
Week7	(a)Write a c program to find both the largest and smallest number in a list of integers. (b)write a c program that uses functions to perform the following: (i)Addition of Two Matrices. (ii)Multiplication of Two Matrices.
Week8	(a) Write a c program that uses functions to perform the following operations: (i)To insert a sub-string in given main string from a given position. (ii) To delete n Characters from a given position in a given string. (b)Write a C program to determine if the given string is a palindrome or not
Week9	(a) Write a C program that displays the position or index in the string S Where the string T begins, or - 1 if S doesn't contain T.

	(b) Write a C program to count the lines, words and characters in a given text .
week10	(a) Write a program to print the details of a student like(Name, Roll No, Marks) using nested structures. (b) Write a C Program to Calculate Difference Between Two Time Period.
week11	(a)Write a C program that uses functions to perform the following operations: i) Reading a complex number ii) Writing a complex number iii) Addition of two complex numbers iv) Multiplication of two complex numbers (Note: represent complex number using a structure.)
week12	(a)Write a C program which copies one file to another and display the contents of a file (b) Write a C program to reverse the first n characters in a file. (Note: The file name and n are specified on the command line). (c) Write a C programme to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

Course Outcomes

On completion of the course, students will be able to

1. Explain basics of C programming, Usage of various operators.
2. Write programs on strings and usage of functions.
3. Write programs on files.

(A2551) IT WORKSHOP

B.Tech (CE) II Semester

L	T	P	C
0	0	3	2

Course Objectives

The IT Workshop for engineers is a training lab course spread over 42 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point.

PC Hardware

Week 1 – Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Week 2 – Task 2: Every student should dissemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Week 3 – Task 3: Every student should individually install MS windows-XP on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Week 4 – Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Week 5 – Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Internet & World Wide Web:

Week 6 - Task 1: **Orientation & Connectivity Boot Camp :** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Task 2: Web Browsers, Surfing the Web : Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Week 7 -Task 3: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Productivity tools

Word

Week 8 – Word Orientation: The mentor needs to give an overview of Microsoft (MS) office 2007/ equivalent (FOSS) tool word: MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Task 1: Using Word to create project certificate. Features to be covered:- Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colours, Inserting Header and Footer, Using Date and Time option in Word.

Week 9 - Task 2: Creating project abstract Features to be covered:- Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 10 - Task 3 : Creating a Newsletter : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel

Week 11 - Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Week 12 - Task 2 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

MS/equivalent (FOSS) tool Power Point:

Week 13 - Task1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Week 14 - Task 2: Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

Task 3: Concentrating on the in and out of Microsoft power point presentations. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

Outcomes

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows-XP, Linux and the required device drivers. In addition hardware level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to dissemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email,

newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools.

(**Recommended to use Microsoft office 2007 in place of MS Office 2003).**

Reference Books

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. Introduction to Computers, Peter Norton, 6/e McGraw Hill Publishers.
3. Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education
4. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech.
5. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
6. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)

III SEMESTER

(A2102) STRENGTH OF MATERIALS – I

B.Tech (CE) III Semester

L	T	P	C
4	1	0	4

Course Objectives

Students will be able to demonstrate basic knowledge of

- Various elastic constants and their relationships to evaluate stresses and strains in the material.
- Behavior of structural members under various types of external loadings and calculation of their strength in tension, compression, shear, bending and torsion.
- Behavior of composite members under axial loading.
- Strain energy stored by body in axial loading, bending, shear and torsion

Unit - I

Simple Stresses and Strains: Elasticity and plasticity Types of stresses and strains Hooke's law stress - strain diagram for mild steel Working stress Factor of safety Lateral strain, Poisson's ratio and volumetric strain Elastic moduli and the relationship between them Bars of varying section composite bars Temperature stresses.

Strain Energy - Resilience Gradual, sudden, impact and shock loadings simple applications.

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 & Shear Stresses

Flexural stresses: Theory of simple bending Assumptions Derivation of bending equation: M/I = f/y =E/R Neutral axis Determination of bending stresses section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections Design of simple beam sections.
Shear Stresses: Derivation of formula Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T, angle sections.

Unit - IV
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.
Conjugate Beam Method:
Introduction - Concept of conjugate beam method. Difference between a real beam and conjugate beam. Deflections of determinate beams with constant and different moments of inertia.

Unit -V
Principal Stresses and Strains: Introduction: Stresses on an inclined section of a Bar under axial loading compound stresses- normal and tangential stresses on an inclined plane for biaxial stresses. Two perpendicular normal stresses accompanied by a state of simple shear Mohr's circle of stresses- Principle stresses and strains- analytical and graphical solutions-Various theories of failures: Introduction, Various Theories of failures like Maximum Principal Stress theory Maximum Principal strain theory Maximum shear stress theory Maximum strain energy theory Maximum shear strain energy theory.

Text Books:
1. Introduction to text book of Strength of materials by R.K. Bansal Laxmi publications Pvt. Ltd., New Delhi.
2. Introduction to text book of Strength of Material by U.C. Jindal, Galgotia publications.

References:
1. Mechanics of Solid, by Ferdinand P Beer and others Tata Mc Graw Hill Publications 2000.

2. Strength of Materials by Schaum's out line series Mc Graw Hill International Editions.
3. Strength of Materials by S. Ramakrishna and R.Narayan, Dhanpat Rai publications.
4. Strength of materials by R.K. Rajput, S. Chand & Co, New Delhi.
5. Strength of Materials by A.R. Basu, Dhanpat Rai & Co, Nai Sarah, New Delhi.
6. Strength of Materials by L.S. Srinath et al., Macmillan India Ltd., Delhi.
7. Strength of materials by R. Subramanian, Oxford university press, New Delhi

Course outcomes

1. Explain the concept of stress and strain developed in a material either in tension or in compression.
2. Find the stresses developed in rod or frame and to understand the elastic behavior of a material in different types of stresses.
3. Draw the bending moment and shear force diagrams of any beam with each and every type of loads.
4. Design a section of beam to calculate the hoop and longitudinal stresses developed in thin & thick cylinder.

(A2103) FLUID MECHANICS

B.Tech (CE) III Semester

L	T	P	C
3	1	0	3

Course Objectives

1. To understand the fundamentals of fluid mechanics; pressure exerted by fluids; and measurement of pressure, Forces on submerged bodies?
2. To learn about different types of fluid flows; different methods applied for describing fluid in motion
3. To learn about different types of energies associated with Fluid in motion
4. To learn about the measurement of flow in pipes and flow in open channels
5. To understand concept of equivalent pipe; Energy losses in flow in pipe
6. To understand the dimensional analysis: Methods of dimensional analysis, Model studies
7. To learn about types and working of turbines and pumps

Unit -I

Introduction: Dimensions and units - Physical properties of fluids specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion-pressure at a point, Pascal's law, Hydrostatic law - atmospheric, gauge and vacuum pressure measurement of pressure. Pressure gauges, Manometers: differential and Micro Manometers.

Hydrostatic forces: Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces- Center of pressure. Derivations and problems.

Unit - II

Fluid Kinematics: Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows : Steady, unsteady, uniform, non uniform, laminar, turbulent, rotational and irrotational flows, Equation of continuity for one, two , three dimensional flows, stream and velocity potential functions, flownet analysis.

Unit - III

Fluid Dynamics: Surface and body forces - Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, (Navier - stokes

equations (Explanationary) Momentum equation and its application - forces on pipe bend.
Pitot tube, Venturi meter and orifice meter - classification of orifices, flow over rectangular, triangular and trapezoidal and Stepped notches -Broad crested weirs.

Unit - IV
Boundary layer Theory:
Approximate Solutions of Navier Stoke's Equations - Boundary layer - concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers -no deviations BL in transition, separation of BL, control of BL, flow around submerged objects-Drag and Lift- Magnus effect.

Unit - V
Closed Conduit Flow: Reynold's experiment - Characteristics of Laminar & Turbulent flows. Flow between parallel plates, Flow through long tubes, flow through inclined tubes. Laws of Fluid friction - Darcy's equation, Minor losses - pipes in series- pipes in parallel -Total energy line and hydraulic gradient line. Pipe network problems, variation of friction factor with Reynold_s number _ Moody's Chart.

Text Books
1. Fluid Mechanics by Modi and Seth, Standard book house.
2. Introduction to Fluid Machines by S.K.Som & G.Biswas (Tata Mc.Grawhill publishers Pvt. Ltd.)
3. Introduction to Fluid Machines by Edward J. Shaughnessy, Jr, Ira M. Katz and James P. Schaffer , Oxford University Press, New Delhi

References
1. Fluid Mechanics by J.F.Douglas, J.M. Gaserek and J.A.Swaffirld (Longman)
2. Fluid Mechanics by Frank.M. White (Tata Mc.Grawhill Pvt. Ltd.)
3. Fluid Mehanics by A.K. Mohanty, Prentice Hall of India Pvt. Ltd., New Delhi
4. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal – Laxmi Publications (P) ltd., New Delhi

Course Outcomes
1. Ability to understand the various physical properties of fluid, characteristics of various fluid flows, computation of displacement,

velocity and acceleration of a fluid in motion.

2. Study and understand laws of conservation of mass, energy and momentum. Computation of discharge, velocity across weirs and notches.
3. Study and understand Laminar and turbulent flows, significance of Reynold's experiment, computation of velocity and discharge for laminar and turbulent flows across pipes.
4. Study and understand various losses in pipe flows. Computation of losses in pipe flow in series and parallel.

(A2104) SURVEYING

B.Tech (CE) III Semester

L	T	P	C
4	1	0	4

Course Objectives

1) Theory of measurement errors, accuracies, magnitude of errors and error propagation
2) Level instrument setup, theory, field procedures and computations, for vertical control survey accuracy.
3) Distances, angles, azimuths and bearing measurements
4) Traversing and traverse computations, for horizontal control survey accuracy.
5) Total Station instrument setup, field procedures and computations, including instrument technical specifications and expected survey precision using the instrument.
6) Topographic surveying and terrain modeling using AutoCAD and Land Development Desktop

Unit – I

Introduction: Overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications, Scales, Conventional Symbols, Signals

Distances and Direction: Distance measurement methods; use of chain, tape and Electronic distance measurements, Meridians, Azimuths and Bearings, declination, computation of angle.

Unit – II

Leveling and Contouring: Concept and Terminology, Temporary adjustments- method of leveling. Characteristics and Uses of contours-methods of conducting contour surveys and their plotting.

Unit – III

Computation of Areas and Volumes: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

Unit –IV

Theodolite: Theodolite, description, uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite. Trigonometrical leveling, Traversing.

Unit – V

Tacheometric Surveying: Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position.

Curves: Types of curves, design and setting out – simple and compound curves.

Introduction to Advanced Surveying : Electromagnetic Spectrum – Radar -Electromagnetic Distance Measurement - EDM Equipment – Corrections – Electronic theodolite - Total stations

Remote sensing-basic concepts-applications - Introduction to Global Positioning system (GPS)- Introduction to Geographic Information System (GIS)

Text Books:

1. Dr. K.R. Arora, Surveying Vo.I, Standard Book House, 6th edition, 2000
2. Punmia, Surveying Vol.I, Standard Book House, 9th edition, 1985

Reference Books:

1. S.K.Duggal, Surveying Vol.I, Tata Mcgraw Hill, 2nd edition
2. Surveying and levelling by R.subramanian,second Edition,Oxford University press-2012
3. Surveying and levelling by R. Agor. Khanna Publishers

Course Outcomes:

Students completing the course will have:

1) Awareness of instrumental, natural and personal errors in measuring and surveying, field procedures for assessing errors, and standards to determine quality of measurements and surveys.
2) Professional and ethical responsibilities to record accurate field notes and to recognize and report poor survey results.
3) Practice with measuring and surveying procedures for a variety of engineering tasks such as horizontal and vertical control surveys, underground pipe alignment, and strategic topographic point selection for terrain modeling.
4) Experience with creating a representative electronic terrain model using a computer program and developing a scaled topographic map

of a proposed project site, including selecting appropriate engineering scales and including typical drawing information.

5) Work on various application software related to surveying

(A2021) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

B.Tech (CE) III Semester

L	T	P	C
3	1	0	3

Unit I

Introduction & Demand Analysis: Definition, Nature and Scope of Managerial Economics Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

Unit II

Theory of Production and Cost Analysis: Production Function Isoquants and Is costs, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis: Cost concepts, Opportunity cost, fixed vs. Variable costs, explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)- Managerial Significance and limitations of BEA.

Unit III

Introduction to Markets & New Economic Environment: Market structures: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing: Objectives and Policies of Pricing- Methods of Pricing, Business: Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment in Post-liberalization scenario.

Unit IV

Capital and Capital Budgeting: Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. Capital Budgeting: Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems)

Unit V

Introduction to Financial Accounting & Financial Analysis: Accounting concepts and conventions-Introduction IFRS-Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Financial Analysis: Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios.

Reference Books

1. S.A Siddiqui & A.S Siddiqui Managerial Economics & Financial Analysis, New Age International Publishers, Hyderabad 2013 .
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
3. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
4. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Person, 2012.
5. Lipsey & Chrystel, Economies, Oxford University Press,2012.
6. Dwivedi: Managerial Economics,Vikas2012
7. Shailaja & Usha: MEFA, University Press,2012.
8. Aryasri: Managerial Economics & Financial Analysis, TMH,2012.

Course Outcomes

- To understand the results of the managerial decisions taken in business organization and study the different types of elasticity of demand.
- Understand and apply Production Function formula in determining increasing, constant and decreasing returns, the price, output determination under perfect competition, monopoly.
- To know the requirements for starting a business and understand the effect of the principles of LPG in the new economic environment, the importance of capital in starting a business unit.
- Understand the accounting concepts and conventions followed in double entry book keeping system and know the preparation of final accounts.
- Understand the application of different financial ratios to study the liquidity, solvency and profitability of a business concern.

(A2105) BUILDING MATERIALS AND CONSTRUCTION

B.Tech (CE) III Semester

L	T	P	C
3	1	0	3

Course Objectives

1. To develop knowledge of building materials
2. To learn the availability, types, uses and various tests for building materials
3. To know about materials that are used for protection and functional purpose

BUILDING MATERIALS

Unit – I

Stones: Qualities of a good building stone; Stone quarrying; Tools for blasting; Materials for blasting; Process of blasting; Precautions in blasting; Dressing of stones; Common building stones of India.

Bricks: General; Composition of good brick earth; Harmful ingredients in brick earth; Classification of brick earth; Manufacture of bricks; Comparison between clamp burning and kiln burning; Qualities of good bricks; Tests for bricks; Classification of bricks; Colours of bricks; Size and weight of bricks; Shape of bricks; Fire –clays; Fire –bricks; Sand – lime or calcium silicate bricks.

Unit –II

Timber: Definition; Classification of trees; Structure of a tree; Felling of trees; Defects in timber; Qualities of good timber; Decay of timber; Preservation of timber; Fire resistance of timber; Seasoning of timber; Market forms of timber; Industrial timber; Advantages of timber construction; Use of timber; Indian timber trees.

Steel: General; Manufacture of steel; Uses of steel; Factors affecting physical properties; Defects in steel; Market forms of steel; Properties of mild steel; Properties of hard steel; Corrosion of ferrous metals.

Paints, Varnishes And Distempers: General; Painting; Varnishing; Distempering; Wall paper; White washing; Colour washing.

Acoustics Of Buildings: Important Technical terms; Requirements of sound effects; Factors to be considered in Acoustics of building; Sound absorbing materials; Sound insulation.

BUILDING CONSTRUCTION

Unit –III

Foundations: Concept of foundations; Factors affecting selection of foundations; Types of foundations; Strip, Isolated, Strap, Combined Footings, RAFT –MAT –Slab and BEAM RAFT, BOX TYPE RAFT, inverted arch foundations, SHELL foundations, Grillage foundations, Piles and their classification; Foundation on black cotton soils.

Unit-IV

Stone Masonry: Technical terms; Classification of stone masonry.

Brick Masonry: Technical terms; Types of bonds in brickwork and their suitability, Plan, elevation and section of brick bonds upto two bricks thickness.

Walls: Classification of walls, Block masonry –Hollow concrete blocks – Hollow clay Blocks.

Dampness And Damp Proofing: Causes of dampness; Methods of preventing dampness; Damp proofing materials and their classification; Methods of providing DPC under different situations.

Unit-V

Floors: Technical terms; Types of ground floors; Granolithic, Flag stone floorings with locally available stones such as Cuddapah, Betamcherla, Shabad etc., Marble Flooring, Terrazzo (Mosaic) Flooring, Rubber Flooring. Repair of floors.

Roofs: Technical terms; Classification of roofs; Steel sloping roofs; Roof covering materials; Types of flat roofs; drainage on flat roofs.

Scaffolding, Shoring, Under Pinning And Form Work: Types of scaffolding; Types of shoring; Methods of underpinning; Types of formwork; Centering.

Text Books

1. Building Materials and Construction - Arora & Bindra, Dhanpat Roy Publications.
2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi

References

1. Building Materials by Duggal, New Age Internationals.
2. Building Construction by PC Verghese PHI.
3. Construction Technology - Vol - I & II by R.Chuddy, Longman UK.
4. Basics of Civil Engg by Subhash Chander; Jain Brothers.

Alternate Building materials and Technology, K.S.Jagadish, Venkatarama Reddy and others; New Age Publications.

Course outcomes

Upon completion of the course students will have knowledge:

1. On the usage of different building materials in the present -day construction.
2. About the different construction activities in the building construction

(A2019) ENVIRONMENTAL STUDIES
(Common to All Branches)

B.Tech (CE) I Semester

L	T	P	C
3	0	0	3

Course Objectives

- Develop an understanding of the necessity of protection of environment
- Develop an understanding of Natural resources
- Develop an understanding of Biodiversity
- Develop an understanding of Global Environmental problems
- Develop an understanding of Environmental pollution

Unit-I

Environmental Studies:

Introduction, Definition, scope and importance, Ecosystems: Introduction, types, characteristic features, structure and functions of ecosystems. Bio geo chemical cycle, Classification of Eco system.

Unit-II

Natural Resources: classification of Resources, Land resources, Land as resource, Common property resources, Land degradation, Soil erosion and desertification, Effects of modern agriculture, fertilizer –pesticide problems, Forest resources, Use and over-exploitation.

Mining and dams – their effects on forest and tribal people, Water resources, Use and over- utilization of surface and groundwater, Floods, droughts, Water logging and salinity, Dams –benefits and costs, Conflicts over Water, Energy resources.

Unit-III

Bio-diversity and its conservation, Value of bio-diversity -consumptive and productive use, social, ethical, aesthetic and option values, Bio-geographical classification of India – India as a mega diversity habitat, Threats to bio-diversity –Hot-spots, habitat loss, poaching of wild life, loss of species, seeds, etc. Conservation of bio-diversity – Insitu and Ex-situ conservation.

Unit-IV

Environmental Pollution –Local and Global Issues, Nature of thermal pollution and nuclear hazards, Global warming, Acid rain, Ozone depletion., Environmental case studies.

Unit-V

Environmental Problems in India, Drinking water, sanitation and public health, Effects of the activities on the quality of environment, Water scarcity and groundwater depletion, Controversies on major dams – resettlement and rehabilitation of people: problems and concerns, Rain water harvesting, cloud seeding and watershed management. Economy and Environment, The economy and environment interaction, Economics of development, preservation and conservation, Sustainability: theory and practices, Limits to growth, Equitable use of resources for sustainable life styles, Environmental Impact Assessment.

Text Books

1. Environmental Science - Y.Anjaneyulu, B S Publications.
2. Environmental studies-Deeksha dave, Cengage learning India Pvt. Ltd.,
3. Environmental sciences and Engineering - P. Venugopal Rao, PHI learning Pvt. Ltd.,
4. Environmental Science and Technology by M. Anji Reddy, B S Publications.

Reference Books

1. Clark, R.S., Marine Pollution, Clanderson Press, Oxford, 2002.
2. Cunningham, W.P., et al. , Environmental Encyclopedia, Jaico Publishing House, Mumbai, 2003.

Course Outcomes:

On successful completion of this course, the students should be able to

1. Explain various factors affecting the environment
2. Describe various types of natural resources
3. Exhibit skills in solving various environmental problems
4. Explain means to protect the environment

(A2106) STRENGTH OF MATERIALS LAB

B.Tech (CE) III Semester

L	T	P	C
0	0	3	2

Course Objective

1. To introduce soil mechanics laboratory techniques to civil engineering undergraduate students.
2. To familiarize students with common geotechnical test methods, test standards and technology.
3. To understand, interpret and properly apply laboratory results obtained using standardized method for construction of structures.
4. To understand the analytical techniques for understanding
   (a) Darcy's law for permeability and seepage
   (b) Stoke's law for hydrometer analysis of particle size distribution of cohesive soils (c) Mohr-Coulomb's analysis for shear strength parameters of soils.
5. Enable students to prepare professional reports for design projects and data presentation skill and to use computers and some computer graphics

LIST OF EXPERIMENTS

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

LIST OF MAJOR EQUIPMENT:

1. UTM for conducting tension test on rods
2. Steel beam for flexure test
3. Wooden beam for flexure test
4. Torsion testing machine
5. Brinnell's / Rock well's hardness testing machine

6. Setup for spring tests
7. Compression testing machine
8. Izod Impact machine
9. Shear testing machine
10. Beam setup for Maxwell's theorem verification.
11. Continuous beam setup
12. Electrical Resistance gauges.

Course Outcomes

1. The ability to identify the structural behavior of steel with respect to torsion, torsion, hard new, impact and shear.
2. Ability to identify the structural behavior of wood & steel members with respect to bending for cantilever and simply suppliers and conditions.
3. Ability to identify the structural behavior of wood and steel under compression.
4. Ability to identify the defection/elastic behavior of continuous beam and to verify the Maxwell's reciprocal theorem on beams and utility of the electrical strain gauges.

(A2107) SURVEYING LAB – I

B.Tech (CE) III Semester

L	T	P	C
0	0	3	2

Course Objectives

At the end of the course, the participants will be able to:

- Gain adequate insight into theoretical and practical aspects of surveying.
- Carry out various hydrographic surveying tasks in the field (under supervision).
- Process data collected in the field and present data in the form of fair sheets and reports of survey

List of Exercises

1. Survey of an area by chain survey (closed traverse) & Plotting
2. Chaining across obstacles
3. Determination of distance between two inaccessible points with compass.
4. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.
5. Radiation method, intersection methods by plane Table survey
6. Two point and three point problems in plane table survey
7. Traversing by plane table survey
8. Fly leveling (differential leveling)
9. An exercise of L.S and C.S and plotting
10. Two exercises on contouring.

