ACHARYA NAGARJUNA UNIVERSITY
Nagarjuna Nagar – 522510
Andhra Pradesh, India

Scheme of Instruction, Examination and detailed Syllabi of
Civil Engineering

4- Year B.TECH

R-2015 REGULATIONS

SEMESTER SYTEM

W.E.F. 2015 – 2016

(from the batch admitted in the year 2015)

Acharya Nagarjuna University
Faculty of Engineering
Academic Regulations 2015 (R15) for B. Tech (Regular)

(Applicable for the students admitted during the
Academic Year 2015-2016 and onwards)

1. Eligibility for Admission:

Admission to the above program shall be made subject to the eligibility, qualification and specialization prescribed by the University for each program from time to time.

    i.   Admission shall be made either on the basis of merit/rank obtained by the qualifying candidates in EAMCET/ECET or otherwise specified, whichever is relevant.

The duration of B.Tech program is of four academic years divided into eight semesters comprising of two semesters in each academic year. A student is required to choose a branch of study at the time of admission. Students under lateral entry will be admitted straightaway into Third semester of B.Tech course in the respective branch. No change of branch shall be allowed after the admissions are closed.

2. Award of B.Tech. Degree:

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

i.Regular entry students shall pursue a course of study for not less than four academic years and in not more than eight academic years.

ii. Student's who fail to fulfill all the academic requirements for the award of the degree within eight academic years (for Regular Entry) / six academic years (for Lateral Entry) from the year of their admission, shall forfeit their seat in B.Tech course and their admission is cancelled.

Completing the course of study shall mean not only satisfying the attendance requirements but also passing of all the subjects within the respective stipulated period

3. Branches of study:

The following Branches of study are offered at present for B. Tech. degree

S.No.	Branch
1.	Civil Engineering
2.	Electrical and Electronics Engineering.
3.	Mechanical Engineering.
4.	Electronics and Communication Engineering
5.	Computer Science and Engineering.
6.	Chemical Engineering
7.	Electronics & Instrument Engineering
8.	Information Technology
9.	BioTechnology

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

Each Branch will have a curriculum with a syllabi that shall consist of the following:

  i. General Core Courses   1. Basic Sciences
                                    2. Engineering Sciences
                                    3. Humanities and social sciences
  ii. Program core courses in Engineering / Technology
  iii. Elective courses of Engineering / Technology / Management Entrepreneurship / Business Communication and allied fields.
  iv. Open Electives/CBCS
  v. Mandatory learning courses
  vi. Project work

4. Credits:

  i. *Academic Year:* Two consecutive (one odd + one even) semesters constitute one academic year.

  ii. *Choice Based Credit System (CBCS):* The CBCS provides choice for students to select from the prescribed courses (core, elective or minor or soft skill courses).

  iii. *Credit:* A unit by which the course work is measured.

5. Distribution and Weightage of Marks (Internal & External):

  i.   The performance of a student in each semester shall be evaluated subject-wise with a maximum of 100 marks for theory and 100 marks for practical subject. In addition internship & project work shall be evaluated for 100 and 200 marks respectively.

  ii. For theory subjects the distribution shall be 40 marks for Internal Evaluation and 60 marks for the External Evaluation.

  iii. There shall be four units in each of the theory subjects.

  iv. For theory subjects, there shall be two midterm examinations during the semester. Each midterm examination shall consist of assignment for 12 marks and sessional test for 18marks with duration of 120 minutes respectively.

     First midterm examination shall be conducted for 50% coverage of syllabus and second midterm examination shall be conducted for remaining 50% of syllabus. Both the midterm exams are compulsory. Final midterm examination marks for a total of 30marks shall be arrived at, by considering the 80% weightage (24 marks) to that midterm examination in which the student scores more marks and the remaining 20% (6 marks) for other midterm exam.

    *Note 1: The assignment test paper shall contain 5 questions of equal weightage and student is asked to answer any 2 questions randomly and shall be condensed for12 marks, any fraction rounded off to the next higher mark.

    *Note 2: The sessional examination shall contain 3 questions out of which first question is objective and compulsory and remaining two questions having internal choice and shall be considered for 18 marks, any fraction rounded off to the next higher mark.

    *Note 3: For the remaining 10 marks in internal evaluation, 5 marks allotted for attendance as indicated in CLAUSE(_6_) and the faculty members teaching the subject shall evaluate remaining 5 marks through quiz/online/objective examination at the end of semester.

V. For theory subjects, there will be 5 questions with following pattern in the End-Examination.
  a. All Questions have to be answered compulsorily.
  b. Question I shall contain 12short Answer questions "a" to "l each of 1 mark. (Total 12 marks) covering one question from each unit.
  c. Out of the remaining four questions, EITHER/OR type shall be followed with 12 marks for each.
  d. In each question as mentioned in (c), one, two or more bits can be set.

vii. Further, whenever any theory subject with two parts is offered (combined subject), for ex:

   Electrical & Mechanical Technology, then there shall be only two parts Part A, Part B in the question paper.

   First question objective can be equally divided into two parts.

   Part – A: shall contain two questions, EITHER/OR type shall be followed with 12 marks for each.

   Part – B: shall also contain two questions, EITHER/OR type shall be followed with 12 marks for each.

viii. Model Question paper for each theory course shall be prepared by the teacher within 15 days from the commencement of the semester and the same shall be forwarded to the Controller of Examinations through the Chairman, BOS concerned.

ix. For practical subjects there shall be a continuous evaluation during the semester for 40 internal marks and 60 end examination marks. Day-to-day work in the laboratory shall be evaluated for 25 marks by the concerned laboratory teacher based on the report of experiments/jobs (10 marks for the record submitted and 15 marks for day to day work). The internal examination for 15 marks (10 marks for experiment and 5 marks for viva-voce) shall be conducted by the laboratory teacher and another examiner from the same department.

*Note: Day to day performance shall be recorded in student record(each experiment carries 15 marks, at least ten experiments should be done and average marks must be taken at the end of semester).

x. There shall be an audit pass (Mandatory learning Course) course in Human Values &Professional Ethics, Life skills and Advanced Communication Skills lab with no credits. There shall be no external examination. However, attendance in the audit course shall be considered while calculating aggregate attendance and student shall be declared pass in the audit course when he/she secures 40% or more in the internal examinations.

xi. There shall be an Discipline centric Elective Course through Massive Open Online Course (MOOC) in III year II semester (For EEE, ECE and CSE branches) and in IV year I semester (For Civil, Mechanical and Chemical branches), where in the student shall register the course offered by authorized institutions/Agencies, through online with the approval of Head of the Department. The Certificate issued by the institution/agency after successful completion of the course will be considered for the award of grade to that course.

xii. For the subject having design and / or drawing, such as Engineering Drawing, Machine Drawing and Estimation, the distribution shall be 40 marks for internal

evaluation and 60 marks for end examination. The Internal evaluation will be 20 marks for day-to-day work in the class that shall be evaluated by the concerned subject teacher based on the reports/submissions prepared in the class. Further, there shall be two midterm exams in a Semester for a duration of 2hrs each, evenly distributed over the syllabi for 20 marks and the average marks of both the mid examinations shall be considered as internal test marks. The sum of day to day evaluation and the internal test marks will be the final internal marks for the subject.

xiii.   There shall internship at the end of III year II Semester. For the internship, the student/institute shall select any organization and a minimum of 4 weeks work must be carried at the organization. A report on work done shall be evaluated by the external supervisor/mentor and department committee. The internship shall be evaluated for 100marks(60 marks shall be awarded by external supervisor and 40 marks by departmental committee). There shall be no external examination for internship.

A student shall acquire 2 credits assigned to the internship only when he/she secures 40 marks on aggregate out of 100 marks allocated.

xiv.   Out of a total of 200 marks for the project work, 80 marks shall be for Internal Evaluation and 120 marks for the End Semester Examination (Viva-voce). The viva-voce shall be conducted by a committee consisting of Head of the Department, Project Supervisor and an External Examiner nominated by the Principal from the panel of 3 members proposed by Head of the Department. The project work shall start in IV year I semester and shall continue in the semester break.The evaluation of project work shall be conducted at the end of the IV year II semester. The Internal Evaluation shall be made on the basis of weekly progress (a minimum of 12 weeks and 3 marks for each week progress) and at least two seminars(one at the beginning of IV B.Tech II semester (20 marks) and the other before submission of project work(24 marks) given by each student on the topic of his project.

xv. The laboratory records and internal test papers shall be preserved for minimum of 2 years in the respective departments and shall be produced to the Committees of the college as and when the same are asked for.

6. Attendance Requirements:

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

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

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

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

v.   A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester, as applicable. They may seek readmission for that semester when offered next.

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

vii.   A weightage in sessional marks uptoa maximum of 5 marks out of 40 marks in each theory subject shall be given for those students who put in a minimum of 75% attendance in the respective subject in a graded manner as indicated below.

Attendance of 90% and above	5marks
Attendance of 85% and above and less than 90%	3marks
Attendance of 80% and above and less than 85%	2marks
Attendance of 75% and above and less than 80%	1mark

7. Minimum Academic Requirements (For Regular Entry Students):

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

i.   A student who could not secure a minimum of 50% aggregate from midterm examination marks is not eligible to appear for the semester end examination and shall have to repeat that semester.

ii. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, design, drawing subject or project if he secures not less than 40% of marks in the semester end examination. In the internship & project he/she should secure not less than 40% and for practical examination not less than 50% of marks in the semester end examination.

iii. A student shall be promoted from I to II year only if he/she fulfils the academic requirements of attendance and internal marks as stipulated in clause 6 and 7 irrespective of back log subjects in I/IV B.Tech.

iv. A student shall be promoted from II to III year only if he/she fulfils the academic requirements of attendance and internal marks as stipulated in clause 6 and 7 and also mustsecure70% of the credits of the subjects that have been studied up to I year II semester from irrespective of whether the candidate takes the end examination or not as per the normal course of study. At the time of commencement of class work, he must attain the required credits

v.   A student shall be promoted from third year to fourth year only if he fulfills the academic requirements of attendance and internal marks as stipulated in clause 6 and 7 and also must secure70% of the credits of the subjects that have been studied upto II year II semester. At the time of commencement of class work, he must attain the required credits

And in case of getting detained for want of credits by sections ii and iii above, the student may make up the credits through supplementary exams of the above exams before the date of class work commencement of Third or Fourth year I semester respectively.

8. Minimum Academic Requirements (For Lateral Entry Students):

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

i. A student shall be deemed to have satisfied the minimum academic requirements and earned the credits allotted to each theory, practical, design, drawing subject or project if he secures not less than 40% of marks in the end examination and a minimum of 50% of marks in the sum total of the internal evaluation and end examination taken together. In the Seminar & Comprehensive viva-voce he/she should secure 40%.

ii. A student who could not secure a minimum of 50% aggregate from midterm examination marks is not eligible to appear for the semester end examination and shall have to repeat that semester.

iii. A student shall be promoted from II to III year only if he/she fulfils the academic requirements of attendance and internal marks as stipulated in clause 6 and 7 irrespective of back log subjects in II/IV B.Tech

iv. A student shall be promoted from III to IV year only if he/she fulfils the academic requirement of attendance and internal marks as stipulated in clause 6 and 7 and also must secure**70%** of the subjects that have been studied up to III year I semester from

9. Grading:

After each subject is evaluated for 100 marks, the marks obtained in each subject will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.

Table – Conversion into Grades and Grade Points assigned

Range in which the marks in the subject fall	Grade	Grade points assigned
≥ 90	O (Outstanding)	10
80-89	A+ (Excellent)	9
70-79	A (Very Good)	8
60-69	B+ (Good)	7
50-59	B (Above Average)	6
45-49	C (Average)	5
40-44	D (Pass)	4
< 40	F (Fail)	0
Absent	Ab (Absent)	0

i. A student obtaining Grade F shall be considered failed and will be required to reappear for that subject when the next supplementary examination offered.

ii. For non credit courses 'Satisfactory' or "Unsatisfactory' shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA.

9.1. Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

i. The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e.

$$SGPA = \Sigma\,(Ci \times Gi)/\,\Sigma\,C_i$$

Where, C_i is the number of credits of the ith subject and G_i is the grade point scored by the student in the ith course.

ii. The Cumulative Grade Point Average (CGPA) will be computed in the same manner taking into account all the courses undergone by a student over all the semesters of a program, i.e.

$$CGPA = \Sigma\,(Ci \times Si)/\,\Sigma\,C_i$$

Where 'S_i' is the SGPA of the ith semester and C_i is the total number of credits in that semester.

iii. Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

iv. While computing the GPA/CGPA the subjects in which the student is awarded Zero grade points will also be included.

Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.

Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.

Grade Conversion to Percentage: % = CGPA × 9.25

10. Gap - Year:

Gap Year – concept of Student Entrepreneur in Residence shall be introduced and outstanding students who wish to pursue entrepreneurship are allowed to take a break of one year at any time after I year/II year/III year to pursue entrepreneurship full time. This period may be extended to two years at the most and these two years would not be counted for the time for the maximum time for graduation. An evaluation committee shall be constituted to evaluate the proposal submitted by the student and the committee shall decide on permitting the student for having the Gap Year.

