

CIVIL ENGINEERING STUDENT'S HANDBOOK

[FOR C.B.C.S SCHEME]

School of Studies in
**Engineering &
Technology**



GURU GHASIDAS VISHWAVIDYALAYA

(A CENTRAL UNIVERSITY ESTABLISHED BY THE UNIVERSITY ACT 2009)

BILASPUR (C.G) 495009

Civil Engineering Student's Handbook



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PREFACE

The School of Engineering & Technology under Guru Ghasidas Vishwavidyalaya (now a Central University since 15th Jan., 2009), Bilaspur (C.G.), was set up in the year 1997 with an objective of making available the facilities of quality higher education in the field of Engineering and Technology to the students of, particularly, the Central region of country where the rural and tribal population still remain deprived of such facilities. The School, remaining fully conscious of its objectives and responsibilities, is growing towards the level of a centre of excellence for quality engineering education in the country. Especially, after up-gradation of the University as a Central University, there has been many fold enhancements in infrastructural facilities as well as faculty and staff. Today, the School has well equipped laboratories with latest equipment, a good library, adequate computational facilities and smart E-classrooms needed for ensuring quality in higher education and research. The mission of the School is to create an ambiance in which new ideas, research and scholarship flourish and to engender the leaders and innovators of tomorrow.

The University campus houses faculties like Arts, Science, Social Science, Humanities, Law and Management etc, our students get opportunities of studying varied nature of elective courses from other faculties, and are groomed to work not only with a group of technically trained people but also with persons having knowledge in different domains of education.

The School on an average, admits around 400 students annually for the 4 - year undergraduate B. Tech programme in seven branches. Admissions are made through Joint Entrance Examination (JEE) (main) or the entrance examination conducted as per the directions of MHRD, Govt. of India. Presently, M.Tech. programme is being run by two departments (Mechanical and Chemical Engineering) and the students who are Graduate Aptitude Test in Engineering (GATE) qualified get admitted. To keep pace with new developments and changes in the field of technology, the Institute revises its Undergraduate and Postgraduate Programmes syllabi from time to time. The School follows semester system of teaching (odd- July - December; and even- January – June).

Ours is a student-centric Institution and, therefore, the endeavor is always to ensure that students are offered the quality and value based education and training so as to create not only outstanding scientists and engineers but also good citizens.

This booklet contains comprehensive information on the existing Rules and Regulations governing the B.Tech. Programmes. The students and parents/ guardians are, therefore, advised in their own interest to get fully familiar with the academic system of the School and rules and regulations. Students' attention is particularly drawn to the attendance requirement, regular assessment procedures, conditions of promotion to higher semesters and grading system, etc.

Thank you for your interest in the School of Engineering & Technology, Guru Ghasidas Vishwavidyalaya, Bilaspur. We wish all our students a very bright future and successful career.

Dean (SOS, Engg. & Tech.)

HEAD OF THE DEPARTMENT MESSAGE

Four years degree course in Civil Engineering program was started in the year 2008 under the department, with due approval from AICTE with annual intake of 40 seats. The department's primary goal is to focus on imparting the best possible exposure to various fields in civil engineering. The department is committed, for establishing well equipped laboratories, with all the modern amenities & excellent setup. As per AICTE norms, well qualified & experienced faculties are to be multiplied very soon in the department. Academicians from premier institutions & field engineers are to be frequently invited in the department, to interact with students & faculty for regular update with the latest global development. Department will also be engaged in organizing co-curricular activities like seminars, expert talk, aptitude test, quiz, field visits, career counseling etc. in order to provide & develop inter personal skills of the students.

Dr. M. Chakradhara Rao
H.O.D Civil Engineering
Guru Ghasidas Vishwavidyalaya (Central University)
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OBJECTIVES OF THE DEPARTMENT:-

- a) To prepare graduates with a solid foundation in technical skills needed to analyze and design civil infrastructure systems.
- b) To make graduates familiar with current and emerging civil engineering and global issues, and have an understanding of ethical and societal responsibilities.
- c) Strengthen the graduates to have necessary qualifications for employment in civil engineering and related professions, for entry into advanced studies, and for assuming eventual leadership roles in their profession.
- d) To develop the technological innovations needed to safeguard, improve, and economize infrastructure and society.

ACHIEVEMENTS OF THE DEPARTMENT

Session/ Achievement Field	Research Publications International/ National Journals	Placement of Students		Others
		No. s	Company	
2012-13	5	5	M/S. Patil Group, Hyderabad	Department initiated the testing and consultancy services
2013-14	3	2	Navyog Engineering Construction (MNC).	3 students selected in L & T Build India Scholarship program
2014-15	3	2	M/s Patel Rail Infrastructure Ltd.	A total revenue of Rs.1,23,014/- was generated by the department through external consultancy services.-
2015-16	7	-	-	A total revenue of Rs.2,31,488/- was generated by the department through external consultancy services.-
2016-17	8	-	-	A total revenue of Rs.7,99,230/- was generated by the department through external consultancy services.

Number of Students Qualified in Various Exams:-

Name of Exam	Year	No. of Students
GATE	2013	23
	2014	21
	2015	18
	2016	23
	2017	16









Name of Exam	Year	No. of Students
NET	2013	1

Name of Exam	Year	No. of Students
CAT	2016	2

COURSES OFFERED BY THE DEPARTMENT

S No.	Courses	Annual Intake	Duration of Course(years)
1	B.Tech	40	4
2	Phd		

FACULTY MEMBERS OF DEPARTMENT

Name	Photo	Designation	Qualification	Specialization
Prof. Shailendra Kumar		Professor	Ph.D., M.Tech.	Structural Engineering
Dr. M. Chakradhara Rao		Associate Professor & Head	Ph.D., M.Tech.	Structural Engineering
Mr.R.K. Choubey		Assistant Professor	M.Tech.	Environmental Engineering
Mr. Nikhil Kumar Verma		Assistant Professor	M.Tech.	Construction & Management
Mr. Ashish Kumar Parashar		Assistant Professor	M.Tech.	Water Resources Engineering
Dr. V V S Surya Kumar Dadi		Assistant Professor	Ph.D., M.Tech.	Earthquake Engineering- Structural Dynamics
Mr. Ankit Jain		Assistant Professor (Ad-hoc)	M.Tech.	Water Resources Engineering
Mr. Rochak Pandey		Assistant Professor (Ad-hoc)	M.Tech.	Construction Technology & Management

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INTRODUCTION

Guru Ghasidas Vishwavidyalaya, a Central University established by an Act 2009 of the Parliament, was originally established as State University by an Act of State Legislative Assembly of the then undivided Madhya Pradesh on 16 June 1983. GGV is an active member of the Association of Indian Universities and Association of Commonwealth University. The National Assessment and Accreditation Council (NAAC) has accredited the University as B.

Situated in a socially and economically challenged area, the Vishwavidyalaya is appropriately named to honour the great Satnami Saint Guru Ghasidas (born in 17th century), who championed the cause of the downtrodden and waged a relentless struggle against all forms of social evils and injustice prevailing in the society.

The Vishwavidyalaya is a semi-residential institution. The Vishwavidyalaya covers almost the total spectrum of higher education in 32 departments offering various courses in the areas of Arts, Commerce, Education, Engineering and Technology, Humanities, Life Sciences, Management, Pharmacy, Sciences and Social Sciences. The lush green sprawling campus of the Vishwavidyalaya spread over an area of aprox. 655 acres is located five KM away from the main Bilaspur Town. River Arpa, the lifeline of Bilaspur, runs parallel to the Vishwavidyalaya campus. Bilaspur is a fast Industrializing City, already having a large number of industrial units coming up in the region. The area is the nerve center of trade in iron and steel, coal, aluminium, textiles, foodgrains, 'Kosa' silk, cement, paper, furniture and jewellery and is internationally known for its rice production. The Vishwavidyalaya aims at disseminating and advancing knowledge by providing instructional and research facilities in various branches of learning. It promotes innovation in teaching learning process, interdisciplinary studies & research, establishes linkages with the industries for the promotion of Science & Technology and to educate and train man-power for the development of the country and is committed to the improvement of the social, economic conditions and welfare of the people by improving their intellectual, academic and cultural development.

Bilaspur city is well by road and rail. Being a railway zone, Bilaspur facilitates train travel from any part of the country. Nearest airport is at Raipur, the Capital of Chhattisgarh, at a distance of 120 Kilometers from Bilaspur.

School of Studies in Engineering & Technology:

The School of Studies in Engineering & Technology is a prestigious school of higher learning producing meritorious students with excellent career growth and universal recognition. The students get the best of opportunities in the form of highly advanced courses, eminent faculty members, well-equipped laboratories, library, hostels and immense facilities to excel in research and development. The selection procedure for students at undergraduate and postgraduate is highly stringent so that School of Studies in Engineering & Technology gets the best brains of India. Highly scientific and innovative technology is used for teaching and carrying out research activities. Every year School of Studies in Engineering & Technology is enriched by the laurels brought by the faculty members and the students in the form of research publications, projects, fellowships and industrial exposure.

The School of Studies in Engineering & Technology awards Bachelors and Masters Degrees in various branches of technology. It has been making special efforts to recruit talented faculty on a world-wide basis. Bright students from all over the country by the selection process through Central Seat Allocation Board (CSAB), Government of India based upon JEE (Mains) merit. The School has about 1600 undergraduate students.

The School has well established Training & Placement Cell which provides the necessary facilities to the students for their placements. The Training & Placement Cell of the School will strive to develop itself as one of the best placement centre in our country.

The School of Studies in Engineering & Technology is poised to reach heights with its quality research, training, collaborations, and projects. It has signed MOUs with some reputed organizations like IBM and IIT Kanpur. The faculty is also involved in research and development and has a number of publications to their credit and some are under process. Finally School of Studies in Engineering & Technology produces career ready graduates who are immediately employable.

Department of Civil Engineering

Four years degree course in Civil Engineering program was started in the year 2008 with annual intake of 40 seats under the Institute of Technology which is renamed as School of Studies in Engineering & Technology in 2017. Ph.D. Program was also started in the department from session 2012-13. With a strong emphasis on learning and all round development, the graduates of our department are bound to be the perfect blend of diverse knowledge, technical expertise, and leadership ability. Efforts are being made to provide world class education and an intellectually stimulating environment in an endeavor to develop well rounded individuals with technical and professional competence of the highest degree. Besides education and research the main objective is to contribute largely to nation building and also to make great strides technologically on the international arena. The department is developing fast and would like to come up as a centre of excellence promoting intelligent, hardworking and technically curious minds. Within the span of 09 years, department is on its way to carve a niche for itself among the leading technological institutes of India.

The department has developed state-of-the-art infrastructure including fully equipped laboratories to impart world class education. Extracurricular event is a regular phenomenon to ignite the minds of graduating buds. The department has at present eight numbers of well qualified faculty members and ten more are to be added in due course of time, against the UGC sanctioned posts. From the session 2012-13 department is offering its consultancy & testing services for the external agencies, in addition to the internal consultancy services for the University.

Draft Ordinance**for Governing the award for the Degree of Bachelor of Technology (B.Tech.)-4 years (8 Semester) Degree Course as per Choice Based Credit System (CBCS)****1.0 GENERAL**

The first degree of four years (Eight Semester) Course in Technology, hereinafter called 4- year B.Tech degree course, shall be designated as 'BACHELOR OF TECHNOLOGY' irrespective Branches. The conduct of the programme and the performance evaluation of B. Tech. courses are on the basis of percentage of marks earned as well as credit system.

2.0 ADMISSION

The minimum qualification for admission to the first year B. Tech. shall be the passing of Higher Secondary School Certificate Examination (10+2) scheme with Physics, Chemistry and Mathematics conducted by Central Board of Secondary Education or any other equivalent examination from recognized Board or University. The candidate shall be eligible for admission on the basis of the merit list of Joint Entrance Examination (JEE) (main) or any other entrance examination decided by Guru Ghasidas Vishwavidyalaya for Admission to B. Tech. degree course time to time. In general the admission to B. Tech. degree course shall be governed by the rules of, MHRD, Government of India (GoI) and Guru Ghasidas Vishwavidyalaya.

The reservations in admission, cancellation of admission and fee refund will be as per MHRD, GoI norms and notifications issued in this regard from time to time.

3.0 ATTENDANCE REQUIREMENT

3.1 A Student shall be required to attend at least 75% of the classes actually held in the semester which may include theory class, seminars, sessionals / practicals/projects, as may be prescribed.

Provided that the Dean of the School of Engineering & Technology on the recommendations of the concerned Head of the Department may condone the shortage in attendance of those

students who have secured 65% attendance. This condonation should not exceed 10% on the following satisfactory grounds.

- (a) Illness / Medical leave of the student.
- (b) Unforeseen mishappening with parents.
- (c) For participating in the extra co-curricular events with prior approval from the university authority.
- (d) For participating in the sports activity with prior approval from the university authority
- (e) For attending in interviews with valid proof and prior permission of the concerned head of department.

3.2 A student who does not satisfy the requirement of attendance as per clause 3.1, he/she will be detained due to shortage of attendance in a particular semester and he/she will have to repeat the same semester taking re-admission as a regular student in the next commencing academic session.

4.0 DURATION

The duration of undergraduate (U.G.) degree programmes leading to B. Tech. degree, shall be normally four years and the maximum duration shall be 8 years from the date of initial registration in First year B.Tech. course. If a candidate will not be able to complete the course in the maximum duration of 8 years then he / she will not be eligible to continue the course from that point of time itself.

5.0 EXTRA ORDINARY LONG ABSENCE

If a student does not participate in the academic activities of the School of Studies of Engineering and Technology of this Vishwavidyalaya for a period exceeding two years for reasons of ill health or medical grounds only, he / she shall neither be permitted to appear in any subsequent examinations nor shall be admitted or promoted to any semester and he / she shall cease to be a student of B. Tech. Degree Course. Here participation in academic activity means attending Lectures, Tutorials, Practicals/Sessionals and such other activities declared as academic activities.

6.0 DISCIPLINE

- Every student is required to observe discipline and decorous behaviour both inside and outside the campus and not to indulge in any activity which will tend to bring down the prestige of the Institute.
- Any act of indiscipline of a student reported to the concerned Head / Dean (Engineering & Technology), will be investigated and necessary action will be taken as per university rules from time to time.
- Ragging of any dimension is a criminal and nonbailable offence in our country. The current State and Central legislations provide for stringent punishment, including imprisonment. Once the involvement of a student is established in ragging, the offending student will be dismissed from the University and will not be admitted into any other Institution. Avenues also exist for collective punishment, if individuals can not be identified in this inhuman act. Every senior student, along with the parent, shall give an undertaking every year in this regard and this should be submitted at the time of admission / registration.

7.0 REGISTRATION REQUIREMENTS

- Every student is required to be present and register / enroll at the commencement of each semester on the day(s) fixed for and notified in the Academic Calendar from time to time.
- Late registration will be permitted with a fine as decided from time to time up to three weeks from the date of commencement of each semester as notified in the Academic Calendar from time to time. If the student does not register in the specified time he / she has to be registered in the next year in the same semester.
- Percentage attendance for all students will be counted from the date of commencement of the semester, irrespective of his/her date of registration. However, in case of first year, first semester, attendance will be counted from date of admission into the Institute or date of commencement of class work, whichever is later.
- Minimum 4 weeks Industrial training during summer break is compulsory after end semester examination of six semester. The student has to submit the industrial training

report to the concerned head of department at the time of registration in the seventh semester.

- If a student finds his / her academic / course load heavy in any semester, or for any other valid reason, he/she may drop courses within 15 instructional days from the commencement of the semester with the recommendation of his / her Head of Department and approval of the Dean, Engineering & Technology.
- The curriculum for any semester, except for the final semester will normally carry credits between 21 to 29.
- Minimum number of credits that a student can register in any given semester (excepting for final semester) is 15. Maximum number of credits that can be registered in a semester is 29. However, in the final semester, a student may earn less than 15 credits if it is sufficient for him/ her to fulfill the requirements for the award of the degree.
- A student who has successfully secured *Cumulative Performance Index (CPI)* equal and more than 7.0 in his / her First Year courses, can be registered for non credit courses in other departments of the university for his / her higher semesters of study. The registration in non credit courses will be done after recommendation of Head of the Department and approval of the Dean, Engineering & Technology and with the permission of the concerned subject teacher. The student has to attend the classes of the non credit courses in addition to the fulfilling the requirements of registered regular subjects in the his/her department prescribed by the Head of Department. 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 Semester Performance Index (SPI) / CPI.

8.0 EXAMINATIONS

8.1. Medium of Instruction/Examination – Medium of instruction and examination shall be English only.

8.2. Practical/ Sessional Work – The student shall be required to complete the Laboratory / Drawing / Design / Job preparation and other academic work assigned for that semester in the session.

8.3. There shall be a full End Semester Examination at the end of each semester consisting of theory papers, practicals/ sessionals.

8.4. There shall be one End Semester Examination (ESE) at the end of each semester conducted by Guru Ghasidas Vishwavidyalaya. Only those students, who will satisfy the attendance requirement to be eligible to appear at the End Semester Examination as per clause 3.0, will be permitted to appear in the End Semester Examination. The examination will consist of theory papers, laboratory practical/sessional and viva-voce as per the scheme of examination of that semester. These examinations shall be designated as follows.

- | | |
|-------------------------|--|
| (a). During First year | - I & II sem. B. Tech. Examination |
| (b). During Second year | - III & IV sem. B. Tech Examination |
| (c). During Third year | - V & VI sem. B. Tech. Examination |
| (d). During Fourth year | - VII & VIII sem. B. Tech. Examination |

8.5. The semester examination will normally be held in the month of November-December and April – May in every academic session, or as decided by the University time to time.

8.6. Supplementary examination will be held only once in a year (for both even and odd semesters) normally in the month of July.

8.7. End Semester Examination time table shall be declared by the Controller of Examination before the commencement of examination.

9.0 PASSING OF EXAMINATION

9.1 Basis of Subjects Evaluation

9.1.1. For passing in a subject (theory / practical/sessional) the performance of the candidate in each semester shall be evaluated subject wise. There shall be continuous assessment throughout the semester by conducting quizzes / class tests / surprise test / assignments / seminar, etc. and mid semester examination, called as Internal Assessment (I.A.) carrying 40% weightage, and End Semester Examination (E.S.E.) carrying 60% weightage. A student has to secure minimum 35% marks in the particular theory subject and minimum 40% marks in a particular practical subject to pass that subject in the end semester examination. For each practical / sessional

subject 60% weightage will be given to the actual practicals/sessionals performed during the semester I.A. and 40% weightage will be given to the End Semester Examination(ESE).

- 9.1.2. For evaluation of end semester practical / sessional examination of a subject, there shall be a panel of three examiners appointed by Head of the Department. All the three examiners shall be internal from the concerned department of the Institute of Technology, or external examiners may also be appointed.
- 9.1.3. To allot the marks of Internal Assessment (IA), there will be one Mid Semester Examination (MSE) in each theory subject of that semester, apart from one Class Tests (CT) and surprise test / assignments / quiz.

9.2 Passing Marks in a Subject

For passing a subject the student is required to fulfill the following conditions:

- (a) Student has to secure minimum 35% marks in a particular theory subject to pass that subject in the end semester examination.
- (b) Student has to secure minimum 40% marks in a particular practical / sessional subject to pass that subject (practical / sessional) in the end semester examination.
- (c) Must have secured minimum 40% marks (Marks of Internal Assessment + Marks of End Semester Examination) for each theory subject.
- (d) Must have secured minimum 50% marks (Marks of Internal Assessment + Marks of End Semester Examination) for each project/practical/sessional subject.
- (e) Must have scored minimum Semester Performance Index (SPI) of 5.0 in the semester.

If a student has cleared all the Theory and Practical/Sessional subjects of one or and both semesters of a year, but has failed to secure SPI of 5.0 in the semester or and semesters of a year then he/she will be allowed to re-appear in the supplementary Examination in those subjects in which the student's Grade Point is less than 5. If the student fails to secure SPI of 5.0 even in the supplementary examination, he/she will not be promoted to the odd semester of the next higher year, and such student shall be treated as an ex-student. Other condition of promotion of the ex-student will be applicable as per Clause 12.