List of Major Equipment

1. Chains, tapes, Ranging rods, cross staff, arrows
2. Compasses and Tripods, Optical square.
3. idade, Plumbing fork, trough compasses
4. Leveling instruments and leveling staves
5. Box sextants, plani-meter.

Course Outcomes

At the end of the course the student will be able to –

1. Prepare the map of field details and find the area of field by conducting chain surveying.

2. Prepare the map of field details and find the area of field by conducting compass surveying.
3. Prepare the map of field details and find the area of field by conducting table surveying.
4. Find the elevation of field points for the preparation of contour map by conducting leveling.

IV SEMESTER

(A2011) PROBABILITY & STATISTICS

B.Tech (CE) IV Semester

L	T	P	C
3	1	0	3

Course Objectives

1. To learn functions of many random variables.
2. Correlation expresses a relation between two set of variables.
3. To test some hypothesis about parent population from which the sample is drawn.
4. Learn about small samples and correlation regression.
5. Learn about Queuing theory.

Unit-I: Probability& Random variables

Sample space and events- Probability - The axioms of probability - Some Elementary theorems - Conditional probability –Bayee's theorem. Random variables -discrete and continuous. Moment generating function of probability distribution.

Unit-II: Distribution& Estimation

Binomial, Poison &normal distributions, Normal distribution related properties. Moment generating functions of the above three distributions, mean and variance. Sampling distributions - sampling distributions of means (σ $\bar{}$ known and unknown). Point estimation - interval estimations Bayesian estimation.

Unit-III: Test of Hypothesis

Test of hypothesis large samples, Null hypothesis- Alternative hypothesis type-I & II errors- critical region confidential interval for mean testing of single variance. Difference between the mean. Confidential interval for the proportions. Tests of hypothesis for the proportions single and difference between the proportions.

Unit-IV: Test for Small samples & Correlation Regression

Test for Small samples: Confidence interval for the t-distribution- tests of hypothesis - t -test, F-test, χ^2 - test.

Correlation regression: Coefficient of correlation- regression coefficient- the lines of regression - the rank correlation.

Unit-V: Queuing Theory

Queuing Theory: Arrival theorem- Pure Birth and Death Process M/M/1 Model & M/M/∞ Model.

Text Books:

1. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
2. Fundamentals of Mathematical Statistics by S.C.Gupta & VK Kapoor, 11th Edition, Sultan Chand & Sons.

References:

1. Probability & Statistics, T. K. V. Iyengar, B. Krishna Gandhi and Others, 2014 Yr Edition S. Chand.
2. Probability & Statistics, D. K. Murugeson & P. Guru Swamy, Anuradha Publishers
3. Probability & Statistics for engineers by G.S.S. BhismaRao, Scitech publications.
4. Probability & Statistics, by William Mendenhall & others Cengage publications.
5. Higher engineering mathematics by B S Grewal, Khanna pub.
6. A first course in probability & statistics by BL.S.Prakasarao. 1st Edition, World scientific. Publishing Co. P. Ltd.
7. Probability & Statistics for Engineers, Miller and John E. Freund, Prentice Hall of India.

Course Outcomes:

1. Analyse random variables involved in the probability models &calculating probabilities.
2. Find the probabilities using distributions.
3. Estimate the hypothesis for large samples.
4. Estimate the hypothesis for small samples using statistic tests and find the relation between the variables by using correlation& regression.
5. Calculate the waiting time of customer, busy and idle period of the system by using Queuing models.

(A2108) STRENGTH OF MATERIALS – II

B.Tech (CE) IV Semester

L	T	P	C
4	1	0	3

Corse Objectives

Students will be able to demonstrate basic knowledge of

- Determination of combined direct and bending stresses.
- Identification of principle planes and computation of principle stresses and strains due to combination of axial forces, bending moments and shear.
- Calculation of slope and deflection of beams under different loading conditions.
- Evaluation of strength of short and long columns.
- Influence line diagrams for shear force, bending moment on a girder due to rolling loads.
- Various theories of elastic failure.

Unit- I

Torsion of Circular Shafts: Theory of pure torsion Derivation of Torsion equations: T/J = q/r = N? /L, Assumptions made in the theory of pure torsion, Torsional moment of resistance Polar section modulus Power transmitted by shafts Combined bending and torsion and end thrust Design of shafts according to theories of failure.

SPRINGS: Introduction ; Types of springs, deflection of close and open coiled helical springs under axial pull and axial couple, springs in series and parallel, Carriage or leaf springs.

Unit - II

Columns and Struts: Introduction, Types of columns- Short, medium and long columns, Axially loaded compression members, Crushing load, Euler's theorem for long columns assumptions- derivation of Euler's critical load formulae for various end conditions, Equivalent length of a column slenderness ratio, Euler's critical stress, Limitations of Euler's theory, Rankine Gordon formula Long columns subjected to eccentric loading, Secant formula, Empirical formulae, Straight line formula Prof. Perrys Formula. Beam columns; laterally loaded struts, subjected to uniformly distributed and concentrated loads Maximum B.M. and stress due to transverse and lateral loading.

Beam columns: Laterally loaded struts-subjected to uniformly distributed and concentrated loads--maximum B.M. and stress due to transverse and lateral loading.

Unit -III

Direct and Bending Stresses: Stresses under the combined action of direct loading and B.M, Core of a section determination of stresses in the case of chimneys, retaining walls and dams conditions for stability stresses due to direct loading and B.M. about both axis.

Beams Curved in Plan: Introduction, circular beams loaded uniformly and supported on symmetrically placed Columns, Semi-circular beam simply-supported on three equally spaced supports.

Unit - IV

Unsymmetrical bending: Introduction- Centroidal principal Axis of section- Graphical Method for locating Principal axis – Moment of Inertia referred to any set of rectangular axis- Stresses in beams subjected to Unsymmetrical bending- Principal Axis-Resolution of bending movements in to two rectangular axis through the Centriod – Location of N.A – Deflection of Beams under Unsymmetrical bending.

Shear centre :Introduction –Shear centre for symmetrical and Unsymmetrical(Channel, I,T and L) sections

Unit- V

Thin Cylinders: Thin seamless cylindrical shells- Derivation of the formula for longitudinal and circumferential stress-hoop, longitudinal and volumetric strains- change in diameter and volume of thin cylinders- Thin spherical shells

Thick Cylinders: Introduction, Lame's theory for thick cylinders-Derivation lame's formula- Distribution of hoop and radial Stresses across thickness-design of thick cylinders- Compound cylinders-Necessary difference of radii for shrinkage- Thick spherical shells.

Text Books

1. A Text book of Strength of materials by R.K.Bansal, Laxmi Publications (P) Ltd., New Delhi
2. Introduction to Strength of Materials by U.C. Jindal, Galgotia publications.
3. Strength of Materials by B.C. Punmia

Reference Books

1. Mechanics of Solid, by Ferdinand P Beer and others Tata Mc.Graw-Hill Publications 2000.
2. Strength of Materials by Schaums Out line Series Mc Graw Hill International Editions.

Course Outcomes

On completion of the course students will be able to

1. Design the circular shaft either in solid or hollow subjected to pure torsion or combination of bending and torsion
2. Design the section of column or strut with given end conditions.
3. Analyze the stresses developed in each member and should be able to design the cross section for the allowable stresses.
4. Draw SFD/BMD of propped cantilevers, Fixed beams and continuous beams under various conditions of loading and with direct moment etc.

(A2109) HYDRAULICS AND HYRAULIC MACHINERY

B.Tech (CE) IV Semester

L	T	P	C
3	1	0	3

Course Objectives

- To introduce concepts of laminar, turbulent flow and boundary layer formation
- To analyze, and solve problems related to water flow in a conduit and in open channel and forces in bodies emerged in fluid.
- To undertake design problems related to water surface profiles, soffit level of stilling basin etc. on the basis of total energy and hydraulic jump formation concepts
- To undertake experiments for evaluation of hydraulic principle

Unit - I

Open Channel Flow: Types of flows - Type of channels, Velocity distribution - Energy and momentum correction factors - Chezy's, Manning's; and Bazin formulae for uniform flow - Most Economical sections. Critical flow: Specific energy-critical depth - critical sub-critical and super critical flows.

Non uniform flow-Dynamic equation for G.V.F., Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method- Rapidly varied flow, hydraulic jump, energy dissipation.

Unit - II

Dimensional Analysis and Similitude: Dimensional analysis-Rayleigh's method and Buckingham's pi theorem-study of Hydraulic models - Geometric, kinematic and dynamic similarities-dimensionless numbers - model and prototype relations.

Unit - III

Hydrodynamic force of jets: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Applications to radial flow turbines. : Layout of a typical Hydropower installation, Heads and efficiencies

Unit - IV

Hydraulic Turbines: Classification of turbines-pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube - theory and function efficiency.

Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics geometric similarity-cavitation.

Unit - V

Centrifugal Pumps: Pump installation details-classification-work done-Manometric head-minimum starting speed-losses and efficiencies-specific speed multistage pumps-pumps in parallel- performance of pumps-characteristic curves- NPSH-cavitation.

Classification of Hydropower plants - Definition of terms - load factor, utilization factor, capacity factor, estimation of hydropower potential.

Text Books

1. Open Channel flow by K. Subramanya . Tata Mc. Graw Hill Publishers
2. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi
3. Fluid Mechanics & Fluid Power Engineering by D.S. Kumar Kataria & Sons.

References Books

1. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house.
2. Elements of Open channel flow by Ranga Raju, Tata Mc Graw Hill, Publications.
3. Fluid mechanics and fluid machines by Rajput, S. Chand &Co.
4. Open Channel flow by V.T. Chow, Mc Graw Hill book company.
5. Hydraulic Machines by Banga & Sharma Khanna Publishers

Course Outcomes

1. At the end of the course the student will be able to –
2. Understand the principles and calculations required to design open channel sections and to find parameters of hydraulic jump and back water curve.
3. Ability to understand the principles and calculations required to utilize the dimensional analysis as a tool in solving problems in the field of fluid mechanics.

4. Ability to understand the principles and calculations required to design impulse and reaction turbines, and conduct model studies for turbines and pumps.
5. Ability to understand the principles and calculations required to assess hydro electric potential, know functions of components of power house and find the factors governing the operation of power station.

(A2110) STRUCTURAL ANALYSIS

B.Tech (CE) IV Semester

L	T	P	C
3	1	0	3

Course Objectives

1. To develop an understanding of various types of structures and their built to facilitate the performance of various activities connected with residence, transportation, storage, healthcare etc. in the field of civil engineering.
2. To develop an understanding of the behavior of structure under serviceability load.
3. To understand the mechanics of the material behavior of different types of structures.
4. To make student aware of various procedure of analysis like Mohr's theorem, method of consistent deformation, reciprocal theorem, Betti's theorem, energy theorem etc. for statically indeterminate structures.
5. To develop good technical reporting and data presentation skills

Unit - I

Analysis of Perfect Frames: Types of frames - Perfect. Imperfect and redundant pin jointed frames. - Analysis of determinate pin jointed frames - Analysis of determinate pin jointed frames using method of joints, method of sections and tension coefficient method for vertical loads, horizontal loads and inclined loads

Unit - II

Energy Theorems: Introduction - Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano's first theorem - Unit load Method. Definitions of simple beams and pin- jointed plane trusses. Definitions of statically determinate bent frames.

Three Hinged Arches - Introduction- Types of Arches - Comparison between three hinged and two hinged arches. Normal Thrust and radial shear in an arch. Geometrical properties of parabolic and circular arch. Three hinged circular arch at different levels. Absolute maximum bending moment diagram for a three hinged arch.

Unit - III

Propped Cantilever and Fixed Beams: Analysis of propped cantilever and fixed beams, including the beams with varying moments of inertia,

subjected to uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - Shear force and Bending moment diagrams for propped Cantilever and Fixed Beams - Deflection of propped cantilever and fixed beams; effect of rotation of a support.

Unit -IV

Slope - Deflection Method and moment Distribution Method: Introduction - Continuous beams. Clapeyron's theorem of three moments- Analysis of continuous beams with constant and variable moments of inertia with one or both ends fixed - continuous beams with overhang. Effects of sinking of supports. Derivation of slope- deflection equation, application to continuous beams with and without settlement of supports using Moment Distribution Method. Shear force and bending moment diagrams, Elastic curve.

Unit - V

Moving Loads and Influence Lines: Introduction maximum SF and BM at a given section and absolute maximum SF and B.M due to single concentrated load U.D load longer than the span, U.D load shorter than the span, two point loads with fixed distance between and them and several point loads - Equivalent uniformly distributed load - Focal length. Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section- Load position for maximum BM at a section - point loads, UDL longer than the span, UDL shorter than the span- influence lines for forces in members of pratt and Warren trusses.

Text Books:

1. Structural Analysis Vol - I and II by Vazarani and Ratwani, Khanna Publishers.
2. Structural Analysis Vol I & II by Pundit and Guptha., Tata McGraw Hill Publishers.

References:

1. Basic Structural Analysis by K.U. Muthu et al., I.K. International Publishing House Pvt. Ltd.
2. Structural Analysis by Hibbeler, Pearson Education Ltd
3. Basic Structural Analysis by C.S. Reddy., Tata McGraw Hill Publishers.
4. Fundamentals of structural Analysis by M.L. Gamhir, PHI.

Course Outcomes

At the end of the course the student will be able to :

1. Analyses three and two hinged arches under static loads - determine horizontal thrust at supports, radial shear, normal thrust and BM. At any given section including effects of settlement of support, temperature effects, lack of fit.
2. Determine the static and kinematic indeterminacies of structural systems and analyses indeterminate beams using slope deflection, moment distribution and Matrix methods.
3. Analyses simple beam and pin jointed trusses using strain energy principles- Castigliano's theorems.
4. Analyses beams and trusses under moving loads with and without the aid of Influence line Diagrams.

(A2111) BUILDING PLANNING AND DRAWING

B.Tech (CE) IV Semester

L	T	P	C
3	1	0	3

PART-A (Planning)

Course Objectives

1. To visualize, sketch and accurately draw shapes and objects to communicate information to specific audiences
2. To interpret, design, produce and evaluate a variety of graphical presentations using a range of manual based techniques
3. To use graphical conventions, standards and procedures in the design

Unit –I

Basic Architecture of Buildings: Aspect-Prospect -Privacy-Furniture requirement–Roominess– Grouping–Circulation –Sanitation -Lighting-Ventilation-Cleanliness-Flexibility-Elegance-Economy-Practical considerations

Building Byelaws and Regulations: Introduction –Terminology – Objectives of building byelaws –Floor Area Ratio (FAR) –Floor Space Index (FSI) –Principles underlying building byelaws –classification of buildings –Open space requirements –built up area limitations –Height of Buildings –Wall thickness –lighting and ventilation requirement.

Unit –II

Residential Buildings: Minimum standards for various parts of buildings –requirements of different rooms and their grouping – characteristics of various types of residential buildings.

Public Buildings: Planning of Educational institutions, hospitals, dispensaries, Office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.

PART –B (Drawing)

Unit –III

Brick Walls: English bond & Flemish bond odd & even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

Foundations: Spread foundation for walls and columns; Footing for a RCC column, raft and pile foundations;

Unit-IV

Doors and Windows: Glazed and paneled doors of standard sizes; Glazed and paneled windows of standard sizes; special windows and ventilators

Stairs: Proportioning and design of a dog-legged, open well RCC stair case for an office / Residential building; Details of reinforcements for RCC stair cases; Plan and elevation of straight run, quarter turn, dog-legged and open well stair cases.

Unit-V

Roofs and Trusses: Types of sloping roof, lean-to roofs, RCC roof with details of reinforcements, King post and Queen post trusses.

Functional Design of Buildings: To draw the line diagram, plan, elevation and section of the following: Residential Buildings (flat, pitched and combined roofs), Office Buildings (flat roof), School The designs must show positions of various components including lift well and their sizes.

Reference Books

1 Principles of Building Drawing Shah & Kale
2 Text Book of Building Construction Sharma & Kaul
3 Building Construction B C Punmia

Course outcomes

At the end of course the student will be able to

1. Prepare working drawings for individual components like doors and windows etc.
2. Draw line diagram, plan, elevation and sections.
3. Hand drafting of any parts of a building

(A2254) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

(Common to CSE, CE & MECH)

B.Tech (CE) IV Semester

L	T	P	C
3	1	0	3

Course Objective:

This course introduces the concepts of electrical DC and AC circuits, basic laws of electricity, instruments to measure the electrical quantities, different methods to solve the electrical networks, construction operational features of energy conversion devices i.e. DC and AC machines, transformers. It also emphasize on basics of electronics, semiconductor devices and their characteristics and operational features.

Unit-I:

Electrical Circuits: Basic definitions, Types of elements, Ohm's Law, Resistive networks, Kirchhoff's Laws,
Inductive networks, capacitive networks, Series, Parallel circuits and Star-delta and delta-star transformations.
Instruments: Basic Principle of indicating instruments – permanent magnet moving coil and moving iron instruments.

Unit-II:

DC Machines: Principle of operation of DC Generator & motor – EMF equation - types – DC motor types –torque
equation – applications – three point starter.

Unit-III:

Transformers: Principle of operation of single phase transformers –EMF equation – losses – efficiency and regulation.
AC Machines: Principle of operation of induction motor – slip – torque characteristics – applications. Principle of operation of alternators – regulation by synchronous impedance method

Unit–IV:

Diodes: P-n junction diode, symbol, V-I Characteristics, Diode Applications, and Rectifiers – Half wave, Full wave and Bridge rectifiers (simple Problems).
Transistors: PNP and NPN Junction transistor, Transistor as an amplifier, SCR characteristics and applications.

Unit-V:

Cathode Ray Oscilloscope: Principles of CRT (Cathode Ray Tube), Deflection, Sensitivity, Electrostatic and Magnetic deflection, Applications of CRO - Voltage, Current and frequency measurements.

Text books:

1. Basic concepts of Electrical Engineering, PS Subramanyam, BS Publications.
2. Basic Electrical Engineering, S.N. Singh, PHI.
3. Electronic Devices and Circuits, S.Salivahanan, N.Suresh Kumar, A.Vallavaraj,Tata McGraw-Hill Companies
4. Electronic Devices and Circuits, K. Lal Kishore, BS Publications

Reference books:

1. Basic Electrical Engineering, Abhijit Chakrabarthi, Sudipta nath, Chandrakumar Chanda, Tata-McGraw-Hill.
2. Principles of Electrical Engineering, V.K Mehta, Rohit Mehta, S.Chand Publications.
3. Basic Electrical Engineering, T.K.Nagasarkar and M.S. Sukhija, Oxford University Press.
4. Fundamentals of Electrical Engineering, Rajendra Prasad, PHI. Basic Electrical Engineering by D.P.Kothari , I.J. Nagrath, McGraw-Hill.
5. Millman's Electronic Devices and Circuits,J. Millman, C.C.Halkias, and Satyabrata Jit, Tata McGraw-Hill companies.
6. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky,PEI/PHI.
7. Introduction to Electronic Devices and Circuits, Rober T. Paynter,PE.
8. Integrated Electronics, J. Millman and Christos C. Halkias, Tata McGraw-Hill companies.
9. Electronic Devices and Circuits, Anil K. Maini, Varsha Agarwal,Wiley India Pvt. Ltd.

Course outcomes

1. Explain the basic electrical circuits, parameters, measuring instruments
2. Explain the operation of the transformers in the energy conversion process,
3. Explain construction, operation, characteristics of DC and AC machines

4. Describe different semiconductor devices, their voltage-current characteristics, realization of various electronic circuits with the various semiconductor devices, and cathode ray oscilloscope,

(A2112) FLUID HYDRAULICS & HYDRAULIC MECHINERY LAB

B.Tech CE-IV Semester

L	T	P	C
0	0	3	2

Course Objective

The main objective of this lab course is to make the students in better understanding of fluid mechanics phenomena such as variation of velocity and pressure, measuring head loss in terms of differential head, liquid jet forces acting on various type of vanes and measurement of flow rate by various devices such as orifice meter, weir etc.

LIST OF EXERCISES

1. Calibration of Venturimeter & Orifice Meter
2. Determination of Coefficient of discharge for a small orifice/mouth piece by constant head method
3. Calibration of contracted Rectangular Notch and / Triangular Notch
4. Determination of friction factor of a pipe
5. Determination of Coefficient for minor losses
6. Verification of Bernoulli Equation
7. Impact of Jet on Vanes
8. Performance test on Pelton wheel turbine
9. Performance test on Francis turbine
10. Performance characteristics of a single stage centrifugal pump
11. Performance characteristics of a multi-stage centrifugal pump
12. Performance characteristics of a reciprocating pump

Course Outcomes

- Ability to understand Learn calibration of discharge measuring devises and finding discharge through the venture meter and the orifice meter

- Ability to understand calibration of discharge measuring devises for open channel/free flow like rectangular and triangular notch.
- Ability to understand the coefficient of discharge for outlet devises viz small orifices and mouth pieces.
- Ability to understand performance characteristics of popular turbines, pumps and determine coefficient of friction factor for minor losses and verify Bernoulli's equation.

(A2113) SURVEYING LAB – II

B.Tech (CE) IV Semester

L	T	P	C
0	0	3	2

List of Exercises

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

List of Equipment

1. Theodolite and leveling staffs.
2. Tachometers.
3. Total station.

Course Outcome

At the end of the course the student will be able to

1. Find the horizontal distances, heights and elevations by conducting theodolite surveying.
2. Find the horizontal distances, heights and elevations by conducting tachometric surveying.
3. Set out the simple circular curves in the field for roads and railway lines by linear and angular instruments.
4. Find the horizontal distances, heights and elevations by conducting total station surveying

(A2114) SURVEYING CAMP

B.Tech (CE) IV Semester

L	T	P	C
0	0	0	2

Course Objectives:

a. To give students an opportunity to improve theoretical and practical knowledge in engineering surveying under actual field conditions.
b. To conduct topographical survey and prepare topographical map of the area as per given technical specifications.
c. To produce high level technical manpower capable of undertaking works in surveying field.
d. To develop self-confidence so that he/she can do work independently by solving field problems during survey works.