11.Transitory Regulations:(old regulations changed)

1. Candidates who admitted into the four year B.Tech degree course under R-15 regulations but who got detained in any year for want of attendance/minimum aggregate sessional marks may join the appropriate year /semester in the semester system applicable for that batch and be governed by the regulations of that batch from then onwards unless otherwise specified.

2. A student admitted under credit based regulations(CR) detained due to lack of sessional marks/attendance at the end of the first semester of II/IV B.Tech shall join II/IV first semester of R-15 batch . Such students will study all the courses prescribed for that R-15 in which the student joins. However the student has to clear all the first year backlog subjects by appearing the supplementary examination. Such candidates will be governed by the regulations applicable to lateral entry candidates of R-15 batch for the award of the degree.

3. A student admitted under CR, detained due to lack of sessional marks/attendance at the end of the second semester of II/IV B.Tech /at the end of subsequent semesters shall follow the credit based regulations only (CR).

12. With–holding of results:

If the candidate has any dues not paid to the college or if any case of indiscipline or malpractice is pending against him, the result of the candidate shall be withheld and he will not be allowed / promoted into the next higher semester. The issue of awarding degree is liable to be withheld in such cases.

13. Award of Class:

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

Class Awarded	CGPA Secured
First Class with Distinction	≥ 8.0
First Class	$\geq 6.5 < 8.0$
Second Class	$\geq 5.5 < 6.5$
Pass Class	$\geq 4.0 < 5.5$

14. Minimum Instruction Days:

The minimum instruction period for a semester is 16 weeks. The minimum instruction days including exams for each semester shall be for 90days.

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

16.General:

   i.   The academic regulations should be read as a whole for purpose of any interpretation.

   ii.   Malpractice rules- nature and punishments is appended

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

   iv.   In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the BOS is final.

   v.   The University may from time to time, revise, amend or change the Regulations, Schemes of Examinations, and/or Syllabi.

17. Conduct and discipline

Students shall conduct themselves within and outside the premises of the institute in a manner befitting the students of our institution.

(b) As per the order of Honorable Supreme Court of India, ragging in any form is considered as a criminal offence and is banned. Any form of ragging will be severely dealt with.

(c) The following acts of omission and / or commission shall constitute gross violation of
the code of conduct and are liable to invoke disciplinary measures with regard to ragging.

(i) Lack of courtesy and decorum, indecent behavior anywhere within or outside the campus.

(ii) Willful damage of college / individual property

(iii) Possession, consumption or distribution of alcoholic drinks or any kind of narcotics or hallucinogenic drugs.

(iv) Mutilation or unauthorized possession of library books.

(v) Noisy and unseemly behavior, disturbing studies of fellow students.

(vi) Hacking of computer systems (such as entering into other person's areas without prior permission, manipulation and / or damage of computer hardware and software or any other cyber-crime etc.)

(vii) Usage of camera / cell phone in the campus

(viii) Plagiarism of any nature

(ix) Any other acts of gross indiscipline as decided by the academic council from time to time.

(d) Commensurate with the gravity of offense, the punishment may be reprimand, fine, expulsion from the institute / hostel, debar from examination, disallowing the use of certain facilities of the institute, rustication for a specified period or even outright expulsion from the institute or even handing over the case to appropriate law enforcement or the judiciary, as required by the circumstances.

(e) For an offence committed in (i) a hostel (ii) a department or in a class room and (iii) elsewhere, the chief warden, the head of the department and the principal respectively, shall have the authority to reprimand or impose fine.

(f) Cases of adoption of unfair means and / or any malpractice in an examination shall be reported to the principal for taking appropriate action.

(g) All cases of serious offence, possibly requiring punishment other than reprimand, shall be reported to the academic council.

(h) The institute level standing disciplinary action committee constituted by the academic council shall be the authority to investigate the details of the offence, and recommend disciplinary action based on the nature and extent of the offence committed.

(i) The principal shall deal with any academic problem, which is not covered under these rules and regulations, in consultation with the programmes committee in an appropriate manner, and subsequently such actions shall be placed before the academic council for ratification. Any emergency modification of regulation, approved by the appropriate authority, shall be reported to the academic council for ratification.

(j) "Grievance and Redressal Committee" (General) constituted by the Principal shall deal with all grievances pertaining to the academic / administrative / disciplinary matters

18. Punishments for Malpractice Cases - Guidelines

The examinations committee may take the following guidelines into consideration while dealing with the suspected cases of malpractice reported by the invigilators/squad members etc; during end examinations. The punishment may be more severe or less severe depending on the merits of the individual cases.

S. No	Nature of Malpractices/Improper conduct	Punishment

1.	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the student which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
2.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject.
3.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester/year examinations.
4.	Gives assistance or guidance or receives it from any other student orally or by any other body language methods or communicates through cell phones with any other student or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the students involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
5.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the student is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects including practical examinations and project work of that semester/year.
6.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects including practical examinations and project work of that semester/year.
7.	Smuggles in the Answer book or takes out or arranges to send out the question paper during the examination or answer book during or after the examination	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects including practical examinations and project work of that semester/year. The student is also debarred for two consecutive semesters from class work and all examinations. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat.
8.	Refuses to obey the orders of the Chief Superintendent/Assistant – Superintendent / any officer on duty or misbehaves or creates	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in

	disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination 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.	that subject and all other subjects of that semester/year. The students also are debarred and forfeit their seats. In case of outsiders, they will be handed over to the police and a police case is registered against them.
9.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects including practical examinations and project work of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
10.	Possesses any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects including practical examinations and project work of that semester/year. The student is also debarred and forfeits the seat.
11.	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 7 to 9.	For Student of the college: Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects including practical examinations and project work 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.
12.	Impersonates any other student in connection	The student who has impersonated shall

	with the examination	be expelled from examination hall. The student is debarred from writing the remaining exams, and rusticated from the college fur one academic year during which period the student will not be permitted to write any exam. If the imposter is an outsider, he will be handed over to the police and a case is registered against him. The performance of the original student who has been impersonated, shall be cancelled in all the subjects of the examination including practicals and project work of that semester/year. The student is rusticated from the college for two consecutive years during which period the student will not be permitted to write any exam. The continuation of the course by the student is subject to the academic regulations in connection with forfeiture of seat
13.	If any malpractice is detected which is not covered in the above clauses 1 to 12 it shall be reported to the college academic council for further action to award suitable punishment.	
14.	Malpractice cases identified during sessional examinations will be reported to the examination committee nominated by Academic council to award suitable punishment.	

Program Codes.

ESC: Engineering Science Core
BSC: Basic Science Core
DEC: Departmental Elective Course
OPC: Open Elective Course
PCC: Program Core Course
PRC: Program Major Project

Acharya Nagarjuna University
Faculty of Engineering

B.TECH COURSE STRUCTURE

For Non Circuit Branches: ME/CE/CHE/BT
(2015-16)

I YEAR I SEMESTER

Course Details		Scheme of instruction			Scheme of Examination				
Code	Subject	L	T	P	Maximum Internal Marks	Maximum External Marks	Total	Credits	Cat. Code
BT/CE/ME /CHE 111	Mathematics-I	4	1	-	40	60	100	4	BSC
BT/CE/ME /CHE112	Physics-I	3	-	-	40	60	100	3	BSC
BT/CE/ME /CHE113	Chemistry-I	3	-	-	40	60	100	3	BSC
BT/CE/ME /CHE114	Engineering Mechanics – I	4	1	-	40	60	100	4	BSC
BT/CE/ME /CHE115	Problem solving using C	3	1	-	40	60	100	3	BSC
BT/CE/ME /CHE116	Engineering Drawing – I	2	-	4	40	60	100	3	ESC
BT/CE/ME /CHE151	Chemistry lab	-	-	3	40	60	100	2	BSC
BT/CE/ME /CHE152	Computer Programming lab	-	-	6	40	60	100	2	BSC
BT/CE/ME /CHE153	Work shop	-	-	3	40	60	100	2	ESC
	Total	19	3	16	360	540	900	26	

I YEAR II SEMESTER

Course Details		Scheme of instruction			Scheme of Examination				
Code	Subject	L	T	P	Maximum Internal Marks	Maximum External Marks	Total	credits	Cat. Code
BT/CE/ME/CHE 121	Mathematics-II	4	1	-	40	60	100	4	BSC
BT/CE/ME/CHE 122	Physics-II	3	-	-	40	60	100	3	BSC
BT/CE/ME/CHE 123	Chemistry-II	3	-	-	40	60	100	3	BSC
BT/CE/ME/CHE 124	Engineering Mechanics – II	3	1	-	40	60	100	3	BSC
BT/CE/ME/CHE 125	Environmental Science and Engineering	3	-	-	40	60	100	3	BSC
BT/CE/ME/CHE 126	Engineering Drawing-II	2	-	4	40	60	100	3	ESC
BT/CE/ME/CHE 127	Basic English for Engineers	4	-	-	40	60	100	3	BSC
BT/CE/ME/CHE 161	Physics lab	-	-	3	40	60	100	2	ESC
BT/CE/ME/CHE 162	English Communication Lab	-	-	3	40	60	100	2	BSC
	Total	**22**	**2**	**10**	**360**	**540**	**900**	**26**	

CE/ME/CHE– 111
     4-1-0

MATHEMATICS – I

Unit-I

Matrices: Rank of a matrix, Consistency of linear system of equations, Linear transformations, vectors, Linear dependence, Eigen values and Eigen vectors, Properties of eigen values, Cayley-Hamilton theorem (without proof), Reduction to diagonal form, reduction of Quadratic form to canonical form, Complex matrices.

Unit-II

Rolle's Theorem(without proof), Lagrange's Mean value theorem (without proof), Taylor's theorem (without proof), Expansions of functions: Maclaurin's series, Taylor's series, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers, Principle of least squares, method of least squares, fitting of other curves.

Unit-III

Double integrals, Change of order of integration , Double integrals in polar coordinates, Area enclosed by plane curves, Triple integrals, Change of variables, Beta function, Gamma function, Relation between beta and gamma functions, error function.

Unit-IV

Fourier Series: Introduction and Euler's formulae, Conditions for a Fourier expansion, Functions having points of discontinuity, Change of interval, Even and Odd functions, Half range series, Typical wave forms and Parseval's formulae, Complex form of the Fourier series.

Text book

1]. Higher Engineering Mathematics by B.S. Grewal, 43rd edition, Khanna publishers, New

   Delhi.

Reference books:

 [1]. Advanced Engineering Mathematics by kreyszig.

 [2]. Engineering Mathematics by Babu Ram

[3] Engineering Mathematics – I   BY N.P. Bali, Satyanarayana Bhavanari and Indrani Kelker Laxmipublications, New Delhi.

[4] Mathematical Foundations for Computer Sciences- by Satyanarayana Bhavanari, Pradeep

Kumar T.V, Shaik Mohiddin shaw, BSP Publications.

ENGINEERING PHYSICS - I

UNIT-I

Ultrasonics   **12 Periods**
Production of Ultrasonics by Piezo electric oscillator method, Detection by Acoustic grating method, Applications - Pulse echo technique, ultrasonic imaging and some general applications.

Interference
Stokes principle (Phase change on reflection), Interference in thin films due to reflected light (Cosine law), Newton's rings experiment – Determination of radius of curvature, Michelson's interferometer: Principle, construction working and its application (Determination of wavelength of monochromatic source).

UNIT-II   **10 Periods**
Diffraction – Single slit (Qualitative and quantitative treatment).
Polarisation – Polarisation by reflection, Refraction and double refraction in uniaxial crystals, Nicol prism, Quarter and half wave plate, circular and elliptical polarization and detection.

UNIT-III   **14 Periods**
Lasers: Laser characteristics, Spontaneous and Stimulated emissions, Basic requirements of a laser, Population inversion – Solid state laser (Ruby laser), Gas (He-Ne) laser, Semiconductor (GaAs) laser, Applications of lasers.
Holography: Principle, recording, reproduction and applications.
Fiber optics: Structure of optical fiber, Types of optical fibers, Numerical aperture, Fiber optics in communications and advantages.

UNIT –IV   **14 Periods**
Electricity and Magnetism
Gauss's law in electricity (statement & proof), Coulomb's law from Gauss law, Gauss law for magnetism, Faraday's law of electromagnetic induction, Lenz's law, Self Inductance, Mutual inductance, energy stored in a magnetic field, Displacement current, Maxwell's equations (qualitative treatment), electromagnetic wave equation and Velocity, A.C. circuit containing series LCR circuit (resonance condition).

TEXT BOOKS:
1. Engineering Physics - R .K. Gaur & S. L. Gupta , Danpati Rai Publications, Delhi, 2001.
2. Engineering Physics - Hitendra K. Malik & A.K.Singh, Tata MacGraw Hill, New Delhi,2009.

REFERENCE BOOKS:
1. Fundamentals of Physics - Resnick & Halliday, John Wiley sons ,9th Edition.
2. Applied Physics-S. Mani Naidu, Pearson Publishers, Chennai
3. Engineering Physics - M.Arumugam, Anuradha Publications, Chennai ,5thEdition , 2006.
4. Engineering Physics - B. K. Pandey & S. Chaturvedi, Cengage LearningIndia Pvt. Ltd., Delhi.