- (f) If a student has passed a semester examination in all the subjects as per clause 9.2 (a-e), he/she shall not be permitted to reappear in that examination for improvement in grades/division.

9.3 Basis of Credits

Credit of a theory or practical/sessional subject is decided by:

Credit = $\{L + (T+P)/2\}$, where L = Lecture periods per week, T = Tutorial period per week, P = Practical/Sessional periods per week. Credit in a subject will be an integer, not in a fractional number. If a credit in a subject turns out in fraction, it will be taken as next integer number.

10.0 ASSESSMENT AND GRADING

10.1. Mode of Assessment and Evaluation

10.1.1. For Theory Subjects

For the assessment of performance of students in a semester, continuous evaluation system will be followed with two components : Internal Assessment (IA), carrying 40% weightage and End Semester Examination(ESE), carrying 60% weightage. There will be one class tests (10 marks), one mid semester examination (20 marks) and teacher assesment (05 marks for attendance and 05 marks on surprise test / assignments /quizes etc.) in each theory subject in a semester forming the part of Internal Assessment (IA). The marks for attendance shall be awarded in a theory subject as per the following Table.

Percentage of attendance	65 - ≤ 75	> 75 - ≤ 80	>80 - ≤ 85	>85- ≤ 90	>90- ≤ 95	>95- ≤ 100
Marks to be awarded	NIL	01	02	03	04	05

10.1.2. For Projects/Practical/ Sessional Subjects

Evaluation of project/practical/sessional during the semester will carry 60% weightage for Internal Assessment (IA) and the End Semester Examination (ESE) will carry 40% weightage. The internal assessment will carry equal weightage of attendance (20% weightage), practical records (20% weightage) and internal viva – voice examination (20% weightage). The marks for attendance shall be awarded in a projects/practical/sessional subject as per the following Table.

Percentage of attendance	65 - ≤ 75	> 75 - ≤ 80	>80- ≤ 85	>85- ≤ 90	>90- ≤ 95	>95- ≤ 100
Percent weightage of Marks	10	12	14	16	18	20

10.1.3. Grading System

Percentage as well as absolute grading system will be followed, in every subject, theory or practical/sessional. A student will be awarded a **Letter Grade**, based on his combined performance of Internal Assessment (IA) and End Semester Examination (ESE). These grades will be described by letters indicating a qualitative assessment of the student's performance through a number equivalent called "Grade Point" (GP) as given below. The following is the **Grade Point** pattern. Grade 'F' indicates not clearing (passing) of the subject.

Letter Grade (LG)	O	A+	A	B+	B	C	P	F	Ab
Grade Point	10	9	8	7	6	5	4	0	0

The Letter Grades are O (Outstanding), A+ (Excellent), A (Very Good), B+ (Good), B (Above Average), C (Average), P (Pass), F (Fail) and Ab (Absent in end semester examination).

Grades will be awarded for every theory and practical/sessional subject separately.

10.2. Absolute Grading System

- (a) The Absolute Grading System as explained below will be adopted for theory and project/practical/sessional subjects.

GRADE	Percentage of Marks Obtained	
	THEORY	PRACTICAL/SESSIONAL/PROJECT
O (Outstanding)	> 90 - ≤ 100	> 90 - ≤ 100
A ⁺ (Excellent)	> 80 - ≤ 90	> 80 - ≤ 90
A (Very Good)	> 70 - ≤ 80	> 70 - ≤ 80
B ⁺ (Good)	> 60 - ≤ 70	> 60 - ≤ 70
B (Above Average)	> 50 - ≤ 60	> 55 - ≤ 60
C (Average)	> 40 - ≤ 50	> 50 - ≤ 55
P (Pass)	= 40	= 50
F (Fail)	00 - < 40	0 - < 50

- (b) 01 Grace marks shall be given only once at the time of award of the degree to improve the Grade in overall result.

10.3. Semester Performance Index (SPI)

Performance of a student in i^{th} semester is expressed by $[SPI]_i$ which is a weighted average of course grade points obtained by a student in this semester, and is expressed by

$$[SPI]_i = \frac{[C_1G_1 + C_2G_2 + \dots]}{[C_1 + C_2 + \dots]} = \frac{\left[\sum C_j G_j \right]_i}{\left[\sum C_j \right]_i} = \frac{N_i}{D_i}$$

Where C_j stands for Credit and G_j stands for Grade points corresponding to j^{th} subject in a semester. SPIs will be calculated up to two places of decimal without rounding off. SPI will be calculated only when a student clears a semester without failing in any subject, theory or practical/sessional.

10.4. Cumulative Performance Index (CPI)

This is a weighted average of course grade points obtained by a student for all the courses taken, since his / her admission. Thus, CPI in the i^{th} semester with “ i ” greater than 2 will be calculated as follows:

$$[CPI]_i = \frac{\sum_{k=1}^{k=i} N_k}{\sum_{k=1}^{k=i} D_k}$$

If a student repeats a course or is declared fail in a subject, then only the grade points earned in the attempt when he / she cleared the course / subject are counted towards CPI. CPI will be calculated in every semester along with SPI, so that a student knows his / her latest CPI.

10.5. Award of Class or Division

- 10.5.1. The class/division awarded to a student with B. Tech. Degree shall be determined by the student's CPI after clearing all the subjects of all the eight semesters, as given below:

- First Division with Distinction or **Honours** : $7.5 \leq \text{CPI} \leq 10.0$
- First Division : $6.5 \leq \text{CPI} < 7.5$
- Second Division : $5.0 \leq \text{CPI} < 6.5$

10.5.2. Division shall be awarded to a student only after clearing all the eight semesters successfully, and having earned at least a total credit of **190** for the award of B.Tech. degree. It shall be based on the integrated performance of the candidate for all the eight semesters as per clause 10.5.1.

10.5.3. No student shall be declared to have passed the final B.Tech. course unless he/she has fully passed all the eight semesters. The results of the eighth semester of those students, who have not passed examination in any previous semester, will be withheld. Such students shall be deemed to have passed the final B.Tech. examination in the year in which they pass / clear all the subjects of all the eight semesters, within the limit of the prescribed period of the whole course.

10.6. Conversion of CPI / SPI in Percentage

There is no equivalence between the CPI/SPI scale and percentage. However notionally,

$$\text{Percentage of particular semester} = (\text{SPI}) \times 10$$

$$\text{Percentage of B.Tech. Degree} = (\text{CPI}) \times 10$$

11.0 TRANSFER OF CREDITS

The courses credited in Indian or Foreign University/Institutions by students during their study period at GGV Bilaspur (C.G.) may count towards the credit requirements for the award of B.Tech. degree. The credit transferred will reduce the number of courses to be registered by the student at GGV. The guidelines for such transfer of credits are as follows.

- B.Tech students with consistent academic performance and CPI greater than 7.5 can credit courses approved by the Dean, Engineering & Technology, in other Institutions during 3rd and 4th year and during summer breaks.
- Credits transferred will not be used for SPI/CPI computations. However, credits transferred will be considered for overall credits requirements of the programme.
- Students can earn credits only from other department of the University (GGV) / IISC/ITs/NITs/Central Universities and other Indian and Foreign

Institutions/Universities with which GGV has an MOU (and that MOU must have specific clauses for provisions of credit transfer by students).

- Credit transfer can only be considered for the courses at same level (i.e., UG, PG, etc.).
- The maximum number of credits that can be transferred by a student shall be limited to 15.
- A student has to get minimum passing grades/ marks for such courses for which the credits transfer are to be made.
- The credits / grades indicated in the grade sheet obtained from the university in which the student has completed the courses should be used by the student as part of his/her transcripts.
- The GGV transcripts will only indicate the courses, credits and grades completed at GGV and the total no. of credits earned in other Universities in a particular semester.

12.0 PROMOTION TO HIGHER YEAR AND HIGHER SEMESTER

- 12.1.** Those students who have cleared all the registered theory, practical/sessional subjects prescribed for the B.Tech. first year shall be promoted to the B.Tech. second year. Those students who have cleared all the registered theory, practical/sessional subjects prescribed for the B.Tech. second year shall be promoted to the B.Tech. third year. Those students who have cleared all the registered theory, practical/sessional subjects prescribed for the B.Tech. third year shall be promoted to the B.Tech. fourth year-
- 12.2.** Supplementary examinations will be held only once in a year (for both even and odd semesters) normally in the month of July after declaration of results of even semester examination of the incumbent session, or as decided by the University time to time.
- 12.3.** Those students who would have backlogs in registered theory and/ or practical/ sessional subjects in the odd and or even semesters of any year will be allowed to appear in the supplementary examinations of the same year.
- 12.4.** Those B.Tech. students who are allowed to appear the supplementary examination (of odd or even or both semester), may be provisionally admitted to attend the classes of the next higher odd semester of the next year. However, such provisionally admitted students will become regular only after passing in all their backlog papers in supplementary examination, if eligible otherwise.

- 12.5.** If a student fails to clear in the supplementary examination all the backlogs of theory, practical/sessional subjects of the odd and even semesters, he/she will not be promoted to the odd semester of the next higher year, and such student shall be treated as ex-student.
- 12.6.** Ex-students, (as per clause 12.5), shall be required to clear their backlog papers (theory and or practical/sessional subjects), in the end semester examination of the corresponding semesters (odd and even) and supplementary examination to be conducted next year (in the following academic session). Such ex-students will be required to deposit the examination fees only.
- 12.7.** If a student fails to appear in the practical/sessional examination of a semester due to unforeseen incident, a makeup end semester practical/sessional examination may be conducted, if required, strictly on the recommendation of the concerned Head of the Department, and approval of the Dean (Engineering & Technology).

13.0 BRANCH CHANGE AFTER FIRST YEAR RESULT

Students admitted in First Year B. Tech. course of the Institute of Technology having CPI of 08 or above at the end of their First Year course, are allowed to change their branch according to merit and subject to the seat availability in the branch where students want to shift. Only those students will be considered for the branch change who would have cleared all the subjects of First and Second semesters in the first attempt itself in the End Semester Examination.

14.0 TRANSCRIPT

Transcript will be provided to the students as per the University norms.

15.0 INTERPRETATION

In case of any dispute in the matter of interpretation of this Ordinance, the decision of the Vice-Chancellor of the University shall be final and binding on the students.

16.0 POWER TO MODIFY

Notwithstanding all that has been stated above, the Academic Council of the University has the right to propose any modifications or amendments to the Executive Council for final decision of the above regulations and further actions from time to time.

17.0 Matters not covered in this Ordinance shall be governed by the relevant ordinance of the University.

Scheme & Syllabus

I- SEM. & II-SEM.

(B.Tech.-1stYear)

**SCHEME OF EXAMINATION B.Tech – I Year (1st Sem.), Common to All Branches, Course – A,
w.e.f. Session: 2015-2016**

S. No	Subject Code	Subjects Theory	Periods /Week			Evaluation Scheme							Grand Total	Credits
						Internal Assessment					E.S.E			
			L ¹	T ²	P ³	C.T. ⁵	M.S.E ⁴	TA ⁷	L.A. ⁶	Total				
1	ENATHS01	Professional Communication in English	3	0	0	10	20	10	-	40	60	100	3	
2	CHATBS01	Engineering Chemistry	3	0	0	10	20	10	-	40	60	100	3	
3	MEATES01	Engineering Mechanics	3	1	0	10	20	10	-	40	60	100	4	
4	CSATES02	Fundamentals of Computers	3	1	0	10	20	10	-	40	60	100	4	
5	EMATBS02	Engineering Mathematics - I	3	0	0	10	20	10	-	40	60	100	3	
Practical														
1	CHALBS01	Engineering Chemistry Lab	-	-	3	-			30	30	20	50	2	
2	MEALES01	Engineering Mechanics Lab	-	-	3	-			30	30	20	50	2	
3	MEALES03	Engineering Drawing	-	-	3	-			30	30	20	50	2	
Total Credits												23		

**SCHEME OF EXAMINATION B.Tech – I Year (2nd Sem.), Common to All Branches, Course – B,
w.e.f. Session: 2015- 2016**

S. No	Subject Code	Subjects Theory	Periods /Week			Evaluation Scheme							Grand Total	Credits
						Internal Assessment					E.S.E			
			L ¹	T ²	P ³	C.T. ⁵	M.S.E ⁴	T.A ⁷	L.A. ⁶	Total				
1	CHBTHS02	Environmental Studies	3	0	0	10	20	10	-	40	60	100	3	
2	MEBTES04	Engineering Thermodynamics	3	1	0	10	20	10	-	40	60	100	4	
3	EEBTES05	Basic Electrical & Electronics Engineering	3	1	0	10	20	10	-	40	60	100	4	
4	PHBTBS03	Engineering Physics	3	0	0	10	20	10	-	40	60	100	3	
5	EMBTBS04	Engineering Mathematics – II	3	0	0	10	20	10	-	40	60	100	3	
Practical														
1	EEBLES05	Basic Electrical & Electronics Engg. Lab	0	0	3	-			30	30	20	50	2	
2	PHBLBS03	Engineering Physics Lab	0	0	3	-			30	30	20	50	2	
3	MEBLES06	Workshop Practice	0	0	3	-			30	30	20	50	2	
Total Credits												23		

¹-Lecture Hours, ²-Tutorial Hours, ³- Practical Hours, ⁴- Mid Sem. Exam, ⁵-Class Tests/Assignments, ⁶-Lab Work Assessment, * - Mandatory course

SEMESTER-I

Syllabus	SEMESTER-I								
Subject code	ENATHS01	Credit: 3			SESSIONAL - TA				ESE
Subject	PROFESSIONAL COMMUNICATION IN ENGLISH	L	T	P	CT	MSE	TA	Total	
				3	0	0	10	20	10

UNIT-1: Business Communication: Some key concepts

Meaning and process of communication, Types, channels, Medium of Communication, Barriers of communications, Professional communication; types and principles.

UNIT-2: Business Letters

Elements and layout of a business letter, Application, enquiries, calling quotation, sending quotation, orders complains and adjustment.

UNIT-3: Report writing

Technical reports; essentials, characteristics and structure. Observation report survey report, trouble report, project report.

UNIT-4: Reading comprehension:

Developing comprehension skill through reading of passages, summarizing, précis writing etc.

UNIT-5: Speaking

The process of speaking. Various phonotory organs. Introduction to phonetics, classification of pure English sounds. Relation between sound, symbol and alphabet.

Suggested Books and References:

1. D'Souza Ebnice and Shahani, G; "Communication Skills in English" Noble Publishing House.
2. Fiske, John, "Introduction to Communication Studies" Rotledge London.
3. Sharma, R.C. and Mohan,, K "Buisness Corres, Pوندence and Report Writting", Tata Magraw Hill, New Delhi.
4. Gartside, "Model Business Letter", Pitman London, 1992.
5. Chhabra, Dr. T.N., "Professional Communication, Sun India Publications, New Delhi.

Syllabus	SEMESTER-I								
Subject code	CHATBS01	Credit: 3			SESSIONAL - TA				ESE
Subject	ENGINEERING CHEMISTRY	L	T	P	CT	MSE	TA	Total	
		3	0	0	10	20	10	40	60

Unit - 1:

Hybridization, Valence Shell Electron Pair Repulsion (VSEPR) theory and its application in predicting shape and geometry of molecules. Molecular Orbital Theory - bond order, magnetic properties and MO diagram of homo-nuclear diatomic molecules and ions.

Unit - 2:

Inductive effect, field effect, hyper-conjugation and resonance. Stability of reaction intermediates - Carbocation, carbanion and Free Radicals. Name reactions – Aldol condensation, Benzoin condensation, Cannizzaro reaction and Perkin reaction.

Unit - 3:

Optical isomerism - definition and example of optical activity, plane of symmetry, enantiomers, diastereomers, meso compound and racemic mixture. R-S nomenclature. Geometrical isomerism - cis-trans isomerism and, E-Z nomenclature. Conformational analysis of ethane and n-butane.

Unit - 4:

Definition of polymers, thermoplastic and thermosetting polymer, addition and condensation polymers, ionic and free radical mechanism of polymerisation. Example of some polymers, viz., Kevlar, Bakelite, Urea-formaldehyde resin and vulcanisation of natural rubber.

Unit - 5:

Electromagnetic radiation, [fV Spectroscopy - Electronic transitions, auxochromes, chromophores, bathochromic and hypsochromic shift, Woodward-Fieser rule for calculating λ_{max} for conjugated dienes and α,β -unsaturated aldehydes and ketones. Note: Problems related to above units shall be asked in examination.

Books recommended:

1. Kalsi, P.S.; "stereochemistry conformation and Mechanism,,," New Age Int. (p), Ltd. New Delhi
2. Puri, B. R.; sharma, L. R. And pathania, M. s. ,,principals of physical Chemistry", Shoban Lal Nagin Chand & Co.
3. Mukherji, S. M. And Singh, S. P., "Reaction Mechanism in Organic Chemistry, Macmillan India Ltd., New Delhi 2007.
4. Alberty R.A. and Silbey R. J., "physical chemistry," John wiley & Sons, Inc., Singapore, 1996.
5. cotton F.A., wilkinson G. and Gaus p.L., 'Basic Inorganic chemistry,' John Wiley & Sons, Inc., Singapore; 3rd F.d.,1996.
6. Graham-Solomon T.W., "Fundamentals of Organic Chemistry", John Wiley & Sons, Inc., Singapore, 1997. I. odian T.w., "Principles of polymerization", John wiley & Sons, Inc., New york, 1981.
8. Sykes P., "A Guidebook to Mechanism of Organic Chemistry", Longman Inc., New York, 1981.
9. Dye J'R. r, "Application of absorption Spectroscopy of Organic Compounds", Prentice Hall of India,1965.
10. Williams D.H. and Fleming I., "Spectroscopic Methods in Organic Chemistry", Tata McGraw Hill Edition, New Delhi, 4th Ed., 19gg.
11. Atkins P.w., "Physical Chemistry", oxford Univ. press, 4th Ed., 1990.
12. Morrison R.T. and Boyd R.N., "Organic Chemistry", Prentice Hall of India, 6th Ed,1gg2.
13. Rao C.N.R. and Agarwala U. C., "Experiments in General Chemistry", East-West Press, New Delhi, 1969.

Syllabus	SEMESTER-I								
Subject code	MEATES01	Credit: 4			SESSIONAL - TA				ESE
Subject	ENGINEERING MECHANICS	L	T	P	CT	MSE	TA	Total	
		3	1	0	10	20	10	40	60

UNIT-1: Force, classification of force, laws of the forces, equilibrium, moment, varignon's theorem, parallel force, couple, General case of equilibrium and their problems.

UNIT-2: Trusses – Analysis by methods of joints and methods of sections. Frames – Analysis of frames, difference between truss & frames.

UNIT-3: Friction, law of friction, General problems on friction, wedge friction, Belt friction, Ratio of tension of belt, power transmitted by a belt, Condition of maximum power transmission by belt. Screw friction – Expression for maximum efficiency of a screw jack, and its problems. Simple lifting machine – Velocity Ratio, Mechanical Advantage, Efficiency, reversibility of a machine, wheel and axle, pulley system & its types, single purchase & double purchase winch crab.

UNIT- 4: Centroid and centre of gravity, Methods & procedure of finding C.G by method of moments and method of integration for various geometrical areas. Moment of Inertia – various theorems on M.I, Radius of gyration, polar M.I, Centroidal axis, Area moment of inertia, product of Inertia & their problems, Introduction of mass moment of inertia.

UNIT-5: Dynamics of body, D'Alembert's principle, rectilinear motion, work and energy, impulse & momentum and principles of conservation of momentum, collision of elastic bodies.

Recommend Text Books

1. Engineering Mechanics – Beer Johnson, TNH publisher
2. Engineering Mechanics – K.L. Kumar, TMH publisher.
3. Engineering Mechanics - Mokashi, TMH, Publisher
4. Engineering Mechanics – Timoshenko & Young, East West publisher
5. Engineering Mechanics - Irvin Shames, PHI publisher
6. Engineering Mechanics – A.K. Tayal. Umesh publication

Syllabus	SEMESTER-I								
Subject code	CSATES02	Credit: 4			SESSIONAL - TA				ESE
Subject	FUNDAMENTALS OF COMPUTER	L	T	P	CT	MSE	TA	Total	
		3	1	0	10	20	10	40	60

Unit- 1: Number Systems

Introduction Decimal Number System, Binary Number System, Conversion of Binary Number to Decimal Number , Conversion of Decimal Number to Binary Number System, Addition of Binary Numbers, Binary Subtraction, Use of Complements to Represents Negative Numbers, Conversion of Binary Fraction to Decimal Fraction, Conversion of Decimal Fraction to Binary Fraction System, Octal Number System, Hexadecimal Number System, Binary Coded Decimal (BCD Codes) EBCDIC Code, Gray Codes.