Two weeks Survey Camp will be conducted during summer vacation in the following activities:

1. Triangulation
2. Trilateration and
3. Rectangulation

The camp must involve work on a large area. At the end of the camp, each student shall have mapped and contoured the area. The camp record shall include all original field observations, calculations and plots.

Course Objective

1. To learn the different techniques of measurements of distances, directions and elevations.
2. To learn about the procedures of preparations of topographical maps of the areas.
3. To learn about the process of establishment of horizontal control points necessary for carrying out survey of the area.
4. To learn about the principles involved in the advanced surveying instruments.
5. To learn about the techniques of layout of curves in transportation engineering.

(A2004) SOFT SKILLS & PROFESSIONAL ETHICS

B.Tech (CE) IV Semester

L	T	P	C
2	0	0	0

MODULE 1. Business Communication Skills

- English Language Enhancement
- The Art of Communication

OBJECTIVE

- The student will gain a functional understanding of basic English Grammar
- Practice language skills to eliminate errors in pronunciation and sentence construction
- Understand and enhance interpersonal communication process

MODULE 2. Intrapersonal & Interpersonal Relationship Skills

- Intrapersonal Relationships
- Interpersonal Relationships – To be an Effective Team Player

OBJECTIVE

- The student will understand the importance of and the various skills involved in developing enriching interpersonal relationships
- Be more aware of his/her own self – confidence, values
- Understand and handle emotions of self and others.
- Understand the necessity and importance of working together as a team
- Learn how to go about being a good team player and form an effective team
- Have put their team building skills to test in the various activities to understand where they stand and improve themselves with each succeeding activity.

MODULE 3. Campus To Company

- Corporate Dressing
- Corporate Grooming
- Business Etiquette
- Communication Media Etiquette

OBJECTIVE

- The student will understand what constitutes proper grooming and etiquette in a professional environment.
- Have some practical tips to handle him/her in a given professional setting.
- Have practiced the skills necessary to demonstrate a comfort level in executing the same.

MODULE 4. Group Discussions, Interviews and Presentations

- Group Discussions
- Interviews
- Presentations

OBJECTIVE

- The student will be able to appreciate the nuances of the Group Decision-making process.
- Understand the skills tested and participate effectively in Group Discussions.
- Learn the basics of how to make an effective presentation and have numerous practice presentations in small groups and larger audiences.
- Attend any type of interview with the confidence borne out of knowledge gained and practice sessions.

MODULE 5. Entrepreneurial Skills Development

- Goal Setting
- Entrepreneurial Skills – Awareness and Development

Objective

- The student will be able to set specific measurable goals for themselves in their personal and/or professional life.
- Understand the skills and the intricacies involved in starting an entrepreneurial venture.

References

1. UNLEASH the power within….Soft Skills – Training Manual (Infosys Campus Connect)

(A2023) GENDER SENSITIZATION
(An Activity-based Course)
B.Tech (CE) IV Semester

L	T	P	C
0	0	3	2

Objectives of the Course:

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Learning Outcomes:

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research. Facts .everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight in to the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the

textbook will empower students to understand and respond to gender violence.

Unit-I:
UNDERSTANDING GENDER:
Gender: Why Should We Study It? (Towards a World of Equals: Unit-1)
Socialization: Making Women, Making Men (?(Towards a World of Equals: Unit-2)
Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.
Just Relationships: Being Together as equals(Towards a World of Equals: Unit-12)
Mary Kom and Onler. Love and Acid just do not Mix Love Letters. Mothers and fathers. Further Reading: Rosa Parks -The Brave Heart.

UNIT-II:
GENDER AND BIOLOGY:
Missing Women: Sex Selection and its Consequences (Towards a World of Equals: Unit-4)
Declining Sex Ratio. Demographic Consequences.
Gender Spectrum: Beyond the Binary(Towards a World of Equals: Unit-10)
Two or Many? Struggles with Discrimination.
Additional Reading: Our Bodies, Our Health(Towards a World of Equals: Unit-13)

Unit-III:
GENDER AND LABOUR:
Housework: the Invisible Labour (Towards a World of Equals: Unit-3)
"My Mother doesn't Work" "Share the Load"
Women's Work: Its Politics and Economics(Towards a World of Equals: Unit-7)
Fact and Fiction. Unrecognized Unaccounted work. Further Reading: Wages and Conditions of Work.

Unit-IV:
ISSUES OF VIOLENCE:
Sexual Harassment: Say No! (Towards a World of Equals: Unit-6)
Sexual Harassment, not Eve- teasing-Coping with Everyday Harassment - Further Reading."Chupulu"
Domestic Violence: Speaking Out(Towards a World of Equals: Unit-8)

Is Home a Safe Place?-When Women Unite Film]. Rebuilding Lives. Further Reading: New Forums for Justice.
Thinking About Sexual Violence (Towards a World of Equals: Unit-11) Blaming the Victim- "I Fought for my Life....." - Further Reading: The Face of Violence.

Unit-V:
GENDER STUDIES:
Knowledge: Through the Lens of gender! (Towards a World of Equals: Unit-5)
Point of view. Gender and the Structure of Knowledge. Further Reading: Unacknowledge Women Artists of Telangana.
Whose History? Questions for Historians and Other! (Towards a World of Equals: Unit-9)
Reclaiming a Past. Writing other Histories. Further Reading: Missing Pages from Modern Telangana History.

Essential Reading: All the Units in the Textbook, "Towards a World of Equals: A Bilingual Textbook on "Gender" written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu.

Note: Since it is Interdisciplinary Course, Resource persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field.

Reference Books:

1. Sen., Amartya."More Than One Million Women Are Missing" New York Review of Books 37.20(20December 1990). Print. 'we Were Making History.....'Life Stories of Women in the Telangana People's Struggle. New Delhi: Kali for Women,1989.
2. Tripti Lahiri."By the Numbers :Where Indian Women Work" Women's Studies Journals(14Novenber2012)Available Online at: http//blogs.wsj.com/India real time/2012/11/14/by-the numbers-Where-Indan-Women work/
3. K. Satyanarayana and Susie Tharu (Ed) Steel Nibs Are Sprouting: New Dalit Writing From South India, Dossier2: Telugu And Kannada http//harpercollins.co.in/BookDetail.asp?book code=3732

4. Vimala." Vantillu(The Kitchen)". Women Writing in India: 600 BC to the present Volume II: The 20thCentury.Ed Susie Thuru and K. Lalita.Delhi" Oxford University press, 1995. 599-601.
5. Shatrughna. Veena et al. Women's Work and its Impact on Child Health and Nutrition, Hyderabad, National Institute of Nutrition, Indian Council of Medical Research,1993
6. Stree Shakti Sanghatana "We Were Making History..... Life Stories of Women in the Telangana people's Struggle New Delhi : Kali for Women,1989
7. Menon, Nivedita. Seeing like a FEMINIST. New Delhi: Zubaan-Penguin books, 2012.
8. Jayaprabha, A "Chupulu (Stares).Women Writing in India: 600BC to the present. Volume II: The 20th Century Ed Susie Tharu and K. Lalita. Delhi: Oxford University press,1995.596-597
9. Javeed, Shayan and Anupam Manuhaar."Women and Wage Discrimination in India: A Critical Analysis" International Journal of Humanities and Social Science invention2.4(2013).
10. Gautam, Liela And Gita Ramaswamy "A Conversation Between A Daughter And A Mother" Broadsheet On Contermporary Politics. Special Issue On Sexuality And Harassment:Gender Politics On Campus Today .Ed Madhumeeta Sinha And Asma Rasheed Hyderabad; Anveshi Research Center For Women's Studies,2014
11. Abdulali Sohaila "I Fought For My Life ...And Won" Available Online At:Http/Www.Theaiternative.In/Lifestyle/I-Fought-For-My-Lifeand-Won-Sohaila-Abdulal/
12. Jeganathan Pradeep, Partha Chatterjee(Ed) "Community, Gender And Violence Subattern Studies Xi Permanent Black And Ravi Dayal Publishers, New Delhi,2000.

V SEMESTER

(A2115) CONCRETE TECHNOLOGY

B.Tech (CE) -V Semester

L	T	P	C
3	1	0	3

Course Objectives

- Students will learn properties of various ingredients of concrete.
- Students will learn properties of fresh and hardened concrete.
- Students will learn various methods of concrete mix design.

Unit-I

Cement: Portland cement- chemical composition- Hydration of cement- Structure of Hydrated cement, Test on physical properties, Different grades of cement.

Admixtures: Types of admixtures, mineral and chemical admixtures- properties-dosages- effects- usage.

Aggregates: classification of aggregate- Particle shape & texture – Bond, Strength & other mechanical properties of aggregate- Specific gravity, Bulk Density, porosity, adsorption & moisture content of aggregate – Bulking of sand- Deleterious substance in aggregate- Soundness of aggregate- Alkali aggregate reaction –Thermal properties – Sieve analysis – Fineness modulus –Grading curves – Grading of fine & coarse aggregates- Gap graded aggregate- Maximum aggregate size

Unit- II

Fresh concrete; Workability- Factors affecting workability –Measurement of workability by different tests- Setting times of concrete- Effect of time and temperature on workability- Segregation & bleeding- Mixing and vibration of concrete- steps in manufacture of concrete- Quality of mixing water.

Unit- III

Hardened concrete- water/cement ratio- Abram's law- Gelspace ratio- Nature of strength of concrete- Maturity concept- Strength in tension& compression- Factors affecting strength- Relation between compression & tensile strength- Curing

Testing of Hardened concrete: Compression tests- Tension tests- Factors affecting strength- flexure tests- Split tests- Pull-out test, Non destructive

testing methods-codal provisions for NDT. Elasticity, Creep& Shrinkage- Modulus of elasticity- Dynamic modulus of elasticity- Poisson's ratio- Creep of concrete- Factors influencing creep- Relation between creep& time- Effects of creep- Shrinkage- types of shrinkage.

Unit- IV

Mix Design: Factors influencing the choice of mix proportions- Durability of concrete-Quality Control of concrete- Statistical Quality Control- Acceptance criteria- Proportioning of concrete mix by normal and pumpable concretes by BIS method of mix design – Formwork – different types of formworks – selection of formwork for different concrete works.

Unit-V

Special Concretes: Light weight concrete-Light weight aggregate concrete- Cellular concrete- No-fines Concrete- Fibre reinforced concrete- Polymer concrete- Types of polymer concrete- Self compacting concrete.

Text books

1. Properties of Concrete by A.M Neville- low priced Edition- 4th edition
2. Concrete Technology by M.S. Shetty, S. Chand & Co
3. Concrete Technology by A.R. Santakumar, Oxford University Press, New Delhi

References

1. Concrete Technology by Job Thomas, Cengage Learning
2. Concrete Technology by M.L. Gambhir, Tata McGraw Hill publishers, New Delhi.
3. Concrete Micro structure, Properties and Materials-P.K. Mehta and J.M. Monterio, McGraw Hill publishers.
4. IS 10262 (2009) Indian Standard Concrete Mixed Proportionally guidelines (2009) I Version.

Course Outcomes

1. Explain ingredients of cement and chemical process involved in manufacturing of cement.
2. Describe properties of fresh and hardened concrete
3. Estimate the durability of concrete and prepare mix design.
4. Explain the various types of special concretes

(A2116) DESIGN AND DRAWING OF RCC STRUCTURES

B.Tech (CE) -V Semester

L	T	P	C
4	1	0	4

Course Objectives

- To help students to understand the fundamental principles and procedures of reinforced concrete design;
- To Help students learn to apply the principles of reinforced concrete design to real world problems; and
- To Prepare students for entry level structural engineering employment.

Unit - I

Concepts of RC Design – Limit State method - Material Stress - Strain Curves - Safety factors - Characteristic values. Stress Block parameters - IS - 456 - 2000 - Working Stress Method.

Beams: Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

Unit - II

Shear, Torsion and Bond: Limit state analysis and design of section for shear and torsion - concept of bond, anchorage and development length. I.S. code provisions. Design examples in simply supported and continuous beams, detailing Limit state design for serviceability for deflection, cracking and codal provision.

Unit - III

Design of Two- way slab, one way slab and continuous slab Using IS Coefficients, Cantilever slab / Canopy slab.

Unit - IV

Design of columns and Struts - Short and Long columns - axial loads, uni-axial and biaxial bending IS Code provisions.

Unit - V

Design of Footings- isolated (square, rectangular) and combined footings. Design of stair case.

Text books:

1. Limit state design of reinforced concrete - P.C.Varghese, Prentice Hall of India, New Delhi.
2. Reinforced concrete design by N.Krishna Raju and R.N. Pranesh. New age International Publishers, New Delhi
3. RCC Design, Laxmi Publications (LP) by B.C. Punmia (Author), Ashok Kumar Jain (Author), Arun Kumar Jain
4. Reinforced concrete design by S.UnnikrishnaPillai&DevadasMenon, Tata Mc.Graw Hill, New Delhi.
5. Fundamentals of reinforced concrete by N.C.Sinha and S.K.Roy, S.Chand publishers.
6. Design of RC Foundations by P.C.Varghese, PHI

References:

1. Fundamentals of Reinforced concrete design by M.L.Gambhir, Printice Hallo of India Ltd., New Delhi.
2. Reinforced concrete structural elements - behaviour, Analysis and design by P.Purushotham. Tata Mc.Graw - Hill , 1994
3. IS SP 34 : Handbook On Concrete Reinforcement And Detailing (With Amendment 1)

Course Outcomes:

1. Explain comprehend the concept of limit states design method for collapse and serviceability, material properties and behaviour.
2. Design Reinforced Concrete Flexural members - Beams, Slabs, Footings under bending, Shear and torsion.
3. Design Reinforced concrete compression numbers - Columns under combined action of axial load and bending.
4. Calculate crack width and long term reflections as per limit state of serviceability.

Notes:

Students would be allowed to use the following handbooks and or codes of practice in the internal as well as the university examination.

1. IS 456:2000 Indian standard 'Plain And Reinforced Concrete - Code Of Practice' (Fourth Revision)
2. SP 16 (1980): Design Aids for Reinforced Concrete to IS 456:1978. Extracts from this handbook are required to solve problems in the design of uniaxial and biaxial bending of RC Columns
3. Semester end examination would test the skill of the student on the design, detailing and drawing of RCC Members. To achieve

this objective, Semester end examination would have a compulsory section exclusively dedicated to design, detailing and drawing of one of the following RC members namely beams, slabs, columns, footings and stairs. The questions in the other section would focus on the understanding of the principles and concepts, analysis and design oriented problems.

(A2117) GEOTECHNICAL ENGINEERING- I

B.Tech (CE) -V Semester

L	T	P	C
4	1	0	4

Course Objectives

1) Able to understand the principles of soil mechanics and application in engineering practices.
2) Able to estimate the relation between engineering properties and their characteristics which control these properties.
3) Able to elucidate the laboratory methods to find out soil properties.
4) Able to apply basic analytical procedures to obtain the engineering quantity and understand their limitations.

Unit – I

Introduction: Origin- Soil formation – soil structure and clay mineralogy – Adsorbed water – Mass- volume relationship –Relative density.
INDEX PROPERTIES OF SOILS: Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices –I.S. Classification of soils

Unit –II

Permeability: Soil water – capillary rise – flow of water through soils – Darcy's law- permeability – Factors affecting –laboratory determination of coefficient of permeability –Permeability of layered systems. In-situ permeability tests (pumping-in and pumping-out tests)
Seepage through Soils: Total, neutral and effective stresses –quick sand condition – Seepage through soils –Flownets: Characteristics and Uses.

Unit – III

Stress Distribution in Soils: Boussinesq's and Westergaard's theories for point loads and areas of different shapes – Newmark's influence chart.
Compaction: Mechanism of compaction – factors affecting – effects of compaction on soil properties. – Field compaction Equipment – compaction quality control.

Unit – IV

Consolidation : Spring analogy-Void ratio and effective stress (e vs log p relationship- Terzaghi's theory of one dimensional consolidation – Assumptions and derivation of Governing Differential Equation (GDE)- Computation of magnitude of settlement and time rate of settlement

Unit – V

Shear Strength of Soils : Importance of shear strength-Mohr's – Coulomb's Failure theories – Shear Parameters-Laboratory tests for determination of strength tests –Direct shear test, Tri-axial compression test(UU,CU and CD) and unconfined compression tests- Vane shear test. Factors affecting shear strength of cohesion less and cohesive soils-Determination of elastic moduli.

Text books:

1 Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt . Ltd, New Delhi
2. Soil Mechanics and Foundation Engineering . By K.R. Arora, Standard Publishers and Distributors, Delhi. Ltd., New Delhi
3. Geotechnical Engineering by C. Venkataramiah, New age International Pvt . Ltd, (2002).
4. Soil Mechanics and Foundation Engineering. By V.N.S. Murthy, CBS Publishers and Distributors.
5. Principles of geotechnical Engineering by B.M. Das, Cingage learning publishers

References:

1. Soil Mechanics and Foundation by by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt.
2. Soil Mechanics – T.W. Lambe and Whitman, Mc-Graw Hill Publishing Company, Newyork.
3. Geotechnical Engineering by Purushotham Raj
4. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata Mc. Graw hill Publishers New Delhi.

Course Outcomes:

1. Explain the relevant engineering properties of soils and their characteristics and describe the factors which control these properties.
2. Estimate the permeability and seepage though soils
3. Explain the stresses on the soil and compaction properties of soil
4. Explain consolidation and shear strength of the soils**.**

(A2118) WATER RESOURCES ENGINEERING – I

B.Tech (CE) -V Semester

L	T	P	C
3	1	0	3

Course objective

- In we are working in the field of irrigation Engineering. We should know how much water is going into the ground from where the plants can take their water also control the floods or avoid the lack of water for irrigation.
- The knowledge of hydrology is pre-requisite for the irrigation engineering and also for design of hydraulic structure. So one of the objectives of this course is to impart the knowledge of hydrology that deals with the occurrence, distribution, movement and properties of water on the earth.
- To impart the knowledge of various irrigation techniques, requirements of the crops.

Unit-I

Introduction to engineering hydrology and it's applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data – Adjustment of record – Rainfall Double Mass Curve. Runoff – Factors affecting Runoff- Runoff over a Catchment – Empirical and Rational Formulae.

Abstraction from rainfall – evaporation, factors affecting evaporation, measurement of evaporation – Evapotranspiration – Penman and Blaney & Criddle Methods – Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

Unit – II

Distribution of Runoff – Hydrograph Analysis Flood Hydrograph – Effective Rainfall – Base Flow – Base Flow Separation – Direct Runoff Hydrograph – Unit Hydrograph, definition, and limitations of applications of Unit hydrograph , derivation of Unit Hydrograph from Direct Runoff Hydrograph and versa – S – hydrograph, synthetic Unit Hydrograph.

Unit – III

Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, Transmissivity and storage coefficient,

Darcy's law, radial flow to wells in confined and unconfined aquifers. Types of wells – well Construction – well Development.

Unit – IV

Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility – Crop Rotation, preparation of land for Irrigation, standards of quality for Irrigation water.

Soil – water – plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension , consumptive use, Duty and delta factors affecting duty – Design discharge for a water course. Depth and frequency of Irrigation, irrigation efficiencies – Water Logging.

Unit – V

Classification of canals, Design of Irrigation canal by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for a canal design canal lining

Design Discharge over a catchment, computation of design discharge – rational formula, SCS curve number method, flood frequency analysis – Introductory part only. Stream Gauging – measurement and estimation of stream flow.

Text books:

1. Engineering Hydrology by Jayaram Reddy, Laxmi Publication Pvt. Ltd., New Delhi
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications Pvt. Ltd., New Delhi
3. Irrigation and Hydraulic structures by S.K. Grag.

References:

1. Elementary hydrology by V.P. Singh, PHI publications.
2. Irrigation and water Resources& Water power by P.N.Modi, Standard Book House.
3. Irrigation water Management by D.K. Majundar, Printice Hall of India.
4. Applied hydrology by Vent te chow, David R. Maidmentlarry W. Mays Tata MC. Graw Hill
5. Introduction to hydrology by Warren Viessvann, Jr. Garryl. Lewis, PHI

Course Outcomes

1. Explain various components of hydrologic cycle that affect the movement of water in the earth.
2. Explain the concepts of movement of ground water beneath the earth.
3. Explain the basic requirements of irrigation and various irrigation techniques, requirements of the crops.
4. Apply of math, science, and technology in the field of water resource Engineering.

(A2119) ENGINEERING GEOLOGY

B.Tech (CE) -V Semester

L	T	P	C
3	1	0	3

Course Objectives

- The students will be introduced to the scope and relation of geology with Civil Engineering.
- The students will learn physical geology, mineralogy, petrology, structural geology and hydrology.
- The students will be able to identify types of stones and minerals.
- The students will be introduced to Geological aspects of earthquakes, landslides.
- They will learn site investigation for dams, reservoir, and bridges.

Unit – I

Introduction: Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological draw backs. Importance of Physical geology, Petrology and Structural geology.

Weathering Of Rocks: Its effect over the properties of rocks importance of weathering with REFERENCE to dams, reservoirs and tunnels weathering of common rock like "Granite"

Unit – II

Mineralogy: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economics minerals such as Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite.

Petrology: Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphic rocks. Their distinguishing features, Megascopic study of Granite, Dolerite,

Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

Unit –III

Structural Geology: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints - their important types. Ground water, Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration.

Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Landslides, their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, earth quakes and landslides.

Unit –IV

Geology of Dams Reservoirs: Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factors Contributing to the success of a reservoir. Geological factors influencing water Lightness and life of reservoirs. Importance of Geophysical studies Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and Geothermal method. Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc. Fundamental aspects of Rock mechanics and Environmental Geology.