ENGINEERING CHEMISTRY – I

UNIT-I: WATER TECHNOLOGY

Various impurities of Water, WHO guidelines, Hardness unitsand determination by EDTA method (simple problems), water treatment for drinkingpurpose-sedimentation, coagulation, filtration (slow sand filter), various methods ofchlorination, breakpoint chlorination.

Water treatment for industrial purpose: Boiler troubles, scales, sludges, causticEmbrittlement, boiler corrosion, priming and foaming- causes and prevention,Internal conditioning -Phosphate, Calgon and carbonate treatment, Externalconditioning-Lime Soda process (simple problems), softening by ion exchangeprocess, Desalination of brackish water by electro dialysis and reverse osmosis.

UNIT-II: ELECTROCHEMICAL ENERGY SYSTEMS
Primary and Secondary batteries, Reserve batteries, Solid state and molten solvent batteries, Recent technological trends, Lithium ion batteries, Nanostructured electrode materials, Lithium and carbon based nanomaterials and nanocomposites, Solid-state Lithium ion batteries, Energy storage and backup. Fuel cells, Scientific prospects of fuel cells, Electrochemistry, In-situ and ex-situ electrochemical characterizations, Current-Voltage measurement, Current Interrupt measurements, Porosity, BET surface area analysis, Gas permeability, Hydrogen as future fuel, Alkaline-, acid- and molten carbonate-fuel cells, Solid oxide fuel cells.

UNIT-III: CORROSION AND ITS PREVENTION

Introduction, electrochemical theory of corrosion,drycorrosion, corrosion due to differential aeration, Types of corrosion-galvanic corrosion (galvanic series), Pitting, Stress and microbiological corrosion, Factorsaffecting corrosion-oxidizers, pH, over voltage and temperature.
Protection methods: Cathodic protection, (Impressed current and sacrificial anode)
anodic protection, corrosion inhibitors- types and mechanism of inhibition

UNIT-IV: POLYMERSS

        Monomer functionality, degree of polymerization, Tacticity, classification of polymerization- addition, condensation and co-polymerization, mechanism of free radical polymerization.
Plastics- Thermoplastic and thermosetting resins, preparation, properties and uses of Bakelite, and PVC. Compounding of plastics.
Conducting polymers: Polyacetylene, mechanism of conduction, examples and applications.
Rubber- Processing of latex, Drawbacks of natural rubber- Vulcanization, Synthetic rubbers- Buna-S and Buna-N.

Prescribed Text Books

1. Engineering Chemistry, P.C. Jain and M. Jain - Dhanapathi Rai & Sons, Delhi
2. A text book of Engineering Chemistry, S.S. Dara - S. Chand & Co. New Delhi
3. Engineering Chemistry, B.K. Sharma - Krishna Prakashan, Meerut
4.   Shashi chawla,A text book of engineering chemistry,3rd Edition,Dhanpat rai & co new delhi,2007.

ENGINEERING MECHANICS -I

UNIT- I

Concurrent Forces in a Plane:
Principles of statics, Force, Addition of two forces: Parallelogram law – Composition and resolution of forces – Constraint, Action and Reaction. Types of supports and support reactions. Free body diagram. Equilibrium of concurrent forces in a plane – Method of projection, method of moments, resultant and equilibrium of concurrent forces in space.

UNIT-II

Friction: Introduction, laws of friction, coefficient of friction, angle of friction, problems involving dry friction, wedges.
Parallel Forces in a Plane: Types of parallel forces, couple, resolution of a force into a force and a couple, general case of parallel forces in a plane.

UNIT-III

Centroid and Centre of Gravity: Concept of centroid and centre of gravity, centroids of simple figures from basic principles, centroid of composite plane figures and curves, centre of gravity of three dimensional bodies.
General cases of Forces in a Plane: Composition of forces in a plane, Equilibrium of forces in a plane, plane trusses-method of joints and method of sections.

UNIT-IV

Moments of Inertia of Plane Figures: Introduction, moment of inertia of a plane figure with respect to an axis in its plane, polar moment of inertia, parallel axis theorem, moment of inertia of composite areas.
Moment of Inertia of Material Bodies: Moment of Inertia of solid rectangular plate, circular plate, solid right circular cone, solid sphere.

LEARNING RESOURCES (For both I and II semesters)
TEXT BOOKS:
1. *Engineering Mechanics by S. Timoshenko, D.H. Young and J V Rao –Tata McGraw-Hill publishing Company Limited, New Delhi(For concepts), 2009*
2. *Engineering mechanics –statics and dynamics by A.K TAYAL –UMESH publications, Delhi (For numerical problems), 2008*

REFERENCE BOOKS:
1. *Engineering Mechanics by S.S.Bhavikatti, New Age International publishers, 2012*
2. *Engineering Mechanics- Statics and Dynamics by Irving H. Shames, Pearson Education, 2006.*
3. *Singer's Engineering Mechanics: Statics and Dynamics, K. Vijaya Kumar Reddy and J Suresh Kuma, 3rd Edition SI Units-BS Publications, 2010.*
4. *A Textbook of Engineering mechanics statics and dynamics by J.L. Meriam and L. Kraige, 6th Edition, Wiley & Sons ,2010.*

CE/ME/CHE 115   **3-1-0**

Problem Solving using C

UNIT-1 (16 Periods)

Computer Basics: The Computer System, Generations of Computer, Classification of
Computer, Block diagram of digital Computer, Inside the Computer-Processor,
Memory, External Ports, PCI Card, Formatting Hard disk, Understanding BIOS,
BIOS Commands, Algorithm, Flowchart, Programming Paradigms.

C-Basics: C-character set, Data types, Constants, Expressions, Structure of C
program, Operators and their precedence & associatively, Simple programs in C using all the
operators, Type casting ,type coercion.

UNIT-II (16 Periods)

Control Structures, Basic input and output statements, Preprocessor directives.
Functions: Concept of a function, passing the parameters, automatic variables,
scope and extent of variables, storage classes, recursion, iteration vs recursion,
types of recursion, Simple recursive and non recursive programs, Towers of Hanoi
problem.

UNIT-III (16 Periods)

Arrays: Single and multidimensional Arrays, Character array as a string, string
functions, Programs using arrays and string manipulation.
Pointers: Pointers declarations, Pointer expressions, Pointer parameters to
functions. Pointers, Pointers and array, Pointer arithmetic.

UNIT-IV (16 Periods)

Structures: Declaring and using structures, operations on structures, structures and
arrays, user defined data types, pointers to structures.Command line arguments.
Files: Introduction, file structure, file handling functions, file types, file error handling,
Programs using file functions.

Text Books:
  1. Programming with C-Gottfried-Schaums Outline Series-TMH
  2. C Programming – Anitha Goel/Ajay Mittal/E.Sreenivasa Reddy-Pearson India

References :
1. Problem Solving with C- Somasekharan-PHI.
2. C Programming- Behrouz A forouzan – CENGAGE Learning
2. Test your c skills-Yaswanth kanithker
3. Let us C- Yaswanth kanithker

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ENGINEERING DRAWING - 1

Unit – I

General: Use of Drawing instruments, Lettering .-Single stroke letters, Dimensioning- Representation of various type lines. Geometrical Constructions..Representative fraction, Scales.-Plain Scales, Diagonal Scales, Comparative Scales, Vernier Scales.

Unit – II

Curves : Curves used in Engineering practice - conic sections - general construction and special methods for ellipse, parabola and hyperbola. cycloid, epicycloids, hypocycloid involute of circle and Archemedian Spiral.

Unit – III

Method of Projections: Principles of projection - First angle and third angle projection of
Points. Projection of Straight lines. Traces of lines. (Limited to first angle projection only)
Projections of Planes : Projections of planes, projections on auxiliary planes.

Unit – IV

Projections of Solids : Projections of Cubes, Prisms, Pyramids, Cylinders and Cones with
varying positions.
Sections Of Solids: Sections of Cubes, Prisms, Pyramids, cylinders and Cones, true shapes of sections. (Limited to the Section Planes perpendicular to one of the Principal Planes).

Unit - V(Demonstration only).

Computer Aided Drafting (using any Standard Package): Setting up a drawing, starting main menu (New, Open Save, Save As etc), Opening Screen error correction on screen units,
co-ordinate system, limits, grid, snap, ortho.
Tool bars: Draw tool bar, object snap, tool bar, modify tool bar, dimension tool bar

TEXT BOOK:
• Engineering Drawing by N.D. Bhatt & V.M. Panchal. (Charotar Publishing House,Anand).

REFERENCE BOOK:
• Engineering Drawing by Prof.K.L.Narayana & Prof. R.K.Kannaiah. SciTech Publisher.

ENGINEERING CHEMISTRY LABORATORY

LIST OF EXPERIMENTS:

1. **Determination of purity of washing soda**
2. **Determination of alkalinity of water**
3. **Determination of iron from Mohr's salt by permanganometry**
4. **Determination of iron from hematite by dichrometry**
5. **Determination of copper from brass by iodometry**
6. **Determination of available chlorine in bleaching powder.**
7. **Determination of hardness of water by EDTA method**
8. **Determination of tin and lead from solder by complex metric titrations**
9. **Determination of chloride by precipitation titration method**
10. **Determination of calcium by semi gravimetric method**
11. **Preparation of phenol-formaldehyde resin**
12. **Chemistry of blue printing**

DEMONSTRATON:

13. **Acid-Base titration by pH meter, conductivity meter and potentiometer**
14. **Determination of viscosity of viscosity of lubricating oil.**

Computer Programming Lab

CYCLE-I Basics of Hardware and Software Exercises:
1. Explore Mother Board components and Layouts, identifying external ports and interfacing, identifying PCI cards and interfacing.
2. Practice partitioning and formatting Hard disks.
3. Install and Uninstall system and application software.
4. Understand BIOS configuration.
5. Connect 2 or more computers in a LAN network.
6. Assembling a Computer and troubleshooting a Computer.
7. Study and practice of operating system commands
a. Study and practice of directory Related Utilities.
b. Study and practice of file and Text Processing Utilities.
c. Study and practice of disk, Compress and Backup Utilities.
d. Study and practice of Networking Utilities

CYCLE-II Programming Exercises:

1.Exercises on data types and operators?
   a) Practice exercises 3.1 to 3.16 and 4.1 to 4.17 and 14.1 to 14.20 Test your C Skills - yaswanth   kanitkar text book.
   b) Write a program which determines the largest and the smallest number that can be stored in different data types of like short, int., long, float and double. What happens when you add 1 to the largest possible integer number that can be stored?
  c) Write a program to find greatest of three numbers using conditional operator?
  d) Write a program to swap two numbers with and without temp variable?
e) Practice a program using multiple unary increment and decrement operators in arithmetic
   expressions?

2. Exercises on control structures?
   a) Practice exercise 2.1 to 2.15 Test your C Skills - yaswanth kanitkar text book.
   b)Write a program to find greatest of three numbers? Use nested if, if else if and
       switch statements?
   c) Write a program to read marks of a student and print the sum and average?
   Display the grade based on the sum of marks?
   e) write a program to count the digits of a number? Use for loop
   f) Write a program to check whether a number is perfect or not? Use do-while
   g) Write a program to check whether a number is strong or not? Use while
   h) Write a program to check whether a number is amstrong or not? Use for
   i) Write a program to check whether a number is palindrome or not? Use for
   j) Write a program to find the Fibonacci series upto the given number? Use while
   k) Write a program to print the pascals triangle? Used do-while
   l) Write a program to print the result of the series $1+x^2/2+x^3/3+....+x^n/n$

3. Exercises on functions?
   a) Practice exercise 5.1 to 5.14 Test your C skills -yaswanth kanitkar text book.
   b) Write program to swap two variables using functions?
      Write a program to perform menu driven arithmetic operations using functions?
 c) Write a program to find the factorial of a number using recursive and non- recursive functions?
   d) Write a program to find the Fibonacci series using recursive functions?
   e) Write a program to find the solution for towers of Hanoi using recursive function?
   f) Write a program to pass parameters to a functions using call by value and call by reference?

4. **Exercises on Arrays?**
   a) Practice exercise 9.1 to 9.17 Test your C skills - yaswanth kanitkar text book.
   b) Write a program to read n numbers and sort them?
   c) Write a program to find the minimum and maximum numbers of the array?
   d) Write a program to read two matrices and find their sum, difference and product of them?
   e)Find the transpose of a matrix?
f) Write a program to print upper and lower triangle of a given matrix?

5. Exercises on strings?
   a) Practice exercise 10.1 to 10.15 yaswanth kanitkar text book.
   b) Write a program to demonstrate the use of string manipulation functions?
   c) Write a program to compare two strings?
   d) Write a program to sort the names in Alphabetical order?

6. **Exercises on pointers?**
a) Practice exercise 7.1 to 8.26 yaswanth kanitkar text book.
 b) Write a program to read dynamic array and sort the elements?
c) Write a program to read dynamic array and find the minimum and maximum of the elements?
d) Write a program to perform pointer arithmetic?
 e) Write a program on pointers for strings?
 f) Write a program to use array of pointers?