Unit- 2: Central Processing Unit (CPU) & Memory

Introduction, CPU Organization, Addressing Modes. Interrupts & Exceptions, Organization of Intel-8085 Microprocessor. Memory: Primary Memory, Secondary Memory, Cache Memory, Virtual Memory, Registers.

Unit -3: Introduction to Programing Language

Introduction to Programming Language: Low Level Programming Language, High Level Language, Fourth Generation Language, Introduction to Software, Application Software and System Software, Compiler, Interpreter, Assembler, Device Driver.

Unit -4: Operating Systems

Definition, Functions and Objective, Evolution of Operating System, Batch Processing, SPOOLING, Multiprogramming, Multiprocessing, Time Sharing, Real Time Processing.

Unit -5: Algorithm and Flowchart

Introduction to Algorithm and Characteristics, Introduction to Flow Chart: Symbols, Rules of Drawing Flow Chart, Advantage and Limitation of Flow Chart, Decision Tables.

Reference Books:

1. Computer fundamentals by P.K.Sinha
2. Computer fundamentals by B.Ram
3. Fundamentals of Computers by V.Rajaraman
4. Fundamental of computers & Programming with c by A.K.Sharma

Syllabus	SEMESTER-I								
Subject code	EMATBS02	Credit: 3			SESSIONAL - TA				ESE
Subject	ENGINEERING MATHS-I	L	T	P	CT	MSE	TA	Total	
		3	0	0	10	20	10	40	60

UNIT-1: Differential Calculus: Successive Differentiation Leibnitz Theorem, Roll's Theorem, Lagrange's Mean value Theorem, Expansion of functions by Maclaurian and Taylor's series. Tangents and Normal's, Maxima and minima of one variable.

UNIT-2: Indeterminate forms, Asymptotes, Radius of curvature, Partial differentiation, Total differentiation.

UNIT-3: Integral Calculus: Reduction formulae, Curve Tracing, Length, Area, Surface volume, Theorem of Pappas or Guldin. Gamma function, Beta function.

UNIT-4: Differential Equations: Differential Equations of first order and its applications, Linear equation of second order, Simultaneous differential equation.

UNIT-5: Partial differential equation of first order, linear homogenous partial differential equation, Application of partial differential equation.

Books Recommended:

- 1-Differential Calculus by Gorakh Prasad.
- 2-Integral Calculus by Gorakh Prasad.
- 3-Diffrential Equation by P.N. Chattrjee.
- 4-Engineering Mathematics by Bali & Iyengar.
- 5- Engineering Mathematics by H.K. Das.
- 6-Higher Engineering Mathematics by B.S. Grewal.

Syllabus	SEMESTER-I						
Subject code	MEALES03	Credit: 2			SESSIONAL - TA		ESE
Subject	ENGINEERING CHEMISTRY LAB	L	T	P	IA	Total	
				0	0	3	30

List of Experiments:

Group - A:

1. Standardization of sodium thiosulphate solution by standard potassium dichromate solution.
2. To determine the Normality and Strength (g/L) of given Ferrous Ammonium Sulphate solution 'A' using standard Ferrous Ammonium Sulphate (N/30) solution 'B' taking KMnO₄ solution as an intermediate.
3. To determine the concentration of hypo solution (Na₂S₂O₃.5H₂O) iodometrically with given Iodine (N/50) solution.
4. Find out the Temporary hardness of given water sample using 0.01M EDTA solution, buffer solution (pH-10) and EBT as an indicator.
5. To determine chloride ion in a given water sample by Argentometric method (Mohr's method)

Group - B:

6. Preparation of Urea Formaldehyde resin.
7. Acetylation of Primary Amine: Preparation of Acetanilide.
8. Base catalyzed Aldol condensation: Synthesis of Dibenzalpropanone.
9. {4+2} Cycloaddition Reaction: Diels-Alder reaction.
10. Preparation of Aspirin and calculate its yield.

Group - C:

11. To calculate the λ_{\max} of a given compound using UV-visible spectrophotometer.
12. To separate the metallic ions by paper chromatography.
13. To determine the surface tension of a liquid by stalagmometer.
14. To determine the percentage composition of the given mixture consisting of two liquids A and B (non-interacting system) by viscosity method.
15. To determine the relative viscosity of given liquids by Ostwald's viscometer

Syllabus	SEMESTER-I						
Subject code	MEALES03	Credit: 2			SESSIONAL - TA		ESE
Subject	ENGINEERING MECHANICS LAB	L	T	P	IA	Total	
				0	0	3	30

1. Verification of Law of Parallelogram of force.
2. Verification of law of triangle of forces.
3. Verification of law of polygon of forces.
4. Verification of law of moment.
5. Practical verification of forces in the member of nib crane.
6. Practical verification of forces in the member of roof truss.
7. Determination of coefficient of friction between two given surface.
8. Determination of coefficient of wheel and axle.
9. Determination of coefficient of single purchase winch crab.
10. Determination of coefficient of double purchase winch crab.
11. Determination of coefficient of simple screw jack.

Syllabus	SEMESTER-I						
Subject code	MEALES03	Credit: 2			SESSIONAL - TA		ESE
Subject	ENGINEERING DRAWING	L	T	P	IA	Total	
		0	0	3	30	30	20

UNIT- 1: CONVENTIONAL LINES, DRAWING SHEETS – THEIR LAYOUT & PLANNING:

Technical lettering – Introduction, single stroke letters, capital and lower letters Scales – Introduction, Representative fraction, construction of scales, Types- plain & diagonal scale. Cycloid curve- Cycloid, Epicycloids & Hypocycloid, and Involute to a plain curve. Spiral curve – Archimedean spiral and logarithmic spiral.

UNIT-2: Projection of points: Concept of quadrant system, first angle and third angle projection, projection of point in all quadrants. General procedure to draw projection of points on HP & VP. Projection of lines – Different situation of lines in spaces.

UNIT- 3: Theory of orthographic projection & projection of planes.

UNIT –4: Projection of solids & section of solids

UNIT – 5: Development of Surfaces & Isometric Projection

Recommended Text Book

1. Fundamental of Engineering Drawing – Luzzadar & Dulf, PHI
2. Engineering Drawing – N.D. Bhatt, Charottar Publishing House
3. Engineering Drawing – Arshad Siddiquee, Zahid Khan & Ahmed, PHI
4. Engineering Drawing – P.S. Gill, S.K. Kataria & Sons publishers.

SEMESTER-II

Syllabus	SEMESTER-II								
Subject code	MEBTES04	Credit: 3			SESSIONAL - TA				ESE
Subject	ENVIRONMENTAL STUDIES	L	T	P	CT	MSE	TA	Total	60
		3	0	0	10	20	10	40	60

UNIT-1: Environment and ecology: Segments of environment. Concept, structure and function of an ecosystem. Producers, consumers and decomposers. Energy flow in the ecosystem, food chains, food webs and ecological pyramids. Types, characteristic features, structure and function of terrestrial and aquatic ecosystem.

UNIT-2: Environmental Pollution: Definition, cause, effects and control measures of Air pollution, Water pollution and Land pollution. Smog (Oxidizing & Reducing), Acid rain, Greenhouse effect, Ozone depletion, BOD, COD, Eutrophication, and Solid waste management.

UNIT-3: Green Chemistry: Introduction, Principles of green chemistry, Introduction to green solvents and green catalysis: Water, Ionic liquid, CO₂, bio-catalysis.

UNIT-4: Green technologies: Photochemistry, Sonochemistry, and Microwave assisted reactions.

UNIT-5: Renewable energy resources: Solar, Wind, Hydro, Geothermal, Ocean, Fuel cells.

Books

1. G. M. Matlers, Introduction to Environmental Engg. & Sciences, Prentice Hall of India Pvt. Ltd.
2. B. J. Novel, Environmental Sciences, Printice Hall Inc.
3. A.K. De, Environmental Chemistry, New Age International (P) Ltd., 5th Ed.
4. Thomas G. Spiro, William M. Stigliani, Chemistry of the Environment, 2nd Edition Prentice Hall of India pvt. Ltd.
5. S. V. S Rana, Essential of Ecology and Environmental Sciences, 4th Edition, PHI, Learning Pvt. Ltd.
6. S.S Dara, Environmental chemistry and Pollution Control, S. Chand & Company Ltd.
7. V. K. Ahluwalia, Green Chemistry: Environmentally Benign Reactions, Ane Books India, New Delhi, 2006.
8. M. M. Srivastava, R. Sanghi, Chemistry for Green Environment, Narosa, New Delhi, 2005
9. D. P. Kothari, Rakesh Ranjan, and K. C. Saigal, Renewable Energy Sources and Emerging Technologies, Prentice Hall of India Pvt. Ltd.
10. M.C. Das & P.C. Mishra, Man & Environment, McMillan India Ltd.

Syllabus	SEMESTER-II								
Subject code	MEBTES04	Credit: 3			SESSIONAL - TA				ESE
Subject	ENGINEERING	L	T	P	CT	MSE	TA	Total	
		THERMODYNAMICS	3	1	0	10	20	10	40

UNIT-1: BASIC CONCEPTS AND DEFINITION: Thermodynamic System, Surrounding and Universe, Phase, Microscopic and Microscopic Point of View, Thermodynamic Equilibrium, Property, state, Path, Quasi-static Process, Reversible and Irreversible process. Heat and work-Forms of work during quasi-static or reversible process, work as a path function, Heat, various thermodynamic processes. Temperature and Zeroth law of thermodynamics, First law of thermodynamics- first law of thermodynamics undergoing cyclic process, first law of thermodynamics undergoing a process, Internal energy of a perfect gas, Application of first law to a closed system, First law of thermodynamics for flow process- flow processes and control volume, flow energy and flow work, first law of thermodynamics applied to open system, General study flow energy equation, application of study flow energy equation

UNIT-2: SECOND LAW OF THERMODYNAMICS: Limitation of first law and essence of second law, thermal reservoir, heat engine, thermal efficiency of heat engine, heat pump and coefficient of performance, statement of second law, equivalence of Kelvin and clausius statement, types of Irreversibility, Carnot cycle, Corollary 1 & 2, Entropy -Clausius inequality, Entropy Principle, temperature and entropy diagram, application of entropy principle.

UNIT-3: PROPERTIES OF PURE SUBSTANCE: Properties of steam – types of steam, wet, saturated and superheated steam, phase transformation at constant pressure, T-s and h-s diagram, sensible heat, latent heat, superheat, internal energy, enthalpy, dryness fraction. Steam Processes – Constant volume, adiabatic, isothermal, polytropic, entropy of steam.

UNIT-4: Vapour Power cycle: Carnot vapour cycle, rankine cycle , effect of operating conditions on ranking efficiency, principle & method of increasing the thermal efficiency, deviation of actual cycle from theoretical cycle, thermal efficiencies and specific steam

Consumptions, requirement of an ideal working fluid, the reheat cycle, binary vapour cycle

UNIT-5: Gas power cycles & Boilers: Air Standard Cycle- Otto, Diesel and Dual, Comparison among cycles, Boilers, Types, Requirements of boiler, boiler efficiency, boiler mountings and accessories.

Recommend Text Books

1. Engineering Thermodynamics - P.K. Nag, TMH publisher.
2. Engineering Thermodynamics – C.P. Arora, TMH publisher.
3. Engineering Thermodynamics - Cengel, TMH, Publisher
4. Engineering Thermodynamics - Jones Dugan, PHI publisher
5. Fundamentals of Engg Thermodynamics - R. Yadav, C. P House publisher
6. Applied Thermodynamics – Onkar Singh, New Age Publishing Co.

Syllabus	SEMESTER-II								
Subject code	EEBTES05	Credit: 3			SESSIONAL - TA				ESE
Subject	BASIC ELECTRICAL & ELECTRONICS ENGINEERING	L	T	P	CT	MSE	TA	Total	
		3	1	0	10	20	10	40	60

Unit 1 - DC Networks: Kirchoff's Laws, node voltage and mesh current methods, star-delta transformation, classification of Network Elements, Superposition theorem, Thevenin and Norton-theorems, maximum power transfer theorem, only independent sources, source conversion.

Unit 2 - Single Phase AC Circuits: RMS series and parallel circuits, representation notation, series and parallel resonance. Value, average value, form factor, solution of R,L,C of impedance, phasordiagram, power in complex

Three phase AC Circuits: Delta and star connections, line and phase quantities, solution of three phase circuits, balanced supply voltage and balanced load, phasordiagram, measurement of power in three phase circuits.

Unit 3 -Magnetic Circuits: B-H Curve, solution of magnetic circuits; Hysteresis and Eddy current losses. Difference between electric and magnetic circuits, behaviour of ferromagnetic material.

Single Phase Transformers Faradays' laws of electromagnetic induction, Transformer construction, emf equations, rating, phasor diagram on no load and full load, equivalent circuit, regulation, losses, efficiency, open and short circuit tests, autotransformer.

Unit 4 - D.C. Machines: Construction, DC Generator, emf equation; DC motor and its torque equations, classification and application, characteristics and speed control of DC motors,

Unit 5 - Semiconductor Devices: V-I characteristics of P-N Junction diode, diodeparameters, equivalent circuits, zener diode, working and characteristics, applications.

Rectifiers: Analysis of half wave & full wave rectifier with resistive load, efficiency, ripple factor, filter circuits.

Suggested Text Books and References:

1. Electrical Technology by B.L.Theraja, volume 1 and 2.
2. Electrical Technology by Ian Mckenzie-Smith and Edward Hughes.
3. Basic Electrical Engineering by I.J.Nagrath (TMH)
4. Fitzrald and Higgonbothom: Basic Electrical Engineering, 5th Edition, MGH.
5. Del Torro, Vincent: Electrical Engineering Fundamentals, 2nd Edition, PHI.
6. Cotton H: Advance Technology, ISSAC Pitman, London.
7. Electronic principles: A. V. Malvino
8. Electronic Devices: Bell
9. Electronic Devices & Circuits: Sanjeev Gupta
10. Electronic Devices & Circuits: Robert. L. Boylestad

Syllabus	SEMESTER-II								
Subject code	PHBTBS03	Credit: 3			SESSIONAL - TA				ESE
Subject	ENGINEERING PHYSICS	L	T	P	CT	MSE	TA	Total	
		3	0	0	10	20	10	40	60

Unit - 1: Special Theory of Relativity

Reference frames, Concept of ether, Michelson- Morley experiment, Einstein's postulates, Lorentz Transformation, Length contraction, Time dilation, variation of mass with velocity, and Mass-Energy equivalence.

Unit - 2: Interference of Light

Introduction of Interference, Young's experiment, theory of Interference, Coherent and non-coherent sources, Fresnel's Bi-prism, Newton's ring.

Unit - 3: Diffraction of Light

Introduction of diffraction, Fresnel and Fraunhofer diffraction, resultant of n-harmonic waves, diffraction due to Plane diffraction grating.

Unit - 4: EM wave and Laser

Equation of continuity for charge conservation, Maxwell's Electromagnetic equations and their physical significance, Electromagnetic waves in free space.

Introduction, elementary idea of spontaneous and stimulated emission, active medium, population inversion, Einstein's coefficients, Applications of lasers.

Unit -5: Solid State Physics and Devices

Energy band gap of metals, insulators and semiconductors, Intrinsic and Extrinsic semiconductors, Fermi levels in intrinsic and extrinsic semiconductors, Electrical conductivity in conductors and semiconductors, Construction, working and Applications of P-N Junction diodes and transistor.

Text Books and References

- 1) Engg. Physics by S. K. Srivastava and R. A. Yadav, New Age Pub. New Delhi
- 2) Engg. Physics by Uma Mukherjee, Narosa Publication
- 3) Engg. Physics by M. N. Avadhanulu, S. Chand Pub.
- 4) Engg. Physics by R. K. Gaur and S. L. Gupta, Dhanpat Rai Pub.
- 5) Electricity and Magnetism by Rangwala and Mahajan, Tata McGraw Hill, 1998
- 6) Concepts of Physics Part -II by H. C. Verma, Bharati Bhawan (P&D), 1998
- 7) Modern Physics by Beiser, McGraw Hill Inc. New York, Publication 1995
- 8) Modern Physics by Mani and Mehta, East-West Press Pvt. Ltd. 1998

Syllabus	SEMESTER-II								
Subject code	EMBTBS04	Credit: 3			SESSIONAL - TA				ESE
Subject	ENGINEERING	L	T	P	CT	MSE	TA	Total	60
	MATHS-II	3	0	0	10	20	10	40	

UNIT-1: Linear Algebra: Vector space, Linear dependence and Linear Independence Linear transformation, Rank & Inverse by elementary transformation, System of Linear equations-inconsistency, Eigen value and Eigen vectors, Caley-Hamilton theorem and its application to find inverse.

UNIT-2: Theory of Equations: Polynomial & Polynomial equation, Division Algorithm, roots of equations, Remainder theorem, Factor theorem, Synthetic division, Fundamental theorem of Algebra. Multiplication of roots, Reciprocal equations, Symmetric function of the roots, Descarte's Rule of sign, Cardon's Method, Ferrari's Method Descarte's Method.

UNIT-3: Vector Calculus: Vector functions, Differentiation of vectors, Velocity and acceleration, Scalar and vector field, Gradient of Scalar field, Directional derivative, properties of gradient, Divergence of vector, Point Function, curl of vector point function, properties of divergence and curl, Integration of vector function, Line integral, Surface Integral, Green, Gauss theorem and Stoke's theorem (without proof) and their simple applications.

UNIT-4: Complex Number : Complex number and its properties, conjugate complex number, Standard form of complex number, De Moivre's theorem, Roots of complex number, Exponential function of complex variable, Circular function of complex variable, Hyperbolic function of complex number, Logarithm of complex number $C + iS$ method of summation.

UNIT-5: Sequence, Convergent, Divergent, Oscillating sequence, Infinite series, Ratio test, Root test, Comparison test, Raabe's Logarithmic test, Couchy's Root test, Gauss's Test, Leibnitz Test Conditionally convergant.

Book Recommended:

1. Engineering Mathematics by H. K. Das
2. Engineering Mathematics by Bali & Iyengar
3. Higher Engineering Mathematics by B. S. Grewal

Syllabus	SEMESTER-II						
Subject code	EEBLES05	Credit: 2			SESSIONAL - TA		ESE
Subject	BASIC ELECTRICAL & ELECTRONICS ENGG. LAB	L	T	P	IA	Total	
				0	0	3	30

List of Laboratory Experiments:

1. To verify OHM's Law
2. To verify Kirchoff's Current Law
3. To verify Kirchoff's Voltage Law
4. To Verify Superposition Theorem
5. To Verify Maximum Power Transfer Theorem
6. To verify Thevenin's Theorem
7. To verify Nofton's Theorem
8. To find V-I Characteristics of incandescent lamp.
9. To find out R, L, C and power factor in series R-L-C Circuit.
10. To Measure Phase, Line quantities and Three Phase power in Star & delta connected Load
11. To perform OC & SC Test in single phase transformer.
12. To perform Load Test in Single Phase Transformer
13. To Perform Polarity Test in Single Phase Transformer
14. To Study Three Phase Squirrel Cage induction motor
15. Full & Half wave rectifiers

List of books for laboratory:

1. Laboratory courses in Electrical Engg: Tarnekar, Kharbanda, Bodkhe & Naik.
2. A text book of practicals in Electrical Engg: Dr. N.K.Jain

Syllabus	SEMESTER-II						
Subject code	PHBLBS03	Credit: 2			SESSIONAL - TA		ESE
Subject	ENGINEERING PHYSICS LAB	L	T	P	IA	Total	
		0	0	3	30	30	20

List of Experiments

1. To determine the wavelength of sodium light with help of Fresnel's Bi-prism.
2. To determine the refractive index and dispersive power of the material of prism with the help of spectrometer.
3. To determine the wavelength of sodium light by Newton's ring method.
4. To determine the wavelength of sodium light by plane diffraction grating.
5. To demonstrate the diffraction pattern and determine the wavelength of different colours of mercury light using diffraction grating.
6. To determine the wavelength and number of lines per cm on a diffraction grating using semiconductor laser diode.
7. Determine the width of the single slit and diameter of circular aperture using Fraunhofer diffraction pattern produced by semiconductor laser diode.
8. To determine the Energy band gap (Eg) of a semiconductor material using P-N junction diode.
9. To determine the e/m ratio by Thomson's method
10. To study the P-N junction diode characteristics, in forward and reverse bias conditions.
11. To study the Zener diode characteristics.
12. To study the characteristics and gain of Transistor in C-B and C-E mode.
13. To study the FET characteristics and determine different parameters.
14. To study the MOSFET characteristics

Text Books and References

1. Engg. Physics Practical by M. N. Avadhanulu, S. Chand Pub.
2. Unified Practical Physics by R. P. Goyal
3. Engg. Physics Practical by Ruby Das et al.
4. Engg. Physics Theory & Experiments by S. K. Srivatava, New Age International

Scheme & Syllabus
(2nd Year to 4th Year)

B.Tech.
(Civil Engineering)
III- SEM. to VIII-SEM.