Unit – V

Tunnels: Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (lithological, structural and ground water) in tunneling over break and lining in tunnels. Tunnels in rock, subsidence over old mines, mining substances

Text books:

1. Engineering Geology by N. Chennkesavulu, McMillan, India Ltd. 2nd addition
2. Principals of Engineering Geology by K.V.G.K. Gokhale – B.S publications
3. Engineering Geology by Subinoy Gangopadhyay. Oxward University press

Reference Books:

1. Engineering Geology for Civil Engineering, P.C.Varghese, PHI Learning& private Limited
2. Geology of Engineering by Aurele Parriaux, CR C Press
3 F.G. Bell, Fundamental of Engineering Geology Butterworths, Publications, New Delhi, 1992.
4 Krynine & Judd, Principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution,

Course Outcomes

1. Explain the relationship between Rocks and Engineering, weathering process influence on Civil Engineering works.
2. Discuss the properties of minerals and rocks on their identification.
3. Explain Geological Structures and identification in the field.
4. Apply the Geophysical Studies and interpret in selection of Civil Structures (Dams, Tunnels and Reservoirs)
5. Explain surface and sub-surface water movement in Geological influence on movement process.
6. Explain Geo hazards and their influence on Civil Structures

(A2120) TRANSPORTATION ENGINEERING-I

B.Tech (CE) -V Semester

L	T	P	C
3	1	0	3

Course Objectives

- Study the behaviour of pavements under various loads able to design the flexible and rigid pavements using different Empirical, semi-empirical and theoretical approaches
- Learn the characteristics, properties and testing procedures of highway materials such as soil, aggregate and bitumen

Unit- I

Highway Development and Planning: Highway development in India – Necessity for Highway Planning- Different Road Development Plans- Classification of Roads- Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports

Unit – II

Highway Geometric Design: Importance of Geometric Design- Design controls and Criteria- Highway Cross Section Elements- Sight Distance Elements-Stopping sight Distance, Overtaking Sight Distance and intermediate Sight Distance- Design of Horizontal Alignment-Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

Unit – III

Traffic Engineering & Regulations: Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies- Data Collection and Presentation- speed studies- Data Collection and Presentation-Origin & Destination Studies, Parking Studies – On Streets & Off-street Parking-Road Accidents- Causes and Preventive Measures- Accident Data Recording – Condition Diagram and Collision Diagrams-Traffic Signs – Types and Specifications – Road Markings- Need for Road Markings-Types of Road Markings- Design of Traffic Signals- Webster Method.

Unit – IV

Intersection Design: Types of Intersections – Conflicts at Intersections-Requirements of At-Grade Intersections- Types of At-Grade Intersections-Channelized and Unchannelized Intersections—Traffic Islands -Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary –

Design Factors of Rotary- Advantages and Limitations of Rotary Intersections

Unit- V

Highway Material, Construction and Maintenance: Highway Material Characterization: Subgrade Soil, Stone Aggregates, Bitumen Materials, Construction of Gravel Roads- Construction of water Bound Macadam Roads- Construction of Bituminious Pavements: Surface Dressing, Bitumen Bound Macadam, Bituminous Concrete- Construction of Cement Concrete Pavements- Construction of joints on cement Concrete Pavements-joint Filler and Seal- Pavement Failures- Maintenance of Highways- Highway Drainage.

Text books:

1. Highway Engineering – S.K.Khanna & C.E.G. Justo, Nemchand & Bros., 7th edition (2000).
2. Railway Engineering – A text book of Transportation Engineering – S.P. Chadula – S. Chand & Co. Ltd. – (2001).
3. Highway Engineering Design – L.R. Kadiyali and Lal- Khanna Publications.
4. Airport Planning and Design- S.K. Khanna and Arora, Nemchand Bros.

References:

1. Highway Engineering – S.P.Bindra , DhanpatRai& Sons. – 4th Edition (1981)
2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna publications – 6th Edition – 1997.
3. Railway Engineering – August – Prabha & Co., 15th Edition – 1994.
4. Air Transportation Planning & design – Virendhra Kumar & Statish Chandhra – Gal Gotia Publishers (1999).

Course Outcomes:

1. Explain history of transportation and development roads.
2. Explain geometric design of roads, traffic Engineering & Traffic regulation, Management studies & Intersection design using various methods.
3. Explain plain railway engineering, its component of railway track & its Geometric designs
4. Explain basic requirement for airport & its geometric design

(A2121) CONCRETE TECHONOLOGY LAB

B.Tech (CE) -V Semester

L	T	P	C
0	0	3	2

Course Objectives:

- To test the basic properties ingredients of concrete, fresh and hardened concrete properties.

List of Experiments

1. Specific gravity of cement
2. Bulking of sand
3. Fineness modulus of fine and course aggregate
4. Normal Consistency of finesses of cement
5. Initial Setting Time and Final Setting Time of Cement
6. Soundness of Cement
7. Compressive Strength of Cement.
8. Workability test on concrete by Slump cone
9. Workability test on concrete by Vee-bee.
10. Workability test on concrete by compaction factor test
11. Young's Modulus and compressive strength of concrete
12. Non - Destructive testing on concrete (for demonstration)

List of equipment:

1. Specific gravity and absorption set up
2. Shape tests set up
3. Fineness modulus of fine and course aggregate apparatus
4. Normal consistency of finess of cement set up
5. Cement setting time equipment
6. Specific gravity and soundness of cement set up
7. Compressive testing machine
8. Workability test on concrete by compaction factor
9. Slump cone and setup
10. Vee-bee apparatus
11. Bulking of sand apparatus
12. Non-destructive testing on concrete

References:

1. Concrete Technology by M.S.Shetty.- S. Chand& Co
2. Concrete Lab Manual by M.L.Gambhir, _ TATA McGraw Hill

Course Outcomes:

Upon successful completion of this course, student will be able to

1. Determine the bulking of sand.
2. Determine the specific gravity of coarse aggregate and fine aggregate by Sieve analysis.
3. Determine the flakiness and elongation index of aggregates.
4. Determine the consistency and fineness of cement.
5. Determine the specific gravity, setting times, soundness and compressive strength of cement.
6. Determine the workability of cement concrete by compaction factor, slump and Vee – Bee tests
7. Explain the non-destructive testing procedures on concrete.

(A2122) ENGINEERING GEOLOGY & TRANSPORTATION MATERIAL LAB

B.Tech (CE) -V Semester

L	T	P	C
0	0	3	2

Course Objectives:

- To supplement theoretical knowledge and to give an idea of practical application of the engineering geology lab which has been designed to have basics of geological mapping and identification of minerals and rocks.
- To test crushing value, impact resistance, specific gravity and water absorption, percentage attrition, percentage abrasion, flakiness index and elongation index for the given road aggregates.
- To know penetration value, ductility value, softening point, flash and fire point, viscosity and stripping for the given bitumen grade.

I. Engineering Geology

1. Study of physical Properties and Identification of minerals referred under theory
2. Megascopic and Microscopic description and identification of rocks referred under theory.
3. Megascopic and Microscopic identification of rocks & minerals.
4. Interpretation and drawing of sections for geological maps showing tilted beds faults, uniformities etc
5. Simple Structural Geology problems

II. Transportation material

1. Aggregate impact and crushing value
2. Specific gravity and water absorption
3. Attrition Test
4. Abrasion Test
5. Shape Tests
6. Ductility Test and Softening point Test
7. Flash & fire point and Penetration Test

Course outcomes:

1. Test aggregates and judge the suitability of materials for the road construction
2. Test the given bitumen samples and judge their suitability for the road construction
3. Compute the optimum bitumen content for the mix design.
4. Explain ground surface features based on map patterns of contour within the framework of fundamental concepts of basic sciences with emphasis on practical application in civil engineering.
5. Explain about different earth materials, their physical properties and their application in day to day use.

(A2005) ANALYTICAL SKILLS-1

B.Tech (CE) -V Semester

L	T	P	C
2	0	0	0

Quantitative Aptitude

1. Number System
2. LCM and HCF
3. Averages
4. Simple Equations
5. Ratios & Proportions
6. Partnerships
7. Percentages
8. Profit & Loss
9. Time & Work
10. Time & Distance
11. Simple and compound interest
12. Permutations & Combinations
13. Probability

VI SEMESTER

(A2123) DESIGN AND DRAWING OF STEEL STRUCTURES

B.Tech (CE) -VI Semester

L	T	P	C
4	1	0	4

Course Objectives

- To help students understand the fundamental principles and procedures of Structural Steel design.
- To help students learn to apply the principles of Structural Steel design to real world problems.
- To prepare students for entry level structural engineering employment.

Unit - I

Materials - Making of iron and steel - Types of structural steel - mechanical properties of steel - Concepts of plasticity - yield strength, behaviour of steel, local buckling. Concept of limit State Design - Different Limit States as per IS 800 : 2007 - Design Strengths - deflection limits – serviceability- Loads and combinations of loads, wind loads on roof trusses.

Bolted connections - Design Strength of a joint in bearing, shear and direct tension –zig-zag and chain bolting- Efficiency of a bolted joint - Prying action-IS Code requirements- Gusset Plates- Design of bolted joints.

Welded Connections -Types of Welded joints- Advantages and disadvantages of welding- Strength of welds-Butt and fillet welds - Permissible stresses in welds - IS Code requirements. Design of welds.

Unit -II

General Design of members subjected to direct tension and bending – Lug Angles. Design of compression members - Buckling class - slenderness ratio- permissible stresses. Design of compression members (simple, built-up laced and battened columns) - column splice - column base - slab base.

Unit –III

Design of beams - Plastic moment - Bending and shear strength- design of laterally supported and unsupported beams - Built up sections - large

plates- Web buckling and crippling - Deflection of Beams - Design of Purlins.

Unit -IV

Beam to beam and beam to Column connections.- Design of eccentric connections with and without brackets- fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints- - Web angle - Un-stiffened seated connections (bolted and Welded types)- Design of truss joints

Unit - V

Design of welded plate girders - optimum depth Design of main section - Design of end bearing stiffeners and intermediate stiffeners. Connection between web and flange- Curtailment of flange plates- Splicing- Design of web splices.

Text books:

1. Design of steel structures - N. Subramanian, Oxford University Press - 2009
2. Limit State Design of steel structures, S.K. Duggal, Tata McGraw-Hill,2010

Reference books:

1. Design of steel structures by K.S.Sai Ram, Person Education.
2. Design of Steel Structures Edwin H.Gaylord, Jr.Charles N.Gaylord and James Stallmeyer Tata McGraw-Hill Education pvt.Ltd.
3. Design of steel structures Vol. 1& 2 - Ramchandra, Standard Publications.

Course Outcomes:

1. Explain the concept of limit state method of design of steel structures, Material properties and types of steel and behaviour.
2. Design simple Bolted, Riveted and Welded Connections as well as eccentric and moment connections.
3. Design Tension and compression Members including splice connections and column bases, Beams and plate girder.
4. Calculate the forces in roof trusses and design the various structural elements there in.

Notes:

Students would be allowed to use the following standards and or codes of practice in the internal as well as the university examination.

1. IS 800 : 2007 Indian standard 'General Construction In Steel Code of Practice' (Third Revision)
2. IS:875 (Part 3) – 1987 Code of Practice For Design Loads (Other than Earthquake) For Buildings and Structures Part 3 Wind Loads (Second Revision)
3. Steel Tables
4. Semester end examination would test the skill of the student on the design, detailing and drawing of structural steel members. To achieve this objective, semester end examination would have a compulsory section exclusively dedicated to design, detailing and drawing of one of the following steel members namely- beams, columns, truss members and Plate Girders. The questions in the other section would focus on the understanding of the principles and concepts, analysis and design oriented problems.

(A2124) GEOTECHNICAL ENGINEERING-II

B.Tech (CE) -VI Semester

L	T	P	C
4	1	0	4

Course Objectives

1. Understand and prepare bore logs for civil engineering projects.
2. Analyze the type of foundation suitability at a particular type of site.

Unit – I

Soil Exploration: Need, Methods of soil exploration, Boring and Sampling methods, Field tests, Penetration Tests, Plate load test, Pressure meter, planning of programme and preparation of soil investigation report.

Unit – II

Earth Slope Stability: Infinite and finite earth slopes, types of failures, factor of safety of infinite slopes, stability analysis by Swedish arc method, standard method of slices, Bishop's Simplified method, Taylor's Stability Number-Stability of slopes of earth dams under different conditions.

Unit – III

Earth Pressure Theories: States of earth pressures-Active, Passive and at rest conditions, Rankine's theory-Computation of Active and Passive Earth Pressures in Cohesion less and Cohesive soils, Coloumb's wedge theory, Culmann's graphical method.

Retaining Walls: Types of retaining walls, stability of retaining walls against overturning, Sliding, bearing capacity and drainage from backfill.

Unit – IV

Shallow Foundations: Strength Criterion: Types, Choice of foundation, Location of depth, safe bearing capacity, Terzaghi and Meyerhof, Skempton and IS methods.

Shallow Foundations – settlement criteria – Safe bearing pressure based on N value-Allowable bearing pressure: Safe bearing capacity- Allowable settlement of structures

Unit-V

Pile Foundation: Types of piles – Load carrying capacity of piles based on static pile formulae in different soils – Dynamic pile formulae – Pile load

tests - Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

Well Foundations: Types – Different shapes of wells, Components of wells, functions and design Criteria, Sinking of wells, Tilts and shifts.

Text books:

1. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt. Ltd, (2004).
2. Soil Mechanics and Foundation Engineering. By V.N.S.Murthy, CBS Publishers and Distributors.
3. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.
4. Soil Mechanics and Foundation Engineering. By K.R. Arora, Standard Publishers and Distributors, Delhi

References:

1. Geotechnical Engineering by C. Venkataramiah, New age International Pvt . Ltd, (2002).
2. Das, B.M., - (1999) Principles of Foundation Engineering –6th edition (Indian edition) Thomson Engineering
3. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd (1998).
4. Geotechnical Engineering by S. K.Gulhati & ManojDatta – Tata Mc. Graw Hill Publishing company New Delhi. 2005.
5. Soil Mechanics and Foundations by - by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
6. Foundation Engineering by Varghese, P.C., Prentice Hall of India., New Delhi.

Course outcomes:

1. Explain various methods of exploration of soil investigation
2. Apply the different methods of slope stability and earth pressure theories.
3. Explain plan and design of retaining wall.
4. Explain the strength and settlement criteria in shallow foundations
5. Explain and design pile and well foundations

(A2125) ENVIRONMENTAL ENGINEERING-I

B.Tech (CE) -VI Semester

L	T	P	C
3	1	0	3

Course Objective

- To make students conversant about the environmental pollution problems related to land, air and water.
- To make the students conversant about the principles of water treatment processes including the problems involved in handling the different sources of water supply.
- To impart the basic knowledge of the process of collection and distribution of domestic waste water and to make them learn about the different techniques of onsite treatment of sewage.
- Students will be familiar with current and emerging environmental engineering and global issues, and have an understanding of ethical and societal responsibilities.

Unit-I

Introduction: Water supply Schemes- Protected water supply- Population forecasts, design period- water demand- Types of demand – factors affecting-fluctuations- fire demand –Sources of Water- intakes- infiltration galleries, confined and unconfined aquifers- water quality parameters and testing- drinking water standards

Unit-II

Layout and general outline of water treatment units- sedimentation, uniform setting velocity- principles- design factors- surface loading- jar test –optimum dosage of coagulant- coagulation- flocculation, clarifier design-coagulants –feeding arrangements. Filtration- theory- working of slow and rapid gravity filters- multimedia filters- design of filters-troubles in operation comparison of filters –disinfection- types of disinfection – theory of chlorination –chlorine demand- other disinfection treatment methods. Distribution systems- Types of layouts of Distribution systems – design of distribution systems- Hardy Cross and equivalent pipe methods-service reservoirs- Determination of Storage Capacity.

Unit-III

Conservancy and water carriage systems- sewage and storm water estimation- time of concentration- storm water overflows combined flow-

characteristics of sewage – examination of sewage-B.O.D.- C.O.D .equations .Design of sewers
Shapes and materials- Sewer appurtenances manholes- inverted siphon-catch basins-flushing tanks- ejectors, pumps and pumping houses- house drainage- components requirements – sanitary fittings- traps-one pipe and two pipe systems of plumbing.

Unit-IV
Layout and general outline of various units in a waste water treatment plant-primary treatment, design of screens- grit chambers- skimming tanks- sedimentation tanks, principle and design of biological treatment-trickling filters- standard and high rate Filters, ASP, Asp modification-Aeration.

Unit-V
Construction and design of oxidation ponds- Oxidation ditches- Sludge Treatment- Sludge digestion tanks-design of digestion tank- Factors affecting sludge digestion- sludge disposal by drying- septic tanks-working principles and design- soak pits. Ultimate disposal of waste water-self purification of rivers- Sewage farming.

Text books:
1. Water supply& Sanitary Engineering by G.S. Birdie.
2. Water supply Engineering, Vol. I waste water Engineering. Vol. II, B.C. Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.ltd New Delhi.
3. Water Supply Engineering Vol.I& waste water Engineering Vol. II, P.N. Modi, Standard Book Publishers, New Delhi.

References:
1. Waste Water Technology By Mark J Hammer and Mark J Hammer Jr
2. Water and Waste Water Technology by Steel
3. Waste Water Engineering by Fair Geyer and Okun.
4. Waste Water Engineering by Metcalf and Eddy
5. Theory & practice of water & waste water Treatment by Ronald L Drose, Wiley India Publishers

Course Outcomes:
1. Apply mathematics and natural science to engineering
2. Explain the function of natural and engineered environmental systems, and ability to design their components and processes to meet the desired needs of society

3. Design of various water treatment units like sedimentation tanks, slow sand and rapid sand filters
4. Estimate the characteristics of waste water like B.O.D and C.O.D and design the various waste water treatment units like Aeration units, trickling filters and sludge digestion tanks.

(A2126) WATER RESOURCES ENGINEERING – II

B.Tech (CE) -VI Semester

L	T	P	C
3	1	0	3

Course Objectives

- Understand fundamentals of design in water resources engineering.
- To introduce the structure of the dams, earth dam, canals, spillways and cross drainage works.
- To learn how to estimate the capacity of reservoir using mass curve.
- Able to classifying the types of water fall from the canals.
- Necessity and importance of diversion, storage head works, weir and barrages and to divert the cross drainage works.

Unit - I

Storage Works: Reservoirs – Types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve – Reservoir Sedimentation – Life of Reservoir. Types of dams, factors affecting selection of type of dam.

Unit - II

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, Factors of safety – stability analysis, Foundation for a Gravity Dam, drainage and inspection galleries.

Unit- III

Earth dam: types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam – graphical method, measures for control of seepage.

Spill ways: types of spillway, Design principles of Ogee spillways – spillway gates. Energy Dissipaters and stilling basins significance of Jump Height Curve and tail water Rating curve – USBR and Indian types of stilling Basins.

Unit – IV

Diversion Head works: Types of Diversion head works – weirs and barrages, layout of diversion head work – components. Causes and failure of weirs and Barrages on permeable foundations – silt Ejectors and silt Excluders

Weirs on permeable Foundations – Creep Theories – Bligh's Lane's and Khosla's theories, Determination of uplift pressure – various Correction Factors – Design principals of weirs on permeable foundations using Creep theories – exit gradient, U/S and D/S Sheet piles- Launching Apron.

Unit – V

Canal Falls – types of falls and their location, Design principles of Notch fall and Sarada type Fall. Canal regulation works, principles of design of distributory and head regulators, Canal Cross Regulators – Canal outlets, types of canal modules, proportionality, sensitivity and flexibility.

Cross Drainage works: Types, selection of site, Design principles of aqueduct, siphon aqueduct and super passage.

Text Books

1. Irrigation engineering and hydraulic structures by S.K. Garg, Khanna publications Pvt. Ltd., New Delhi
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications Pvt. Ltd., New Delhi

References:

1. Irrigation and resources engineering by G.L.Asawa, New Age International publishers
2. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta
3. Irrigation engineering by K.R. Arora
4. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand publishers
5. Introduction to hydrology by Warren Viessvann, Jr. Gary. Lewis, PHI
6. Engineering Hydrology by CS Pojha, R. Berndtsson and P. Bhunya, Oxford University press

Course Outcomes:

1. Explain water resources importance, occurrence, forms and availability
2. Explain development and management of water resources
3. Explain different forms, water availability and its exploration methods for different uses
4. Explain storage and conservation of water by planning and constructing different types of dams, canals etc

(A2127) ADVANCED STRUCTURAL DESIGN
(Professional Elective - I)

B.Tech (CE) -VI Semester

L	T	P	C
3	1	0	3

Course Objectives:

- To develop the necessary theoretical understanding of complex structural response
- To analyze and evaluate systems in structural engineering using force and displacement methods of various structures (plane trusses, plane frames, continuous beams and grids)
- To deal with matrix analysis of structures by forming an excellent mathematical framework
- To analyse structural behaviour with and without shear wall.

Unit-I

Design and detailing of cantilever and counterfort retaining walls- stability Checks

Unit-II

Working stress design of water tanks- Circular and Rectangular Water tanks resting on ground as well as elevated above ground- Design of Intze tank- Design of staging for elevated water tanks.

Unit-III

Design of Cinema Balcony, Flat slabs (Interior Panels only)-

Unit-IV

Working Stress Design of Concrete Bridges- IRC loading, Design of Slab Bridge using Pigeaud's Curves, Design of T- beam Girder Bridge.

Unit-V

Design of RCC Chimneys, Bunkers& Silos

Text Books

1. Advanced reinforced Concrete Structures by Varghese, Pranties Hall of India Pvt.Ltd.
2. Bridge Engineering By S.Ponnuswamy. Mc Graw Hill Co

3. Reinforced Concrete Design by S.A. Pillai and D.Menon, Tata McGraw Hill Publishing Company.
4. Advanced reinforced Concrete Structures by Krishna Raju
5. Advanced R.C.C. Design by S.S. Bhavikatti
6. Design of Bridges by Krishna Raju, Oxford & IBH Publishers.

References:

1. Reinforced Concrete Structures Vol. 2 by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, Publications Pvt.Ltd. New Delhi
2. Essentials of Bridge Engineering By D.John Son Victor, Oxford and IBM Publication Co. Pvt. Ltd

Course Outcomes:

On successful completion of the course students will be able to:

1. Explain the terminology and topics of higher level theory of structures at a professional level.
2. Explain the matrix analysis of structures.
3. Apply theory to analyse various structures (plane trusses, plane frames, continuous beams and grids)

Notes:

Limit state design is not yet adopted in text books dealing with the design of Liquid Retaining Structures and Road Bridges. Hence students shall be allowed to follow working stress design till the time we have a good number of text books using Limit State Design for these topics.