7. **Exercises on structures?**
a) Practice exercise 11.1 to 11.30 yaswanth kanitkar text book.
b) Write a program to create student structure and read marks of three subjects and find the sum and total of the student?
c) Write a program on arrays of structures for 60 students record using the above student structure?
d) Write a program for complex structure? Perform addition, subtraction and multiplication of two complex numbers?
e) Write a program for addition and multiplication of two polinomials?

8.**Write a program on Files?**
a) Practice exercise 12.1 to 12.20 yaswanth kanitkar text book.
b)write a program to append content of a file?
c)Write a program to display the content of a file?
d)Write a program to copy content of one file to other file?
e)Write a program to count the no of characters in a file?
f)Write a program to compare the contents of two files?

References:
   1. Test your C Skills by – Yaswanth Kanithkar-BPB Publishers
   2. C programming; Test your skills-A.N.Kamthane-Pearson India

WORKSHOP

LIST OF EXPERIMENTS:

Minimum three experiments should be conducted from each trade

1. CARPENTRY

To make the following jobs with hand tools

a) Lap joint b)Lap Tee joint c)Dove tail join d) Mortise & Tenon joint

e) Cross-Lap joint

2.WELDING USING ELECTRIC ARC WELDING PROCESS / GAS WELDING.

The following joints to be welded.

a) Lap joint b) Tee joint c) Edge joint d) Butt joint e) Corner joint

3.SHEET METAL OPERATIONS WITH HAND TOOLS.

a)Rectangular Tray b)Triangular Tray c)Pipe Joint d)Funnel e)Rectangular Scoop

4.HOUSE WIRING

a)To connect one lamp with one switch

b)To connect two lamps with one switch

c)To connect a fluorescent tube

d)Stair case wiring

e)Go down wiring

REFERENCE BOOKS:

1.Kannaiah P. & Narayana K. C., "Manual on Work Shop Practice", Scitech

Publications, Chennai, 1999.

2.Workshop Lab Manual , R.V.R. & J.C. College of Engineering , Guntur

CE/ME/CHE– 121   **4-1-0**
Mathematics-II

Unit-I

Ordinary differential equations (first order): Introduction, variables separable equations, Linear equations, Bernoulli's equations, Exact equations, equations reducible to exact equations, Orthogonal trajectories, Newton's law of cooling, Rate of Decay of Radio-Active Materials.

Unit-II

Ordinary differential equations (higher order): Linear Differential equations: Definition, Theorem, Operator D, Rules for finding the complementary function, Inverse operator, Rules for finding the particular integral, Working procedure to solve the equation, Linear dependence of solutions, Method of variation of parameters, Equations reducible to linear equations, Cauchy's homogeneous linear equation, Legendre's linear equation, Simultaneous linear equations with constant coefficients**.**

Unit-III

Laplace Transforms : Introduction, Transforms of elementary functions, Properties of Laplace Transforms, existence conditions, Transforms of derivatives, Integrals, multiplication by t^n , division by t, Evaluation of integrals by Laplace Transforms, Inverse transforms, convolution theorem, Application to Differential equations with constant coefficients, transforms of unit step function, unit impulse function, periodic function.

Unit-IV

Vector Calculus: Scalar and vector point functions, Del applied to scalar point functions. Gradient, Del applied to vector point functions, Physical interpretation of divergence, Del applied twice to point functions, Del applied to products of point functions, Integration of vectors, Line integral, Surfaces, Green's theorem in the plane (without proof), Stoke' s theorem (without proof), Volume integral, Gauss divergence Theorem (without proof),.

Text book

1]. Higher Engineering Mathematics by B.S. Grewal, 43rd edition, Khanna publishers, New

    Delhi.

Reference books:

 [1]. Advanced Engineering Mathematics by kreyszig.

 [2]. Engineering Mathematics by Babu Ram.

[3] Engineering Mathematics – I BY N.P. Bali, Satyanarayana Bhavanari and Indrani Kelker Laxmipublications, New Delhi.

[4] Mathematical Foundations for Computer Sciences- by Satyanarayana Bhavanari, Pradeep Kumar T.V, Shaik Mohiddin shaw, BSP Publications

CE/ME/CHE– 122   3-1-0
Engineering Physics-II
Unit-I   **12 Periods**
Principles of Quantum Mechanics
Dual nature of light, Matter waves & properties, de Broglie's concept of matter waves,
Davisson and Germer experiment, Heisenberg's uncertainty principle and applications (non-existence of electron in nucleus). One dimensional time independent Schrodinger's wave
equation, Physical significance of the wave function, Particle in a box (one dimensional).
Unit-II   **12 Periods**
ELECTRON THEORY OF METALS: Classical free electron theory - Mean free path -
Relaxation time and drift velocity - Quantum free electron theory - Fermi - Dirac (analytical)
and its dependence on temperature - Fermi energy, Hall effect and its uses.
BAND THEORY OF SOLIDS: Bloch theorem (qualitative) - Kronig - Penney model - Origin
of energy band formation in solids - Classification of materials into conductors, semi-conductors & insulators -Concept of effective mass of an electron.
Unit-III   **12**
Periods
Dielectric and Magnetic Materials
Electric dipole moment, polarization, dielectric constant, polarizability, types of polarizations,
internal fields (qualitative), Clausius-Mossotti equation, Frequency dependence of polarization,
Ferroelectrics and their applications.
Origin of magnetic moment of an atom, Bohr magneton, classification of dia, para and ferro
magnetic materials on the basis of magnetic moment, Hysteresis curve, soft and hard magnetic
materials, Ferrites and their applications.
UNIT –IV
Advanced Materials of Physics   **14**
Periods
Optoelectronic devices: Qualitative treatments of Photo diode, LED and LCD; Solar cell and
its characteristics.
Superconductivity: First experiment, critical parameters (T_c, H_c, I_c), Meissner effect, types of
superconductors, BCS Theory (in brief) and Applications of superconductors.
NanoTechnology : Introduction to nano materials, nano scale, surface to volume ratio,
fabrication of nanomaterials, sol-gel and chemical vapour deposition methods, Carbon nano
tubes-preparation and properties (thermal, electrical and mechanical - in brief), some
applications of nanomaterials.

TEXT BOOKS
1. Engineering Physics - R .K. Gaur & S. L. Gupta , Danpati Rai Publications, Delhi, 2001.
2. Engineering Physics – V. Rajendran, Tata MacGraw Hill, New Delhi, 2009.

 REFERENCE BOOKS
 1. Engineering Physics-P.K. Palanisamy, Scitech Publications PVT. Ltd, New Delhi
 2. Engineering Physics – M.R. Srinivasan, New age International Publishers, New Delhi
 3. Materials science – M.Vijaya and G.Rangarajan, TMH, New Delhi
 4. Engineering Physics, D.K. Bhattacharya and Poonam Tandon, Oxford university Press,
        New Delhi

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ENGINEERING CHEMISTRY -II

UNIT-I: CHEMISTRY OF NANOMATERIALS

Introduction to nano chemistry, preparation of nano materials - carbon nanotubes and fullerenes and their engineering applications.

UNIT-II: INSTRUMENTAL METHODS OF ANALYSIS

Basic principles, instrumentation and applications of UV-Visible, Infra-Red, Nuclear Magnetic Resonance (NMR), Gas Chromatography and High Performance Liquid Chromatography.

UNIT-III: SOLID STATE CHEMISTRY

Band theory of solids, types of semiconductors, preparation of semiconductors and semiconductor devices.

UNIT-IV: SOLAR ENERGY HARNESSING

Fundamentals, Conversion into electrical energy, Photovoltaic and Photogalvanic energy storage, Semiconductor photoelectrochemical cells, Photoelectrochemical reactions, Regenerative photoelectrochemical cells, Basic problems, Photocorrosion and protection of semiconductor electrodes, Protective coatings, Coatings of metals and electrically conductive polymers, Electrodes with chemically modified surfaces.

Prescribed Text Books

1. Engineering Chemistry, P.C. Jain and M. Jain – Dhanapath Rai & Sons, Delhi

2. Text book of Nano Science and Nano technology, B.S. Murthy and P. Shankar, University press.
3.   Text book of engineering chemistry, Shasi chawla,Dhanapath rai & sons,Delhi.
4. Gurudeep raj & chatwal anand , "Instrumental methods of analysis ", 7th edition,CBS publications,1986.
5. Quantitative analysis by day&underwood.
6.A Text book of Instrumental methods by Skoog and West.
7. H.W. Wilard and demerit, "Instrumental methods of analysis ", 7th edition,CBS publications,1986.

CE/ME/CHE-124   **4-1-0**

ENGINEERING MECHANICS -II

UNIT- I

Kinematics of Rectilinear Motion: Introduction to dynamics, displacement, velocity, acceleration, motion with uniform and variable acceleration.

Kinetics of Rectilinear Motion: Equations of rectilinear motion - motion of a particle acted upon by a constant force – D'Alemberts principle, work and energy, impulse momentum, conservation of energy, collision of elastic bodies – direct central impact.

UNIT-II

Kinematics of Curvilinear Motion: Introduction, components of motion- rectangular components – normal and tangential components.

Kinetics of Curvilinear Motion: Equations of motion- Rectangular components- tangential and normal components, Equations of dynamic equilibrium- D'Alembert's principle, Work and Energy.

UNIT-III

Rotation of a rigid body about a fixed axis: Kinematics of rotation, Equation of motion for a rigid body rotating about a fixed axis, rotation under the action of constant moment.

UNIT-IV

Kinematics of Plane Motion: Concepts of Relative velocity and instantaneous center.
Kinetics of Plane Motion: Equations of motion, Dynamic equilibrium of symmetrical rolling bodies.

LEARNING RESOURCES (For both I and II semesters)

TEXT BOOKS:

3. *Engineering Mechanics by S. Timoshenko, D.H. Young and J V Rao –Tata McGraw-Hill publishing Company Limited, New Delhi(For concepts), 2009*
4. *Engineering mechanics –statics and dynamics by A.K TAYAL –UMESH publications, Delhi (For numerical problems), 2008*

REFERENCE BOOKS:

5. *Engineering Mechanics by S.S.Bhavikatti, New Age International publishers, 2012*
6. *Engineering Mechanics- Statics and Dynamics by Irving H. Shames, Pearson Education, 2006.*
7. *Singer's Engineering Mechanics: Statics and Dynamics, K. Vijaya Kumar Reddy and J Suresh Kuma, 3rd Edition SI Units-BS Publications, 2010.*

A Textbook of Engineering mechanics statics and dynamics by J.L. Meriam and L. Kraige, 6th

Edition, Wiley & Sons ,2010.

ENVIRONMENTAL SCIECNE AND ENGINEERIG

UNIT-I
Introduction:
Definition, Scope and Importance.
Natural Resources:
Forest Resources – Use and over-exploitation, Deforestation, Mining, dams and their effects on forests and tribal people; Water Resources – Use and over-utilization of surface and ground water,floods and droughts, Water logging and salinity, Dams – benefits and problems, Conflicts over water; Energy resources – Energy needs, Renewable and non-renewable energy sources; Land resources – Land as a resource, land degradation, soil erosion & desertification, Effects of modern agriculture on land resources.
Ecosystems:
Definition, Structure and functions of an Ecosystems, Biogeochemical cycles-water, carbon,nitrogen and water cycles, Types-Forest, Greenland, Desert, Aquatic ecosystem.
UNIT-II
Biodiversity and its Conservation:
Definition, Value of biodiversity. Bio-geographical classification of India, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to bio-diversity, Endemic and endangered species of India,Conservation of biodiversity.
Environmental Pollution:
Causes, effects and control measures of Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, nuclear pollution, Solid waste management.
UNIT-III
Social Issues and Environment:
From unsustainable to sustainable development, Population growth and environment, Green revolution, Rain water harvesting, watershed management, cloud seeding, Resettlement and rehabilitation of people - problems and concerns, Environmental Impact Assessment.
Climate Changes: Global warming & Green house effect, Acid rain, Ozone layer depletion.
UNIT-IV
Environmental acts:
Prevention and Control of Water pollution & Air Pollution act, Environmental protection act, Wildlife protection act, Forest Conservation act.
International Conventions:
Stockholm Conference 1972, Earth Summit 1992. Copenhagen Summit 2009.
Case Studies: Chipko movement, Narmada Bachao Andolan, Silent Valley Project, Madhura Refinery and TajMahal, Chernobyl Nuclear Disaster, Ralegaon Siddhi, Florosis and Bhopal Tragedy.
Field work:
Visit to a local area to document environmental assets – river/ forest/ grassland / hill /mountain. Study of local environment-common plants, insects, birds. Study of simple ecosystems – pond, river, hill, slopes etc. Visits to industries, water treatment plants, effluent treatment plants.
Text Books
1. Environmental Studies, by Dr. Suresh K. Dhameja, Published by S.K. Kataria & Sons, Ludhiana.
Reference Books
1. Environmental studies by Anubha Kaushik and C.P.Kaushik., New Age International Publishers, New Delhi.
2. T Benny Joseph, Environmental Studies, the Tata McGraw-Hill Publishing Company Limited, New Delhi.
3.Environmental chemistry by A.K.De.