SCHEME of B.TECH.-III- SEMESTER - CIVIL ENGINEERING

WEF: ODD SEMESTER OF SESSION – 2016-2017

S. No	Subject Code	Subjects Theory	Periods /Week			Evaluation Scheme						Grand Total	Credits
			L ¹	T ²	P ³	Internal Assessment				E.S.E			
						C.T. ⁵	M.S.E ⁴	T.A. ⁷	L.A. ⁶		Total		
1	CE3TPC01	Fluid Mechanics-I	3	0	0	10	20	10	-	40	60	100	3
2	CE3TES05	Strength of Materials	3	1	0	10	20	10	-	40	60	100	4
3	CE3TBS05	Engineering Mathematics-III	3	0	0	10	20	10	-	40	60	100	3
4	CE3TES06	Building Materials & Construction	3	1	0	10	20	10	-	40	60	100	4
5	CE3TPC02	Surveying-I	3	0	0	10	20	10	-	40	60	100	3
Practical													
1	CE3LPC01	Surveying-I Lab	0	0	3	-	-	30	30	20	50	50	2
2	CE3LPC02	Fluid Mechanics Lab	0	0	3	-	-	30	30	20	50	50	2
2	CE3LES05	Material Testing Lab	0	0	3	-	-	30	30	20	50	50	2
Total Credits													23

SCHEME of B.TECH. - IV - SEMESTER - CIVIL ENGINEERING

WEF: EVEN SEMESTER OF SESSION – 2016-2017

S. No	Subject Code	Subjects Theory	Periods /Week			Evaluation Scheme						Grand Total	Credits
			L ¹	T ²	P ³	Internal Assessment				E.S.E			
						C.T. ⁵	M.S.E ⁴	T.A. ⁷	L.A. ⁶		Total		
1	CE4THS03	Engineering Economics	3	0	0	10	20	10	-	40	60	100	3
2	CE4TPC03	Building Planning and Drawing	3	0	0	10	20	10	-	40	60	100	3
3	CE4TBS06	Numerical Analysis & Computer Applications	3	0	0	10	20	10	-	40	60	100	3
4	CE4TPC04	Surveying-II	3	0	0	10	20	10	-	40	60	100	3
5	CE4TPC05	Structural Analysis-I	3	1	0	10	20	10	-	40	60	100	4
6	CE4TPC06	Fluid Mechanics-II	3	0	0	10	20	10	-	40	60	100	3
Practical													
1	CE4LPC03	Civil Engg. Drawing	0	0	3	-	-	30	30	20	50	50	2
2	CE4LPC04	Surveying-II Lab	0	0	3	-	-	30	30	20	50	50	2
3	CE4LBS03	Numerical Analysis & Computer Applications LAB	0	0	3	-	-	30	30	20	50	50	2
Total Credits													25

¹-Lecture Hours, ²-Tutorial Hours, ³- Practical Hours, ⁴- Mid Sem. Exam, ⁵-Class Tests/Assignments, ⁶-Lab Work Assessment

SCHEME of B.TECH. – V - SEMESTER - CIVIL ENGINEERING

WEF: ODD SEMESTER OF SESSION – 2017-2018

S. No	Subject Code	Subjects	Periods /Week			Evaluation Scheme					Grand Total	Credits	
		Theory	L ¹	T ²	P ³	Internal Assessment							E.S.E
						C.T. ⁵	M.S.E ⁴	T.A. ⁶	L.A. ⁷	Total			
1	CE5TPC07	Design of Concrete Structures	3	1	0	10	20	10	-	40	60	100	4
2	CE5TPC08	Structural Analysis - II	3	1	0	10	20	10	-	40	60	100	4
3	CE5TPC09	Highway Engineering	3	0	0	10	20	10	-	40	60	100	3
4	CE5TPC10	Estimation and Costing	3	0	0	10	20	10	-	40	60	100	3
5	CE5TPC11	Geotechnical Engineering - I	3	0	0	10	20	10	-	40	60	100	3
6	CE5TPC12	Environmental Engineering - I	3	0	0	10	20	10	-	40	60	100	3
		Practical											
1	CE5LPC04	Highway Engineering Lab	-	-	3	-	-	-	30	30	20	50	2
2	CE5LPC05	Environmental Engineering Lab	-	-	3	-	-	-	30	30	20	50	2
Total Credits												24	

SCHEME of B.TECH. – VI - SEMESTER - CIVIL ENGINEERING

WEF: EVEN SEMESTER OF SESSION – 2017-2018

1	CE6TPC13	Water Resources Engineering -I	3	0	0	10	20	10	-	40	60	100	3
2	CE6TPC14	Environmental Engineering - II	3	0	0	10	20	10	-	40	60	100	3
3	CE6TPC15	Design of Steel Structures	3	1	0	10	20	10	-	40	60	100	4
4	CE6TPC16	Geotechnical Engineering- II	3	0	0	10	20	10	-	40	60	100	3
5	CE6TPE1X	Professional Elective -1X	3	1	0	10	20	10	-	40	60	100	4
6	CE6TOE1X	Open Elective -1X	3	0	0	10	20	10	-	40	60	100	3
		Practical											
1	CE6LPC05	Geotechnical Engineering - Lab	0	0	3	-	-	-	30	30	20	50	2
2	CE6LPC06	Computer Applications in Civil Engg. Lab	0	0	3	-	-	-	30	30	20	50	2
Total Credits												24	

Note: Industrial Training for one month is mandatory after end semester examination

X_ indicates the serial alphabet of a subject in the subject group

¹-Lecture Hours, ²- Tutorial Hours, ³- Practical Hours, ⁴- Mid Sem. Exam, ⁵-Class Tests/Assignments, ⁶-Lab Work Assessment

SCHEME of B.TECH. – VII - SEMESTER - CIVIL ENGINEERING

WEF: ODD SEMESTER OF SESSION – 2018-2019

S No	Subject Code	Subjects Theory	Periods /Week			Evaluation Scheme					Grand Total	Credits
			L ¹	T ²	P ³	Internal Assessment				E.S.E		
						C.T ⁵	M.S.E ⁴	T.A ⁷	L.A. ⁶			
1	CE7TPC17	Water Resources Engineering-II	3	0	0	10	20	10	-	60	100	3
2	CE7TPE2X	Professional Elective -2X	3	1	0	10	20	10	-	60	100	4
3	CE7TPE3X	Professional Elective -3X	3	0	0	10	20	10	-	60	100	3
4	CE7TPE4X	Professional Elective -4X	3	0	0	10	20	10	-	60	100	3
5	CE7TPE5X	Professional Elective -5X	3	0	0	10	20	10	-	60	100	3
6	CE7TOE2X	Open Elective -2X	3	0	0	10	20	10	-	60	100	3
Practical												
1	CE7LPS01	Seminar	0	0	3		50	50	-	50		2
2	CE7LPS02	Minor project	0	0	8		60	60	40	100		4
Total Credits												25

SCHEME OF B.TECH.- VIII - SEMESTER - CIVIL ENGINEERING

WEF: EVEN SEMESTER OF SESSION – 2018-2019

S No	Subject Code	Subjects Theory	Periods /Week			Evaluation Scheme					Grand Total	Credits	
			L ¹	T ²	P ³	Internal Assessment				E.S.E			
						C.T ⁵	M.S.E ⁴	T.A. ⁷	Total				
1	CE8TPC18	Earthquake Resistant Design of structures	3	1	0	10	20	10	-	40	60	100	4
2	CE8TPE6X	Professional Elective -6X	3	0	0	10	20	10	-	40	60	100	3
3	CE8TPE7X	Professional Elective -7X	3	1	0	10	20	10	-	40	60	100	4
4	CE8TOE3X	Open Elective -3X	3	0	0	10	20	10	-	40	60	100	3
Practical													
1	CE8LPS03	Major Project	0	0	15		120			120	80	200	8
2	CE8LPC07	Structural Detailing Lab	0	0	3		-	-	30	30	20	50	2
Total Credits												24	

X_ indicates the serial alphabet of a subject in the subject group

¹-Lecture Hours, ²-Tutorial Hours, ³- Practical Hours, ⁴- Mid Sem. Exam, ⁵-Class Tests/Assignments, ⁶-Lab Work Assessment

List of Professional (Core) Electives

Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE6TPE1X	Professional Elective-1 (PE Group-1)	4	VI
A	CE6TPE1A	Advanced Concrete Technology		
B	CE6TPE1B	Advanced Surveying		
C	CE6TPE1C	Advanced Concrete Design		
D	CE6TPE1D	Highway Safety		
E	CE6TPE1E	Advanced Fluid Mechanics		
Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE7TPE2X	Professional Elective-2 (PE Group-2)	4	VII
A	CE7TPE2A	Design of Prestressed Concrete		
B	CE7TPE2B	Structural Dynamics		
C	CE7TPE2C	Theory of Elasticity & Plasticity		
D	CE7TPE2D	Fracture of Concrete Structures		
E	CE7TPE2E	Advance Structural Analysis		
Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE7TPE3X	Professional Elective-3 (PE Group-3)	3	VII
A	CE7TPE3A	Environmental Geotechnical Engineering		
B	CE7TPE3B	Air Pollution Control Engineering		
C	CE7TPE3C	Industrial Waste Water Management		
D	CE7TPE3D	Water Resources Planning & Management		
E	CE7TPE3E	Environmental Impact Assessment		
Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE7TPE4X	Professional Elective-4 (PE Group-4)	3	VII
A	CE7TPE4A	Ground Water Hydrology		
B	CE7TPE4B	Ground Improvement Techniques		
C	CE7TPE4C	Geo-Informatics & GIS Applications		
D	CE7TPE4D	Rock Mechanics		
E	CE7TPE4E	Design of Hydraulic Structures		

Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE7TPE5X	Professional Elective-5 (PE Group-5)	3	VII
A	CE7TPE5A	Industrial Structures		
B	CE7TPE5B	Systems Analysis in Civil Engineering		
C	CE7TPE5C	Railway Engineering		
D	CE7TPE5D	Pavement Construction and Maintenance		
E	CE7TPE5E	Planning & Design of Building Services		
Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE8TPE6X	Professional Elective-6 (PE Group-6)	4	VIII
A	CE8TPE6A	Machine Foundation		
B	CE8TPE6B	Earthquake Geotechnical Engineering		
C	CE8TPE6C	Bridge Engineering		
D	CE8TPE6D	Solid and Hazardous Waste Management		
E	CE8TPE6E	Construction Equipment & Techniques		
Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE8TPE7X	Professional Elective-7 (PE Group-7)	3	VIII
A	CE8TPE7A	Air and Water Transportation		
B	CE8TPE7B	Theory of Plates & Shells		
C	CE8TPE7C	Repair and Rehabilitation of Structures		
D	CE8TPE7D	Finite Element Analysis		
E	CE8TPE7E	Hydropower Engineering		

List of Open Electives

Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE6TOE1X	Open Elective-1 (OE Group-1)	3	VI
A	CE6TOE1A	Construction Planning and Management		
B	CE6TOE1B	Rural Technology and Community Development		
C	CE6TOE1C	Engineering System Design Optimization		
D	CE6TOE1D	Engineering System Modelling and Simulation		
Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE7TOE2X	Open Elective-2 (OE Group-2)	3	VII
A	CE7TOE2A	Value Engineering		
B	CE7TOE2B	Supply Chain Management-Planning		
C	CE7TOE2C	Travel Demand Analysis		
D	CE7TOE2D	Quality Control Assurance and Safety in Construction		
Sl. No.	Subject Code	Name of Subject	Credits	SEMESTER
x	CE8TOE3X	Open Elective-3 (OE Group-3)	3	VIII
A	CE8TOE3A	Management Information System		
B	CE8TOE3B	Enterprise Resource Planning		
C	CE8TOE3C	Engineering Risk-Benefit Analysis		
D	CE8TOE3D	Fluid Dynamics		

SEMESTER-III

SYLLABUS	(SEMESTER-III)								
Subject Code:	CE3TPC01	CREDITS: 3			SESSIONAL - TA			ESE	
Subject:	Fluid Mechanics-I	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT-1: Introduction: Fluid, physical properties of fluids ideal and real fluid, Newtonian and Non-Newtonian Fluid Statics: Pressure density height relationship, pressure measurement by Manometers, Pressure on plane and curved surfaces, centre of pressure, buoyancy, stability of immersed and floating bodies, metacentric height.

UNIT-2: Kinematics of fluid flow : Steady and unsteady flow, uniform and non-uniform flow, laminar and turbulent flow, one, two and three dimensional flow, streamlines and path lines, rotational and irrotational flow, continuity equation, three dimensional continuity equation. Velocity potential and stream function.

UNIT-3: Dynamics of fluid flow: Euler's equation of motion along a streamline and its integration, Bernoulli's equation and its applications – Pitot tube, Venturimeter, orificemeter, and problems related to application of momentum equations.

UNIT-4: Flow in Pipes: Major and minor losses in pipe lines, loss due to sudden contraction & expansion, Pipes in series and parallel Flow in open Channel: Comparison between open channel and pipe flow, definition of uniform and non-uniform flow, Chezy's and Manning's Formula, Hydraulically efficient channel section of rectangular, trapezoidal.

UNIT -5: Flow through mouthpieces and orifices: Hydraulic coefficients of orifice flow through large rectangular orifice, mouthpieces, Borda's mouthpieces. Notches and Weirs: Rectangular, triangular and trapezoidal notches and weir, cippoletti and broad crested weir.

NAME OF TEXT BOOKS:

Fluid Mechanics and Machines – Dr. A.K. Jain (Khanna Publications)

Fluid Mechanics and Machines – Dr. R.K. Bansal (Laxmi Publications)

Fluid Mechanics & Hydraulic Machines – Dr.P.N.Modi&S.M.Seth,(Narosa Publishing House)

NAME OF REFERENCE BOOKS:

Mechanics of Fluid – Irving H. Shames (McGraw Hill)

Introduction to Fluid Mechanics – James A. Fay (Prentice Hall India)

Fluid Mechanics – R.J. Garde (New Age International Publication)

Fluid Mechanics – Streeter V.L. & Wylie E.B. (Tata McGraw Hills)

Fluid Mechanics – John F Douglas (Pearson Publication)

Introduction to Fluid Mechanics Fox, R.W. and McDonald, A.T., John Wiley & Sons.

Fluid Mechanics”, Streeter, V.L. and Benjamin, W.E., “McGraw-Hill.

Fluid Mechanics and Fluid Mechanics Som, S.K. and Biswas, G.,Tata McGraw Hill.Introduction to Fluid Mechanics, Fox, R. W. and A. T. McDonald, 6th ed., John Wiley, New York, (2004)

SYLLABUS	(SEMESTER-III)							
Subject Code:	CE3TES05	CREDITS: 4			SESSIONAL - TA			ESE
Subject:	Strength of Materials	L	T	P	CT	MSE	TA	TOTAL
		3	1	-	10	20	10	40

UNIT-1: Simple Stresses -Strain and compound stresses: Types of stresses and strains, Mechanicals properties, Hooke's law, stress– strain curve for mild & Cast iron, hardness, impact strength, Poisson's ratio, Relation between the elastic moduli & Poisson's ratio, Bars subjected to varying loads, Temperature stresses in composite bars, Elongation of bars of constant and varying sections. Stress at a point. Components of stress in rectangular coordinates, stresses on an inclined plane, Principal stresses & principle plane, Mohr's circle of stresses.

UNIT-2: Shear Force - Bending Moment and Bending Stress: Shear Force & Bending Moment diagrams in statically determinate beams loaded with different load combination, Relationship between Load intensity- Shear Force - Bending Moment, Thrust diagram, Point of contra flexure, loading diagram & Bending moment diagram from shear force diagram, beam with internal hinge.

UNIT-3: Shear Stresses in Beams and Slope-Deflections of Beams: Derivation of Shear Stress formula, assumptions, and Shear stresses in symmetrical elastic beam with different sections. Derivation of differential equation for deflection, Slope & Deflection of Beams by Double integration method, Macaulay's method & Moment area method. Propped cantilever.

UNIT-4: Torsion and Columns: Equation of Pure Torsion, Assumptions, and Power transmitted, Stiffness of Shafts, Comparison of Solid & Hollow shaft, Strain energy in Torsion. Stable and unstable equilibrium, Short columns, Euler's formula for long columns, Equivalent length, Limitation of Euler's formula, Rankine's formula.

UNIT -5: Thin -Thick Cyl;inders-Spheres and Rivet-welded Connection: Stresses in Thin Cylinders, Changes in Dimensions of Cylinder, Rivetted Cylinders, Thin Spherical Shells. Thick Cylinders, Lamé's equation. Riveted Joints, Method of riveting, Types of joints, assumptions made in analysis of riveted joints, pitch of Rivets, Failure of a Riveted joint, Strength of a riveted joint, Efficiency of a Joint, Design of Riveted joints for axial load. Welded connection, Types of joints, strength of joints, size of weld, comparison of welded & Riveted joints.

TEXT BOOKS: Strength of Materials – R.K. Rajput (S. Chand & Co.)

NAME OF REFERENCE BOOKS:

Mechanics of Structures (Vol. – I) – Junarkar (Charotar Publications)

Strength of Materials – Timoshenko, S. & Gere (CBS Publishers)

Introductions to Solid Mechanics –Shames &Pitarresi (Prentice Hall of India)

Engineering Mechanics of Solid – Popov (Pearson Publication)

Strength of Materials–S. Ramamurtham (DhanpatRai Publications)

Strength of Materials (Part-I) – Timoshenko (CBS Pubishers)

SYLLAUS	(SEMESTER-III)										
Subject Code:	CE3TBS05			CREDITS: 3			SESSIONAL - TA			ESE	
Subject:	Engineering Mathematics-III			L	T	P	CT	MSE	TA	TOTAL	
				3	-	-	10	20	10	40	60

UNIT-1 Functions of a complex variable: Complex variable, function of complex variable, limit, continuity, and differentiability, of a function of a complex variable. Analytic functions, Cauchy- Riemann equations, Orthogonal curves, harmonic functions, conformal mapping, bilinear transformation (Möbius transformation) Cauchy integral theorem, Cauchy integral formula, Cauchy's inequality Taylor theorem, and Laurent's theorem.

UNIT-2 Fourier series and Fourier transform: Periodic function, Fourier series, Dirichlet's conditions for a Fourier series. Advantages of Fourier series and determination of Fourier coefficients, Fourier series of function of periods 2π , change of interval, Even Odd functions, Half range sine and cosine series, practical harmonic analysis, Fourier transformation, Fourier sine and cosine transform, properties of Fourier transform.