Students would be allowed to use the following handbooks and or codes of practice in the internal as well as the university examination.

1. IS 456:2000 Indian standard 'Plain and Reinforced Concrete - Code of Practice' (Fourth Revision)
2. IS : 3370 (Part 1 to 4) – 1965 (Reaffirmed 1999) Indian Standard 'Code of Practice for Concrete Structures for the Storage of Liquids'
3. IS : 4995 (Part II) – 1974 Indian Standard 'Criteria for Design of Reinforced Concrete Bins for Storage Of Granular and Powdery Materials'
4. IRC : '6-2000 Standard Specifications and Code of Practice for Road Bridges, Section : II Loads and Stresses' (Fourth Revision)
5. IRC: 21 –2000 "Standard specification and code of practice for road bridges (Plain and Reinforced)" Indian road congress, New Delhi, India, 2000.

6. IRC: 18 –2000 “Standard specification and code of practice for road bridges (Plain and Reinforced)” Indian road congress, New Delhi, India.
7. IRC: 21 –2000 “Code of Practice for Concrete Road Bridges” Indian road congress, New Delhi, India, 2011.
8. Pigeaud’s Curves for Design of Slab Bridges

(A2128) DESIGN OF BRIDGE STRUCTURES
(Professional Elective - I)

B.Tech (CE) -VI Semester

L	T	P	C
3	1	0	3

Course Objectives

- Types of bridges, types of loadings acting on bridges, forces and stresses on bridges.
- Method of analysis and Design of Solid slab Bridges.
- Method of Analysis and Design of Girder Bridges and Courbon's and Grillage analogy.
- Design of Pre-stressed concrete Bridges.
- Design and analysis of Bridge Decks and design loads for piers and Abutments.

Unit- I

Introduction: History of Bridges - Components of a Bridge and its definitions- Classification of Road Bridges - Selection of Site and Initial Decision Process - Survey and Alignment; Geotechnical Investigations and Interpretations. River Bridge: Selection of Bridge site and planning - Collection of Bridge design data - Hydrological calculation Road Bridges - IRC codes - Standard Loading for Bridge Design - Influence lines for statically determinate structures - I.L. for statically indeterminate structures - Transverse distribution of Live loads among deck longitudinal - Load combinations for different working state and limit state designs Railway Bridges: Loadings for Railway Bridges; Railroad data. Pre-design considerations; - Railroad vs. Highway bridges.

Unit- II

Super Structures Selection of main bridge parameters, design methodologies -Choices of superstructure types; Orthotropic plate theory, load + techniques - Grillage analysis - Different types of superstructure (RCC and PSC); Longitudinal Analysis of Bridge.- Transverse Analysis of Bridge- Temperature Analysis-

Unit -III

Design of Steel Bridges - Design of Plate girder bridges.

Unit -IV

Design of RC Bridges -Design of slab bridges – Girder bridges

Unit- V

Substructure, Bearings and Deck Joints, Parapets and Railings Substructure - Pier; Abutment - Wing walls- Importance of Soil-Structure Interaction - Types of foundations - Open foundation- Pile foundation- Well foundation- - Bearings and Deck Joints - Different types of bridge bearings and expansion joints - Parapets and Railings for Highway Bridges

Textbooks

1. Johnson Victor D., "Essentials of Bridge Engineering", Oxford and IBH Publishing Co., New Delhi, 1990.
2. Jagadeesh .T.R. and Jayaram.M.A., "Design of Bridge Structures", Prentice Hall of India Pvt. Ltd, Learning Pvt. Ltd., 2013
3. Design of Bridges by Krishna Raju, Oxford & IBH Publishers.

References

1. Phatak D.R., "Bridge Engineering", Satya Prakashan, New Delhi, 1990.
2. Ponnuswamy S., "Bridge Engineering", Tata McGraw-Hill, New Delhi, 1996.
3. Rajagopalan. N. "Bridge Superstructure", Alpha Science International, 2006

Course Outcomes:

1. Explain different types of Bridges, economic span length, General Design Requirements.
2. Explain the Method of Analysis of Solid Slab Bridges.
3. Explain the Method and Analysis of Girder bridges and Understanding Courbon's Theory and Grillage Analogy.
4. Explain basic Principles required for Prestressed. Concrete bridges and Understanding General Requirements of Road Bridges.
5. Explain harmonic analysis and Grillage analogy for analysis of bridge Decks and also understanding about the design of Piers and Abutments.

Notes:

Limit state design is not yet adopted in text books dealing with the Road Bridges. Hence students shall be allowed to follow working stress design till the time we have a good number of text books using Limit State Design for Bridges.

Students would be allowed to use the following handbooks and or codes of practice in the internal as well as the university examination.

1. IRC : "6-2000 Standard Specifications and Code of Practice for Road Bridges, Section : Ii Loads and Stresses" (Fourth Revision)
2. IRC: 21 –2000 "Standard specification and code of practice for road bridges (Plain and Reinforced)" Indian road congress, New Delhi, India, 2000.
3. IRC: 18 –2000 "Standard specification and code of practice for road bridges (Plain and Reinforced)" Indian road congress, New Delhi, India.
4. IRC: 21 –2000 "Code of Practice for Concrete Road Bridges" Indian road congress, New Delhi, India, 2011.
5. IRC 112 - 2011 : "Code of Practice for Concrete Road Bridges"
6. Pigeaud's Curves for Design of Slab Bridges

(A2129) PRESTRESSED CONCRETE

(Professional Elective - I)

B.Tech (CE) -VI Semester

L	T	P	C
3	1	0	3

Course objectives:

- To learn the concept, materials, methods and systems of prestressing
- To know the different types of losses and deflection of prestressed members
- To learn the design of prestressed concrete beams for flexural, shear and tension and to calculate ultimate flexural strength of beam
- To learn the design of anchorage zones, composite beams, analysis and design of continuous beam

Unit - I

Introduction: Historic development- General Principles of prestressing pre-tensioning and post tensioning - Advantages and limitations of Prestressed concrete - General principles of PSC - Classification and types of prestressing Materials - high strength concrete and high tensile steel their characteristics.

Methods and Systems of prestressing: Pre-tensioning and Post-tensioning methods and systems of prestressing like Hoyer system, Magnel Blaton system, Freyssinet system and Gifford - Udall System - Lee McCall system.

Unit – II

Losses of Prestress: Loss of prestress in pretension and post- tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, slip in anchorage, frictional losses.

Unit -III

Flexure: Analysis of sections for flexure- beams Prestressed with straight, concentric , eccentric, bent and parabolic tendons - stress diagrams- Elastic design of PSC beams of rectangular and I sections - Kern line - Cable profile and cable layout.

Shear: General considerations - Principal tension and compression - Improving shear resistance of concrete by horizontal and vertical prestressing and by using inclined or parabolic cables- Analysis of rectangular and I beams for shear - Design of shear reinforcements - Bureau of Indian Standards (BIS) Code provisions (IS 1343-2012).

Unit - IV

Transfer of Prestress in Pretensioned Members: Transmission of prestressing force by bond - Transmission length - Flexural bond stresses - IS code provisions - Anchorage zone stresses in post tensioned members - stress distribution in End block - Analysis by Guyon, Magnel, Zielinski and Rowe's Methods - Anchorage zone reinforcement - BIS Provisions (IS 1343-2012).

Unit - V

Composite Beams: Different Types - Propped and Unpropped - stress distribution - Differential shrinkage - Analysis of composite beams - General design considerations.

Deflections: Importance of control of deflections - Factors influencing deflections - Short term deflections of uncracked beams - prediction of long time deflections - BIS code requirements(IS 1343-2012)..

Text book:

1. Prestressed concrete by N. Krishna Raju, 5th Edition, Tata McGraw Hill Book Education Pvt. Ltd.
2. Prestressed Concrete by K.U. Muthu *et al.,* PHI Learning Pvt. Ltd.

References:

1. Design of prestressed concrete structures by T.Y. Lin and Burns, John Wiley, New York.
2. Prestressed concrete by S. Ramamrutham, Dhanpat Rai & Sons, Delhi.
3. Prestressed Concrete by N. Rajagopalan, Narosa Publishing House.

Course Outcomes:

1. Explain the prestressed concrete mechanism, fabrication and construction process
2. Analyze prestressed concrete members
3. Design a prestressed concrete beam accounting for losses, anchorage zone for post tensioned members and design of continuous beams

Notes:

Students would be allowed to use the following handbooks and or codes of practice in the internal as well as the university examination.

1. IS 1343: 2012 Indian standard "Prestressed Concrete - Code of Practice" (Second Revision)

(A2130) CONSTRUCTION PROJECT MANAGEMENT
(Professional Elective-II)

B.Tech (CE) -VI Semester

L	T	P	C
3	1	0	3

Course Objectives:

The objective of this course is:

- To introduce to the student the concept of project management including network drawing and monitoring.
- To introduce the various equipment related to construction like earth moving equipment, trucks and handling equipment, aggregate production and construction equipment and machinery.
- To introduce the importance of safety in construction projects.

Unit-I

Management process- Roles, management theories, Social responsibilities, planning and strategic management, strategic implementation, Decision making tools and techniques-Organizational structure, Human resource management- motivation performance- leadership.

Unit-II

Classification of construction projects, Construction Stages, Resources-Functions of Construction Management and its Applications, Preliminary planning –Collection of Data-Contract planning –Scientific Methods of Management; Network Techniques in construction management- Bar Chart-Grant Chart, CPM- PERT-Cost & Time optimization .

Unit-III

Resource planning – planning for manpower, materials, Cost, equipment, Labour, Scheduling, Forms of, Scheduling-Resource allocation, budget and budgetary control methods.

Unit-IV

Contract-types of contract, contract document, specification, important conditions of contract- tender and tender document- Deposits by contractor –Arbitration, negotiation – M- Book –Muster rolls- stores

Unit-V

Management information systems- Labour Regulations: Social security-welfare Legislation-laws relating to wages , Bonus and industrial disputes,

Labour administration – insurance and safety Regulations- Workmen's compensation Act – other labour laws- safety in construction : legal and financial aspects of accidents in construction , occupational and safety hazard assessment , human factors in safety , legal and financial aspects of accidents , occupational and safety hazard assessment.

Text Books

1) Ghalot, P.S., Dhir, D.M., Construction planning and Management, Wiley Eastern limited,1992
2) Chikara, K.K., Construction Project Management, Tata McGraw Hill publishing Co, Ltd New Delhi,1998
3) Punima, B.C., Project planning and Control with PERT and CPM, Laxmi Publications New Delhi 1987

Reference:

1. Construction Management and Planning by Sengupta, B. Guha, H., Tata McGraw Hill Publications

Course Outcomes:

Upon the successful completion of this course, the students will be able to:

1. Explain the importance of construction planning and functioning of various earth moving equipment.
2. Explain of production of aggregate products and concreting.
3. Apply the gained knowledge to project management and construction techniques.

(A2131) URBAN TRANSPORTATION PLANNING
(Professional Elective-II)

B.Tech (CE) -VI Semester

L	T	P	C
3	1	0	3

Course Objectives:

- To learn various procedures for travel demand estimation.
- To various data collection techniques for OD data.
- To know various models and techniques for trip generation, trip distribution, mode choice and traffic assignment.
- To develop alternative urban transport network plans.

Unit-I

Urban Transportation Problem Travel Demand: Urban Issues, Travel Characteristics, Evolution of Planning Process, Supply and Demand – Systems approach. Travel Demand: Trends, Overall Planning process, Long term Vs Short term planning, Demand Function, Independent Variables, Travel Attributes, Assumptions in Demand Estimation, Sequential, and Simultaneous Approaches, Aggregate and Disaggregate Techniques.

Unit-II

Data Collection and Inventories: Collection of data – Organisation of surveys and Analysis, Study Area, Zoning, Types and Sources of Data, Road Side Interviews, Home Interview Surveys, Commercial Vehicle Surveys, Sampling Techniques, Expansion Factors, Accuracy Checks, Use of Secondary Sources, Economic data – Income – Population – Employment – Vehicle Ownership.

Unit-III

Trip Generation and Distribution : UTPS Approach, Trip Generation Analysis: Zonal Models, Category Analysis, Household Models, Trip Attraction models, Commercial Trip Rates. Trip Distribution: Growth Factor Methods, Gravity Models, Opportunity Models, Time Function Iteration Models. By- pass Trips.

Unit-IV

Mode Choice and Traffic Assignment: Mode Choice Behaviour, Competing Modes, Mode Split Curves, Models and Probabilistic Approaches. Traffic Assignment: Basic Elements of Transport Networks,

Coding, Route Properties, Path Building Criteria, Skimming Tree, All-or-Nothing Assignment, Capacity Restraint Techniques, Reallocation of Assigned Volumes, Equilibrium Assignment, Diversion Curves.

Unit-V

Plan Preparation and Evaluation: Travel Forecasts to Evaluate Alternative Improvements, Impacts of New Development on Transportation Facilities. Master plans, Selection of Corridor, Corridor Identification, Corridor deficiency Analysis, Economic Impacts of Transportation.

Text Books

1. Introduction to Urban System Planning' by Hutchinson, B.G., McGraw Hill.
2. Transportation Engineering - An Introduction' by Khisty C.J., Prentice Hall.
3. Fundamentals of Transportation Planning' by Papacostas, Tata McGraw Hill.

References:

1. Introduction to Transportation Planning – M.J. Bruton; Hutchinson of London Ltd.
2. Introduction to Urban System Planning - B.G. Hutchinson; McGraw Hill.
3. Traffic Engineering and Transport Planning - Kadiyali L.R., Khanna Publishers
4. Lecture notes on UTP - Prof. S. Raghavachari, R.E.C. Warangal. M.Tech.(Highway Engineering)- R13 Regulations

Course Outcomes:

At the end of course students will be able to

1. Estimate travel demand for an urban area.
2. Plan the transportation network for a city.
3. Identify the corridor and plan for providing good transportation facilities.
4. Evaluate various alternative transportation proposals.

(A2132) PAVEMENT ANALYSIS AND DESIGN
(Professional Elective-II)

B.Tech (CE) -VI Semester

L	T	P	C
3	1	0	3

Course Objectives:

- To study the behaviour of pavements under various loads
- To design the flexible and rigid pavements using different Empirical, semi-empirical and theoretical approaches
- To learn the characteristics, properties and testing procedures of highway materials such as soil, aggregate and bitumen.

Unit I

Factors Affecting Pavement Design: Variables Considered in Pavement Design, Types of Pavements, Functions of Individual Layers, Classification of Axle Types of Rigid Chassis and Articulated Commercial Vehicles, Legal Axle and Gross Weights on Single and Multiple Units, Tyre Pressure, Contact Pressure, EAL and ESWL Concepts, Traffic Analysis: ADT, AADT, Truck Factor, Growth Factor, Lane Distributions & Vehicle Damage Factors, Effect of Transient & Moving Loads.

Unit II

Stresses In flexible and Rigid Pavements: Stress Inducing Factors in Flexible and Rigid pavements; Stress In Flexible Pavements: Visco-Elastic Theory and Assumptions, Layered Systems Concepts, Stress Solutions for One, Two and Three Layered Systems, Fundamental Design Concepts; Stresses In Rigid Pavements: Westergaard's Theory and Assumptions, Stresses due to Curling, Stresses and Deflections due to Loading, Frictional Stresses, Stresses in Dowel Bars & Tie Bars.

Unit III

Material Characteristics: CBR and Modulus of Subgrade Reaction of Soil, Mineral aggregates – Blending of aggregates, binders, polymer and rubber modified bitumen, Resilient, Diametral Resilient and Complex (Dynamic) Moduli of Bituminous Mixes, Permanent Deformation Parameters and other Properties, Effects and Methods of Stabilisation and Use of Geo Synthetics, Non destructing testing.

Unit IV

Design Of Flexible and Rigid Pavements: Development of design methods, Flexible Pavement Design Concepts, Asphalt Institute's Methods with HMA and other Base Combinations, AASHTO, IRC Methods for highways and low volume roads, Design Of Rigid Pavements: Calibrated Mechanistic Design Process, PCA, AASHTO & IRC Specifications, Rigid Pavement Design for Low Volume Rural Roads and highways. Design Of Overlays: Types & Design of Overlays: IRC Methods of Overlay Design, Importance of Profile Correction Course.

Unit V

Runway Design : Aircraft configurations, Flexible airport pavements - IS specifications and design, Corps of Engineers, FAA methods, AI methods ; Rigid airport pavements – IS specifications, PCA method, Corps of Engineers method, FAA method.

Text Books

1. Pavement Analysis and Design' by Yang H. Huang, Pearson Education, Second Edition.
2. Principles of Pavement Design' by Yoder. J. & Witczat Mathew, W. John Wiley & Sons Inc.
3. Pavement Design' by Srinivasa Kumar R, Universities Press, Hyderabad.

References:

1. Design of Functional Pavements, Nai C. Yang, McGraw Hill Publications
2. Concrete Pavements, AF Stock, Elsevier, Applied Science Publishers
3. Principles of Pavement Design, Yoder. J. & Witzorac Mathew, W. John Wiley & Sons
4. Pavement Analysis & Design, Yang H. Huang, Prentice Hall Inc.
5. Pavement and Sur-facings for Highway & Airports, Micheal Sargious, Applied Science Publishers Limited.
2. IRC Codes for Flexible and Rigid Pavements design M.Tech. (Highway Engineering)-R13 Regulation

Course Outcomes:

1. Estimate the stresses, strains and deflections in rigid and flexible pavements; traffic loading; and material characterization.
2. Design methodologies for both rigid and flexible pavements

3. Explain the structural and functions failure and the evaluation of pavements
4. Calculate the proportions of ingredients required for the mix design of both asphalt mixtures and cement concrete

(A2003)ADVANCED ENGLISH COMMUNICATION SKILLS LAB

B. Tech. (CE) VI-Semester

L	T	P	C
0	0	3	2

Introduction

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

Course Objectives

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

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

Syllabus

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

1. **Functional English**
   Starting a conversation, responding appropriately and relevantly, using the right body language, Role play in Different Situations.

2. **Vocabulary building**
   Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrasal verbs.

3. **Group Discussion**
   Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.

4. **Interview Skills** –
   Concept and process, pre-interview planning, opening strategies, answering strategies, Interview through tele and video- conferencing.

5. **Resume` and Technical Report writing**
   Structure and presentation, planning, defining the career objective, projecting ones strengths and skill-sets, summary, formats and styles, Letter-writing.
   Reading comprehension – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning and critical reading.

Minimum Requirement:
The English Language Lab shall have:

- The Computer aided Language Lab for 60 students with 60 systems,
- One master console, LAN facility and English language software for self- study by learners.
- The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.
- System Requirement (Hardware component):
- Computer network with Lan with minimum 60 multimedia systems with the following specifications:
  P – IV Processor
  d) Speed – 2.8 GHZ
  e) RAM – 512 MB Minimum
  f) Hard Disk – 80 GB
  Headphones of High quality

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

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

The following software from 'train2success.com'

Preparing for being Interviewed, Positive Thinking, Interviewing Skills, Telephone Skills, Time Management, Team Building, Decision making

Distribution and Weightage of Marks: English Language Laboratory Practical Examination:

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.

2. For the Language lab sessions, there shall be a continuous evaluation during the year for **40** sessional marks and **60** year-end Examination marks. Of the **40** marks, **20** marks shall be awarded for day-to-day work and **20** marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

Course Outcomes

1. Organise ideas relevantly and coherently.
2. Engage in debates.
3. Discuss in a group.
4. Face interviews.
5. Write project/research reports/technical reports.
6. Make oral presentations.
7. Write formal letters.
8. Transfer information from non-verbal to verbal texts and vice versa.
9. To take part in social and professional communication.

(A2133) GEOTECHNICAL ENGINEERING LAB

B.Tech (CE) -VI Semester

L	T	P	C
0	0	3	2

Course Objectives:

- To impart knowledge of determination of index properties required for classification of soils.
- To teach how to determine compaction characteristics and consolidation behavior from relevant lab tests; to determine permeability of soils.
- To teach how to determine shear parameters of soil through different laboratory tests.

List of Experiments

1. Water content and Specific gravity
2. Atterberg's Limits (LL & PL)
3. Field density-core and sand replacement method
4. Grain size analysis
5. Permeability of soil, constant and variable head test
6. Compaction Test
7. CBR Test
8. Consolidation Test
9. Unconfined Test
10. Tri-axial Compression test
11. Direct shear test
12. Vane shear test

References:

1. BIS codes for soil testing and ASTM codes of practice
2. Lambe, T.W., "Soil Testing for Engineers", Wiley Eastern Ltd., New Delhi, 1969.
3. Engineering Properties of Soil and their Measurements – Bowels J.E (1988), McGraw Hill Book Co. New York.

Course Outcomes:

1. Determine index properties of soil and classify them.
2. Determine permeability of soils.
3. Determine Compaction, Consolidation and shear strength characteristics.

(A2006) ANALYTICAL SKILLS-II

B.Tech (CE) -VI Semester

L	T	P	C
2	0	0	0

Logical Reasoning

- Analogy
- Classification
- Series & Sequence
- Coding & Decoding
- Directions
- Blood Relations
- Seating Arrangements
- Clocks and Calendars

Analytical Ability & Reasoning

- Cubes
- Logical Deductions
- Figure Analysis
- General Puzzles
- Data Sufficiency
- Data Interpretation

Business English

- Basics of Communication Skills
- Articles
- Tenses
- S+ V agreement
- Model Verbs
- Be/do/has/have forms

VII SEMESTER

(A2134) IRRIGATION DESIGN AND DRAWING
(Professional Elective-III)

B.Tech (CE) -VII Semester

L	T	P	C
3	1	0	3

Course Objectives:

1. To know the importance, location, components and types of irrigation structures.
2. To design various irrigation structures.
3. To get experience in drawing of irrigation structures.

GROUP A

1. Surplus Weir.
2. Syphon Well Drop
3. Trapezoidal notch fall
4. Tank sluice with tower head

GROUP B

1. Sloping glacis weir
2. Canal regulator
3. Under Tunnel
4. Type III Syphon aqueduct

Final Examination Pattern:

- The question paper is divided into two parts with two parts with two questions in each part.
- The student has to answer ONE question from each part. .Part I should cover the designs and
- Drawing from Group A for 45 marks and part II should cover only designs from Group B carrying 30 marks.
- The duration of the examination will be Three hours.
- However, the students are supposed to practice the drawing for Group B structures also for internal evaluation.