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   2-0-3

ENGINEERING DRAWING -II

Unit – I

Development of surfaces: Lateral development of cut sections of Cubes, Prisms, Pyramids, Cylinders and Cones.

Unit – II

Intersection of solids: Interpenetration of Right Regular solids. Intersection of Cylinder Vs Cylinder, Cylinder Vs Cone, Cylinder Vs Prism**.**

Unit – III

Isometric projections : Isometric Projection and conversion of Orthographic Projections into isometric views. (Treatment is limited to simple objects only).

Orthographic projections: Conversion of Pictorial views into Orthographic views.

Unit – IV

Perspective projections: Perspective View: Points, Lines, Plane figures and Simple Solids, Vanishing Point Methods(General Method only).

Unit - V(Demonstration only).

Computer Aided Drafting (using any Standard Package):

Practice of 2 D drawing: Exercise of orthographic views for simple solids using all commands in various tool bars.

TEXT BOOK:
•Engineering Drawing by N.D. Bhatt & V.M. Panchal. (Charotar Publishing House, Anand).
•AutoCAD for Engineering Drawing Made Easy by P.Nageswara Rao
REFERENCE BOOK:
• Engineering Drawing by Prof.K.L.Narayana & Prof. R.K.Kannaiah. SciTech Publisher.
• Engineering Graphics with AutoCAD by James D. Bethune

Basic English for Engineers

UNIT-1:

1. Listening Skills: The boy who broke the bank (English and Soft Skills)
2. Sonnet - To Science (The Siren's Song)
3. Vocabulary Building: One-Word Substitutes, Words Often Confused
4. Reading Comprehension

UNIT- II:

1. Written Communication Skills: Gateman's Gift (English and Soft Skills)
2. Work without Hope (The Siren's Song)
3. Grammar: Correction of Sentences
4. Writing: Letter Writing-- Formal and Informal Letters

UNIT - III:

1. Assertive Skills: The Verger (English and Soft Skills)
2. Seven Ages of Man (The Siren's Song)
3. Writing: Note- Taking, Note-Making
4. Paragraph Writing: Technical Description-Process, Object

UNIT - IV:
1. Teamwork Skills: Whitewashing the fence (English and Soft Skills)
2. Ozymandias (The Siren's Song)
3. Vocabulary Building: Idioms
4. Writing: Essay Writing

TEXTBOOKS:
1. S.P.Dhanavel, *English and Soft Skills*, New Delhi: Orient Black Swan Pvt. Ltd., 2013.
2. David Murdoch, *The Siren's Song: An Anthology of British and American Verse*, Madras, Orient Longman, 1993.
3. V.R.Narayanaswami, *Strengthen Writing 3rd Edition* New Delhi: Orient Blackswan Private Ltd., 2009.

REFERENCE BOOKS:
1. Dr. Shalini Verma, *Word Power Made Handy*, S.Chand & Co Ltd., 2009.
2. Sharon J.Gerson, Steven M.Gerson, *Technical Writing*, New Delhi: Pearson education, 2007.
3. Sanjay Kumar and Pushp Lata, *Communication Skills*, Noida: Oxford University Press, 2012.
4. M. Ashraf Rizvi, *Effective Technical Communication,* New Delhi: Tata Mc-Grew Hill, 2009.
5. Bikram K. Das, Kalyani Samantray, Rath Nayak, Susmita Pani & Saveeta Mohanty, *An Introduction to Professional English and Soft Skills,* New Delhi: Foundation Books, 2009.

Engineering Physics Lab

Any 15 experiments from the following list

LIST OF EXPERIMENTS

1.   Compound pendulum –Determination of acceleration due to gravity (g)
2.   Interference fringes - measurement of thickness of a foil / diameter of Wire using wedge method.
3.   Sensitive galvanometer - Determination of figure of merit
4.   Newton's rings – Measurement of radius of curvature of plano convex lens
5.   Lissajous' figures –Calibration of an audio oscillator
6.   Photo cell – I-V Characteristic curves and determination of stopping potential
7.   Diffraction grating – Measurement of wavelengths
8.   Torsional pendulum- Determination of rigidity modulus of the wire material.
9.   Carey- Foster's bridge: Determination of specific resistance/Temperature coefficient of resistance.
10. Photo voltaic cell - Determination of fill-factor
11. Variation of magnetic field along the axis of a current carrying circular coil.
12. Series l LCR resonance circuit - Determination of "Q" factor.
13. Thomson's method - determination of e/m of an electron.
14. Determination of a.c. Frequency – Sonometer.
15. Prism/Grating - Determination of dispersive power.
16. To determine the wavelength of Laser source.
17. Hall effect – Determination of Hall coefficient.
18. Determination of energy band gap.
19. Determination of Numerical Aperture of an optical fiber.
20. Determination of Amplitude and Frequency of an AC signal using a CRO.

CE/ME/CHE 162   **0-0-4**
English Communication Lab

Module-l Communication Skills

a) Types of Communication
b) Barriers to Communication
c) Strategies for Effective Communication
d) Verbal Communication Skills
e) Non- verbal Communication Skills

Module-2: Advanced Vocabulary

a) Word List (GRE & TOEFL related)
b) Catchphrases
c) Idioms

Module-3: Employability Skills

a) Interview Skills
b) Group Discussion
c) Debate
d) Resume Writing

Module-4: Telephonic Skills

a) Formal &Informal interaction

b) Receiving Messages & Complaints

c) Tone modulation

Module-5: Descriptive Skills
a) Process Description
b) Picture Description
c) Narration
d) Email Etiquette

Module-6: Behavioural Skills

a) Dress code & Conduct
b) Personality Development
c) Team Work
d) Motivation
e) Organization Skills

Suggested Software:

1. Globerena Software
2. K-Van Solutions Software
3. Centronix Software
4. Clarity English Software
5. Train 2 Success- CD Series (Zenith Global Consultancy)

Suggested List of Tasks:

Module 1	1. Tips for effective communication 2. Videos can be shown to make the students learn the importance of non-verbal communication
Module 2	3. Number of Worksheets will be given on Vocabulary enhancement 4. By conducting Quiz
Module 3	5. Mock Interviews can be conducted 6. Peer Discussions can be conducted
Module 4	7. Listening to Mock-Telephoning Skills 8. Role Plays can be conducted on telephonic conversations
Module 5	9. Pictorial descriptions 10. Narrating situations/stories
Module 6	11. Tips to improve personality development 12. Case studies on team work and organizational skills

NOTE: 10 Lab Activities are minimum in Record.

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

1. *Communicate to Conquer: A Handbook of Group Discussions and Job Interviews* with CD, PHI Publications.
2. *The ACE of Soft Skills: Attitude, communication and Etiquette for Success*, by Pearson Publications.
3. Leena Sen, *Communication Skills 2ⁿᵈ Edition*, PHI, 2007.
4. Stephen P. Robbins and Timothy A. Judge, *Organizational Behavior 13ᵗʰ Edition*, PHI, 2009.
5. Meenakshi Raman and Prakash Singh, *Business Communication*, Oxford University Press, 2006.
6. Sanjay Kumar and Pushp Lata, *Communication Skills,* Oxford University Press, 2011.
7. Dr. Shalini Verma, *Word Power Made Handy*, S.Chand & Co Ltd., 2009.

II B.Tech. – I Semester

Code	Name Of Subject	L	T	P	Int.	Ext.	Total	Credits
					Maximum Marks			
CE211	Mathematics - III	4	-		40	60	100	3
CE212	Building Materials & Construction.	4	-		40	60	100	3
CE213	Surveying – I	4	1		40	60	100	4
CE214	Solid Mechanics-I	4	1		40	60	100	4
CE215	Fluid Mechanics	4	1		40	60	100	4
CE216	Engineering Geology	4	-		40	60	100	3
CE251	Advanced Communication Skills Laboratory (AUDIT)	-	-	4	40	60	0	0
CE252	Engineering Geology Laboratory	-	-	4	40	60	100	2
CE253	Surveying Field Work - I	-	-	4	40	60	100	2
	Total	**24**	**3**	**12**	**360**	**540**	**800**	**25**

L – Lecture   ;   T – Tutorial: P – Practical

II B.Tech. – II Semester

Code	Name Of Subject	L	T	P	Int.	Ext.	Total	Credits
					Maximum Marks			
CE221	Concrete Technology	4	-		40	60	100	3
CE222	Surveying– II	4	1		40	60	100	4
CE223	Solid Mechanics-II	4	1		40	60	100	4
CE224	Hydraulics & Hydraulic Machines	4	1		40	60	100	4
CE225	Elements of Electrical and Mechanical Engineering	4	-		40	60	100	3
CE226	Professional Ethics and Human Values	2	-		40	60	100	0
CE261	Material Testing Laboratory	-	-	4	40	60	100	2
CE262	Hydraulics & Hydraulic Machines Laboratory	-	-	4	40	60	100	2
CE263	Building Planning & Drawing	-	-	4	40	60	100	2
	Total	**22**	**3**	**12**	**360**	**540**	**900**	**24**

L – Lecture   ;   T – Tutorial: P – Practical

CODE: CE211   **MATHEMATICS – III**

Lectures   : 4 Periods/Week   Sessional marks   : 40
University Exam   : 3 Hours   University Exam. Marks   : 60
                                                                          Credits: 3

UNIT – I
Partial Differential Equations:
Introduction - Formation of Partial Differential Equations - Solutions of a Partial Differential Equation- Linear Equations of the first Order (STANDARD TYPE) – method of separation of variables – Solution of one dimensional heat, wave equations and Laplace equations.
(17.1 – 17.3, 17.5,17.6, 18.2, 18.4 to 18.7)

UNIT – II
Numerical Methods:
Solution of Algebraic and Transcendental Equations: Introduction – Bisection Method – Regular falsi method – iteration method -   Newton Raphson Method; Numerical integration : Trapezoidal rule - Simpson's 1/3 - Simpson's three-eighth rule.
Numerical solution of first order ordinary differential equations - - Picard's Method, Taylor series method, Euler's Method - Runge- Kutta Method of fourth order.
(28.1 to 28.3, 30.6 to 30.8, 32.1 to 32.4, 32.7)

UNIT – III
Probability and distributions:
Definition of probability and conditional probability: Addition theorem – Multiplication theorem – Bayes theorem – Random Variables – Binomial – Poisson's and Normal distributions.
(26.1 to 26.7, 26.14 to 26.16)

Complex Variables : Introduction – Limit – derivative of complex variable – Analytic functions – Harmonic functions.
(20.1 to 20.5)

UNIT – IV
Complex variables (continued):
Complex integration – Cauchys theorem – Cauchy's integral formula – Taylar's series and Laurent series (without proof) - zeros and singularities – Residues – Residue theorem – Calculation of residues.   (20.12 to 20.19)

TEXT BOOK
1. B.S. Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers,

REFERENCE BOOKS:

1. N.P. Bali, A textbook of Engineering Mathematics, Laxmi publications

2. Erwin Kreyszig, Advanced Engineering Mathematics, 8th Edition, New Age International (P) Ltd

3 Engineering Mathematics – I BY N.P. Bali, Satyanarayana Bhavanari and Indrani Kelker Laxmipublications, New Delhi.

CODE: CE212   BUILDING MATERIAL & CONSTRUCTION

Lectures	: 4 Periods/Week	Sessional marks	: 40
University Exam	: 3 Hours	University Exam. Marks	: 60
			Credits: 3

UNIT – I

Stones: Qualities of a good building stone, Common building stones of India.

Bricks: General; Composition of good brick earth; Harmful ingredients in brick earth; Manufacture of bricks by clamp burning and kiln (only Hoffmans kiln) burning, Qualities of good bricks; Tests for bricks; Classification of bricks; Size and weight of bricks.

Lime: General; Some definitions; Sources of lime; Constituents of limestones; Classification of limes; Properties of fat lime and hydraulic lime.

Timber: Definition; Structure of a tree; Qualities of good timber; Decay of timber; Preservation of timber; Advantages of timber construction; Uses of timber.

UNIT – II

Glass: Manufacture and Classification, Treatment of glass, Uses of glass, testing for quality, Characteristics and Performance of glass, Glass fiber.

Plastics: Classification of plastics, Properties of plastics, Fabrication of plastic articles, some plastics in common use, Reinforced plastics.

Paints: Types of paints, Composition of paints, Considerations in choosing paints, Paints commonly used in buildings.

Plastering: Specifications for cement plastering, plastering method, Specifications for plastering with cement mortar.

UNIT –III

Stone & Brick Masonry: Technical terms; Types of bonds in brickwork and their suitability. Classification of stone masonry.

Walls: Classification of walls.

Floors: Technical terms; Types of ground floors

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

UNIT –IV

Staircases: Technical terms; Types of stair-cases, design considerations.

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

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

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

NOTE

Two questions of 14 marks each will be given from each unit out of which one is to be answered. Fourteen questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Engineering Materials by S. C. Rangwala; Charotar Publishing House, Anand.
2. Building construction by B. C. Punmia et all; Laxmi Publications, New Delhi.
3. Planning and Designing Buildings by Yashwant S. Sane, Allies Book Stall.