UNIT-3 Laplace transformation: Laplace transformation, properties of Laplace transformation, first shift theorem, Laplace transform of the derivative of $f(t)$, multiplication and division by t . Unit step function: Laplace transformation of unit function, second shifting theorem, Laplace transform of function and periodic function. Inverse Laplace transformation Multiplication by s , division by s , first shifting property, second shifting property, inverse Laplace transform of derivatives, solution of differential equations by Laplace transform

UNIT-4 Correlation & Regression: Scatter diagram, Linear Correlation, Measures of Correlation, Karl Pearson's Coefficient of correlation, Limits for correlation coefficients, Coefficient of correlation for bivariate frequency distribution, Rank correlation, Linear Regression, Equations to the line of Regression. Regression coefficient. Angle between two lines of Regression.

UNIT -5 Theoretical Distributions: Discrete and Continuous probability distribution's .Mathematical expectation, Mean and Variance, Moments, Moments generating function, probability distribution ,Binomial, Poisson and Normal distribution ,Test of significance based on chi-square , T,F, and Z distribution, degree of freedom , conditions for applying χ^2 (chi-square) test , student's test.

TEXT BOOKS:

- 1) Prasad C "Advanced Engineering mathematics", 2) Pati T "Functions of complex variables",
- 3) Dass H.K. "Advanced Engineering mathematics", 4) Ray M. "Mathematics statistics",
- 5) Higher Engg. Mathematics by Dr. B.S. Grewal- Khanna Publishers.,
- 6) Advanced Engg. Mathematics by Erwin Kreyszig – John Wiley & Sons,
- 7) Advanced Engg. Mathematics by R.K. Jain and S.R.K. Iyengar – Narosa Publishing House.,
- 8) Applied Mathematics by P.N.Wartikar & J.N. Wartikar. Vol- II- Pune VidyarthiGrihaPrakashan,Pune.,
- 9) Applied Mathematics for Engineers & Physicists by Louis A. Pipes- TMH

SYLLABUS	(SEMESTER-III)								
Subject Code:	CE3TES06	CREDITS: 4			SESSIONAL - TA			ESE	
Subject:	Building Materials & Construction	L	T	P	CT	MSE	TA		TOTAL
		3	-	-	10	20	10	40	60

UNIT- 1: Stones, Bricks, Tiles, Timber; Properties, Classification & Uses

UNIT-2: Miscellaneous Engineering Materials; Ceramics & glass; Plastics & Rubber; Paints, Varnishes and distempers; Composite materials; Adhesives; Thermal, Electrical & Sound Insulators.

UNIT 3: Cement, Aggregate, Concrete and Steel; classification, properties & uses.

UNIT-4: Foundations, Masonry, Arches & Lintels; Classification, Requirements & Uses.

UNIT-5: Shoring, Underpinning, Formwork, Advanced construction materials & Techniques.

NAME OF TEXT BOOKS:

Building Materials – S.K. Duggal (New Age Publication)

Building Materials – S. C. Rangwala (Charotar Publication)

Building Construction by S.G. Rangwala, Charter Publishing House, Anand, India.

Building Construction by Sushil Kumar, Standard Publ. and Distributors, New Delhi

Building Construction by Punmia B.C., Lakshmi Publications, New Delhi.

Advanced Building Materials and Construction by Mohan Rai and Jai Sing, CBRI Publications, Roorkee

Concrete Technology – A.M. Neville & J.J. Brooks (Pearson Education)

Concrete Technology – M.S. Shetty (S. Chand & Co.)

Engineering Materials – Surendra Singh (Laxmi Publication)

Construction Engineering and Management – S. Seetharaman (Umesh Publication)

Building Materials – Gurucharan Singh (Standard Publishers, Delhi)

SYLLABUS	(SEMESTER-III)								
Subject Code:	CE3TPC02	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Surveying-I	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT-1: Introduction and chain surveying: Definition - Principles - Classification - Fields and office work - Scales - Conventional signs – Survey instruments, their care and adjustment - Ranging and chaining - Reciprocal ranging - Setting perpendiculars - well-conditioned triangles.

COMPASS SURVEYING: Prismatic compass - Surveyor's compass - Bearing - Systems and conversions - Local attraction – Magnetic declination - Dip

UNIT-2: Different methods of determining elevations: Spirit, Trigonometric and Barometric methods Spirit leveling-Definitions of terms, Principle, Temporary and permanent adjustment of levels. Sensitivity of bubble tube, Auto & Dumpy levels, Levelling staff, Methods of spirit leveling Booking and reduction of field notes. Types of leveling: - Reciprocal, Profile, Differential, Precise leveling, Plotting of profiles Correction: - Curvature and refraction. CONTOURING; Direct and Indirect methods of contouring. Interpolation of contours, Drawing section from contour map, Application and Modern methods of depicting relief on a Map.

UNIT - 3: THEODOLITE AND TRAVERSING: Vernier theodolites, Temporary and permanent adjustments, Requirements of nonadjustable parts, Measurement of horizontal angle by repetition and reiteration method, Measurement of vertical angles. AREA AND VOLUMES; Computation of area and volume by different mathematical methods.

UNIT - 4: PLANE TABLE SURVEYING: Principles, Advantages and disadvantages, Plane table equipment, Use of Telescopic Alidade, Different methods of Plane Table Surveying, Resection-Two and Three point problems. Fields work in Plane Table Surveying.

UNIT-5: CURVES: Classification of curves; Elements of Simple, Compound, Reverse and Transition curves, Method of setting out Simple and Compound curves. Special field problems.

NAME OF TEXT BOOKS:

Surveying (Vol. I & II) – Punmia, B.C. (Laxmi Publications, New Delhi, 1996)

Surveying (Vol. I & II) – Kanetkar (Pune VidyarthiGrihaPrakashan, Pune)

urveying (Vol. II & III) – Agor, R (Khanna publications, Delhi, 1995)

Surveying (Vol. II & III) – Arora, K.R. (Standard Book House, Delhi, 1993)

Fundamentals of Surveying – S.K. Roy (Prentice Hall of India)

Surveying (Vol. I & II) – S.K. Duggal (Tata McGraw Hill)

SYLLABUS	(SEMESTER-III)							
Subject Code:	CE3LPC01	CREDITS: 2			SESSIONAL - TA		ESE	
Subject:	Surveying-I Lab	L	T	P	IA	MSE		TOTAL
		-	-	3	30	-	30	20

List of experiments

1. Linear measurement & offsetting using metric chain.
2. Determination of the area of the given field by cross staff survey.
3. Compass open traversing using prismatic compass and elimination of local attraction.
4. Compass closed traversing using prismatic compass and elimination of local attraction by bowditch method.
5. To find the difference in elevation between the two non intervisible stations by the method of differential levelling.
6. To draw longitudinal sectional profile of the road by the method of profile levelling.
7. To draw cross-sectional profile of the road by the method of profile levelling.
8. Contour and its plotting by grid method.
9. Measurement of horizontal angle by repetition method.
10. Measurement of horizontal angle by reiteration method.
11. Traversing of the given area by radiation method using plane table survey.
12. Traversing of the given area by intersection method using plane table.

Text Book:

Surveying and Leveling. N.N.Basak, 1st Edition, Tata McGraw Hill

Surveying (Vol. I & II) – Punmia, B.C. (Laxmi Publications, New Delhi, 1996)

Surveying (Vol. I & II) – Kanetkar (Pune VidyarthiGrihaPrakashan, Pune)

NAME OF REFERENCE BOOKS:

Surveying (Vol. II & III) – Agor, R (Khanna publications, Delhi, 1995)

Surveying (Vol. II & III) – Arora, K.R. (Standard Book House, Delhi, 1993)

Fundamentals of Surveying – S.K. Roy (Prentice Hall of India)

Surveying (Vol. I & II) – S.K. Duggal (Tata McGraw Hill)

SYLLABUS	(SEMESTER-III)						
Subject Code:	CE3LPC02	CREDITS: 2			SESSIONAL - TA		ESE
Subject:	Fluid Mechanics Lab	L	T	P	IA	MSE	TOTAL
		-	-	3	30	-	30
							20

List of experiments

1. To calculate the total energy at different points and plot the graph between total energy vs. distance. (Verification of Bernoulli's equation)
2. To determine the Meta centric height with angle of ship model.
3. To determine the co-efficient of Discharge Cd for Venturimeter
4. To determine the co-efficient of Discharge Cd for Orificemeter.
5. To determine the co-efficient of discharge and the co-efficient of velocity for Orifice.
6. To determine the co-efficient of discharge and the co-efficient of velocity for Mouthpiece.
7. To determine the coefficient of discharge Cd of Rectangular Notch.
8. To determine the coefficient of discharge Cd V Notch - 45°
9. To determine the coefficient of discharge Cd V Notch - 60°
10. To determine the friction factor for Darcy-Weisbach equation
11. Experimental determination of critical velocity in pipe.
12. To determine the coefficient of impact for vanes
13. To find the co-efficient of pitot tube
14. To plot velocity profile across the cross section of pipe
15. To determine the Reynold's Number in pipe
16. Calibration of rectangular sharp cornered weir and to study the pressure distribution on the upstream face of the weir.
17. Calibration of rectangular streamlined weir and to study the pressure distribution on the upstream face of the weir

SYLLABUS	(SEMESTER-III)							
Subject Code:	CE3LES05	CREDITS: 2			SESSIONAL - TA		ESE	
Subject:	Material Testing Lab	L	T	P	IA	MSE	TOTAL	
		-	-	3	30	-	30	20

List of experiments

Testing of cement

1. Normal Consistency, Fineness of Cement, Setting times of Cement
2. Specific Gravity of Cement
3. Soundness of Cement
4. Compressive strength of cement

Testing of aggregate

5. Fineness modulus of Fine and Coarse aggregate
6. Bulk density of aggregate
7. Specific Gravity and Water Absorption of Aggregate
8. Bulking of Sand

Testing of bricks

9. Compressive strength, Water Absorption & Efflorescence of Bricks

Testing of concrete

10. Workability of Concrete
11. Compressive strength
12. Modulus of Elasticity
13. Tensile Strength of Concrete
14. NDT Test of Concrete

SYLLABUS	(SEMESTER-IV)									
Subject Code:	CE4THS03			CREDITS: 3			SESSIONAL - TA			ESE
Subject:	Engineering Economics			L	T	P	CT	MS E	TA	TOTAL
				3	-	-	10	20	10	40

Unit-1: Basic Concepts and Definitions, Methodology of Economics, Demand and Supply – elasticity, Theory of the Firm and Market Structure, Price and output determinations in different types of market

Unit-2: Public Sector Economics –Welfare economics, Central and commercial marks and their functions, Industrial policies, theory of localization, weber & surgent Florence theory, investment analysis-NPV, ROI, IRR, Payback period, SWOT analysis.

Unit-3: Monetary and Fiscal Policy; Tools, impact on the economy, Inflation, Business Cycle, Cash Flow-2, 3, 4 Model.

Unit -4: Business Forecasting – Elementary techniques, Cost and Revenue Analysis, Capital Budget, Break Even Analysis.

Unit-5: Indian economy; Urbanization, Unemployment–Poverty, Regional Disparities, Unorganized Sectors- Roll of Plans, Reforms-Post Independent period.

Text/Reference Books:

1. Mankiw Gregory N. (2002), Principles of Economics, Thompson Asia
2. V. Mote, S. Paul, G. Gupta (2004), Managerial Economics, Tata McGraw Hill
3. Misra, S.K. and Puri (2009), Indian Economy, Himalaya
4. PareekSaroj (2003), Textbook of Business Economics, Sunrise Publishers

SYLLABUS	(SEMESTER-IV)								
Subject Code:	CE4TPC03	CREDITS: 3			SESSIONAL - TA			ESE	
Subject:	Building Planning & Drawing	L	T	P	CT	MS E	TA		TOTAL
		3	-	-	10	20	10	40	60

Part-A (60% weight age)

UNIT – Principles of building Planning;

UNIT – 2 BUILDING BYELAWS AND REGULATIONS: Introduction – Terminology – Objectives of building byelaws – Floor Area Ratio (FAR) – Floor Space Index (FSI) – Principles underlying building byelaws – classification of buildings – Open space requirements – built up area limitations – Height of Buildings – Wall thickness – lighting and ventilation requirement.

UNIT – 3 RESIDENTIAL & PUBLIC BUILDINGS: Minimum standards for various parts of residential and public buildings – requirements of different rooms and their grouping – characteristics of various types of residential buildings.

UNIT – 4 SIGN CONVENTIONS AND BONDS: Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys, Aluminum alloys etc., Lead, Zinc, tin, white lead etc., Earth, Rock, Timber and Marble. English bond & Flemish bond odd & even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

Part-B (40% weight age)

UNIT – 5 BUILDING DRAWING: Preparation of plan, elevation and section of residential buildings- single storey (load bearing structures), double storey (R.C.C.Framed structure) by using principles of planning and local building bye- laws. For this unit students have to draw the problem on the drawing sheet in the examination.

Text books: 1. Building planning designing and scheduling, (5th Edition) by Gurucharan Singh and Jagadish Sing, Standard Publications Distributers, Delhi, 2010.

2. Building planning and drawing, (3rd edition) by Kumara Swami N., Anand Charotar Publishing House Pvt Ltd, 2010.

SYLLABUS	(SEMESTER-IV)									
Subject Code:	CE4TBS06		CREDITS: 3			SESSIONAL - IA				ESE
Subject:	Numerical Analysis & Computer Applications		L	T	P	CT	MSE	TA	TOTAL	
			3	0	-	10	20	10	40	60

UNIT – 1 Approximations and Errors in Computation: Errors and their analysis, Types of errors Curve fitting : Method of Least squares , fitting of a straight line , polynomial fit : Nonlinear Regression (second degree parabola), Numerical Solution of Algebraic and Transcendental Equations: Secant Method ,Regulafalsi Method, Newton Raphson Method, Solution of a system of simultaneous linear algebraic Equations Direct method: Gauss elimination Method, Gauss Jordan method, Iterative methods .Jacobi Iterative Method, Gauss Seidel Iterative method.

UNIT – 2 The Calculus of Finite Differences: Finite differences, Difference formula, operators and relation between operators. Inverse Operator, Interpolation with equal intervals: - Newton's forward and backward interpolation formula. Interpolation with Unequal intervals: - Lagrange's interpolation Newton's difference formula, inverse interpolation,

UNIT –3 Numerical Differentiation and Integration: - Numerical Differentiation Newton's forward and Backward difference interpolation formula. Maxima and Minima of a Tabulated function, Numerical Integration :- Trapezoidal rule , simpson is (1/3)rd and (3/8) th rule , Boole's rule, weddle rule , Difference Equations -: Definition ,order and degree of a difference equation ., Linear difference equations, Difference equations reducible to Linear form . simultaneous difference equations with constant coefficients

UNIT – 4 Numerical solution of ordinary differential equation: Taylor series method, Euler's method, Modified Euler method Runge's method RungeKutta method ,. Numerical solution of partial differential Equations : Classification of P.D.E. of the second order Elliptic equations , solution of Laplace equation , solution of poisson's Equation, solution of elliptic equations by Relaxation method parabolic equations ,

UNIT – 5

Programming in ANSI 'C' language: Overview of 'C', Constants, Variables, Data types, Operators and Expression, Decision making and Branching, Decision making and looping, Arrays, Programs in C or C++ language.

Name of Text Books:

1. JAIN & IYNGAR Numerical Methods for Scientific and Engineering Computations.
2. RAO G.S. Numerical Analysis.
3. Grewal B S Numerical Methods In Engineering and Science.
4. Das K K Advance Engineering Methods.
5. Rajaraman V Computer Oriented Numerical Methods
6. E Balagurusamy-Programming in ANSI 'C'

SYLLABUS		(SEMESTER-IV)							
Subject Code:	CE4TPC04	CREDITS: 3			SESSIONAL - TA			ES E	
Subject:	Surveying-II	L	T	P	CT	MS E	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT-1: Tacheometry: Definitions, Principles of stadia systems. Instrument constants, Substance and Tangential Systems. Construction and use of Reduction Tacheometers.

UNIT-2: Triangulation::Principle and classification of Triangulation System, Triangulation chains, Strength of Figures, Station marks and Signals, Satellite station, intersected and Resected points, field work- Reconnaissance, Intervisibility of station, Angular measurement, Base line measurement and its extension.

UNIT-3: Adjustment Computations: Weighting of observations. Treatment of random errors, probability equation, Normal law of error, Most Probable Value, Propagation of errors and variances. Most probable value, Principle of Least square, Observations and correlative Normal Equations. Adjustment triangulation figures and level nets.

UNIT-4: Photographic surveying: Photo theodolite, principle of the method of terrestrial photogrammetry, stereo Photogrammetry.Aerial surveying; Aerial surveying, scale and distortion of the vertical and tilted photograph, comparison between air photograph and map.

UNIT -5: Hydrographic surveying: Introduction, shore line survey, soundings methods, gauges, equipment required for hydrographic surveying.EDM : Principle, Type, Use

TEXT BOOKS:

Surveying (Vol. I & II) – Punmia, B.C. (Laxmi Publications, New Delhi, 1996)
Surveying (Vol. I & II) – Kanetkar T.P. (Pune VidyarthiGrihaPrakashan, Pune)

REFERENCE BOOKS:

Surveying (Vol. I & II) – Punmia, B.C. (Laxmi Publications, New Delhi, 1996)
Surveying (Vol. I & II) – Kanetkar (Pune VidyarthiGrihaPrakashan, Pune)
Surveying (Vol. II & III) – Agor, R (Khanna publications, Delhi, 1995)
Surveying (Vol. II & III) – Arora, K.R. (Standard Book House, Delhi, 1993)
Fundamentals of Surveying – S.K. Roy (Prentice Hall of India)
Surveying (Vol. I & II) – S.K. Duggal (Tata McGraw Hill)
Borden D. Dent, Jeffrey Trogonson, Thomas W. Hodler, Cartography: Thematic Map Design, McGraw-Hill Higher Education, 2008.
Gopi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson Education India, 2007.
Hoffman.B, H.Lichtenegga and J.Collins, Global Positioning System - Theory and Practice, Springer - Verlag Publishers, 2001.
Punmia B. C, Ashok K. Jain, Arun K. Jain, Higher Surveying, Laxmi Publications, 2005.
Engg Surveying Technology – Kennie, T.J.M. and Petrie G. (Blackie & Sons Pvt.Ltd.,London, 1990)
Solving Problems in Surveying – Bannister A. and Baker, R. (Longman Scientific Technical)

Syllabus									
Subject Code:	CE4TPC05	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Structural Analysis-I	L	T	P	CT	MS E	TA	TOTAL	
		3	1	-	10	20	10	40	60

UNIT-1: Principle of superposition, virtual work principle, Maxwell reciprocal theorem, deflection of beams using conjugate beam method. Deflection of beams and truss using energy method (Castigliano theorem), Analysis of plane truss using tension coefficient method (determinate),

UNIT-2: Three-hinged Arches: Bending Moment, Shear force, axial force for three-hinged arches, Analysis of Suspension bridge without stiffening girders.

UNIT-3: Influence Lines: Basic concept of moving load and influence line; influence lines for reactions, Shearing forces and bending moments for determinate beams; absolute maximum shearing force and bending moment.

UNIT-4: Influence lines for three-hinged arches and stresses in simply supported plane determinate trusses

UNIT-5: Static and kinematic indeterminacy of structure, Method of structural analysis, Analysis of fixed beam, continuous beam using Theorem of three moments Effect of yielding of supports.

REFERENCE BOOK:

Elementary structural Analysis by A.K. Jain

Advanced Structural Analysis by A. K. Jain

SYLLABUS	(SEMESTER-IV)								
Subject Code:	CE4TPC06	CREDITS: 3			SESSIONAL - TA			ESE	
Subject:	Fluid Mechanics-II	L	T	P	CT	MS E	TA		TOTAL
		3	-	-	10	20	10	40	60

UNIT-1: Turbulent flow in pipe: Nature of turbulence, free and wall turbulence, turbulent flow in pipes, equation for velocity distribution over smooth and rough surfaces, Colebrook-White equation, Moody's diagram, Explicit equation for friction factors.

UNIT -2: Boundary layer Analysis: Boundary layer thickness, boundary layer over a flat plate, laminar boundary layer, turbulent boundary layer, and laminar sub layer, Application of momentum equation, local and average friction coefficient. Fluid flow past submerged bodies. Drag and lift, drag on sphere and cylinder Magnus effect.