Text books:

1. Water Resources Engineering – Principles and Practice by Challa Satyanarayana Murthy, New Age International Publishers.

2. Irrigation Engineering and Hydraulic structures by S.K. Garg, Standard Book House.

Course Outcomes:

1. Design and detail of various irrigation structures like Surplus Weir, Syphon Well Drop, Trapezoidal notch fall and Tank sluice with tower head
2. Design and detail of various irrigation structures like Sloping glacis weir, Canal regulator, Under Tunnel and Type III Syphon aqueduct

(A2135) WATER RESOURCES SYSTEMS ANALAYSIS
(Professional Elective-III)

B.Tech (CE) -VII Semester

L	T	P	C
3	1	0	3

Course Objectives:

- The subject of this course is the planning and management of water resource systems.
- The course will cover the topics of water planning and management by providing in depth coverage of the analysis tools like optimization and simulation.
- Providing the theoretical framework for analysis based on the economics of water and the design of water systems**.**

Unit – I

Introducing: the definition of system, Type of system, System Approach, Systems analysis and type of systems, Techniques of water resources systems, analysis.

System Techniques in water resources: Objective fictions and constrains, Optimization of a function and variable, Optimization of a function of multiple variables, Constrained optimization, Kuhn – Tucker conditions.

Unit – II

Linear programming-I: Formulation of linear programming models, graphical method, simplex method, application of Linear programming in water resources.

Unit – III

Linear programming -II: Revised simplex method duality in linear programming, sensitivity and post optimality analysis

Unit – IV

Dynamics programming: Belman's principles of optimality forward and backward recursive dynamic programming, curse of dimensionality, Applications of dynamic programming for resource allocation

Unit –V

Water Resources Economics: Basics of Engineering economics, Discount factors, Uniform annual series, Amortization, Comparison of alternate Plans Principles of Economics analysis, Conditions of project

optimality, benefit cost analysis socio economic intuitional and pricing of water resources.

Text Books

1. Water resource System Analysis, Vedula & Mujumdar, Tata Mc Craw Hill Company Ltd.
2. Water Resources Economics – James & Lee. Oxford publishers 2005

References:

1. Operational Research by Taha, Printice Hall of India publishers.
2. Water Resources project Economic by Kuiper. E.
3. Engineering g optimization: Theory and Practice, Rao, Singiresu S.

Course Outcomes:

1. Explain the fundamentals of economic theory as applied to water resources.
2. Conduct optimization and simulation modeling.
3. Conduct model-based analysis of integrated water resource

(A2136) WATER SHED MANAGEMENT
(Professional Elective-III)

B.Tech (CE) -VII Semester

L	T	P	C
3	1	0	3

Course Objectives:

1. Introduce the concept of watershed management and Understand the watershed characteristics
2. To learn the principles of soil erosion, measures to control erosion and various water harvesting techniques.
3. Learn land management practices for various land use/land cover.
4. Introduce concepts of watershed modeling.

Unit I

Introduction: Concept of watershed development, objectives of watershed development, need for watershed development in India, Integrated and multi-disciplinary approach for watershed management.

Characteristics of Watershed: Size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds.

Unit II

Principles of Erosion: Types of erosion, factors affecting erosion, effects of erosion on land fertility and land capability, estimation of soil loss due to erosion, Universal soil loss equation. MEASURES TO CONTROL EROSION: Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, rockfill dams, brushwood dam, Gabion.

Unit III

Planning of Watershed Management Activities: peoples participation, preparation of action plan, administrative requirements. WATER HARVESTING: Rainwater Harvesting, catchment harvesting, harvesting structures, soil moisture conservation, check dams, artificial recharge, farm ponds, percolation tanks.

Unit IV

Land Management: Land use and Land capability classification, management of forest, agricultural, grassland and wild land. Reclamation of saline and alkaline soils.

Unit V

Ecosystem Management: Role of Ecosystem, crop husbandry, soil enrichment, Inter, mixed and strip cropping, cropping pattern, sustainable agriculture, bio-mass management, dry land agriculture, Silvi pasture, horticulture, social forestry and afforestation.

Text Books

1. Watershed Management' by Das MM and M.D Saikia, PHI Learning Pvt. Ltd, 2013.
2. Land and Water Management' by Murthy.VVN, Kalyani Publications, 2007.
3. Watershed Management' by Murthy J V S, New Age International Publishers, 2006.

Reference books:

1. Land and Water Management by VVN Murthy, - Kalyani Publications. 2. Irrigation and Water Management by D.K. Majumdar, Printice Hall of India

Course Outcomes:

1. Calculate watershed parameters and analyze watershed characteristics to take appropriate management action.
2. Explain soil erosion and design control measures.
3. Explain land grading techniques in land management and harvesting techniques using watershed management.
4. Explain appropriate models for watershed management.

(A2137)ADVANCED STRUCTURAL ANALYSIS
(Professional Elective-IV)

B.Tech (CE) -VII Semester

L	T	P	C
3	1	0	3

Course Objective

- To develop an understanding of theory and application of the various advanced methods of structural analysis.
- To understand the analytical procedure related to the analysis of building frame by some classical methods viz. Kani's methods and approximate methods of analysis.
- To understand matrix method and its application for computer based analysis of structure.
- To develop the skill to deals with the problems of moving loads in the structures and their analysis techniques.

Unit - I

Moment Distribution Method - Analysis of single Bay Single Story Portal Frames including side sway. Analysis of inclined frames

Kani's Method: Analysis of continuous beams including settlement of supports. Analysis of single bay single storey by Kani's Method including Side sway. Shear force and bending moment diagrams. Elastic curve.

Unit - II

Slope Deflection Method: Analysis of single Bay - Single storey Portal Frames by Slope Deflection Method Including Side Sway. Shear force and bending moment diagrams. Elastic curve.

Two Hinged Arches: Introduction - Classification of Two hinged Arches - Analysis of Two Hinged Parabolic arches - Secondary stresses in two hinged arches due to temperature and elastic shortening of rib.

Unit – III

Approximate Methods of Analysis: Introduction - Analysis of multi-storey frames for lateral loads: Portal Method, Cantilever method and Factor method. Analysis of multi- storey frames for gravity (vertical) loads. Substitute Frame method. Two Cycle Moment Distribution method for approximate analysis of vertical loads- Analysis of Mill bents.

Unit – IV

Matrix Methods of Analysis (*System Approach*): Introduction - Static and Kinematic Indeterminacy - Analysis of continuous beams including settlement of supports up to three degrees of indeterminacy using stiffness method. Analysis of pin-jointed determinate plane frames using stiffness method - Analysis of single bay single storey frames including side sway, using stiffness method. Analysis of continuous beams upto three degree of indeterminacy using flexible method. Shear force and bending moment diagrams. Elastic curve.

Unit - V

Influence Lines for Indeterminate Beams: Introduction - ILD for two span continuous beam with constant and variable moments of inertia. ILD for propped cantilever beams.

Indeterminate Trusses: Determination of static and kinematic indeterminacies - Analysis of trusses having single and two degree of internal and external indeterminacies - Castigliano's second theorem.

Text books:

1. Structural Analysis Vol - I and II by Pundit and Gupta., Tata McGrew Hill Publishers.
2. Indeterminate Structural Analysis by K.U. Muthu et al., I.K. International Publishing House Pvt. Ltd.
3. Advanced Structural Analysis by A.K. Jain, Nem Chand Bros.

References:

1. Matrix Analysis of Structures by Singh, Cengage Learning Pvt.Ltd.
2. Structural Analysis by Hibbeler, Pearson Publishing House.
3. Matrix Analysis of Structures by Pundit and Gupta. Tata McGraw Hill Publishers.
4. Structural Analysis Vol - I & II by Vizarani and Ratwani, Khanna Publishers.

Course Outcomes

1. Explain fundamental concept and methods of structural analysis.
2. Calculate rotations and displacements, in building frames subjected to vertical and lateral loadings.
3. Generate mathematical expressions involving all possible structural actions.
4. Analyze building framing system and its components under the action of gravity and lateral loads.

5. Identify, formulate and solve engineering problems and to effectively use and apply the computer friendly structural analysis techniques viz. stiffness and flexibility methods to the field problems.
6. Solve the problems of moving loads in the structures.

(A2138) FINITE ELEMENT METHOD
(Professional Elective-IV)

B.Tech (CE) -VII Semester

L	T	P	C
3	1	0	3

Course Objectives:

- To study the concept of FEM
- To study the strain –displacement and linear constitutive relation
- To understand the numerical techniques applied in FEM
- To Establish element stiffness and load vector
- To study about the 2-D isoparametric concepts
- To analyze the 2-D frame elements using FEM techniques
- To apply FEM for analysing plates and shells

Unit – I

Introduction to Finite Element Method – Basic steps involved in Finite element methods- Advantages and Disadvantages of FEM, Finite Difference Method- Rayleigh Ritz Method and application to solve simple bar elements and single span beams - Force and Displacement boundary Conditions, Natural boundary conditions, Essential and Non essential boundary conditions- Initial value problem- Boundary value problem – Body Force and Surface tractions (forces) - Basic Equations in Elasticity – stress strain equations – Generalized Hooke's law- concept of plane stress – plane strain – advantages and disadvantages of FEM. Element shapes – nodes – nodal degree of freedom – strain displacement relations.

Unit – II

Local and Global coordinate system- Natural Coordinates- Simple Natural Coordinates- Area and Volume coordinates, Convergence and Compatibility Conditions for Shape functions, Geometric Invariance- Pascal Triangle- Shape functions- Transformation of coordinate system- Strain displacement matrix- generation of element stiffness matrix - Lumped and Consistent load vector- Application of boundary conditions Finite Element Analysis (FEA) of – one dimensional problems – Bar element – Shape functions- stiffness matrix.

FEA Beam elements – stress strain relation – shape functions- stiffness matrix – continuous beams up to 2(two) spans.

Unit - III

FEA of Two dimensional problem – CST &LST and 4 noded quadrilateral element – shape functions- Lagrangian & Serendipity elements – Hermite polynomials- Lagrange Polynomials –stress strain relationship- Element Degenaration- Static Condensation

Unit – IV

Isoparametric formulation – Concepts of isoparametric elements for 2D analysis – formulation of CST element, 4-noded and 8-nodediso-parametric quadrilateral elements- Jacobi matrix

Unit – V

Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

Text books:

1. Introduction to Finite elements in engineering by Chandrupatla, Belegundu, Prentice Hall.
2. Finite element method by Daryl L.Logan, CENGAGE Learning.

References:

1. Finite element analysis by S.S. Bhavikatti – New age International publishers.
2. Finite element analysis by P. Seshu, PHI.

Course Outcomes:

On completion of the course, the students will be able to:

1. Demonstrate the differential equilibrium equations and their relationship
2. Apply numerical methods to FEM
3. Develop the displacement models and load vectors
4. Compute the stiffness matrix for isoperimetric elements
5. Analyze plane stress and plane strain problems

(A2139) EARTHQUAKE ENGINEERING
(Professional Elective-IV)

B.Tech (CE) -VII Semester

L	T	P	C
3	1	0	3

Course Objectives:
The students will come to know regarding these topics

- Plate tectonic theory, seismic waves and earthquake measurements instruments
- Earthquake resistant design of buildings
- Determine the horizontal seismic coefficient, design seismic base shear and distribution of design force.
- Seismic methods of analysis and design
- Structural walls and non structural elements.
- Ductility considerations in earthquake resistant design

Unit-I
Engineering Seismology: Earthquake phenomenon cause of earthquakes-Faults-Plate tectonics –Seismic waves-Terms associated with earthquakes-Magnitude/Intensity of an earthquake-scales-Energy released –Earthquake measuring instruments- Seismograph, accelerograph-strong ground motions- Seismic Zones of India.
Theory of Vibrations: Elements of vibratory systems-Degrees of Freedom-Continuous system- Lumped mass idealization –Oscillatory motion-Simple Harmonic Motion- Free vibration of single degree of freedom (SDOF) system –undamped and damped –critical damping-Logarithmic decrement-Forced vibrations-Harmonic excitation-Dynamic magnification factor-Excitation by rigid based translation for SDOF system-Earthquake ground motion.

Unit-II
Conceptual Design: Introduction- Functional planning-Continuous load path- Overall form-simplicity and strength-Horizontal and Vertical members-Twisting of building-Ductility- definition- ductility relationships-flexible buildings-framing systems-choice of construction materials-Unconfined concrete-confined concrete-masonry-reinforcing steel.
Introduction to earthquake resistant design: Seismic design requirements- regular and irregular configurations-basic assumptions-design earthquake loads-basic load combinations- permissible stresses-

seismic methods of analysis-factors in seismic analysis-equivalent lateral force method.

Unit-III

Reinforced Concrete Buildings: Principles of earthquake resistant design of RC members-Structural models of frame buildings-Seismic methods of analysis- Seismic design methods- IS code based methods for seismic design-Seismic evaluation and retrofitting-Vertical irregularities-Plan configuration problems –lateral load resisting systems-Determination of design lateral forces –Equivalent lateral force procedure-Lateral distribution of base shear.

Unit-IV

Masonry Buildings: Introduction-Elastic properties of masonry assemblage-Categories of masonry buildings-Behaviour of unreinforced and reinforced masonry walls- Behaviour of walls-Box action and bands – Behaviour of infill walls-Improving seismic behaviour of masonry buildings-Load combinations and permissible stresses-Seismic design requirements –Lateral load analysis of masonry buildings.

Unit-V

Structural Walls and Non- Structural walls- sectional walls- sectional shapes-variations in elevation-cantilever walls without openings- failure mechanism of non- structures- Effects of non-structural elements on structural systems-Analysis of non-structural elements-Prevention of non-structural damage- Isolation of non- structures. Ductility Considerations in Earthquake Resistant design of RC buildings: Introduction –Impact of Ductility-Requirements for Ductility-Assessment of Ductility-Factors affecting Ductility- Ductile detailing considerations as per IS 13920. Behavior of beams, columns and joints in RC buildings during earthquakes- Vulnerability of open ground storey and columns during earthquakes.

Text books:

1. Earthquake Resistant Design of Structures- S.K. Duggal. Oxford University Press.
2. Earthquake Resistant Design of Structures- Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd.

References:

1. Sesmic Design of Reinforced Concrete and Masonry Bilding- T. Paulay and M.J.N. Priestly,John Wiley &Sons.
2. Earthquake Resistant Design of Building structures by Vinod Hosur, Wiley India Pvt.Ltd.
3. Elements of Mechanical Vibration by R.N. Iyengar, I.K. International Publishing House Pvt. Ltd
4. Masonry and Timber structures including earthquake Resistant Design –Anand S. Arya, Nemchand & Bros.
5. Earthquake Tips- Learning Earthquake Design and Construction. C.V.R. Murthy.

Course Outcomes:

1. Evaluate seismic forces for various structures as per relevant Indian standards ·
2. Design and detail of structures for seismic resistance as per Indian Standards ·
3. Apply concepts of repair and rehabilitation of earthquake affected structures.

(A2142) ENVIRONMENTAL ENGINEERING – II
(Professional Elective-V)

B.Tech (CE) -VII Semester

L	T	P	C
3	1	0	3

Course Objectives:

- Outline planning and the design of wastewater collection, conveyance and treatment systems for a community/town/city.
- Provide knowledge of characterisation of wastewater generated in a community.
- Impart understanding of treatment of sewage and the need for its treatment.
- Summarize the appurtenance in sewerage systems and their necessity.
- Teach planning, and design of septic tank and imhoff tank and the disposal of the effluent from these low cost treatment systems.

Unit – I

Introduction to sanitation – systems of sanitation – relative merits & demerits – collection and conveyance of waste water – sewerage – classification of sewerage systems- Estimation of sewage flow and storm water drainage – fluctuations – types of sewers - Hydraulics of sewers and storm drains– design of sewers – appurtenances in sewerage – cleaning and ventilation of sewers.

Unit – II

Pumping of wastewater: Pumping stations – location – components– types of pumps and their suitability with regard to wastewater.

House Plumbing: systems of plumbing-sanitary fittings and other accessories–one pipe and two pipe systems – Design of building drainage.

Unit – III

Sewage characteristics – Sampling and analysis of wastewater - Physical, Chemical and Biological Examination-Measurement of BOD and COD - BOD equations.

Treatment of sewage: Primary treatment-Screens-grit chambers-grease traps–floatation– sedimentation – design of preliminary and primary treatment units.

Unit – IV

Secondary treatment: Aerobic and anaerobic treatment process-comparison.

Suspended growth process: Activated Sludge Process, principles, designs, and operational problems, modifications of Activated Sludge Processes, Oxidation ponds, Aerated Lagoons.

Attached Growth Process: Trickling Filters–mechanism of impurities removal- classification–design-operation and maintenance problems. RBCs, Fluidized bed reactors.

Unit V

Miscellaneous Treatment Methods: Nitrification and Denitrification – Removal of Phosphates –UASB–Membrane reactors-Integrated fixed film reactors. Anaerobic Processes: Septic Tanks and Imhoff tanks- working Principles and Design–disposal of septic tank effluent.

Text Books

1. Wastewater Engineering Treatment and Reuse by Metcalf & Eddy, Tata McGraw-Hill edition.
2. Elements of Environmental Engineering by K.N. Duggal, S. Chand & Company Ltd. New Delhi, 2012.
3. Environmental Engineering by Howard S. Peavy, Donald R. Rowe, Teorge George Tchobanoglus – Mc-Graw-Hill Book Company, New Delhi, 1985.
4. Wastewater Treatment for Pollution Control and Reuse, by Soli. J Arceivala, Sham R Asolekar, Mc-GrawHill, New Delhi; 3rd Edition.

References

1. Environmental Engineering –II: Sewage disposal and Air Pollution Engineering, by Garg, S.K.; Khanna Publishers.
2. Sewage treatment and disposal by Dr. P.N. Modi & Sethi.
3. Environmental Engineering, by Ruth F. Weiner and Robin Matthews – 4th Edition Elsevier, 2003.
4. Environmental Engineering by D. Srinivasan, PHI Learning Private Limited, New Delhi, 2011.

Course Outcomes:

1. Plan and design the sewerage systems
2. Design the appropriate appurtenances in the sewerage systems
3. Plan suitable treatment flow for sewage treatment
4. Identify the critical point of pollution in a river for a specific amount of pollutant disposal into the river

(A2147) ADVANCED FOUNDATION ENGINEERING
(Professional Elective-V)

B.Tech (CE) -VII Semester

L	T	P	C
3	1	0	3

Unit - I

Introduction - Bearing capacity of Footings subjected to Eccentric and inclined loading - Meyerhoff's, Hansen's, Vesic theories - Foundations on layered soils - Elastic settlement of Footings embedded in sands and clays of infinite thickness, Footings on soils of Finite thickness, Schmertamaunn's method, Janbu method

Unit - II

Pile Foundation - Pile groups - settlement of pile groups resting in sands and clays - negative skin friction - under reamed piles - laterally loaded piles - ultimate lateral capacity - Broms Method - Reese and Matlock Approach.

Unit – III

Lateral earth pressures theories - Rankine's and coulomb's theories - Graphical Methods, Culmann's, Trial Wedge methods - Stability checks of cantilever and gravity retaining walls. Reinforced earth retaining walls.

Unit - IV

Cantilever and anchored sheet piles - earth pressure diagram - determination of depth of embedment in sands and clays - braced cuts - earth pressure diagrams - forces in struts.

Unit -V

Foundations in Expansive Soils - problems in expansive soils - mechanism of swelling - swell pressure and swelling potential - heave - foundation practices - sand cushion - CNS technique - under - reamed pile foundations - granular pile anchor technique, stabilization of expansive soils.

Text books:

1. Das, B.M./., - 1999 Principles of Foundation Engineering - 4th edition PWS Publishing , Singapore.
2. Bowles, J.E., - 1988 Foundation Analysis and Design - 4th edition, McGrew - Hill International.
3. Soil Mechanics and Foundation Engineering by V N S Murthy , CBS Publishers and Distributors.

References:

1. Geotechnical Engineering Principles and Practices by Cuduto, PHI International.
2. Geotechnical Engineering by C. Venkataramah, New age International Pvt. Ltd., Publishers 2002.
3. Analysis and design of structuctures - Swami Saran, Oxford & IBH Publishing Company Pvt. Ltd.

Course Outcomes

1. Determine allowable bearing pressures and load carrying capabilities of different foundation systems.
2. Recognize the behavior of soils in foundation and behind retaining structures.
3. Determine the single and group pile capacity and estimate the settlements
4. Estimate the lateral loads on retaining structures and foundation walls.

(A2148) GROUND IMPROVEMENT TECHNIQUES
(Professional Elective - V)

B.Tech (CE) -VII Semester

L	T	P	C
3	1	0	3

Course Objectives

1. Learning of various ground improvement techniques and surface and sub-surface compaction techniques.
2. Learning of preloading and dewatering techniques.
3. Stabilization of soil by physical and chemical admixtures.
4. Learning of geosynthetics functions and design of reinforced soil structures.

Unit-I

Introduction to Ground Improvement Modification: Need and objectives, Identification of soil types, In situ and laboratory tests to characterize problematic soils, Mechanical, Hydraulic, Physico-chemical, Electrical, Thermal methods and their applications.

Unit-II

Mechanical Modification: Deep compaction Techniques- Blasting Vibrocompaction, Dynamic Tamping and compaction piles

Unit-III

Hydraulic Modification- Objectives and techniques, traditional dewatering methods and their choice, Design of dewatering system, Electro-osmosis, Electro-Kinetic dewatering, Filtration, Drainage and seepage control with Geo synthetics, preloading and vertical drains

Unit-IV

Physical and Chemical Modification- Modification by admixtures, Shotcreating and Guinting Technology, Modification at depth by grouting, Crack Grouting and compaction grouting ,Jet grouting, Thermal modification, Ground freezing.

Unit-V

Modification by inclusions and confinement: Soil reinforcement, reinforcement wit strip, and grid reinforced soil. In-situ ground reinforcement ground anchors, rock bolting and soil nailing.