REFERENCE

Building Drawing by M.G. Shah, C.M. Kale and S.Y. Patki, Tata McGrqw-Hill, New Delhi.

CODE: CE213   **SURVEYING – I**

Lectures	: 4/1 Periods/Week	Sessional marks	: 40
University Exam	: 3 Hours	University Exam. Marks	: 60
Credits: 4			

UNIT – I

Surveying & Measurements : Definitions; Classification; Principles of Surveying; Basic measurements in surveying; Instruments used for different measurements; Units of measurement(linear & Angular); Plan and map; Scales used for Maps and plans; Phases of survey work and Duties of a surveyor.

Linear Measurements : Accuracy, Precision; Methods of distance measurement; Equipments for distance measurement; Procedures for distance measurement - Ranging, Chaining/taping a line; Types and Sources of Errors in chaining , taping and their corrections; Degree of accuracy in chaining.

Chain Surveying : Principle of Chain surveying; Basic definitions; Well-Conditioned & Ill-Conditioned triangles; Selection of stations and survey lines; Procedure of Field Work in Chain Surveying; Off-sets; Booking the survey (Field Book); Conventional Symbols; Problems encountered in chaining; Obstacles in chain Surveying.

UNIT – II

Minor instruments & Errors : Optical Square; Prism Square; Simple Clinometer; Sources and types of errors; Significant figures, rounding of Numbers; Probability in Survey measurements; Normal distribution; Errors in computed results; Weights of measurements.

Compass Surveying : Angles and Bearings; Instruments used to measure angles and bearings; Designation of Bearings; Traverse Survey; Types of traverse; Fore and Back Bearings; Calculation of Included Angles from Bearings and Bearings from Included Angles; Prismatic & Surveyor's Compass; Magnetic Dip & Declination; Local Attraction and Corrections; Plotting of a Compass Traverse.

UNIT – III

Traversing : Definition; Methods of Traversing; Selection of Traverse Stations; Marking of Stations; linear and angular (both bearings and angles) measurements; Compatibility of linear and angular measurements; Traverse Computations - Consecutive Co-ordinates, Independent Co-ordinates, Checks in traversing; Closing error; Methods of adjustments; Gale's traverse table; Omitted measurements.

Plane Table : Principle; Accessories of plane table; Orientation; Procedure of setting up plane table over a station; Methods of Plane Tabling - Radiation, Intersection, Traversing; Resection - Two point problem; Advantages and disadvantages

UNIT - IV
.
Simple Leveling : Basic definitions; Curvature and Refraction; Different methods of leveling; Levels - Dumpy level, Tilting level, Auto level; Sensitivity of a Level tube; Leveling staff; Level field book; Booking and reducing levels; Classification of direct differential leveling methods -Fly leveling, Check leveling, Profile leveling and Cross sectioning, Reciprocal leveling and Precise leveling; Sources of errors & Difficulties in leveling.

Contouring : Methods of representing Relief; Contouring; contour interval; Characteristics of contours; Methods of locating contours; Direct and indirect methods of contouring; Interpolation and sketching of contours; Location of a contour gradient on map and ground; Uses of contour maps.

NOTE : Two questions of 10 marks each will be given from each unit out of which one is to be answered. Ten questions of one mark each will be given from entire syllabus which is a compulsory question.

LEARNING RESOURCES

TEXT BOOKS:
1. *Surveying Vol. 1 & II by Dr. K. R. Arora,11th Edition, Standard Book House,2012.*
2. *Surveying Vol. I & II by S K Duggal, 4th Edition, McGraw Hill Education (India) Private Limited,2013.*

REFERENCE TEXT BOOKS :
1. Surveying Vol. I&II by B.C. Punmia ,Laxmi Publications,2005.
2. Surveying and Levelling by N.N Basak, McGraw Hill Education (India) Private Limited,2014.
3. Plane Surveying by AM Chandra, 2nd Edition,New Age International (P) Ltd.,2006.

WEB REFERENCES :
http://nptel.ac.in/courses/105104101/
http://nptel.ac.in/courses/105107121/
http://nptel.ac.in/courses/105107122/

CODE: CE214 **SOLID MECHANICS – I**

Lectures	: 4/1 Periods/Week	Sessional marks	: 40
University Exam	: 3 Hours	University Exam. Marks	: 60
			Credits: 4

UNIT-I

Stress
Introduction; Method of sections; Definition of stress; Normal stresses in axially loaded bars; Shear stresses ; Analysis for normal and shear stresses; Stresses on inclined sections in axially loaded bars; Allowable stress and factor of safety

Strain
Introduction; Normal strain; Stress-strain diagrams; Hooke's law; Deformation of axially loaded bars; Thermal strain and deformation; statically indeterminate axially loaded bars; Shear strain; Hooke's law for shear stress and shear strain

Generalized Hooke's law and Pressure vessels
Poisson's ratio; Generalized Hooke's law for isotropic materials; Relationship between Modulus of elasticity and Modulus of rigidity; Dilatation and Bulk modulus; Thin-walled pressure vessels – Cylindrical and spherical vessels

UNIT-II
Internal forces in beams
Introduction; Diagrammatic conventions for supports and loads; Calculation of beam reactions; Application of method of sections; Shear force in beams; Bending moment in beams; Shear force and bending moment diagrams; Differential equations of equilibrium for a beam element

UNIT-III
Normal stresses in beams
Introduction; Basic assumptions; The elastic flexure formula ; application of flexure formula; Unsymmetric bending – Bending about both principal axes of a beam with symmetric cross section.

UNIT-IV
Shear stresses in beams
Introduction; Shear flow; The shear stress formula for beams; Shear stress in beam flanges; Shear centre.

Torsion
Introduction; Application of the method of sections; Torsion of circular elastic bars – Basic assumptions, the torsion formula ; Power transmission by circular shafts

NOTE

Two questions of 14 marks each will be given from each unit out of which one is to be answered. Fourteen questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK

Mechanics of Materials by Pytel and Kiusalaas , Cengage Learning

REFERENCES

1. Mechanics of materials by E.P. Popov , Prentice Hall of India
2. Engineering mechanics of solids by E.P.Popov, PHI Learining
3. Elements of strength of materials by S.P.Timoshenko and D.H.Young, Affiliated East-West Press Pvt.Ltd.

CODE: CE215   **FLUID MECHANICS**

Lectures	: 4/1Periods/Week	Sessional marks	: 40
University Exam	: 3 Hours	University Exam. Marks	: 60
			Credits: 4

UNIT – I

Introduction
Dimensions and units – Physical properties of fluids- specific gravity, viscosity, surface tension, vapour pressure and their influences on fluid motion

Fluid Statics
Variation of static pressure; Absolute and gauge pressure; Pressure measurement by manometers; Pressure on plane surfaces and curved surfaces.

Buoyancy
Buoyancy; Stability of submerged bodies and floating bodies; Metacentre and metacentric height.

UNIT – II

Fluid Kinematics
Methods of describing fluid motion; Classification of flows; Steady, unsteady, uniform and non-uniform flows; Laminar and turbulent flows; One, two and three dimensional flows; Irrotational and rotational flows; Streamline; Path line; Streak line; Equation for acceleration; Convective acceleration; Local acceleration; Continuity equation; Velocity potential and stream function; Flow net; Vortex flow – free vortex and forced vortex flow.

Fluid Dynamics
Euler's equation of motion; Bernoulli's equation; Energy correction factor; Momentum principle; Applications of momentum equation- Force exerted on a pipe bend.

UNIT – III

Flow Measurement In Pipes
Discharge through venturi meter; Discharge through orifice meter; Discharge through flow nozzle; Measurement of velocity by pitot tube.

Flow Through Orifices And Mouthpieces
Flow through orifices; Determination of coefficients for an orifice; Flow through large rectangular orifice; Flow through submerged orifice; Classification of mouthpieces; Flow through external and internal cylindrical mouthpiece.

Flow Over Notches And Weirs
Flow through rectangular, triangular and trapezoidal notches and weirs; End contractions; Velocity of approach; Broad crested weir.

UNIT – IV

Analysis Of Pipe Flow
Laws of Fluid friction – Darcy's equation, Minor losses – pipes in series – pipes in parallel – branched pipes; Total energy line and hydraulic gradient line, Hydraulic power transmission through a pipe; Siphon; Water hammer.

Laminar Flow

Reynold's experiment; Characteristics of laminar flow; Steady laminar flow through a circular pipe (Hagen Poiseuille equation).

Turbulent Flow In Pipes

Characteristics of turbulent flow, Hydro dynamically smooth and rough boundaries, Velocity distribution, Friction factor for pipe flow, Variation of friction factor with Reynolds number-Moody's chart.

NOTE

Two questions of 14 marks each will be given from each unit out of which one is to be answered. Fourteen questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK

Hydraulics and Fluid Mechanics including Hydraulic Machines by P. N. Modi and S. M. Seth; Standard book house; New Delhi.

REFERENCE BOOKS

1. Fluid Mechanics by A. K Jain, Khanna Publishers
2. Fluid Mechanics and Hydraulic Machines by R. K. Bansal; Laxmi Publications; New Delhi.
3. Fluid Mechanics by Streeter and wyile, McGrawhill Publications
4. Fluid Mechanics by S K Som and G Biswas,Tata Mcgraw Hill Publications
5. Fluid Mechanics by John F. Douglas, Janusz M Gasiorek, John A. Swaffield, Pearson Education Publishers
6. Fluid Mechanics, Hydraulics and Hydraulic Machines by K R Arora, Standard Publishers

CODE: CE216   ENGINEERING GEOLOGY

Lectures	: 4 Periods/Week	Sessional marks	: 40
University Exam	: 3 Hours	University Exam. Marks	: 60
			Credits: 3

UNIT-I

Introduction: Branches of geology; Importance of geology in Civil engineering.

Physical Geology: Geological processes; Weathering, Erosion, and Civil engineering importance of weathering and Erosion:

Mineralogy: Definition of mineral; Importance of study of minerals; Significance of different physical properties in mineral identification; Study of physical properties, structure and chemical composition of following common rock forming and economic minerals: Feldspar, Quartz, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Apatite , Kyanite, Garnet, Beryl, Talc, Calcite, Dolomite, Pyrite, Hematite, Magnetite, Galena, Graphite, Magnesite , Bauxite and Clay minerals:

UNIT- II

Petrology : Introduction; Definition of Rock, Civil engineering importance of petrology; Rock cycle, Geological Classification of rocks:

Igneous Rocks:Forms, Structures and textures of igneous rocks. Megascopic description and civil engineering uses of Granite, Basalt, Dolerite, Pegmatite and Charnockite:

Sedimentary Rocks:Formation; Structures and textures of sedimentary rocks. Megascopic description and civil engineering uses of Laterite, Conglomerate, Sand stone, Lime stone and Shale:

Metamorphic Rocks :Types of metamorphism; Structures and textures of metamorphic rocks. Megascopic Description and Civil engineering uses of Gneiss, Schist, Quartzite, Marble and Slate:

UNIT-III

Structural Geology: Introduction; Out crop, Strike and dip, Causes for development of secondary structures: Classification of Structures associated with rocks like Folds, Faults, Joints, Unconformities and their Civil engineering importance :

Earthquakes: Classification and causes; Intensity and magnitude and their measuring scales; Effects of earthquakes; Seismic belts; Civil Engineering considerations in seismic areas; Seismic zones of India:

Land Slides : Classification; Causes and effects; Preventive measures of landslides:

Ground water: Introduction: Classification of rocks based on porosity and permeability; Types of aquifers; Effects of groundwater over draft.

UNIT- IV

Geophysical Investigations: Geophysical methods of investigation – Over view; Electrical resistivity method; Seismic refraction method:

Dams: Types of Dams; Geological considerations for the selection of dam sites; Stages of

investigation; Case histories of some dam failures; Geology of some Indian dam sites:

Tunnels: Purpose of Tunneling; Geological considerations for tunneling; Effects of tunneling; Over break; Geology of some tunnel sites:

Improvement in the Properties of Rock Mass: Materials and Methods of Grouting, Principles and mechanism of Rock bolting.

NOTE

Two questions of 14 marks each will be given from each unit out of which one is to be answered. Fourteen questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK
A text Book of Engineering Geology by N. Chennakesavulu; Macmillan India Ltd., Delhi.

REFERENCE BOOKS

1. Principles of Engineering Geology- KVGK Gokhale - B. S. Publication
2. Fundamentals of Engineering Geology, F.G.Bell - Butterworths Publications – New Delhi.
3. Principles of Engineering Geology and Geotechnics- CBS Publishers & Distribution.
4. Engineering Geology for Civil Engineers by D. Venkata Reddy; Oxford & IBM Publishing Company Pvt. Ltd., New Delhi.
5. Engineering and General Geology by Parbin Singh; S. K. Kataria & Sons, New Delhi.
6. Rock Mechanics for Engineers by Dr.B.P.Varma, Khana Publishers, Delhi-6.
7. Principles of Engineering Geology by K M Bangar, Standard Publishers and Distributers.