UNIT-3: Non-uniform flow in open channel: Specific energy, critical flow, analysis of flow over hump and transition, equation of gradually varied flow, hydraulic jump and evaluation of its elements in rectangular channel.

UNIT-4: Compressibility effect in pipe flow: Transmission of pressure waves in rigid and elastic pipes, water hammer Dimensional analysis and Hydraulic similitude. Dimensional analysis, Buckingham's theorem, important dimensionless numbers and their significances, geometric, kinematics and dynamic similarity, model study.

UNIT-5: Hydraulic Machines: Turbines: Classification of turbines, draft tube, specific speed, unit quantities, and characteristics curves of turbines, and governing of turbine. Pump: Introduction, Centrifugal pumps, efficiencies, specific speed, cavitations, slip, percentage slip

NAME OF TEXT BOOKS:

Fluid Mechanics and Machines – Dr. A.K. Jain (Khanna Publications)
 Fluid Mechanics and Machines – Dr. R.K. Bansal (Laxmi Publications)
 Fluid Mechanics – Dr. P.N. Modi (Standard Book House)
 Mechanics of Fluid – Irving H. Shames (McGraw Hill)
 Introduction to Fluid Mechanics – James A. Fay (Prentice Hall India)

NAME OF REFERENCE BOOKS:

Fluid Machines – Dr. Jagdish Lal (Metropolitan Book Company Private Ltd.)
 Fluid Machines – John P. Douglas (Pearson Publication)

SYLLABUS	(SEMESTER-IV)						
Subject Code:	CE4LPC03	CREDITS: 2			SESSIONAL - TA		ESE
Subject:	Civil Engineering Drawing	L	T	P	IA	MS E	TOTAL
		-	-	3	30	-	30

Name of drawing plates

1. Graphical Symbols: Doors, Windows, Drains, Pipes, Sanitary, Plumbing, Alphabetical, Fitment, Electrical fitting symbols
2. To draw the foundation details of internal walls of load bearing structure showing all detail.
3. To draw the foundation details of external walls of load bearing structure showing all detail.
4. To draw the single line plan of a single storey residential building.
5. To draw the double line plan, elevation and section of single story residential building.
6. To draw the single line plan of a primary school building.
7. To draw the single line plan of a primary health centre building.
8. To draw the double line plan, elevation and section of a primary health centre building.
9. To draw section and elevation of flush shutter, paneled shutter doors and windows.
10. To draw section and elevation of fully glazed, half glazed, half glazed and half paneled doors and windows.
11. To draw king post truss showing all detail.
12. To draw Queen post truss showing all detail.
13. To draw the two point perspective view of simple blocks.
14. To draw the two point perspective view of stepped blocks.

Recommended Books:

A course in Civil Engineering Drawing – V.B. Sikka (Katson Technical Publications)
Civil Engineering Drawing – Shah, Kala and Patki (Tata McGraw Hill)

SYLLABUS	(SEMESTER-IV)									
Subject Code:	CE4LPC03			CREDITS: 2		SESSIONAL - TA		ESE		
Subject:	Surveying-II Lab			L	T	P	IA	MS E	TOTAL	
				-	-	3	30	-	30	20

Name of surveying field work

1. Find the plane table instrument station using Resection method (Two point problem)
2. Find the plane table instrument station using Resection method (Three point problem)
3. Determination of Tacheometric constants.
4. Determination of elevation and height by tangential method when both angles are angles of elevation.
5. Determination of elevation and distance when line of sight inclined upward.
6. Determination of elevation and distance when line of sight inclined downward.
7. To perform the experiment for reduction to centre from different positions of a satellite station when: (i) Satellite station in north position, (ii) Satellite station in left position.
8. To perform the experiment for reduction to centre from different positions of a satellite station when: (i) Satellite station in south position, (ii) Satellite station in right position.
9. To find the most probable value of angle for combined triangle by method of difference.
10. To find the most probable value of triangles of a quadrilateral shapes by method of correlates.
11. Adjustment of two connected triangles.
12. Adjustment of quadrilateral by method of least square.
13. Adjustment of geodetic triangles with central station by method of least square.
14. Study of total station.

SYLLABUS	(SEMESTER-IV)									
Subject Code:	CE4LBS03			CREDITS: 2		SESSIONAL - TA				
Subject:	Numerical Analysis & Computer Applications Lab			L	T	P	IA	MS E	TOTAL	ESE
				-	-	3	30	-	30	20

Programming based on C or C++ for the numerical methods given in the subject Numerical Analysis & Computer Applications (**CE4LBS03**)

SEMESTER V

SYLLABUS	(SEMESTER-V)									
Subject Code:	CE5TPC07		CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Design of Concrete Structures		L	T	P	CT	MSE	TA	TOTAL	
			3	1	-	10	20	10	40	60

UNIT – 1: Introduction to design of concrete structures-limit state analysis and design of beams for flexure, bond

UNIT- 2: Shear and torsion

UNIT-3: One way slabs, stair cases, Two-way slabs

UNIT- 4: Axially and eccentrically loaded columns. (uniaxial only)

UNIT-5: Footings – different types of isolated footings, synthesis of limit state and working Stress methods.

REFERENCE BOOK:

Reinforced Concrete Design by Pillai & Menon

Limit State Design of Reinforced Concrete by P.C. Verghese

SYLLABUS	(SEMESTER-V)									
Subject Code:	CE5TPC08		CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Structural Analysis - II		L	T	P	CT	MSE	TA	TOTAL	
			3	1	-	10	20	10	40	60

UNIT-1: Analysis of indeterminate beams by Consistent Deformation methods, Analysis of indeterminate rigid plane frames and truss using energy method.

UNIT-2: Slop Deflection Method: Continuous beams and portals by moment distribution due to load and yielding of supports.

UNIT-3: Moment-distribution method. Continuous beams and portals by moment distribution due to load and yielding of supports.

UNIT-4: Introduction to Flexibility matrix and Stiffness Matrix methods: Applications of the methods to simple indeterminate beams.

UNIT-5: Analysis of symmetrical two hinge arches (parabolic and circular). Influence lines for propped cantilevers, continuous beams using Muller-Breslau's principle.

REFERENCE BOOK:

Indeterminate Structural Analysis by C. K. Wang

Fundamental of Structural Analysis by Leet.

SYLLABUS	(SEMESTER-V)								
Subject Code:	CE5TPC09	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Highway Engineering	L	T	P	CT	MSE	TA	TOTAL	60
		3	-	-	10	20	10	40	

UNIT 1: Introduction: Importance of highway transportation, Modes of transportation, characteristics of highway transport. Historical development & planning: Historical development of roads, Road development and planning in India, Necessity of planning, Roads classification, patterns, Planning surveys. Highway alignment and surveys: Engineering Surveys for highway location Maps and Drawing. Highway drainage: Importance, Surface and subsurface drainage.

UNIT 2: Geometric Design: Cross Section elements, Sight Distance, Design of horizontal and vertical Alignment.

UNIT 3: Traffic Engineering: Traffic characteristics, studies such as volume, density, Speed, 'O' and 'D' and their uses, Traffic control devices and road accidents.

UNIT 4: Highway Materials: Behavior of highway materials, properties of Subgrade materials and pavement component materials. Tests on subgrade soil, aggregate and bitumen.

UNIT 5: Pavement Design: Types of pavements, Factors affecting design of flexible and rigid pavements, Design of flexible pavements: Group index, I.R.C. recommended method, California highway department method, U. S. Corp method
Design of Rigid pavement: Westergard's stress analysis of wheel loads for design of pavement, effect of temperature and warping stress in design

TEXT BOOK:

Principle and Practices of Highway Engineering – Kadiyali& Lab (Khanna Publishers, Delhi)
Highway Engineering – S. K. Khanna& C.E.G. Justo (Khanna Publishers, Delhi)
Highway Engineering – Rangawala S.C. (Charotar Publishers)
A textbook of Transportation Engineering – S.P. Chandola (S. Chand)
Transportation Engineering – A.K. Upadhyay (S.K. Kataria& Sons)

REFERENCE BOOK:

Specifications for Road and Bridge Works – MOST (IRC Publishers) Manual for Survey, Investigation and Preparation of Road Projects – IRC Publication 2001.

SYLLABUS	(SEMESTER-V)								
Subject Code:	CE5TPC10	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Estimation and Costing	L	T	P	CT	MSE	TA	TOTAL	60
		3	-	-	10	20	10	40	

UNIT-1: Method of estimating, measurements, taking out quantities.

UNIT-2: Typical estimates for buildings and Civil Engineering Works, Specifications for all types building items.

UNIT-3: Analysis of rates, data for various building items.

UNIT-4: Earthwork calculations.

UNIT-5: Introduction to Departmental procedures, tender, contracts, arbitrations, valuation of buildings.

REFERENCE BOOKS:

B.N Dutta, Estimating and Costing in Civil Engineering Theory and Practice

M. Chakraborti, Estimating, Costing and Specifications in Civil Engineering.

SYLLABUS		(SEMESTER-V)							
Subject Code:	CE5TPC11	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Geotechnical Engineering - I	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	

Unit 1: Introduction, Basic Definitions and Relationships, Determination of Index Properties, Classification of Soils.

Unit 2: Soil Water: Types of soil water, Capillarity in soils, Permeability of soils, Darcy's law, Determination of permeability of soils, Permeability of stratified soils, Seepage velocity, Absolute coefficient of permeability, Factors affecting permeability- Effective stress principle- Effective stress under different field conditions- Seepage pressure-Quick sand condition.

Unit 3: Stress distribution in Soils: Importance of estimation of stresses in soils – Boussinesq's and Westergard's theories for point loads, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical and horizontal planes – Newmark's influence chart.

Unit 4: Compaction of Soils: Definition and importance of compaction – Standard Proctor compaction test, Modified compaction test- Factors affecting compaction- Influence of compaction on soil properties – Field compaction and its control.

Consolidation: Types of compressibility – Immediate settlement – Primary consolidation and secondary consolidation – Stress history of clay, normally consolidated soil, over consolidated soil and under consolidated soil- preconsolidation pressure and its determination- Estimation of settlements -Terzaghi's 1-D consolidation theory – Coefficient of consolidation and its determination.

Unit 5: Shear Strength: Definition and use of shear strength - Source of shear strength- Normal and Shear stresses on a plane – Mohr's stress circle- Mohr-Coulomb failure theory- Measurement of shear strength, Drainage conditions -Direct shear test, Triaxial shear test, Unconfined compression test and Vane shear test – Factors affecting shear strength of granular soils and cohesive soils.

Stability of Soil Slopes: Types of slopes – Types of slope failures – Slip circle method, Determination of centre of most critical slip circle – Taylor's stability charts and their use. Stabilization of soil slopes.

REFERENCE BOOKS:

1. "Basic and Applied Soil Mechanics" by Gopal Ranjan and A.S.R. Rao, Wiley Eastern Ltd., New Delhi, 2009.
2. "Soil Mechanics and Foundation Engg" by V.N.S. Murthy, CBS Pub. New Delhi. 2007.
3. Geotechnical Engineering by B. M. Das, Bharat Singh, SamsherAlam
4. Geotechnical Engineering by S. K. Gulathi&Dutta
5. Soil Mechanics by Lambe& Whiteman
6. Soil Mechanics by B.C.Punamia,

SYLLABUS	(SEMESTER-V)								
Subject Code:	CE5TPC12	CREDITS: 3			SESSIONAL - TA				ESE
Subject:		L	T	P	CT	MSE	TA	TOTAL	
	Environmental Engineering - I	3	-	-	10	20	10	40	60

UNIT 1: Introduction: Necessity and importance of water supply schemes. Water demand: Classification of water demands, Estimation of quantity of water required by a town, per capita demand, factors affecting per capita demand, design period and population forecasting, variation in water demand. Sources of water supply. Surface sources and underground sources, Intake works, site selection, type of intake works.

UNIT 2: Quality of water: Common impurities, physical, chemical and biological characteristics of water, water quality standards for municipal and domestic supplies. Water Processing: Object of water processing, flow diagrams of typical ground water system and surface water systems. Sedimentation Theory of sedimentation, sedimentation tanks and its types, design parameters related with sedimentation tanks, sedimentation with coagulations, coagulants and coagulant aids, Jar test for determining coagulant dosage.

UNIT 3: Filtration; Theory of filtration, slow sand and rapid sand filters, Construction and operation. Disinfection, Methods of disinfection, Chlorination, Types of chlorination, Break Point chlorination.

UNIT 4: Softening: Methods of Softening, Iron Removal, Fluoridisation. Distribution System: Methods of distribution, layout of distribution system, methods of analysis, pressure in the distribution system, distribution reservoirs, functions and its types, storage capacity of distribution reservoir.

UNIT 5: Air Pollution: Introduction, causes, sources, characteristics, effects of air pollution on plants, humans, animals and materials and atmosphere, air pollution control methods and equipment. Noise Pollution: Definition, sources, effects of noise pollution on humans, animals and non-living things, methods of noise control.

TEXT BOOKS:

Water Supply Engineering – S.K. Garg (Khanna Publication).
Water Supply Engineering – B.C. Punmia (Laxmi Publication, New Delhi)

REFERENCE BOOKS:

Environmental Engineering – Peavy & Rowe (Tata McGraw Hill, New Delhi).
Water Supply and Sanitary Engineering – G.S. Birdi (Dhanpat Rai Publications).
Introduction to Environmental Science – Y. Anjaneyulu (B.S. Publications)
Environmental Science and Engineering – Henry and Heinke (Pearson Education)

SYLLABUS	(SEMESTER-V)								
Subject Code:	CE5LPC04	CREDITS: 2			SESSIONAL - TA				ESE
Subject:		L	T	P	CT	MSE	TA	TOTAL	
	Highway Engineering Lab	-	-	3	-	-	30	30	20

Minimum 10 experiments to be performed

1. To determine the crushing value of the given aggregate sample.
2. To determine 10% finer value of the given aggregate sample.
3. To determine the abrasion value of the given aggregate sample by los angles apparatus.
4. To determine the impact value of the given aggregate sample.
5. To determine the elongation index of the given aggregate sample.
6. To determine the flakiness index of the given aggregate sample.
7. To determine the water absorption of the given coarse aggregate.
8. To determine the specific gravity of the given coarse aggregate.
9. To determine the penetration value of the given bitumen material.
10. To determine the softening point of the given bitumen material.
11. To determine the ductility of the given bitumen material.
12. To determine the viscosity of the given bitumen material.

SYLLABUS	(SEMESTER-V)								
Subject Code:	CE6LPC06	CREDITS: 2			SESSIONAL - TA				ESE
Subject:		L	T	P	CT	MSE	TA	TOTAL	
	Environmental Engineering Lab	-	-	3	-	-	30	30	20

Determination of the following Parameters in the given Water Sample:

1. Turbidity by Nephelometer.
2. TDS and fixed solids by Gravimetric method.
3. pH using pH-meter.
4. Carbonate, Bi-Carbonate & Hydroxide Alkalinity.
5. Dissolved Oxygen [DO] using DO meter.
6. Concentration of Chlorides.
7. Optimum coagulant dose for coagulation by Jar test apparatus.
8. Chlorine Demand of Water.
9. Total Hardness and Calcium Hardness.
10. Study of Weather Monitoring Station.
11. Study of Sound Level Meter.

SEMESTER VI

SYLLABUS	(SEMESTER-VI)								
Subject Code:	CE6TPC13	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Water Resources Engineering -I	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT 1: Introduction: Need for Irrigation, advantages and disadvantages of irrigation, types of irrigation systems – Flow irrigation, Lift irrigation. Methods of Irrigation: Introduction, requirement of irrigation methods, surface and sub-surface irrigation. Water Requirement of crops: Introduction, water requirement of crop, crop season and crops of India, crop period and base period, delta, duty of water, relationship between delta, duty and base period, factors affecting duty.

UNIT 2: Canal Irrigation: Classification of canal, parts of canal irrigation system, canal alignment, typical canal cross section, command areas, losses in irrigation systems. Design of stable channels in alluvium. Introduction, Kennedy's silt theory, Lacey's Theory, Lacey's regime equations, Lacey's shock theory, Design of channels by Kennedy's and Lacey's theories, maintenance of irrigation channels.

UNIT 3: Water Logging and its Control. Causes and ill effects of water logging, prevention and control, reclamation of water logged lands, surface drainage. Design of Lined Channels. Introduction, benefits of lining, types of lining, economics of lining, procedure and design of lined canals.

UNIT 4: River behaviour, control and training. Objects, river characteristics, classification of river training works, methods of river training embankments, bank protection, cut-offs, meandering causes and parameters. Flood Control; Introduction, channel improvement, flood ways evacuation and flood plain zoning. National Policy of floods.

UNIT 5: Reservoir Planning: Introduction, type of reservoirs, storage zones of a reservoir, mass curve and demand curve, determination of reservoir capacity, safe field. Hydrograph, unit hydrograph, Flood Routing: flood Routing principle, inflow storage discharge method, reservoir losses, reservoir, sedimentation, life of reservoir.

TEXT BOOKS:

Irrigation Engineering and Hydraulic Structures – S.K. Garg (Khanna Publications)

Irrigation Engineering – B.C. Punmia (Laxmi Publications)

REFERENCE BOOKS:

Irrigation, Water Resources and Water Power Engineering – Dr. P.N. Modi (Standard Book House)

Theory and Design of Irrigation Structures (Volume – I & II) – Varshney (Nem Chand & Bros.)

Irrigation and Water resources Engineering – Asawa G.L. (New Age International Publications)

Fundamentals of Irrigation Engineering – Bharat Singh (Nem Chand & Bros)

Water Resources Engineering -W. Mays (Wiley, John & Sons)

SYLLABUS	(SEMESTER-VI)								
Subject Code:	CE6TPC14	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Environmental Engineering - II	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT - 1: Objective, design period, Physical, Chemical and Biological characteristics. Waste water sampling, self-purification of natural streams, effluents Standards, Oxygen Sag Curve, sources of sewage. Design of sanitary sewers, minimum size of sewer, velocities in sewers and gradient of sewers. Sewer appurtenances viz. manholes, street inlets, flushing devices, Vent pipes etc.

UNIT – 2: Waste Water primary Treatment: characteristics of wastewater. Effluent discharge standards, Primary, secondary and tertiary treatment of wastewater. Types of screens, design of screen chamber, sources of grit, design of grit chamber, disposal of grit, oil and grease removing skimming tanks, design of PST with inlet and outlet details, primary sludge and its disposal

UNIT - 3: Aerobic Treatment UNITS: Biological principle of ASP, SVI, sludge bulking and control; biological principle of Trickling filter, re-circulation, operational troubles; Rotating biological contactor. Low cost treatment methods: Principle of Oxidation pond, symbiosis, principle of Aerated Lagoons, aeration method, Principle of Oxidation Ditches, sewage farming, ground water recharge.

UNIT- 4: Anaerobic Treatment UNITS: Septic tanks, biological Principle, method of treatment and disposal of tank effluent. Anaerobic digester, principle of anaerobic digestion, Stages of digestion, bio-gas production. Sludge disposal methods, advantages and disadvantages

UNIT – 5: Municipal Solid Wastes: Characteristics, generation, collection & transportation of solid wastes, engineered systems for solid waste management (reuse/ recycle, energy recovery, treatment & disposal), environmental & health implications, disposal of solid waste by land filling, composting and incineration methods. Hazardous waste management, environmental and health implications due to Exposure, incineration, landfill disposal, site remediation, disposal of refuse by Composting.

TEXT BOOKS:

Environmental Engineering – Peavy & Rowe (Tata McGraw Hill, New Delhi).

Waste Water Engineering – S.K. Garg (Khanna Publication).

Manual on sewerage & sewage Treatment published by Ministry of UrbanDev. GOI, Ministry of Urban development

REFERENCE BOOKS:

Waste Water Engineering – Metcalf Eddy (Tata McGraw Hill, New Delhi).

Hazardous Waste management: M.D. LaGrega, P.L. Buckingham, J.C. Evans

Manual on Municipal Solid Waste Management: CPHEEO (Ministry of Urban Dev.)