Textbooks:

1. Hausmann. M.R. (1990) – Engineering Principles of Ground Modifications, McGraw Hill publications.

References:

1. Koerner. R.M (1994)- Designing with Geosynthesis –Prentice Hall New Jersey
2. Jones C.J.F.P (1985)- Earth Reinforcement and Soil structures – Butterworths, London
3. Xianthakos, Abreimson and Bruce- Ground control and Improvement
4. Mosley- Ground Improvement

Course Outcomes:

1. Explain principles, applications, and design procedures for various ground improvement techniques and piling methods.
2. To assess the effectiveness of a ground improvement technique, and the performance of piled foundations and structures using analytical/theoretical/ numerical calculations.
3. Evaluate alternative solutions and the effectiveness before, during and after using ground improvement techniques
4. Apply techniques in ground improvement.

(A2140)TRANSPORTATION ENGINEERING-II

B.Tech (CE) -VII Semester

L	T	P	C
3	1	0	3

Course Objectives:

- To Study about the basics and design of various components of railway engineering and types and functions of track, junctions and railway stations.
- To study about the aircraft characteristics, planning and components of airport and types and components of docks and harbors.
- To know about various urban transportation systems and Intelligent Transportation Systems.

Unit – I

Introduction To Railway Engineering: Permanent way components – Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast, Gauge — Creep of Rails- Theories related to creep – Sleeper density.

Unit – II

Geometric Design Of Railway Track: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – Points and Crossings , Rail Joints, Railway Stations & Yards, Signalizing & Interlocking.

Unit – III

Airport engineering: Airport Site selection- Runway Orientation- Basic Runway Length – Corrections for Elevation, Temperature – Air Port Classification- Runway Geometric design- Factors Controlling Taxiway Layout – Terminal Area- Apron – Hanger – Blast Considerations, Typical Airport Layouts- Windrose Diagram- Runway Lightening system & Marking.

Unit- IV

Port and Harbour Engineering: Requirements of Port and Harbour, Classifications of Port & Harbour, Features of a Harbour, Planning of Harbour, Breakwater, Dry docks, Jetties, Aprons, Transit shed and warehouses, Navigational aids, Maintenance of Port and Harbours, Inland water Transport.

Unit- V

Intelligent Transport Systems: ITS Definitions, Benefits of ITS, user services, Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Introduction to ITS applications; Advanced Traffic Management Systems (ATIMS), Advanced Public Transportation System (APTS), ITS architecture components and standards, Over view of ITS implementations in developed countries.

Text books:

1. Railway Engineering – A text book of Transportation Engineering – S.P. Chadula – S. Chand & Co. Ltd. – (2001).
2. Highway Engineering Design – L.R. Kadiyali and Lal- Khanna Publications.
3. Airport Planning and Design- S.K. Khanna and Arora, Nemchand Bros.
4. Transportation Engineering and Planning – C.S. Papacostas, P.D. Prevedours.

References:

1. Railway Engineering – August – Prabha& Co., 15th Edition – 1994.
2. Air Transportation Planning & design – Virendhra Kumar &StatishChandhra – Gal Gotia Publishers (1999).
3. Harbour, Dock and Tunnel Engineering – R. Srinivasan.
4. Dock and Harbour Engineering – Hasmukh P Oza, Gutam H Oza.

Course outcomes:

1. Explain the basics of railway engineering & components of railway track and its geometric design.
2. Explain basic requirement for Airport.
3. Explain the basic requirements and components of harbor and docks
4. Describe the range of technologies involved in the Transportation

(A2141) ESTIMATION & COSTING

B.Tech (CE) -VII Semester

L	T	P	C
3	1	0	3

Course Objectives:

- To prepare the detailed and abstract estimation of buildings using long wall short wall method and centre line method.
- To prepare the detailed and abstract estimation of earthwork for roads and canals.
- To calculate the rate analysis for different items of work in civil constructions.
- To prepare the bar bending schedules of reinforcement.
- To know the different types of contracts, contract documents and condition of contract.
- To prepare the bid analysis for a given sub trade and calculate the valuation of building.

Unit – I

General items of work in Building – Standard Unit Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating. Detailed Estimates of Buildings.

Unit – II

Earthwork for roads and canals.

Unit – III

Rate Analysis – Working out data for various items of work over head and contingent charges.

Unit – IV

Reinforcement bar bending and bar requirement schedules, Contracts, Types of contracts, Contract Documents, Conditions of Contract.

Unit – V

Valuation of buildings. Standard specifications for different items of building construction.

Text Books

1. Estimating and Costing by B.N. Dutta, UBBS Publishers, 2000.
2. Estimating and Costing by G.S. Birdie.

References

2. Standard Schedule of rates and standard data book by public works department.
3. I.S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering work – B.I.S)
4. Estimation, Costing and Specifications by M. Chakraborthi; Laxmi publications.
5. National Building Code.

Course outcomes:

1. Explain various types of estimates work stages and specification.
2. Estimate working out quantities for activities in roads and canals and schedules preparation.
3. Calculate rate analysis for various items of works in civil construction.
4. Explain types of contracts, tenders and to prepare valuation of buildings.

(A2241) RENEWABLE ENERGY SOURCES
(Open Elective-I: Offered by EEE Department)

B.Tech (CE): VII Semester

L	T	P	C
3	0	0	3

Course Objectives

- It introduces solar energy its radiation, collection, storage and application.
- It also introduces the Wind energy, Biomass energy, Geothermal energy and Ocean energy as alternative energy sources.

Unit – I: Solar Energy

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

Solar energy collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

Storage and applications: Different methods, Sensible, latent heat and stratified storage, solar ponds. Solar Applications- solar heating/cooling technique, solar distillation and drying, photovoltaic energy conversion.

Unit-II: Wind energy

Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Betz criteria

Unit-III: Bio-mass

Principles of Bio-Conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C. Engine operation and economic aspects.

Unit-IV: Geothermal energy

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

Ocean energy: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants, and their economics.

Unit-V: Direct energy conversion
Need for DEC, Carnot cycle, limitations, principles of DEC.

Text Books
1. Non-Conventional Energy Sources /G.D. Rai
2. Renewable Energy Technologies /Ramesh & Kumar /Narosa

Reference Books
1. Renewable energy resources/ Tiwari and Ghosal / Narosa.
2. Non-Conventional Energy / Ashok V Desai /Wiley Eastern.
3. Non-Conventional Energy Systems / K Mittal /Wheeler
4. Solar Energy /Sukhame

Course Outcomes
1. Interpret the principles of solar radiation, collection and application.
2. Explain the concepts of Wind energy generation
3. Demonstrate the concepts of Bio-mass energy and operation of IC engines
4. Illustrate the perception of Geo-thermal energy and production in India
5. Elucidate the ideology of direct energy conversion

(A2362) MATERIAL SCIENCE
(Open Elective-I: Offered by ME Department)

B.Tech (CE): VII Semester

L	T	P	C
3	0	0	3

Course Objectives:
Selection of materials to suit for particular application play a major role in engineering and technology. Understanding the behavior of materials, particularly structure-property relation, will help selecting suitable materials for a particular application.

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

Unit -II
Constitution of Alloys: Necessity of alloying, types of solid solutions, Hume Rothery rules, intermediate alloy phases, and electron compounds.

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

Unit – IV
Non-ferrous Metals and Alloys: Structure and properties of copper and its alloys, Aluminum and its alloys, Titanium and its alloys.

Unit – V
Ceramic materials: Crystalline ceramics, glasses, cermets, abrasive materials, nano materials – definition, properties and applications of the above.
Composite materials: Classification of composites, various methods of component manufacture of composites, particle – reinforced materials, fiber reinforced materials, metal ceramic mixtures, metal – matrix composites and C – C composites.

Text books:

1. Introduction to Physical Metallurgy / Sidney H. Avener.
2. Material science & Metallurgy / Kodgire

Reference books:

1. Science of Engineering Materials / Agarwal
2. Materials Science / Vijendra Singh
3. Elements of Material science / V. Raghavan
4. An introduction to material science / W.g.vinas & HL Mancini
5. Material science & material / C.D. Yesudian & Harris Samuel
6. Engineering Materials and Their Applications – R. A Flinn and P K Trojan / Jaico Books.

Course outcomes: On completion of this course, a student shall be able to

1. Select the materials suitable for engineering applications
2. Assess the properties of materials upon knowing the structure of the material
3. Synthesize the material to suit for required properties.

(A2452) PRINCIPLES OF ELECTRONIC COMMUNICATIONS
(Open Elective-I: Offered by ECE Department)

B.Tech (CE) VII-Semester

L	T	P	C
3	0	0	3

Course Objectives:

- To study the concept of analog communication systems.
- To study about different digital modulation techniques such as PCM, DM and various shift keying techniques.
- To study the concepts of different digital modulation techniques
- To study about different error detecting and error correcting codes like block codes, cyclic codes and convolution codes

Unit I: Basics of Communication System

Introduction

Block diagram of Communication system, Radio communication: Types of communications, Analog, Pulse, and Digital, Types of Signals, Fourier Transform for various signals, Fourier Spectrum, Power spectral density, Correlation, Convolution, Time Division Multiplexing, Frequency Division Multiplexing.

Unit II:

Amplitude Modulation: Need for modulation, Types of Amplitude modulation: AM, DSBSC, SSBSC, Power and BW requirements, Generation of AM, DSBSC, SSBSC, Demodulation of AM: Diode detector, Coherent detection of DSBSC& SSBSC.

Unit III:

Angle Modulation

Frequency & Phase Modulation, Advantages of FM over AM, Bandwidth consideration, Narrow band FM, Wide band FM, Comparison of FM and PM.

Pulse Modulation Sampling, Sampling Theorem for Band limited signals, Types of Pulse modulation : PAM, PWM, PPM,

Generation and demodulation of PAM, PWM, PPM.

Unit IV:

Digital communication

Advantage, Block diagram of PCM, Quantization error, DPCM, Adaptive DPCM, DM and Comparison.

Digital Modulation: ASK, FSK, PSK, DPSK, QPSK, coherent and Non-coherent reception.

Unit V:

Information Theory: Concept of Information, Rate of Information and entropy, Source coding for optimum rate of information, Coding efficiency, Shannon Fano coding, Huffman Coding.

Error Control Coding: Introduction, Error detection and Correction codes, Block codes, Convolution codes.

Textbooks:

1. Communication Systems Analog and Digital–R. P. Singh, SD Sapre, TMH, 20th reprint, 2004.
2. Principles of Communication Systems – H Taub& D. Schilling, Gautam Sahe, TMH, 3rd Edition, 2007.
3. Communication Systems – B.P. Lathi, BS Publication, 2004.

References:

1. Analog and Digital Communication – K. Sam Shanmugam, Willey, 2005.
2. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
3. Digital Communications- John G. Proakis, Masoud Salehi- 5th Edition, Mcgarw- Hill,2008.

Course Outcomes:

At the end of the course, the student will be able to:

1. Explain the baseband signal & systems.
2. Differentiate between AM and FM transmission and Reception.
3. Describe basic concepts of digital communication systems.
4. Explain basic concepts of different digital modulation techniques.
5. List different error detecting and error correcting codes.

(A2509) JAVA PROGRAMMING
(Open Elective-I: Offered by CSE Department)

B.Tech (CE) VII-Semester

L	T	P	C
3	0	0	3

Objectives: The Students will learn the following

- To understand object oriented programming concepts and applications in problem solving
- Learn the Java programming language: its syntax, idioms, patterns, and styles.
- To learn the basics of Java console and GUI based programs
- Introduce event driven Graphical User Interface (GUI) programming

Unit- I:

Java Programming: History of Java, Comments, Data Types, Variables, Constants, Scope and Life Time of Variables, Operators, Hierarchy Expressions, Type Conversions and Casting, Enumerated Types, Control for Block Scope, Conditional Statements, Loops, Break and Continue Statements, Simple Java Standalone Programs, Arrays, Console Input and Output, Formatting Output, Constructors, Methods, Parameter Passing, Static Fields and Methods, Access Controls, This Reference, Overloading Methods and Constructors, Recursions, Garbage Collections, Building Strings, Exploring Strings Class.

Unit -II:

Inheritance: Inheritance Hierarchies Super And Sub Classes, Member Access Rules, Super Keyword, And Preventing Inheritance: Final Classes And Methods, The Object Class and Its Methods.

Polymorphism: Dynamic Binding, Method Overloading, Abstract Classes and Methods.

Interface: Interface vs. Abstract Classes, Defining an Interface, Implementing Interfaces, Accessing Implementations Through Interfaces References, Extending Interface.

Inner Classes: Use 0f Inner Classes, Local Inner Classes, Anonymous Inner Classes, Static Inner Classes, Example.

Packages: Defining, Creating and Accessing a Package, Understanding Class path, Importing Packages

Unit -III:

Exception Handling: Dealing With Errors, Benefits of Exception Handling, The Classification of Exceptions, Exception Hierarchy, Checked Exceptions And Unchecked Exception, Usage of Try , Catch, Throw, Throws, and Finally, Re-Throwing Exceptions, Exception Specification, Built in Exceptions, Creating Own Exception Sub Classes.

Multithreading: Difference Between Multiple Processes and Multiple Threads, Thread States, Creating Threads, Interrupting Threads, Thread Priorities, Synchronizing Threads, Inter-Thread Communication, Producer Consumer Problem.

Unit -IV:

Collection Framework in Java: Introduction to Java Collections, Overview of Java Collection Frame Work, Generics, Commonly used Collection Classes-Array List, Vector, Hash Table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, Calendar and Properties.

Files: Streams-Byte Streams, Character Streams, Text Input /Output , Binary Input /Output, Random Access File Operations, File Management using File Class.

Connecting to Database: JDBC Type I To IV Drivers, Connecting to a Database, Querying a Database and Processing The Results, Updating Data With JDBC.

Unit -V:

GUI Programming with Java: The AWT Class Hierarchy, Introduction to Swing, Swing vs. AWT, Hierarchy for Swing Components, Containers-JFrame, JApplet, JDialog, JPanel, Overview of Some Swing Components, JButton, JLabel, JTextfield, JTextarea, Simple Swing Applications, Layout Management- Layout Manager Types- Border Grid and Flow.

Event Handling: Events, Event Sources, Event Classes, Event Listeners, Relationship Between Event Sources and Listeners, Delegation Event Model, Examples: Handling a Button Click, Handling Mouse Events, Adapter Classes.

Applets: Inheritance Hierarchy for Applets, Differences Between Applets and Applications, Life Cycle of an Applet, Passing Parameters to Applets, Applet Security Issues.

Textbooks:

1. Java Fundamentals: A Comprehensive Introduction, Herbert Schildt and Dale Skrien, TMH.

References:

1. Java for Programming, P.J. Dietel Pearson Education

2. Object Oriented Programming through Java, P.Radha Krishna, and Universities Press.
3. Thinking in Java, Bruce Eckel, Pearson Education
4. Programming in Java, S. Malhotra and S. Choudhary, Oxford University Press

Course Outcomes:

Upon the completion of the course, the student will be able:

1. Explain OOPs concepts and basics of java programming (Console and GUI Based)
2. Apply OOPs and java Programming in problem solving.
3. Develop of JAVA applets vs. JAVA applications.
4. Realize the use of various system libraries.

(A2143) AUTO CAD & STAAD PRO

B.Tech (CE) -VII Semester

L	T	P	C
0	0	3	2

Course Objectives:

Understand the concept and techniques to draw.

- Create multiple designs using several of tools and Create layers to control the objects' visibility.
- Explain drawing using annotations and Plot or print the drawing by scale.
- To use constraint for certain design

AUTO CAD

1. Starting a new drawing, drawing tools, commands and settings- Drawing basic shapes.
2. Drawing of plans of buildings, single storey, multi storied
3. Development of section, elevations of buildings using plans.
4. Door, windows, roof trusses.
5. Details of Dog-legged stair case

STAAD PRO

1. Introduction to the software-Tools, Menus, Editor
2. Modeling of 2D&3D framed structures-RCC
3. Defining& assigning member properties and loads
4. Result analysis and design of beams, column and footings
5. Modeling of steel truss-Member properties and wind loads
6. Analysis and design of truss members

Text Book:

1. Computer Aided Design Lab Manual by Dr. M. N. SeshaPrakash and Dr. C.S .Suresh

References:

1. Text book of Engineering Drawing with auto-CAD, K. VenkataReddy /B.S . Publications.

Course outcomes

On completion of the course, the student will be able to

1. Design and draw, single and multistoried building plans.
2. Develop sections and elevations for plans.
3. Detail individual components of a building viz., doors, windows, staircases etc
4. Model load analysis and design RCC structures
5. Model load analysis and design steel structures

(A2144) ENVIRONMENTAL ENGINEERING LAB

B.Tech (CE) -VII Semester

L	T	P	C
0	0	3	2

Course Objective

1. To learn the handling of different equipments related to water and wastewater analysis
2. To learn about the preparations of stock and standard solutions, their handling, storage, etc.
3. To understand the different experiments involved in water and wastewater analysis.
4. To learn more about the titration techniques of chemical analysis
5. To develop skills related to report writing.

LIST OF EXPERIMENTS:

1. Determination of pH and Turbidity.
2. Determination of Conductivity and Total dissolved solids (Organic and Inorganic)
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides.
5. Determination of iron.
6. Determination of Dissolved Oxygen.
7. Determination of Nitrates.
8. Determination of Optimum dose of coagulant.
9. Determination of Chlorine demand.
10. Determination of total Phosphorous.
11. Determination of B.O.D
12. Determination of C.O.D
13. Presumptive Coliform test.

References:

1. Environmental Engineering Lab Manual – Dr. B. Kottaiah & N. Kumaraswamy (Charotar Publications)
2. Water supply Engineering – S. K Garg (Khanna Publications)

Course Outcomes:

1. Determine the method of calibration of pH of solution(water)
2. Determine the method of turbidity, Alkalinity/Acidity, Chlorides tests in solution.
3. Determine total solids, organic solids and inorganic solids.
4. Determine iron, Dissolved Oxygen, Nitrogen, Phosphorous, B.O.D, C.O.D, Optimum coagulant dose, Chlorine

VIII SEMESTER

(A2022) MANAGEMENT SCIENCE

B.Tech (CE) -VIII Semester

L	T	P	C
4	0	0	4

Course Objectives:
This course is intended to familiarise the students with the framework for the managers and leaders available for understanding and making decisions relating to issues related organisational structure, production operations, marketing, Human resource Management, product management and strategy.

Unit -I
Introduction to Management & Organization: Introduction to Management: Concepts of Management and organization- nature, importance and Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Mayo's Hawthorne Experiments, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

Unit -II
Operations & Marketing Management: Principles and types of plant layout-Methods of Production, Work study Basic procedure involved in method study and Work Measurement-Business process reengineering Statistical Quality Control: control charts for variables and Attributes and Acceptance sampling, Total Quality Management (TQM), Six sigma, Deming's contribution to quality, objectives of inventory control EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records. JIT System, Supply chain management functions of marketing, marketing mix, marketing Strategies based on product life cycle, channels of distribution.

Unit -III
Human Resource Management: Human Resources Management (HRM) : Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs. PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development,

Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job EvaluationandMeritRating.CapabilityMaturityModel,Levels-Performance Management System.

Unit -IV

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

Unit- V

Strategic Management and Contemporary Strategic Issues: Strategic Management : Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Bench Marking and Balance Score Card as contemporary Business Strategies.

Text books:

1. Aryasri: Management Science, McGraw Hill, 2012.
2. Vijay kumar and Apparao Management Science, Cenage, 2012.

References:

1. Kotler Philip & Keller Kevin Lane: Marketing Management, Pearson, 2012
2. Koontz &Weihrich: Essentials of Management, McGraw Hill, 2012.
3. Thomas N.Duening & John M.Ivancevich Management—Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford University Press, 2012.
5. Schermerhorn, Capling, Poole & Wiesner: Management, Wiley, 2012.
6. Parnell: Strategic Management, Cengage 2012.
7. Lawrence R Jauch, R. Gupta & William F.Glueck: Business Policy and Strategic Management, Frank Bros.20

Course Outcomes:

1. Apply management skills and demonstrate leadership qualities in the practical situation.
2. Analyze the statistical data for drawing inference to make decisions

3. Explain the volatility of market.
4. Exhibit higher level of proficiency in understanding the human behavior in different conditions.
5. Solve problems to cope with future uncertain with PERT/CPM.
6. Formulate and implement strategies and understand the importance of being visionary in achieving goals using SWOT analysis.

(A2256) MODERN CONTROL THEORY
(Open Elective-II: offered by EEE Department)

B. Tech. (CE) VIII-Semester

L	T	P	C
3	0	0	3

Unit–I: Mathematical Preliminaries Fields, Vectors and Vector Spaces – Linear combinations and Bases – Linear Transformations and Matrices – Scalar Product and Norms – Eigen-values, Eigen Vectors and a Canonical form representation of Linear operators – The concept of state – State Equations for Dynamic systems – Time invariance and Linearity – Non-uniqueness of state model – State diagrams for Continuous-Time State models.

Unit-II: State Variable Analysis Linear Continuous time models for Physical systems– Existence and Uniqueness of Solutions to Continuous-Time State Equations – Solutions of Linear Time Invariant Continuous-Time State Equations – State transition matrix and its properties. General concept of controllability – General concept of Observability – Controllability tests for Continuous-Time Invariant Systems – Observability tests for Continuous-Time Invariant Systems – Controllability and Observability of State Model in Jordan Canonical form – Controllability and Observability Canonical forms of State model.

Unit-III: Non Linear Systems Introduction – Non Linear Systems - Types of Non-Linearities – Saturation – Dead-Zone - Backlash – Jump Phenomenon etc;– Singular Points – Introduction to Linearization of nonlinear systems, Properties of Non-Linear systems – Describing function–describing function analysis of nonlinear systems – Stability analysis of Non-Linear systems through describing functions. Introduction to phase-plane analysis, Method of Isoclines for Constructing Trajectories, singular points, phase-plane analysis of nonlinear control systems.

Unit-IV: Stability Analysis
Stability in the sense of Lyapunov, Lyapunov‘s stability and Lyapunov‘s instability theorems - Stability Analysis of the Linear continuous time invariant systems by Lyapunov second method – Generation of Lyapunov functions – Variable gradient method – Krasooviski‘s method. State

feedback controller design through Pole Assignment – State observers: Full order and Reduced order.