Advanced English Communication Skills Lab

(Common to CE/ME branches)

Lectures: 3 Periods   Sessional Marks: 40

University Exam: 3 hours   University Examination Marks: 60

Course Objectives:

The main course objective of ***Advanced English Communication Skills Lab*** is to develop the student's Verbal and Non-Verbal Communication, Cognitive and Poignant Skills, Interview Skills, Employability and Interpersonal skills, which relate to situations in the work place. The skills imparted to the learners are body language, leadership, time management, team management, assertive skills, group discussions, interview techniques and positive work ethics ...etc.

The methodology includes Interactive sessions, Role Play, Team Work/Group Work/Pair Work and Peer Evaluation. The emphasis is on learning by doing to improve the learners' life skills.

Course Outcomes:

CO1	To realize the importance of communication skills in job arena To enhance the students ability to communicate
CO2	Able to realize the importance of body language while communicating with others in professional life
CO3	Able to learn vocabulary for GRE, TOEFL, IELTS,IES etc and written communication skills

CO4	Capable to participate in all recruitment procedures
CO5	Able to communicate effectively over a phone and proficient to demonstrate telephoning skills
CO6	Able to know the importance of personality development

Syllabus:

Module- I Communication Skills (Ref: 3

    I.   Verbal Communication:

f) Types of Communication

g) Barriers to Communication

h) Strategies for effective communication

Module- II Nonverbal Communication:

    a) Body Language – Voluntary and Involuntary
    b) Kinesics
    c) Facial Expressions
    d) Proxemics
    e) Oculesics
    f) Haptics and Chronemics

Module- III : **Vocabulary and Written Communication Skills:**

    a) Word list (GRE & TOEFL related)

    b) One-word Substitutes

    c) Idiomatic Expressions

    d) Email etiquette

Module- IV: Employability Skills (Ref: 6)

    e) Interview Skills
    f) Group Discussion

g) Debate

h) Resume Writing

Module- V: Telephonic Skills:

a) Formal &Informal interaction

b) Receiving Messages & Complaints

c) Tone modulation

Module-VI: Behavioural Skills:

f) Dress code & Conduct
g) Personality Development
h) Team Work
i) Motivation
j) Organization Skills

Suggested List of Tasks

Module 1	3. Tips for verbal communication 4. Videos can be shown to make the students learn the importance of verbal communication
Module 2	1.Tips for Nonverbal communication 2. Videos can be shown to make the students learn the importance of non-verbal communication
Module 3	1. Number of Worksheets will be given on Vocabulary enhancement 2. By conducting Quiz
Module 4	1. Mock Interviews can be conducted 2. Peer Discussions can be conducted
Module 5	1. Listening to Mock-Telephoning Skills 2. Role Plays can be conducted on telephonic conversations
Module 6	1. Pictorial descriptions 2. Narrating situations/stories

NOTE: 10 Lab Activities are minimum in Record (100 pages single side book) with
Contents: Name of the Activity, Source, Skill Improved.

Minimum Requirements:

The Advanced English Communication Skills Lab shall also need two labs. One is Communication Skills Lab with LAN facilitated 60 multimedia systems and software of the Soft Skills suggested by the concern faculty. The other, Conversational Skills Lab with 5 to 6 round tables, 60 movable chairs and audio-visual Devices with LCD Projector.

Suggested Software:

6. Globerena Software

7. K-Van Solutions Software

8. Centronix Software

9. Train 2 Success- CD Series (Zenith Global Consultancy)

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

8. Communicate to Conquer: A Handbook of Group Discussions and Job Interviews with CD, PHI Publications.
9. The ACE of Soft Skills: Attitude, communication and Etiquette for Success, by Pearson Publications.
10. Communication Skills, Leena Sen, 2nd Edition, PHI, 2007.
11. Introduction to Psychology, Dennis Coon and John O. Mitterer, 11th Edition, Thompson Wadsworth, 2007.
12. Organizational Behavior, Stephen P. Robbins and Timothy A. Judge, 13th Edition, PHI, 2009.
13. Business Communication, Meenakshi Raman and Prakash Singh, Oxford University Press, 2006.

DISTRIBUTION AND WEIGHTAGE OF MARKS

Soft Skills Laboratory Practical Paper:

1. The practical examinations for the Soft Skills Laboratory shall be conducted as per the University norms prescribed for the Core Engineering Practical Sessions.

2. For the *Advanced English Communication Skills 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, 30 marks to be allotted for Internal Lab examination, 10 (5+5) marks to be allotted to their attendance and attitude in the lab sessions. 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 60 marks, 40 marks shall be equally distributed to LSRW Skills, 10 marks shall be awarded for day-to-day performance (i.e. *Final Grade in the Record)* and 10 marks to be allotted for Vice-a-voce by the external examiner to evaluate the learners Interpersonal Skills and Soft Skills.

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CODE: CE252   ENGINEERING GEOLOGY LABORATORY

Lectures	: 4 Periods/Week	Sessional marks	: 40
University Exam	: 3 Hours	University Exam. Marks	: 60
			Credits: 2

Note: A minimum of twelve (12No) shall be done and recorded

1. Study of Survey of India Topographical Maps
2. Study of Satellite Imageries through appraisal cards
3. Study of Physical Properties and identification Minerals (2 experiments)
   i. Silicate minerals
   ii. Non silicate minerals
4. Megascopic description and identification of Rocks (3 experiments)
   i. Igneous rocks
   ii. Sedimentary rocks
   iii. Metamorphic rocks
5. Joint Data Analysis
6. Simple Structural geology Problems
7. Study of Geological Maps and their Cross-section
8. Electrical Resistivity Method (demo)
9. Seismic Hammer Sounding Method (demo)
10. Study of Structural Models
11. Study of Tunnel Models

CODE: CE253   LABORATORY
                         SURVEYING FIELD WORK - I

Lectures   : 4 Periods/Week   Sessional marks   : 40
University Exam   : 3 Hours   University Exam. Marks   : 60
                                                                   Credits: 2

Chain & Compass Survey

Measurement of area – Cross staff survey
Traversing by compass and graphical adjustment.
Plotting of an area using Chain/Compass.

Simple Leveling
Measurement of elevation difference between two points using any leveling Instrument (Fly Leveling)
Elevation difference between two points by Reciprocal leveling method.
Profile Leveling – Plotting of Profile.
Contouring of a small area by method of Blocks/Tacheometric Survey.

Plane Table Survey
Determination of the distance between two inaccessible points.
Plotting of a building by plane table Traversing
Resection methods.

Theodolite
Measurement of horizontal and vertical angles.
Determination of distance between two inaccessible points

CODE: CE221　　　　**CONCRETE TECHNOLOGY**

Lectures	: 4 Periods/Week	Sessional marks	: 40
University Exam	: 3 Hours	University Exam. Marks	: 60
			Credits: 3

UNIT-I

Cement

General, Manufacture of Portland cement by dry process, Approximate oxide composition limits of OPC, Bogue's compounds, Hydration of cement, heat of hydration, structure of hydrated cement.

Types Of Cements and testing of cement

Ordinary Portland cement, low alkali cement, Rapid hardening cement, Sulphate resisting cement, Portland blast furnace slag cement, Portland pozzolana cement, air entraining cement, white cement, hydro phobic cement, oil well cement, low heat Portland cement.

Soundness test, Setting times test, Compressive strength test and Fineness test by air permeability apparatus.

Aggregates And Testing Of Aggregates

Classification of aggregates according to size and shape. Characteristics of aggregates-shape and texture, cleanliness, toughness, hardness.

Tests for bulking of fine aggregate, Fineness modulus and Zoning of fine aggregate, Fineness modulus of coarse aggregate.

UNIT-II

Water

Tolerable concentrations of impurities in mixing water, Use of sea water for mixing concrete.

Fresh Concrete

Workability, factors affecting workability, Segregation and Bleeding in concrete, measurement of workability using slump cone test, Kelly ball test, Vee-Bee test, compaction factor test.

Hardened Concrete
Factors affecting compressive strength of concrete, Cube compression test, split tensile strength test, flexural strength of concrete.

Durability of concrete, factors affecting durability of concrete.

UNIT-III

Production Of Concrete

Batching of materials, mixing, transportation, placing, compaction and finishing of concrete. Curing of concrete and methods of curing.

Concrete Mix Design

Basic considerations for concrete mix design, factors influencing the choice of mix proportions, Indian standard method of concrete mix design

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Ready Mixed Concrete (RMC)

Advantages of RMC, components of RMC plant, distribution and transportation, handling and placing, specifications for ready mix concrete as per IS:4926-2003.

UNIT-IV

Chemical And Mineral Admixtures

Functions of admixtures, accelerators, retarders, air entraining admixtures, plasticizers and super plasticizers, water proofers, fly ash, silica fume, ground granulated blast furnace slag.

Special Materials In Construction And Concreting Techniques

Ferro-cement, self-compacting concrete, fibre reinforced concrete, high strength concrete. Shortcrete or guniting.

Future Trends In Concrete Technology

Recycled aggregate concrete, properties of recycled aggregate concrete, green building, maintenance, need for green buildings.

NOTE

Two questions of 14 marks each will be given from each unit out of which one is to be answered. Fourteen questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOKS

1. Concrete technology by A.R.Santha kumar, Oxford University Press
2. Concrete technology by M.S.Shetty, S.Chand & Company Pvt. Ltd., New Delhi

REFERENCE BOOKS

1. Properties of concrete by A.M.Neville, Longman Publishers
2. Concrete technology by M.L.Gambhir, Tata McGraw-Hill Publishing company Ltd., New Delhi

CODE: CE222 **SURVEYING – II**

Lectures	: 4/1Periods/Week	Sessional marks	: 40
University Exam	: 3 Hours	University Exam. Marks	: 60
			Credits: 4

UNIT – I

Modern Systems in Surveying : Electronic Distance Measurements - Basic definitions, distance from measurement of transit time; Infrared EDM instruments; Microwave EDM instruments; Digital theodolite; Total Station; Digital Level; Global Positioning System.

Computation of Areas : Introduction; Simpson's rule; Boundaries with offsets at irregular intervals; Meridian methods; Coordinate method; Planimeter - Area of Zero circle. Area of cross sections - two level section only.

Computation of volumes :Trapezoidal rule; Prismoidal formula; Volume from spot levels; volume from contour plan; Capacity of a reservoir

UNIT – II

Theodolite Surveying : Types of Theodolites; Vernier Theodolite - Essential Parts; Basic definitions; Fundamental lines and desired relations; Temporary and permanent adjustments; Field operations - Measurement of horizontal angles(Repetition & Reiteration), vertical angles, direct angles, deflection angles, bearings; Lining-in, Balancing- in, Double sight, Random line method of running a line, Prolonging a straight line and location of intersection of two straight lines, to lay off a horizontal angle.

Construction Surveying : Control stations; Horizontal Control - Reference grid; Vertical Control; Positioning of a structure; offset pegs; Reference pillars and Batter boards; Grade stakes; Boning rods or travelers; Sight rails; Slope rails; Profile boards or batter boards; controlling side slopes in embankment and cutting; Setting out a foundation; setting out a culvert; Setting out a sewers and pipe lines; Setting out of Bridges - Location of centre line, Location of piers

UNIT – III

Trigonometric Leveling : Introduction; Plane trigonometric leveling methods - When base of the vertical or inclined object accessible and when base of the object is not accessible; Axis signal correction; Difference in elevation by single observation and reciprocal observations.

Tacheometric Surveying : Advantages of tachometric surveying; Basic systems of tachometric measurements; Principle of stadia measurements, Determination of constants K and C; Inclined sight with staff vertical; Inclined sight with staff normal to the line of sight; External- Focussing Telescope with an Anallactic lens; Internal focussing telescope; uses of Tacheometry; Errors in Tacheometric surveying; Accuracy of Tacheometric Surveying.

UNIT – IV

Curves Ranging : Circular curves - Basic definitions; Designation of a curve; Relationship between radius and degree of curve; Elements of a simple circular curve; Location of the tangent points; selection of peg interval; Methods of setting out; Problems in setting out curves; Com-pound and Reverse curves.

NOTE:

Two questions of 14marks each will be given from each unit out of which one is to be answered. Fourteen questions of one mark each will be given from entire syllabus which is a compulsory question.

LEARNING RESOURCES

TEXT BOOKS:
1. Surveying Vol. 1 & II by Dr. K. R. Arora,11th Edition, Standard Book House,2012.
2. Surveying Vol. I & II by S K Duggal, 4th Edition, McGraw Hill Education (India) Private Limited,2013.

REFERENCE TEXT BOOKS :
1. Surveying Vol. I&II by B.C. Punmia ,Laxmi Publications,2005.
2. Surveying and Levelling by N.N Basak, McGraw Hill Education (India) Private Limited,2014.
3. Plane Surveying by AM Chandra, 2nd Edition,New Age International (P) Ltd.,2006.