Environmental Engineering-II. P. Venugopala Rao Tata McGraw Hill Water and Wastewater Technology, Hammer (PHI)

SYLLABUS	(SEMESTER-VI)								
Subject Code:	CE6TPC15	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Design of steel Structures	L	T	P	CT	MSE	TA	TOTAL	
		3	1	-	10	20	10	40	60

UNIT 1: Introduction: General, types of Steel, mechanical behaviour of steel, measures of Yielding, measures of Ductility, types of Structures, Structural Steel Sections.

Methods of Structural design: Introduction- Design Philosophies-Working Stress method-Ultimate Strength method-Load and Resistant factor- Limit State Method-Partial safety factor-Load-Load combinations-Classification of Cross sections- General aspects in the design.

UNIT 2: Design of Steel fasteners: Types of fasteners – Riveted connections- Bolted connections- Assumptions- Failure of bolted joints – Strength of bolted joints – Design examples – Design of Welded connections – Butt weld- fillet weld – Design examples.

UNIT 3: Design of Tension Members: General – Modes of Failure of Tension member- Analysis of Tension members- Example - Design steps – Design examples – Lug angles – Design.

Design of Compression Members: General – Strength of Compression members- Design Compressive strength- Example on analysis of Compression members – Design of Angle struts – Design Examples- Built up Columns- Design of Lacing – Design of Battens- Design Examples- Design of Roof members.

UNIT 4: Design of Beams: General- Lateral Stability of Beams- Bending Strength of Beams – Plastic Section Modulus - Design Examples.

Design of Beam Columns: Behaviour of members under combined loading – Modes of Failures – Design Examples.

Design of Column Splices and Column Base: Design of Column Splice-Design Examples- Design of Column Base- Slab Base- Gusseted Base- Design Examples.

UNIT 5: Design of Eccentric Connections: Design of Brackets- Type-1 and Type 2 – Moment Resistant connections - Design Examples.

Design of Plate Girder: General- Components of Plate Girder- Optimum depth – Bending Strength – Shear Strength – Shear Buckling- Simple Post critical method- Tension Field method- Stiffeners- Bearing- Transverse stiffeners - Design Examples.

Reading:

1. Limit state Design of Steel Structures – Duggal.
2. Limit state Design of Steel structures – Bhavikatti S S.
3. IS-800-2007.
4. Limit state Design of Steel Structures - Arya & Azmani.

SYLLABUS	(SEMESTER-VI)								
Subject Code:	CE6TPC16	CREDITS: 3			SESSIONAL - TA				ESE
Subject:		L	T	P	CT	MSE	TA	TOTAL	
	Geotechnical Engineering- II	3	-	-	10	20	10	40	60

UNIT 1: Lateral Earth Pressures: Lateral earth pressure theory, different types of earth pressures, Rankine's active and passive earth pressures, pressure distribution diagram for lateral earth pressures against retaining walls for different conditions in cohesionless and cohesive soils, Coulomb's active and passive earth pressure theory, Culmann's graphical construction, Problems.

UNIT 2: Bearing capacity of foundation: Bearing capacity – Basic Definitions, Factors affecting bearing capacity, estimation of Bearing capacity by different methods. Analytical measures – Terzaghi's and Meyerhof methods and calculations. Field measures – SPT, CPT and Plate load tests.

Settlement of foundation: Settlement analysis – Types of foundation settlement, Components of settlements - their estimation, allowable settlement values, effects, causes and remedial measures of total and differential settlements

UNIT 3: Shallow foundations: Types of shallow foundations and choice, basic requirements, significance of these foundations

Pile foundations: Classification and uses, load carrying capacity calculations by different methods – static methods, dynamic methods, in-situ penetration tests, piles load test; Negative skin friction; under reamed pile foundations; Pile groups – Necessity, Efficiency, Group capacity and settlements.

UNIT 4: Well foundations; Types of caissons and their construction; Different shapes of wells, component parts and forces; Estimation of bearing capacity, sinking of wells and remedial measures for tilts and shifts.

UNIT 5: Soil Exploration: Introduction and different methods – Direct methods, Semi-direct and Indirect methods; Sampling in soils and rocks; Subsurface exploration program - Preparation of bore logs and preparation of exploration report

Reading:

1. Murthy V.N.S (2007): Soil Mechanics and Foundation Engineering – CBS publications, Delhi.
2. Das, BM (2009): Geotechnical engineering – Cengage learning, New Delhi.
3. Gopal Ranjan, Rao ASR (2000): Basic and applied soil mechanics – New age publication, Delhi.
4. Iqbal H Khan (2007): Geotechnical Engineering – Prentice Hall, Delhi.
5. Basic & Applied Soil Mechanics. by- Gopal Ranjan & A. S. R. Rao
6. Foundation Analysis & Design by - J. E. Bowles

SYLLABUS	(SEMESTER-VI)								
Subject Code:	CE6TPE1X	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Professional Elective -1X	L	T	P	CT	MSE	TA	TOTAL	
		3	1	-	10	20	10	40	60
Professional Elective-1A or Professional Elective-1B or Professional Elective-1C or Professional Elective-1D or Professional Elective-1E					Any one subject to be Selected from the Professional Electives (Group-1 i.e. CE6TPE1A or CE6TPE1B or CE6TPE1C or CE6TPE1D or CE6TPE1E)				
Professional Electives Group -1									
CE6TPE1A					Advanced Concrete Technology				
CE6TPE1B					Advanced Surveying				
CE6TPE1C					Advanced Concrete Design				
CE6TPE1D					Highway Safety				
CE6TPE1E					Advanced Fluid Mechanics				

SYLLABUS		(SEMESTER-VI)							
Subject Code:	CE6TPE1A	CREDITS: 4			SESSIONAL - TA			ESE	
Subject:	Advanced Concrete Technology	L	T	P	CT	MSE	TA		TOTAL
				3	1	-	10	20	10

UNIT – 1: Importance of Bogue’s compounds, Structure of a Hydrated Cement Paste, Volume of hydrated product, porosity of paste and concrete, transition Zone, Elastic Modulus, factors affecting strength and elasticity of concrete, Rheology of concrete in terms of Bingham’s parameter. CHEMICAL ADMIXTURES- Mechanism of chemical admixture, Plasticizers and super plasticizers and their effect on concrete property in fresh and hardened state, Marsh cone test for optimum dosage of super plasticizer, retarder, accelerator, Air-entraining admixtures, new generation super-plasticiser.

MINERAL ADMIXTURE-Fly ash, Silica fume, GGBS, and their effect on concrete property in fresh state and hardened state.

UNIT – 2: MIX DESIGN - Factors affecting mix design, design of concrete mix by BIS method using IS10262 and current American (ACI)/ British (BS) methods. Provisions in revised IS10262-2004.

UNIT – 3: DURABILITY OF CONCRETE - Introduction, Permeability of concrete, chemical attack, acid attack, efflorescence, Corrosion in concrete. Thermal conductivity, thermal diffusivity, specific heat. Alkali Aggregate Reaction, IS456-2000 requirement for durability.

UNIT – 4: RMC concrete - manufacture, transporting, placing, precautions, Methods of concreting-Pumping, under water concreting, shotcrete, High volume fly ash concrete concept, properties, typical mix, Self-compacting concrete concept, materials, tests, properties, application and typical mix.

UNIT – 5: Fiber reinforced concrete - Fibers types and properties, Behaviour of FRC in compression, tension including pre-cracking stage and post-cracking stages, behaviour in flexure and shear, Ferro cement - materials, techniques of manufacture, properties and application. Light weight concrete-materials properties and types. Typical light weight concrete mix high density concrete and high performance concrete-materials, properties and applications, typical mix.

REFERENCES:

Neville, A.M. and Brooks, J.J., " CONCRETE TECHNOLOGY", ELBS .1990.

Neville, A.M., "PROPERTIES OF CONCRETE", PITMAN. 1983.

Brandt, A.M., "CEMENT BASED COMPOSITES: Materials, Mechanical Properties and Performance", E & FN Spon. 1995.

Newman, K., "CONCRETE SYSTEMS in COMPOSITE MATERIALS".EDT BY L.Holliday. Elsevier Publishing Company. 1966.

SYLLABUS	(SEMESTER-VI)								
Subject Code:	CE6TPE1B	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Advanced Surveying	L	T	P	CT	MSE	TA	TOTAL	
		3	1	-	10	20	10	40	60

UNIT 1: Astronomical Surveying: Astronomical coordinate systems, astronomical triangle, determination of azimuth.

UNIT 2: Construction and Boundary Surveys: Equipment for construction surveys, Setting out pipe line, setting out buildings and structures, setting out a highway.

UNIT 3: Theory of Errors: Types and sources of errors, theory of least squares, method of weights, method of correlates, angle and station adjustment, figure adjustment. Land Surveys: Layouts, measurements.

UNIT 4: Triangulation and Baseline Measurements: Triangulation figures or systems, station marks, signals, towers, baseline measurement by rigid bars, flexible apparatus, problems, satellite station and reduction to centre.

UNIT 5: Total Station and GPS: Basic principles, classifications, applications, comparison with conventional surveying. Electromagnetic wave theory - electromagnetic distance measuring system - principle of working and EDM instruments, Components of GPS – space segment, control segment and user segment, reference systems, satellite orbits, GPS observations. Applications of GPS.

Reading:

1. Borden D. Dent, Jeffrey Troguson, Thomas W. Hodler, Cartography: Thematic Map Design, McGraw-Hill Higher Education, 2008.
2. Gopi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson Education India, 2007.
3. Hoffman.B, H.Lichtenegga and J.Collins, Global Positioning System - Theory and Practice, Springer -Verlag Publishers, 2001.
4. Punmia B. C, Ashok K. Jain, Arun K. Jain, Higher Surveying, Laxmi Publications, 2005.

SYLLABUS	(SEMESTER-VI)								
Subject Code:	CE6TPE1C	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Advanced Concrete Design	L	T	P	CT	MSE	TA	TOTAL	
		3	1	-	10	20	10	40	60

UNIT 1: Combined Footings: Simple Rectangular, trapezoidal footings (with and without central beam); Strap footing; raft foundation.

UNIT 2: Types of retaining walls; Cantilever Retaining wall design; Counterfort retaining wall (demonstration only)

UNIT 3: Water tanks resting on ground; Intze type water tank design

UNIT 4: Large span concrete roofs, Introduction– classification- behaviour of flat slabs - direct design and equivalent frame method- codal provisions - waffle slabs.

UNIT-5: Chimneys, analysis of stresses in concrete chimneys- uncracked and cracked sections- codal provisions- design of chimney.

TEXT BOOKS & REFERENCES:

Purushothaman, P., Reinforced Concrete Structural Elements-, Tata McGraw Hill, 1986

Ashok K Jain, Reinforced Concrete –Nem Chand Bros. Roorkee , 1998

Jain and Jaikrishna, Plain and Reinforced Concrete – Vol I and II, NemChand Bros., Roorkee, 2000.

Taylor C Pere, Reinforced Concrete Chimneys, Concrete publications, 1960

Design of deep girders, Concrete Association of India, 1960

Mallick and Gupta, Reinforced Concrete, - Oxford and IBH, 1982

BIS codes (IS 456 , IS 2210, IS 4998, IS 3370, SP 16, SP 24, SP 34).

IRC Codes (IRC 5, IRC 6, IRC 21)

Menon and Pillai, Reinforced Concrete Design

SYLLABUS	(SEMESTER-VI)								
Subject Code:	CE6TPE1D	CREDITS:			SESSIONAL - TA				ESE
		L	T	P	CT	MSE	TA	TOTAL	
Subject:	Highway Safety	3	1	-	10	20	10	40	60

UNIT 1: Introduction to safety - Accident characteristics and factors: road – driver – vehicle-environment.

UNIT 2: Statistical Interpretation and Analysis of Crash Data - Accident recording and analysis.

UNIT 3: Advanced statistical methods, Crash Reconstruction - Driver behaviour and crash “causality”, crash reporting and collision diagrams, basics of crash statistics, before-after methods in crash analysis.

UNIT 4: Road Safety Audits - Safety Programs, safety education, Traffic Law Enforcement. Elements of highway safety management systems, Safety countermeasures.

UNIT 5: Safety management process, Mitigation Measures - Crash Facts, Exclusive pedestrian signal phasing, Roadway lighting, pedestrian refuge islands and curb extension. Road Safety Management System.

Reading:

1. Institute of Transportation Engineers (ITE), The Traffic Safety Toolbox: A Primer on Traffic Safety, ITE, 1999.
2. Lynn B. Fricke, Traffic Accident Reconstruction, Northwestern University Center for Public Safety, 1990.
3. Ogden, K.W. Safer Roads: A Guide to Road Safety Engineering. Avebury Technical, 1996.
4. Rune Elvik and TrulsVaa, The Handbook of Road Safety Measures, Elsevier, 2004.
5. Leonard Evans, Traffic Safety, Science Serving Society, 2004.
6. Ezra Hauer, Observational Before-After Studies in Road Safety, Pergamon Press, 1997 (reprinted 2002).
7. Simon Washington, Matthew Karlaftis, and Fred Mannering, Statistical and Econometric Methods for Transportation Data Analysis, Chapman & Hall/CRC Press, 2003.
8. J. Stannard Baker, Traffic Collision Investigation, Northwestern University Center for Public Safety, 2002.
9. Lynn B. Fricke, Traffic Accident Reconstruction, Northwestern University Center for Public Safety, 1990.

SYLLABUS	(SEMESTER-VI)								
Subject Code:	CE6TPE1E	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Advanced Fluid Mechanics	L	T	P	CT	MSE	TA	TOTAL	
		3	1	-	10	20	10	40	60

UNIT 1: Dynamic of Fluid Flow, One-Dimensional method, The Navier Stokes Equation, Limiting Case, Applications. Boundary Layer Theory for low and high Viscosity, Boundary Layer thickness, Prandtl's Equation, Momentum Integral Equation, Pressure Distribution in boundary layer.

UNIT2: Dimension analysis and similarities, Buckingham theorem, types of similarities, forces influencing hydraulic phenomenon, significance of dimensionless numbers, distorted model, and model proto type similarity law; Laminar and Turbulent

UNIT 3: Flow in Pipes, Reynolds experiment, mechanism of turbulent flow, Prandtl's mixing length theory, Karman similarity hypothesis, Universal velocity distribution near solid boundary, Hydro dynamically smooth and rough pipes. Power law for velocity distribution, Nikuradse experiment, Ageing of Pipes; Compressible Fluid Flow, Equation of motion, continuity equation and energy equation. Stagnation point and its properties, flow through ducts of varying areas, flow through convergent and divergent nozzles, effects of compressibility, shock waves, supersonic expansion and contraction; Ideal Fluid Flow, Circulation and Vorticity, Source and sink, combining flow field by super position, combined flow field for Engineering importance. Doublet in rectilinear flow and Doublet with Circulation.

UNIT 4: Flow past a cylinder curved flow and with circulation and their different combinations; Unsteady flow in bounded systems, Quasi-steady flow, unsteady flow in pipes and open channel flow.

UNIT 5: Finite difference representation of depth dependent-discharge, Simulation of unsteady flow in pipes, channels and ducts. Development of St. Venant equation of continuity and motion Non uniform flow in open channel flow, equation of gradually varied flow. Classification of water surface profiles, location of hydraulic jump.

ESSENTIAL READING:

J. F. Douglas, J. M. Gasiorek, J. A. Swaffield, Fluid Mechanics, Pearson Education. R. J. Garde, A. G. Mirajgaoker, Engineering Fluid Mechanics, SciTech Publication, Chennai.

SUPPLEMENTARY READING:

V. L. Streeter, Fluid Mechanics, McGraw-Hill Book, New York, 1971.

J. A. Liggett and D. A. Caughey, Fluid Mechanics: An interactive text, ASCE press.

A. K. Jain, Fluid Mechanics, Khanna Publishers, Delhi.

K. C. Patra, Engineering Fluid Mechanics and Hydraulic Machines, Narosa publishing house, New Delhi.

Fluid Mechanics and Application with CD roams, CENGEL, Prentice Hall, and New Delhi.

SYLLABUS	(SEMESTER-VI)								
Subject Code:	CE6TOE1X	CREDITS:3			SESSIONAL - TA				ESE
Subject:	Open Elective -1X	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60
Open Elective-1A or Open Elective-1B or Open Elective-1C or Open Elective-1D		Any one subject to be Selected from the Open Electives Group (i.e. CE6TOE1A or CE6TOE1B or CE6TOE1C or CE6TOE1D)							
Open Electives Group 1									
CE6TOE1A		Construction Planning and Management							
CE6TOE1B		Rural Technology and Community Development							
CE6TOE1C		Engineering System Design Optimization							
CE6TOE1D		Engineering System Modelling and Simulation							

SYLLABUS	(SEMESTER-VI)								
Subject Code:	CE6TOE1A	CREDITS: 3			SESSIONAL – TA				ESE
Subject:	Construction Planning and Management	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT 1: Introduction: Objectives and functions of project management, project feasibility reports, Planning for construction projects: Steps, factors, advantages and disadvantages for different stake holder.

Scheduling: Scheduling Job layout and Line of balance, project management through networking, Bar Chart, Linked bar chart, Work-break down structures, Activity-on-arrow diagrams.

UNIT 2: PERT: Network analysis, critical path, probability of project.

UNIT3: CPM: Network analysis, Critical Path, Difference between CPM and PERT.

UNIT 4: Safety: Importance, causes of Accidents safety measures, responsibility for safety, safety benefits to various parties.

Quality control in construction: Importance, Elements of quality, Characteristics, factors affecting, specification, inspection, quality control circle.

UNIT 5: Time and motion studies, Standard and special equipment, factors affecting selection of construction equipment, cost of owning and operating the construction Equipment, Excavatory equipment: Mass haul diagram, terms related with excavatory equipment, types, factors for selection, factors affecting output.

TEXT BOOKS:

Construction Engineering and Management – S. Seetharaman (Umesh Publications, New delhi, 1997)

PERT & CPM – Punmia, B.C. and Khandelwal, K.K. (Laxmi Publications, New Delhi 1997)

Construction Management and Planning – Sen Gupta & Guha (Tata McGraw Hill)

Construction planning and management by U K Srivastava

REFERENCE BOOKS:

Construction Planning Equipment and Methods – Peurify/ Schexnayder, 6th Edition (Tata McGraw Hill)

PERT & CPM – Sreenath, I.S. (East West Press, New Delhi, 1975)

Construction Management and Accounts – Vazirani, V.N. & Chandola, S.P. (Khanna Publishers, New Delhi, 2002)

Construction Planning and Management – Gahlot & Dhir (New Age Publishers)

SYLLABUS	(SEMESTER-VI)								
Subject Code:	CE6TOE1B	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Rural Technology and Community Development	L	T	P	CT	MSE	TA	TOTAL	60
		3	-	-	10	20	10	40	

UNIT 1: Data Analysis and Measures of Central Tendency- Meaning, nature, scope and limitations of statistics, collection of statistical data, classification, tabulation and diagrammatic representation of data, Measures of central tendency: Statistical averages Mean, Median, Mode.

UNIT 2: Data, Information and Knowledge; concept of information, need of information (professional, educational, research), qualities of information, value of information, difference between data and information, properties of the needed information. Information and Management; planning, organizing, co-ordinating and controlling.

UNIT 3: Concepts of marketing; difference between marketing selling and retailing; marketing mix, market-segmentation, marketing planning, strategy and approaches; modern concept of marketing.

UNIT 4: Community development; concept, definition, meaning, need, history, principles, objectives and scope. Community Building: Coming of Age, regenerating community, communitymodel.

UNIT 5: Consensus Organizing Model, What's Behind Building Healthy Communities?, Participatory Democracy, The Role of various NGOs in Community Development. The Role of Business and Government in Community Development Initiatives. How to Form a Non-profit Corporation Fund Raising and Grant Writing.