Unit-V: Optimal Control Introduction to optimal control - Formulation of optimal control problems – calculus of variations – fundamental concepts, functional, variation of functional – fundamental theorem of theorem of Calculus of variations – boundary conditions – constrained minimization – formulation using Hamiltonian method – Linear Quadratic regulator.

Text Books

1. Modern Control System Theory by M. Gopal – New Age International -1984
2. Modern Control Engineering by Ogata.K – Prentice Hall - 1997

Reference Books:

1. Optimal control by Kircks

Course Outcomes

On completion of the course students will be able to

1. Analyze and draw the state diagrams for continuous time state models.
2. Observe the controllability and observability of state models
3. Illustrate the stability analysis of Non-linear systems
4. Determine the stability of Linear Continuous time invariant systems
5. Formulate optimal control problems

(A2363) ELEMENTS OF MECHANICAL ENGINEERING
(Open Elective-II: Offered by ME Department)

B.Tech (CE): VIII Semester

L	T	P	C
3	0	0	3

Course objectives: The content of this course shall provide the student the basic concepts of various mechanical systems and exposes the student to a wide range of equipment and their utility in a practical situation. It shall provide the fundamentals of Steam, I.C. Engines, compressors, manufacturing methods and transmission systems that usually exist in engineering.

Unit –I:

Steam boilers: Classification of boilers, essentialities of boilers, selection of different types of boilers, study of boilers, boiler mountings and accessories. Performance of boilers, working principle of steam turbines.

Unit-II:

Metal joining: Arc welding, resistance welding, gas welding, brazing and soldering Metal forming: forging – operations, rolling and extrusion principles

Machine tools: Lathe classification, specifications, and operations.

Casting: Steps involved in making a casting – Advantages and applications. – Patterns and Pattern making

Unit-III:

Reciprocating and rotary air compressors: uses of compressed air, types, working principle, work done, simple problems.

Refrigeration: concepts, principle of refrigeration and types of refrigeration.

Unit-IV:

Internal combustion engines: classification of IC engines, basic engine components and nomenclature, working principle of engines, Four strokes and two stroke petrol and diesel engines, comparison of CI and SI engines, comparison of four stroke and two stroke engines, simple problems such as indicated power, brake power, friction power, specific fuel consumption, brake thermal efficiency, indicated thermal efficiency and mechanical

efficiency.

Unit-V:

Belts –Ropes : belt and rope drives, velocity ratio, slip, length of belt , open belt and cross belt drives, ratio of friction tensions, centrifugal tension in a belt, power transmitted by belts and ropes, initial tensions in the belt, simple problems.

Gear trains: classification of gears, gear trains velocity ratio, simple, compound and reverted gear trains and simple problems.

Text Books:

4. Mechanical Engineering Science/ K R Gopala Krishna/ Subhas publications
5. Thermal Engineering/ Ballaney,P.L/ Khanna Publishers, 2003
6. Elements of Mechanical Engineering/ A.R.Asrani, S.M.Bhatt and P.K.Shah/ B.S. Publs**.**
7. Elements of Mechanical Engineering/ M.L.Mathur, F.S.Metha & R.P.Tiwari/ Jain Brothers, 2009
8. Production Technology / P.N.Rao/ McGraw-Hill publications
9. Theory of Machines/ S.S. Rattan/ Tata McGraw Hil , 2004 & 2009.

Course outcomes:

After completing the course, the student shall be able to

1. Select different mechanical elements and manufacturing processes.
2. Evaluate the performance of Boilers, I.C Engines and Compressors.
3. Analyze power transmission by belt, rope, chain and gear trains.

(A2422) ELECTRONIC MEASUREMENTS & INSTRUMENTATION
(Open Elective-II: Offered by ECE Department)

B. Tech. (CE) VIII-Semester

L	T	P	C
3	0	0	3

Course Objectives:
This course provides:

- An introduction to measurement techniques and instrumentation design and operation.
- The basic concept of units, Measurement error and Accuracy, the construction and design of measuring devices and circuits, measuring instruments and their proper applications.
- To use different measuring techniques and the measurement of different physical parameters using different transducers.

Unit- I: Block Schematic of Measuring Systems
Performance characteristics, Static characteristics, Accuracy, Resolution, Precision, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag; Measuring Instruments: DC Volt meters, D'Arsonval Movement, DC Current Meters, AC voltmeters and Current Meters, Ohmmeters, Multi meters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments.

Unit –II: Signal Analysers
AF, HF Wave Analysers, Harmonic Distortion, Heterodyne Wave Analysers, Spectrum Analysers, Power Analysers, Capacitance-Voltage Meters, Oscillators. Signal Generator-
AF and RF signal generators, Sweep frequency Generators, pulse and Square wave Generators, Function Generators, Arbitrary waveform Generator, Video signal Generators, Specifications

Unit- III: Oscilloscopes
CRT, Block Schematic of CRO, Time base circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay Lines, Applications: Measurement of time, Period and Frequency specifications.
Special Purpose oscilloscopes: Dual trace, Dual Beam CROs, sampling oscilloscopes, storage oscilloscopes, digital storage CROs.

Unit- IV: Transducers

Classification, Strain gauges, Bounded, Un bounded; force and displacement transducers, Resistance Thermometers ,hotwire anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers ,Digital temperature sensing system. Piezo Electric transducers, variable capacitance transducers, Magneto Strictive Transducers.

Unit- V: Bridges

Wheat stone bridge, Kelvin Bridge and Maxwell's bridge

Measurement of Physical Parameters: Flow Measurement, displacement meters, Liquid level Measurements , Measurement of Humidity and Moisture, Velocity, Force, Pressure – High Pressure , Vacuum level , Temperature – Measurements, Data Acquisition Systems.

Text Books:

1. Electronic instrumentation, second edition - H.S.Kalsi, Tata McGraw Hill, 2004.
2. Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI, 5th Edition, 2003

References:

1. Electronic Instrumentation & Measurements - David A. Bell, Oxford Univ. Press, 1997.
2. Electronic Measurements And Instrumentation: B.M.Oliver, J.M.cage TMH reprint 2009.
3. Measurement Systems - Emest O. Doebelin and Dhanesh N Manik, 6^{th} Ed., TMH.
4. Electronic Measurements & Instrumentations by K. Lal Kishore, Pearson Education – 2010.
5. Industrial Instrumentation: T.R. Padmanabham Springer 2009.
6. A Course in Electrical and Electronics Measurement and Instrumentation, A. K. Sawhney, Edition 10, DhanpatRai Publications 1994

Course Outcomes:

Upon a successful completion of this course, the student will be able to:

1. Describe the fundamental concepts and operations of various instruments required in measurements.
2. Distinguish the functioning, specification, and applications of signal analysing instruments.

3. Describe the principle of operation, working of different electronic instruments like Digital multi meter, CROs and DSOs.
4. Discuss about different types of transducers and physical parameters measurement.

(A2510) DATA BASE MANAGEMENT SYSTEMS
(Open Elective-II: Offered by CSE Department)

B.Tech (EEE): VIII-Semester

L	T	P	C
3	0	0	3

Course Objectives:

- To understand the basic concepts and the applications of database systems.
- To master the basics of SQL and construct queries using SQL.
- To understand the relational database design principles.
- To become familiar with the basic issues of transaction processing and concurrently control.
- To become familiar with database storage structures and access technologies.

Unit I:

Introduction: Data base System Applications, Purpose of Database Systems, View of Data – Data Abstraction –Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator, History of data base systems

Introduction to Data base design and ER diagrams – ER Model - Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Conceptual Design with ER model – Conceptual Design for Large Enterprise.

Introduction to the Relational Model, Integrity constraints over Relations, Enforcing Integrity Constraints, Query Relational Data, Logical database Design, Introduction to views- Destroying/ altering tables & Views

Unit II:

Relational Algebra & Calculus– Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

Form of Basic SQL Query- Examples of SQL Queries – introduction to Nested Queires, Correlated Nested Queries, Set comparison Operators, Aggregate Operators, Null values comparison, using Null values, logical connectives, AND, OR & NOT Impact on SQL constructs, Outer Joins, Disallowing Null Values, and Complex Integrity constraints in SQL

Triggers and Active Data bases.

Unit III:

Introduction to Schema Refinement – Problems Caused by redundancy, Decompositions – Problem related to decomposition, Functional Dependencies - Reasoning about FDS, Normal Forms – FIRST,SECOND, THIRD Normal forms – BCNF –Properties of Decompositions- Loss less-join Decomposition, Dependency preserving Decomposition, Schema Refinement in Data base Design – Multi valued Dependencies – FOURTH Normal Form, Join Dependencies, FIFTH Normal form, Inclusion Dependencies

Unit IV:

Transaction management Transaction Concept- Transaction State-Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability-

Concurrency control-Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity.

Recovery System- Failure classification, storage structure, Recovery & atomicity, Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems.

Unit V:

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing

– Clustered Indexes, Primary and Secondary Indexes, Index data Structures – Hash Based Indexing, Tree based Indexing, Comparison of File Organizations. Storing data: Disks and Files: -The Memory Hierarchy – Redundant Arrays of Independent Disks.

Tree Structured Indexing: Intuitions for tree Indexes, Indexed Sequential Access Methods (ISAM) B+Trees: A Dynamic Index Structure, Search, Insert, and Delete.

Hash Based Indexing: Static Hashing, Extendable hashing, Linear Hashing, Extendible Vs. Linear Hashing.

Textbooks:

1. Data base Management Systems, Raghu Ramakrishnan, Johannes Gehrke, TMH, 3rd Edition, 2003.
2. Data base System Concepts, A.Silberschatz, H.F. Korth, S.Sudarshan,

McGraw hill, VI edition, 2006.

3. Fundamentals of Database Systems 5th edition, Ramez Elmasri, Shamkant B.Navathe, Pearson Education, 2008.

Reference books:

1. Database Management System Oracle SQL and PL/SQL, P.K.Das Gupta, PHI.
2. Database System Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.
3. Database Systems, A Practical approach to Design Implementation and Management Fourth edition, Thomas Connolly, Carolyn Begg, Pearson education.
4. Database-Principles,Programming,andPerformance,P.O'Neil,E.O'Neil, 2nd Edition Elesevier
5. Fundamentals of Relational Database Management Systems, S. Sumathi, S. Esakkirajan, Springer.
6. Introduction to Database Management, M.L.Gillenson and others, Wiley Student Edition.
7. Database Development and Management, Lee Chao, Auerbach publications, Taylor & Francis Group.
8. Introduction to Database Systems, C.J. Date, Pearson Education.

Course Outcomes:

Upon the completion of this subject students will be able to

1. Demonstrate the basic elements of a relational database management system.
2. Identify the data models for relevant problems.
3. Design entity relationship and convert entity relationship diagrams into RDBMS and formulate SQL queries on the respect data.
4. Apply normalization for the development of application softwares.

(A2246) POWER SYSTEM ENGINEERING
(Open Elective-III: Offered by EEE Department)

B.Tech (CE): VIII Semester

L	T	P	C
3	0	0	3

Unit-I: Power Generating Stations

Thermal Power Stations: Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, ash and flue gases.- Brief description of TPS components: Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and Cooling towers.

Hydro Electric Power station: Elements of hydroelectric power station-types-concept of pumped storage plants-storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area: head and efficiencies.

Gas and Nuclear Power Stations Nuclear Power Stations: Nuclear Fission and Chain reaction.- Nuclear fuels- Principle of operation of Nuclear reactor.-Reactor Components: Moderators, Control rods, Reflectors and Coolants.- Radiation hazards: Shielding and Safety precautions-

Unit-II: Performance of Transmission Lines

Classification of Transmission Lines - Short, medium and long line and their model representations - Nominal-T, Nominal-Pie and A, B, C, D Constants for symmetrical & Asymmetrical Networks - Long Transmission Line-Rigorous Solution, evaluation of A,B,C,D Constants.

Underground Cables

Types of Cables, Construction, Types of Insulating materials, Calculations of Insulation resistance and stress in insulation, Capacitance of Single Core cable.

Unit-III: Distribution Systems

D.C. Distribution Systems: Classification of Distribution Systems - Comparison of DC vs AC and Under-Ground vs Over-Head Distribution Systems- Radial D.C Distributor fed at one end and at both the ends (equal/unequal Voltages) and Ring Main Distributor.

A.C. Distribution Systems: Voltage Drop Calculations in A.C. Distributors for the following cases: Power Factors referred to receiving end voltage and referred to respective load voltages.

Unit-IV: Power System Protection.
Causes of over voltage, principle of operation and construction of lightning arrestors, circuit breakers and relays and their classification, significance of fuses and classification, construction of HRC fuse.
Neutral grounding: Solid, resistance, reactance-arching grounds and grounding practices

Unit-V: Power factor correction and Voltage Control: Causes of low p.f -Methods of Improving p.f -Phase advancing and generation of reactive kVAR using static Capacitors-Most economical p.f. for constant kW load and constant kVA type loads, Numerical Problems. Dependency of Voltage on Reactive Power flow.- Methods of Voltage Control: Shunt Capacitors, Series Capacitors, Synchronous Capacitors, Tap changing and Booster Transformers

Text Books
1. A Text Book on Power System Engineering by M.L. Soni, P.V.Gupta, U.S. Bhatnagar, A. Chakrabarthy, Dhanpat Rai & Co Pvt. Ltd.
2. Electrical power systems - by C.L. Wadhwa, New Age International (P) Limited, Publishers, 1998.

Reference Books
1. Elements of Power Station design and practice by M.V. Deshpande, Wheeler Publishing.
2. Electrical Power Generation, Transmission and Distribution by S.N.Singh., PHI, 2003.
3. Gas turbine performance, by PP Wals, P.Fletcher, Blackwell Publisher, 2004.
4. Principles of Power Systems by V.K Mehta and Rohit Mehta S.Chand & Company Ltd., New Delhi 2004.
5. Power system Analysis-by John J Grainger William D Stevenson, TMC Companies, 4th edition
6. Power System Analysis and Design by B.R. Gupta, Wheeler Publishing.
7. Power System Analysis by Hadi Saadat – TMH Edition.
8. Electrical Power Transmission system engineering Analysis and design by Turan Gonen, CRC press (Taylor & Francis Group) Special Indian Edition,2/e.

Course Outcomes

1. Explain the operation and design of different power plant.
2. Illustrate the factors involved in the designing of a DC and AC distribution systems.
3. Demonstrate the causes for low power factor, voltage drop and methods to improve them.
4. Elucidate the different factors involved in economizing power generation.

(A2364) ELEMENTS OF AUTOMOBILE ENGINEERING
(Open Elective-III: Offered by ME Department)

B.Tech (CE): VIII Semester

L	T	P	C
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Course objective
The content of this course shall provide the student the basic concepts of various mechanical/ electrical/ electronic systems used in automobiles. It shall provide the fundamentals of power generation, drives and controls used in automobiles.

Unit – I
Introduction: Components of four wheeler automobile – chassis and body – power unit – power transmission rear wheel drive, front wheel drive, 4 wheel drive – types of automobile engines, engine construction – engine lubrication, splash and pressure lubrication systems, oil filters, oil pumps – crank case ventilation – engine service, re-boring, decarburization

Unit – II
Fuel System: S.I. Engine: Fuel supply systems, Mechanical and electrical fuel pumps, carburetor, types, air filters, petrol injection.
C.I. Engines: Requirements of diesel injection systems, types of injection systems, fuel pump, nozzle, Alternative fuels for Automobiles-injection, Classification, Properties, Hybrid vehicles injection timing, testing of fuel, pumps.
Cooling System : Cooling Requirements, Air Cooling, Liquid Cooling and Forced Circulation System – Radiators – Types – Cooling Fan - water pump, thermostat, evaporating cooling – pressure sealed cooling – antifreeze solutions.

Unit – III
Electrical System: Charging circuit, generator, current – voltage regulator – starting system, bendix drive mechanism solenoid switch, lighting systems, Horn, wiper, fuel gauge – oil pressure gauge, engine temperature indicator etc.
Ignition System: Function of an ignition system, battery ignition system, constructional features of storage battery, auto transformer, contact breaker points, condenser and spark plug – Magneto coil ignition system,

electronic ignition system using contact breaker, electronic ignition using contact triggers – spark advance and retard mechanism.

Unit – IV

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

Steering System: Types of steering mechanism – Ackerman steering mechanism, Davis steering mechanism

Unit – V

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

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

Text books

1. Automobile Engineering ,Vol. 1 & Vol. 2/ Kripal Singh
2. Automobile Engineering , Vol. 1 & Vol. 2 ,by K.M Gupta,Umesh publication

Reference Books

1. A System approach to Automotive Technology by Jack Erjavec YesDee publishing Pvt Ltd.
2. Automobile Engineering / William Crouse
3. Automotive Mechanics / Heitner
4. Alternative fuels of Automobiles by P.Rami Reddy, Frontline publications.

Course outcomes:

By undergoing this course, a student shall be able to

1. Identify power generation, transmission and control mechanisms in an automobile
2. Manipulate the chemical, thermal, mechanical and electrical energies in an automobile
3. Infer the interaction between subsystems

(A2453) INDUSTRIAL ELECTRONICS
(Open Elective-III: Offered by ECE Department)

B.Tech (CE): VIII Semester

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Course Objectives

- To study different types of power semiconductor devices and their switching characteristics.
- To explain the operation characteristics and performance parameters of controller rectifiers.
- To interpret the characteristics of DC and AC Drives
- To discuss the different modulation techniques of pulse width modulated inverters and to understand the harmonic reduction methods.
- To illustrate the practical applications of power converters in conditioning the power supply.

Unit- I
Power Devices
Power diode, Power transistor, Power MOSFET, SCR, TRIAC, GTO, IGBT, MCT – Protection of power devices.

Unit -II
Converters
Introduction to half wave, full wave and bridge rectifiers: Single phase and three phase, Half controlled and fully controlled converters, dual converters, Introduction to cyclo converters and ac controllers.

Unit-III
Inverter and Copper: Voltage, Current and Load commutation, Voltage Source Inverter (VSI), Series and Parallel Inverter, Bridger inverter, Single and Three Phase voltage control using PWM, Current Source Inverter (CSI) Choppers, Step up and step down choppers, Chopper Classification, Class A, B, C, D, E, AC Choppers.

Unit-IV
DC and AC Drives

Steady State Characteristics of DC motors, Control of DC Motor using Converters and Choppers, Regenerative and dynamic braking, Closed Loop Control Scheme, Speed torque Characteristics of induction motor, Static stator voltage control, V/f control, Statice rotor resitance control, Slip power recovery scheme, Self control of synchronous motor.

Unit -V

Other Applications

Electronic Timers, Digital Counters, Voltage regulators, Online and off line UPS switched mode power supply, Principle and Application of Induction and Dielectric heating.

Text book:

1. G. K. Mithal, "Industrial Electronics", Khanna Publishers, Delhi, 2000.

References:

1. M. H. Rashid, "power Electronics Circuits, Devices and Application", PHI, 3rd edition, 2004.
2. G. M. Chute and R. D. Chute, "Electronics in Industry", Mc Graw Hill Ltd, Tokyo, 1995.
3. F. D. Petruzulla, "Industrial Electronics", McGraw Hill, Singapore, 1 996

Course Outcomes:

On completion of this course, the students will have:

1. Illustrate different types of Power Semiconductor Devices.
2. Classify the operation and performance parameters of controlled rectifiers, inverters, and Choppers.
3. Express the operation of DC and AC drives.
4. Relate the industrial applications of power electronic converters.

(A2517) INFORMATION SECURITY
(Open Elective - III: Offered by CSE Department)

B.Tech (CE): VIII Semester

L T P C
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Objectives

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- To understand various cryptographic algorithms
- To understand the basic categories of threats to computers and networks

Unit I:

Attacks on Computers and Computer Security: Introduction to Information Security, the need for security, Security approaches, Principles of Security, Types of Security attacks, Security Services, Security Mechanisms, A model for Network Security.

Cryptographic Techniques: Introduction, plain text and cipher text, substitution Techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, steganography, Key range and key size, possible types of attacks.

Unit II:

Symmetric Key Ciphers: Block cipher principles, DES, AES, Blowfish, Differential and linear cryptanalysis, Block cipher modes of operations, stream ciphers, RC4, location and placement of encryption function, key distribution

Asymmetric key Ciphers: Principles of public key cryptosystems, key distribution, RSA, Diffie-Hellman key exchange, ECC algorithms.

Unit III:

Message Authentication Algorithms and Hash Functions: Authentication Requirements, Functions, Message Authentication Codes, Hash Functions, Secure Hash Functions, HMAC, CMAC, Digital Signatures, Knapsack algorithm.

Authentication Applications: Kerberos, X.509 authentication Services, Public key Infrastructure, Biometric Authentication.

Unit IV:

E-Mail-Security: Pretty Good Privacy, S/MIME

IP Security: IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security payload, Combining Security associations, Key management.

Unit V:

Web Security: Web Security Considerations, Secure Socket Layer and Transport layer Security, Secure Electronic transaction,

Intruders, Virus & Firewall: Intruders, intrusion detection, Virus and virus related threats, Counter measures, Firewall design principles, Types of firewalls password management.

Case studies on Cryptography and Security: Secure Inter-branch payment transaction, Cross site scripting Vulnerability, Virtual Elections

Textbooks:

1. Cryptography and Network Security : William Stallings, Pearson Education, 4th Edition
2. Cryptography and Network Security : Atul Kahate, Mc Graw Hill, 2nd Edition

References:

1. Cryptography and Network Security: C.K. Shyamala, N. Harani, Dr. T.R. Padmanabhan, Wiley India, 1st Edition.
2. Cryptography and Network Security: Forouzan Mukhopadhyay, Mc Graw Hill, 2nd Edition
3. Information Security, Principles and Practice: mark stamp, Wiley India.
4. Principles of Computer Security: WM. Arthur Conklin, Greg White, TMH
5. Introduction to Network Security: Neal Krawetz, CENGAGE Learning
6. Network Security and Cryptography: Bernard Menezes CENGAGE Learning

Course Outcomes

On completion of the course students will be able to

1. Describe public key cryptosystem
2. Describe the enhancement made to IPV4 by IPSec
3. Discuss the fundamental ideas of public key cryptography
4. Generate and distribute a PGP key pair and use the PGP package to send an encrypted email message.
5. Discuss web security and firewalls

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