WEB REFERENCES :
http://nptel.ac.in/courses/105104100/
http://nptel.ac.in/courses/105104101/
http://nptel.ac.in/courses/105107121/
http://nptel.ac.in/courses/105107122/

CODE: CE223   **SOLID MECHANICS – II**

Lectures   : 4/1Periods/Week   Sessional marks   : 40
University Exam   : 3 Hours   University Exam. Marks   : 60
                                                                     Credits: 4

UNIT – I

Compound stresses

Introduction; Superposition and its limitation; Superposition of normal stresses; Stresses in a dam-middle-third rule; Eccentrically loaded short columns; Core or kernel of a section; Superposition of shear stresses; Stresses in closely coiled helical springs; Deflection of closely coiled helical springs

UNIT -II

Analysis of Plane-Stress

Introduction; The basic problem; Equations for transformation of plane-stress; Principal planes and Principal stresses ; Maximum shear stresses ; Mohr's circle of stress ; Construction of Mohr's circle

Work and Strain Energy

Introduction; Elastic strain energy for uni-axial stress; elastic strain energy in pure bending; Strain energy of beams in shear; Strain energy of circular shafts in torsion; Work and strain energy method; Determination of displacements by work and strain energy method

UNIT-III

Failure Theories

Introduction; maximum normal stress theory; maximum shearing stress theory; maximum strain energy theory; maximum distortion energy theory; comparison of theories.

Buckling of columns

Introduction; Examples of instability; Criteria for stable equilibrium; Euler load for column with pinned ends; Euler loads for columns with different end restraints; Limitations of the Euler's formulae; Generalized Euler buckling load formulae; Eccentric loads and the secant formula

UNIT –IV

Deflection of statically determinate beams

Introduction; strain-curvature and Moment-Curvature relation; Governing differential equation for deflection of elastic beams; Solution of beam deflection problem by Direct integration; Introduction to moment area method; Derivation of Moment area theorems; conjugate-beam method; slope and deflection of beams using moment area method.

NOTE

Two questions of 14 marks each will be given from each unit out of which one is to be answered. Fourteen questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK

Mechanics of Materials by Pytel and Kiusalaas , Cengage Learning

REFERENCES

1. Mechanics of materials by E.P. Popov , Prentice Hall of India
2. Engineering mechanics of solids by E.P.Popov, PHI Learining
3. Elements of strength of materials by S.P.Timoshenko and D.H.Young, Affiliated East-West Press Pvt.Ltd.

CODE: CE224   **HYDRAULICS AND HYDRAULIC MACHINES**

Lectures   : 4/1Periods/Week   Sessional marks   : 40
University Exam   : 3 Hours   University Exam. Marks   : 60
                                                                    Credits: 4

UNIT – I

Open Channel Flow - Uniform Flow

Introduction, Classification of flows, Types of channels; Chezy, Manning's, Bazin, Kutter's Equations; Hydraulically efficient channel sections - Rectangular, Trapezoidal and Circular channels; Velocity distribution; Energy and momentum correction factors; Pressure distribution.

Open Channel Flow - Non - Uniform Flow

Concept of specific energy; Specific energy curves; Critical flow; Critical flow in a rectangular channel; Critical slope; Different slope conditions; Channel transitions- Reduction in width of channels, hump; Momentum principle applied to open channel flow; Specific force.

UNIT – II

Open Channel Flow - Gradually Varied Flow

Dynamic equation; surface profiles; Computation of surface profiles by single step method; Back water curves and Draw down curves; Examples of various types of water surface profiles.

Open Channel Flow - Rapidly Varied Flow

Hydraulic jump; Elements and characteristics of hydraulic jump; Types of hydraulic jump; Location and applications of hydraulic jump; Energy loss in a hydraulic jump.

UNIT – III

Momentum Principles

Action of jets on stationary and moving flat plates and curved vanes; Angular momentum principle; Torque in rotodynamic machines.

Hydraulic Turbines

Classification; Impulse; Reaction; Radial, Axial, mixed and tangential flow turbines; Pelton, Francis turbines; Runner profiles; Velocity triangles; Head and efficiency; Draft tube theory; Similarity laws; Concept of specific speed and unit quantities; Selection of Turbines; Operational characteristics.

UNIT – IV

Centrifugal Pumps

Manometric head; Losses and efficiencies; Work done; Working Principle; Priming; Velocity triangles; Performance and characteristic curves; Cavitation effects; Similarity considerations.

Dimensional Analysis And Similitude

Dimensional homogenity; Rayleigh's method; Buckingham π -method ; Geometric, Kinematic and Dynamic similarities; Reynold's, Froude, Euler, Mach and Weber numbers; Model laws; Scale effect; Distorted models.

NOTE

Two questions of 14 marks each will be given from each unit out of which one is to be answered. Fourteen questions of one mark each will be given from entire syllabus which is a compulsory question.

TEXT BOOK

Hydraulics and Fluid Mechanics including Hydraulic Machines by P. N. Modi and S. M. Seth; Standard Book house, New Delhi

REFERENCE BOOKS

1. Fluid Mechanics by A. K. Jain; Khanna Publishers, Delhi
2. Open channel flow by K. Subramanya, TMH Publishers
3. Fluid Mechanics and Hydraulic Machines by R. K. Bansal; Laxmi Publications, New Delhi.

CODE: CE225   ELEMENTS OF ELECTRICAL AND MECHANICAL ENGINEERING

Lectures   : 4 Periods/Week   Sessional marks   : 40
University Exam   : 3 Hours   University Exam. Marks   : 60

Credits: 3

Part A : ELECTRICAL ENGINEERING

UNIT – I

Electrical Installation

Alternating current and its advantages**;** Single phase and three phase power supply ; Ratings of different electrical appliances ; Wires /Cables ; Standard wire gauge; Number of strands and current carrying capacity ; Types of wiring systems; Fuses MCBs; Earthing – Purpose, Types ; First aid for electric shock

Transformers

Function; Principle of operation ; Construction details ; Types of transformers

UNIT – II

Electrical Machines

Single phase induction motor– Principle of operation, types and applications.
Three phase induction motor – Principle of operation, types and applications

Lightning Phenomenon

What is lightning?; Charge formation in cloud – Wilson's theory, Simpson's theory; Different forms taken by lightning; Mechanism of forked lightning ; Protection of structures against lightning using lightning rods

Part B : MECHANICAL ENGINEERING

UNIT – III

Transmission of motion and Power

Methods of drive; Power transmission elements – Shafting , Belt-drive, Belting, Pulleys ; Velocity ratio of pulleys ; Creep and slip in belt; Tension in a belt; Power transmitted by a belt ; Rope drive; Chain drive; Friction drive; Gear drive; Spur gear ; Power transmitted by gearing.

Air Compressors

Introduction; Reciprocating compressors – Single stage , multi-stage; Rotary compressors.

UNIT – IV

Metal Forming

Metal working Processes – Hot working , Cold working ; Rolling – Principle , Rolling stand arrangement , Roll passes, Break down passes, Roll pass sequences ; Extrusion and other processes – Extrusion principle, hot extrusion , Cold extrusion, Extruding tubes ; Wire drawing ; Bar and tube drawing.

Fabrication processes

Classification ; Welding – Classification of welding ; Electric arc welding – Principle of arc, Arc welding equipment, Electrodes, Manual metal arc welding, Submerged arc welding

NOTE

1. Part A

Two questions of 14 marks each will be given from each unit of Part A out of which one is to be answered. Seven questions of one mark each will be given from entire Part A syllabus which is a compulsory question.

2. Part B

Two question of 14 marks each will be given from each unit of Part B out of which one is to answered. Seven questions of one mark each will be given from entire Part B syllabus which is compulsory question.

3. In the University examination , Part A and Part B should be answered on separate booklets.

TEXT BOOKS

1. Electrical Installation and estimation by M. Rajalingam , Radiant Publishing House
2. Fundamentals of Electrical and Electronics Engineering by T. Thyagarajan , SCITECH Publications (India) Pvt. Ltd.
3. An Introduction to High Voltage Engineering by Subir Roy, Prentice-Hall of India , 2006.
4. Elements of Mechnical Engineering by K.P. Roy , Media Promoters
5. Manufacturing Technology – Foundary, Forming and Welding by P.N.Rao , TataMcGraw-Hill Publishing Company Ltd.

CODE: CE226   **PROFESSIONAL ETHICS & HUMAN VALUES**

Lectures	: 2 Periods/Week	Sessional marks	: 0
University Exam	: 0 Hours	University Exam. Marks	: 0
			Credits: 0

CODE: CE261   **LABORATORY**

MATERIAL TESTING LABORATORY

Lectures	: 4 Periods/Week	Sessional marks	: 40
University Exam	: 3 Hours	University Exam. Marks	: 60
			Credits: 2

Note: A minimum of 6 experiments from PART-A and 6-experiments from PART-B shall be done and recorded

PART-A

1. Study of stress-strain characteristics of mild steel bars by UTM.
2. Study of stress-strain characteristics of HYSD bars by UTM.
3. Determination of modulus of elasticity of the material of the beam by conducting bending test on simply supported beam.
4. Determination of modulus of rigidity by conducting torsion test on solid circular shaft.
5. Determination of hardness of the given material by Brinnel's/Vicker's/ Rockwell hardness test.
6. Determination of impact strength of the given material by conducting Charpy/Izod test
7. Determination of ultimate shear strength of steel by conducting direct shear test.
8. Determination of modulus of rigidity of the material of closely coiled helical spring.
9. Determination of compressive strength of wood with grain parallel / perpendicular to loading.

PART-B

1. Determination of (a) Normal consistency of cement (b) Fineness of cement using 90 microns IS sieve.
2. Determination of Initial setting and final setting time of cement.
3. Determination of (a) Specific gravity of cement (b) soundness of cement.
4. Determination of Fineness modulus of (a) Fine aggregate (b) Coarse aggregate.
5. Determination of workability of concrete by conducting Slump cone test .
6. Determination of workability of concrete by conducting Compaction factor / Vee-Bee consistometer test
7. Determination of (a) Cube compressive strength (b) Split tensile strength of concrete.
8. Determination of modulus of elasticity of concrete by conducting compression test on concrete cylinder
9. Determination of Bulk density and Specific gravity of (a) fine aggregate (b) coarse aggregates.
10. Determination of Bulking of fine aggregate.
11. Determination of compressive strength of clay / fal G- Bricks.
12. Determination of water absorption of bricks.

HYDRAULICS AND HYDRAULIC MACHINES LABORATORY

Lectures	: 4 Periods/Week	Sessional marks	: 40
University Exam	: 3 Hours	University Exam. Marks	: 60

Credits: 2

Note: A minimum of twelve (12 No) shall be done and recorded

1. Verification of Bernoulli's theorem.

2. Venturimeter: Determination of Coefficient of discharge.

3. Orificemeter: Determination of Coefficient of discharge.

4. Orifice : Determination of Coefficient of discharge by steady and unsteady flow methods.

5. Mouthpieces: Determination of Coefficient of discharge by steady and unsteady flow methods.

6. Characterization of laminar and turbulent flows by Reynold's apparatus.

7. Determination of friction factor of Pipes.

8. Determination of loss of head in pipes due to bend /sudden contraction/ sudden expansion.

9. Determination of Coefficient of discharge for rectangular notch / V – notch.

10. Determination of Manning's and Chezy's coefficients in open channel.

11. Study on Characteristics of Hydraulic Jump

12. Measurement of force due to impact of jets on vanes of different types.

13. Performance studies on Pelton turbine.

14. Performance studies on Francis turbine /Kaplan turbine.

15. Performance studies on single stage centrifugal pump.

16. Performance studies on Reciprocating pump.

BUILDING DRAWING

Lectures	: 4 Periods/Week	Sessional marks	: 40
University Exam	: 3 Hours	University Exam. Marks	: 60
			Credits: 2

An Approach to Planning

Site planning; Space requirement–Establishing areas for different units, Furniture requirements, Roominess, Flexibility, Sanitation, Lighting, Ventilation, Space for equipment for air– conditioning, Space for machinery etc.; Flow diagram and line plan–Grouping, Circulation, Orientation, Aspect and prospect, Privacy, Elegance and economy; Climatic considerations; Architectural composition–Unity, Mass composition, Contrast, Proportion, Scale, Accentuation and rhythm, Materials for the exterior and Expression; Colour.

Building Rules and Bye–Laws

Zoning regulations; Regulations regarding layouts or sub-divisions; Building regulations; Rules for special type of buildings; Calculation of plinth, floor and carpet area; Floor space index.

Building Elements

Conventional signs; Guidelines for staircase planning; Guidelines for selecting doors and windows; Terms used in the construction of door and window; Specifications for the drawing of door and window

Note: Any ten of the following shall be done using AutoCAD /3D MAX software

1. Learning basic commands of CAD software & drawing various geometrical shapes
   a) Draw commands
   b) Editing commands
   c) Creating text
   d) Dimensioning
2. Draw Conventional signs for building materials and symbols for sanitary installations and fittings
3. Draw symbols for Doors & Windows and Electrical Installations
4. Draw Elevation and Sections of Door & Window
5. Draw Cross section of load bearing wall over spread footing
6. Draw plan & sectional elevation of Dog-Legged staircase
7. Draw Pitched roof (King post truss)
8. Draw plan of a single storied residential building showing furniture & cub-boards using layers and blocks in CAD software
9. Draw plan of a single storied residential building showing Electrical and Sanitary features using layers and blocks in CAD software
10. Draw Plan, Section & Elevation of single storied residential building
11. Learning basic commands in 3-D, creating pre-defined solid primitives and applying Boolean operations
12. Create a two roomed ground floor building in 3-D and render the model