TEXT/REFERENCE BOOKS:

1. Biddle, William Wishart. 1968. Encouraging Community Development: A Training Guide for Local Workers. New York: Holt, Rinehart and Winston.
2. Clark, Kenneth B. and Jeannette Hopkins, eds. 1969. A Relevant War Against Poverty: A Study of Community Action Programs and Observable Social Change. New York: Harper and Row.
3. Clinard, Marshall Barron. 1970. Slums and Community Development: Experiments in Self-Help. New York: Free Press.,
4. Creevey, Lucy E., ed. 1986. Women Farmers in Africa: Rural Development in Mali and the Sahel. Syracuse, NY: Syracuse University Press.,
5. Dobyns, Henry F., Paul L. Doughty, and Harold D. Lasswell, eds. 1971. Peasants, Power, and Applied Social Change: Vicos as a Model. Beverly Hills, CA: Sage,
6. Edwards, Allen David and Dorothy G. Jones. 1976. Community and Community Development. The Hague, Netherlands: Mouton.
7. Green, Tova and Peter Woodrow. 1994. Insight and Action: How to Discover and Support a Life of Integrity and Commitment to Change. Philadelphia, PA: New Society Publishers,
8. Heskin, Allen David. 1991. The Struggle for Community. Boulder, CO: West view Press.,
9. Kramer, Ralph M. and Harry Specht. 1975. Readings in Community Organization Practice. 2d ed. Englewood Cliffs, NJ: Prentice-Hall.,
10. Lean, Mary. 1995. Bread, Bricks, and Belief: Communities in Charge of Their Future. West Hartford, CT: Kumarian Press.,
11. Sustainable Rural Technology, by M.S. Viridi, Daya Publishing House, ISBN: 8170355656,
12. Rural Technology, (Paperback, English), by Punia Rd Roy, Publisher: SatyaPrakashan (2009),
13. Rural Education And Technology, by S B Verma S K Jiloka , Publisher: Deep & Deep pvt. ltd (2006)

SYLLABUS		(SEMESTER-VI)							
<i>Subject Code:</i>	CE6TOE1C	CREDITS:3			SESSIONAL - TA			ESE	
<i>Subject:</i>	Engineering System Design Optimization	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT 1: Introduction- Optimization problem formulation, optimization algorithms, applications and examples, different optimization methods available.

UNIT 2: Single Variable optimization-Optimization criteria, bracketing methods – Exhaustive search method, Bound phase method; Region Elimination methods – Fibonacci search method, Golden search method; Gradient based methods – Newton Raphson method, Bisection method; Root finding using optimization technique.

UNIT 3: Multi objective optimization- Optimization criteria, Different search methods, Unidirectional search, Direct search method – Evolutionary optimization method, Powell’s conjugate direction method; Gradient based methods – Newton’s method and Variable metric method.

UNIT 4: Specialized Methods- Integer programming, Geometric programming, simulated annealing, Global optimization using - steep descent method, simulated annealing.

UNIT 5: Genetic algorithms and evolutionary approaches-Differences and similarities between genetic algorithms and traditional techniques, operators of GA’s, Computer program for simulated annealing, Newton-Raphson method, Evolutionary optimization method.

TEXT BOOKS:

1. Kalyanmoy Deb, “Optimization for Engineering design”, Prentice Hall, India, 2005.
2. Kalyanmoy Deb, “Multi objective optimization using Evolutionary algorithms”, John Wiley, 2001.

REFERENCE BOOKS:

1. Taha, Operations Research, TMH 2010

SYLLABUS	(SEMESTER-VI)								
Subject Code:	CE6TOE1D	CREDITS: 3			SESSIONAL - TA			ESE	
Subject:	Engineering System Modelling and Simulation	L	T	P	CT	MSE	TA		TOTAL
		3	-	-	10	20	10	40	60

UNIT 1: Introduction-Systems, System types, System Modelling, Types of system modelling, Classification and comparison of simulation models, attributes of modelling, Comparison of physical and computer experiments, Application areas and Examples

UNIT 2: Mathematical and Statistical Models- Probability concepts, Queuing Models, Methods for generating random variables and Validation of random numbers.

UNIT 3: Language-System modelling, programming languages, comparison of languages, Identifying and selection of programming language, feasibility study of programming language for the given application.

UNIT 4: Experiments-Simulation of different systems, Analysis, validation and verification of input and output simulated data, study of alternate techniques.

UNIT 5: Case study-Developing simulation model for information centres, inventory systems and analysis of maintenance systems.

TEXT BOOKS:

1. Geoffrey Gordon, "System Simulation", Second edition, Prentice Hall, India, 2002.
2. Jerry Banks and John S.Carson, Barry L.Nelson, David M.Nicol, "Discrete Event System Simulation", Third edition, Prentice Hall, India, 2002.

REFERENCE BOOKS:

1. Robert E. Shannon, "System Simulation The art and science", , Prentice Hall, New Jersey, 1995.
2. D.S. Hira, "System Simulation", S.Chand and company Ltd, New Delhi, 2001.

SYLLABUS	(SEMESTER-VI)								
Subject Code:	CE6LPC05	CREDITS: 2			SESSIONAL - TA				ESE
Subject:	Geotechnical Engineering - Lab	L	T	P	CT	MSE	TA	TOTAL	
		-	-	3	-	-	30	30	20

Minimum 10 experiments to be performed

1. Specific Gravity of soil particles.
2. Sieve Analysis.
3. Liquid Limit, Plastic Limit & Shrinkage Limit.
4. Proctor's Standard Compaction Test.
5. Determination of Field Density.
6. Constant Head Permeability Test.
7. Variable Head Permeability Test.
8. Unconfined Compression Test.
9. Triaxial Compression Test (U.U Test).
10. Consolidation Test.

Reading:

Soil Mechanics Laboratory Manual.

SYLLABUS	(SEMESTER-VI)								
Subject Code:	CE6LPC06	CREDITS: 2			SESSIONAL - TA				ESE
Subject:	Computer Application in Civil Engg. Lab	L	T	P	CT	MSE	TA	TOTAL	
		-	-	3	-	-	30	30	20

Minimum 10 problems to be solved either by using STAAD Pro/Excel Programming

USING MS EXCEL Programs

1. Analysis of simple beams
2. Design of simply supported RCC beams
3. Design of columns
4. Design of isolated footing (Flat, stepped and sloped)
5. Design of combined footings
6. Design of cantilever retaining walls
7. Design of slabs (one way and Two way)

USING STAAD Pro

8. Analysis of simple beams and Frames (2-D)
9. Analysis of multi storey frames for DL and LL
10. Analysis of multi storey frames for DL, LL, WL/EQL
11. Design of structural elements
12. Analysis and design of combined footing
13. Analysis and design of roof truss
14. Analysis of simple beams for rolling loads

SEMESTER VII

SYLLABUS (SEMESTER-VII)									
Subject Code:	CE7TPC17	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Water Resources Engg.-II	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT 1: Dams: Types of Dams, Forces, failure of dams and criteria for structural stability, principle and shear stress, stability analysis, Elementary profile of a gravity dam, Profile from practical considerations, Openings in dams.

UNIT 2: Spillways and Energy Dissipaters: Introduction, essential requirements of a spillway, spillway capacity, components, Types of spillways, Ogee Spillway, Energy Dissipation below spillways, Types of Energy dissipater, USBR stilling basins

UNIT 3: Diversion Head-works: Introduction, Types of diversion works, location and components, Weir and Barrage, Effect of construction of weir on the river regime, Bligh's creep theory, Theory of seepage flow, Khosla's theory, Vertical drop Weir.

UNIT 4: Regulation Works: Introduction, Definition of falls, necessity and location of falls, comparative study of the main types of falls. Hydraulic Gates: Spillway gates, types, tainter gates, Roller gates.

UNIT 5: Cross Drainage Works: Introduction, suitability, various types of C-D Works, Design principles of C-D Works

NAME OF TEXT BOOKS:

Irrigation Engineering and Hydraulic Structures – S.K. Garg (Khanna Publications)

Irrigation Engineering – B.C. Punmia (Laxmi Publications)

Name of Reference Books:

Irrigation, Water Resources and Water Power Engineering – Dr. P.N. Modi (Standard Book House)

Theory and Design of Irrigation Structures (Volume – I & II) – Varshney (Nem Chand Bros.)

Irrigation Engineering – Asawa G.L. (New Age International Publications)

Fundamentals of Irrigation Engineering – Bharat Singh (Nem Chand & Bros.)

Dams and weirs- William G Bligh, Kessinger Publishing

SYLLABUS

Subject Code:	CE7TPE2X	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Professional Elective -2X	L	T	P	CT	MSE	TA	TOTAL	
		3	1	-	10	20	10	40	60
Professional Elective-2A or Professional Elective-2B or Professional Elective-2C or Professional Elective-2D or Professional Elective-2E		Any one subject to be Selected from the Professional Electives Group-2 (i.e. CE7TPE2A or CE7TPE2B or CE7TPE2C or CE7TPE2D or CE7TPE2E)							
Professional Electives Group -2									
CE7TPE2A	Design of Prestressed Concrete								
CE7TPE2B	Structural Dynamics								
CE7TPE2C	Theory of Elasticity & Plasticity								
CE7TPE2D	Fracture of Concrete Structures								
CE7TPE2E	Advance Structural Analysis								

SYLLABUS									
Subject Code:	CE7TPE2A	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Design of Prestressed Concrete	L	T	P	CT	MSE	TA	TOTAL	
			3	1	-	10	20	10	40

UNIT 1: Introduction: Fundamentals of prestressing - Classification and types of prestressing- Concrete Strength and strain characteristics - Steel mechanical properties - Auxiliary Materials like duct formers.

UNIT 2: Prestressing Systems: Principles of pretensioning and post tensioning - study of common systems of prestressing for wires strands and bars.

Losses of Prestress: Losses of prestress in pre tensioned and post tensioned members - I.S. code provisions.

UNIT 3: Analysis of Sections: In flexure, simple sections in flexure, kern distance - cable profile - limiting zones - composite sections cracking moment of rectangular sections.

UNIT 4: Design of Simply Supported Beams: Allowable stress as per I.S. 1343 - elastic design of rectangular and I-sections.

UNIT 5: Shear and Bond: Shear and bond in prestressed concrete beams - conventional design of shear reinforcement - Ultimate shear strength of a section - Prestress transfer in pretensioned beams-Principles of end block design.

Reading:

1. Krishna Raju. N "Prestressed Concrete", Tata Mc Graw Hill.
2. Lin.T.Y, "Prestressed concrete", Mc Graw Hill Pub. Co.
3. Rajagopalan, "Prestressed concrete", Narosa Publishing House.

SYLLABUS

Subject Code:	CE7TPE2B	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Structural Dynamics	L	T	P	CT	MSE	TA	TOTAL	60
			3	1	-	10	20	10	

UNIT- 1: INTRODUCTION: Comparison between static and dynamic analysis; Degrees of freedom; Undamped system; Newton's law of motion; 'D' Alembert's principle; Solution of the differential equation of motion.

UNIT-2: FREE VIBATION OF SINGLE DEGREE - OF - FREEDOM SYSTEM: Equation of motion for single degree - of - freedom system; Free un damped vibration of the SDOF system; Damped single degree - of - freedom system -Viscous damping, Equation of motion, Critically damped system, Over damped system. Under damped system and Logarithmic decrement.

UNIT-3: RESPONSE OF SDOF SYSTEM TO HARMONIC LOADING: Undamped harmonic excitation; Damped harmonic excitation; Evaluation of damping at resonance; Response to support motion; Force transmitted to the foundation. Response of SDOF system to general dynamic loading: Impulsive loading and Duhamel's integral; Numerical evaluation of Duhamel's integral — Undamped system; Numerical evaluation of Duhamel's integral -Damped system.

UNIT-4: GENERALIZED COORDINATES AND RAYLEIGH'S METHOD: Principle of virtual work; Generalized SDOF system - Rigid body; Generalized SDOF system - Distributed elasticity; Rayleigh's method; Improved Rayleigh's method.

UNIT-5: STRUCTURES MODELED AS SHEAR BUILDINGS: Stiffness equations for the shear building; Flexibility equations for the shear building; Free vibration of a shear building (Single bay two Storeyed) - Natural frequencies and normal modes.

FORCED MOTION OF SHEAR BUILDINGS (Two Storeyed): Modal superposition method; Response of a shear building to base motion; Harmonic forced excitation.

REFERENCES:

Earthquake Resistant Design of Structures by Pankaj Agarwal, Manish Shrikhande , First edition(2006), Prentice Hall of India Private Ltd., New Delhi . (for Chapters 1,2,4 and 5)
Dynamics of Structures by A.K.Chopra, Second edition (2001), Prentice Hall India Private Ltd

SYLLABUS									
Subject Code:	CE7TPE2C	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Theory of Elasticity & Plasticity	L	T	P	CT	MSE	TA	TOTAL	60
		3	1	-	10	20	10	40	

UNIT-1: Basic concepts of deformation of deformable bodies- Notations of stress and strain in a 3D field Transformations of stresses and strains in Cartesian and polar co-ordinates- Equilibrium equations in two and three dimensions in Cartesian co-ordinates.

UNIT-2: Plane stress and plane strain problems - Two dimensional problems in Cartesian co-ordinates as applied in beam bending, using Airy's stress function - Polar co-ordinates. Equations of equilibrium and compatibility-Two dimensional problems in polar co-ordinates-Stress concentration in holes.

UNIT-3: Energy principle -theorem of minimum potential energy and complementary potential energy-

UNIT-4: Torsion of various shaped bars- Prandtl's membrane analogy- energy method Torsion of rolled Profiles- Stress concentration at re-entrant corners.

UNIT-5: Introduction, yield criteria for metals, graphical representation of yield criteria, Flow laws of plastic mass, Plastic strain relations-Application to thick cylinders - Hollow spheres -Torsion.

REFERENCES: Timoshenko and Goodier, Theory of Elasticity, McGraw-Hill, 2006.

Wang, Applied Elasticity, Dover Publications Inc. Newyork.1985.

W.F. Chen and D.J. Pan., Plasticity for Structural Engineers, Springer Verlag 1998

SYLLABUS

SYLLABUS									
Subject Code:	CE7TPE2D	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Fracture of Concrete Structures	L	T	P	CT	MSE	TA	TOTAL	
		3	1	-	10	20	10	40	60

UNIT 1: Concepts of linear elastic fracture mechanics,

UNIT-2: Principles of Nonlinear fracture mechanics and energy balance approach

UNIT-3: Behaviour of materials like concrete under fracture load and fracture process of concrete

UNIT-4: Nonlinear fracture properties of concrete using different models, Modelling and applications of nonlinear fracture models, R-curve behaviour of concrete,

UNIT-5: Test methods for determining fracture parameters of concrete, Fracture mechanics applications to concrete structures.

REFERENCES:

Anderson TL (2005) Fracture Mechanics Fundamentals and Applications. CRC Press, Taylor & Francis Group, Boca Ranton.

Bažant ZP, Planas J (1998) Fracture and size effect in concrete and other quasibrittle materials, Florida: CRC Press.

Karihaloo BL (1995) Fracture mechanics and structural concrete, Concrete Design and Construction Series, Longman Scientific & Technical, Harlow, Essex, England.

Kumar S. and Barai S.V. (2011). Concrete Fracture Models and Applications. Springer.

SYLLABUS									
Subject Code:	CE7TPE2E	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Advanced Structural Analysis	L	T	P	CT	MSE	TA	TOTAL	
		3	1	-	10	20	10	40	60

UNIT-1: Direct stiffness method Introduction - element stiffness matrix - rotation transformation matrix - transformation of displacement and load vectors and stiffness matrix - equivalent nodal forces and load vectors - assembly of stiffness matrix and load vector - determination of nodal displacements and element forces - analysis of plane truss - plane frame (with numerical examples) - analysis of grid - space-truss and space-frame (without numerical examples) - computer Implementation - introduction to analysis packages (A project on development of an analysis program using above method is envisaged at this stage)

UNIT-2: Beams on elastic foundation: general theory - infinite beam subjected to concentrated load - boundary conditions - infinite beam subjected to a distributed load segment - semi-infinite beam subjected to loads at its end - semi-infinite beam with concentrated load near its end - short beams.

UNIT-3: Beams curved in plan: Analysis of cantilever beam curved in plan - analysis of circular beams over simple supports

UNIT-4: Non-symmetrical bending of straight beams: Shear centre – a review, symmetrical and non-symmetrical bending - bending stresses in beams subjected to non-symmetrical bending - deflections of straight beams subjected to unsymmetrical bending - fully plastic load for unsymmetrical bending.

UNIT-5: Introduction to Structural Dynamics

Single degree of freedom – un-damped and damped vibration-free vibration - forced vibration, introduction to multi degree of freedom systems.

REFERENCES

- Wang, C. K., Matrix Methods of Structural Analysis, International Textbook Company, 1970.
 Przemieniecki, J. S., Theory of Matrix Structural Analysis, McGraw Hill, New York, 1985.
 Weaver, W., and Gere, J. M., Matrix Analysis of Framed Structures, CBS Publishers, 2004.
 Rajasekaran, S., and Sankara subramanian, G., Computational Structural Mechanics, PHI
 Boresi, A. P. and Sidebottom, O. M., Advanced Mechanics of Materials, John Wiley and Sons, 2003.
 Srinath, L. S., Advanced Mechanics of Solids, Tata McGraw Hill, 2009.
 Timoshenko, S., Strength of Materials, Part II, CBS Publishers, 2002.
 Reddy, C. S., Basic Structural Analysis, Tata McGraw Hill, New Delhi, 2007.
 Paz M., Structural Dynamics, CBS Publishers, 2007.
 Meirovich, L., Elements of Vibration Analysis, McGraw Hill, 2007.

**SYLLABUS
(SEMESTER-VII)**

Subject Code:	CE7TPE3X	CREDITS:3			SESSIONAL - TA				ESE
Subject:	Professional Elective -3X	L	T	P	IA	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

Professional Elective-3A or Professional Elective-3B or Professional Elective-3C or Professional Elective-3D or Professional Elective-3E	Any one subject to be Selected from the Professional Electives Group-3 (i.e. CE7TPE3A or CE7TPE3B or CE7TPE3C or CE7TPE3D or CE7TPE3E)
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Professional Electives Group -3

CE7TPE3A	ENVIRONMENTAL GEOTECHNICAL ENGINEERING
CE7TPE3B	AIR POLLUTION CONTROL ENGINEERING
CE7TPE3C	INDUSTRIAL WASTEWATER MANAGEMENT
CE7TPE3D	WATER RESOURCES PLANING & MANAGEMENT
CE7TPE3E	ENVIRONMENTAL IMPACT ASSESSMENT

SYLLABUS									
Subject Code:	CE7TPE3A	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Environmental Geotechnical Engineering	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT-1: Soil- Pollutant Interaction: Introduction to geo environmental engineering – environmental cycle – sources, production and classification of waste – causes of soil pollution – factors governing soil-pollutant interaction- Physio-chemical behaviour and modelling -failures of foundations due to pollutants

UNIT-2: Characterization, Stabilization and Disposal: Safe disposal of waste – site selection for landfills – characterization of land fill sites – waste characterization –stability of landfills – current practice of waste disposal- passive contaminant system - Hazardous waste control and storage system – mechanism of stabilization - solidification of wastes – micro and macro encapsulation – absorption, adsorption, precipitation- detoxification — organic and inorganic stabilization

UNIT-3: Transport of Contaminants: Contaminant transport in sub surface – advection – diffusion – dispersion – governing equations– contaminant transformation – sorption – biodegradation – ion exchange – precipitation – hydrological consideration in land fill design – ground water pollution – bearing capacity of compacted fills – pollution of aquifers by mixing of liquid waste – protecting aquifers.

UNIT-4: Detection and Testing Methods: Methodology- review of current soil testing concepts – Proposed approach for characterization and identification of contaminated ground soil for engineering purposes

UNIT-5: Remediation of Contaminated Soils: Rational approach to evaluate and remediate contaminated sites – monitored natural attenuation – ex-situ and in-situ remediation – solidification, bio – remediation, incineration, soil washing, electro kinetics, soil heating, verification, bio venting – Ground water remediation – pump and treat, air sparging, reactive well- application of geo synthetics in solid waste management – rigid or flexible liners.

REFERENCES:

- Wentz, C.A., Hazardous Waste Management, McGraw Hill, Singapore, 1989.
 Daniel, B.E., Geotechnical practice for waste disposal, Chapman and Hall, London, 1993.
 Fang, H.Y. Introduction to environmental Geotechnology, CRC press New York, 1997.
 Lagrega, M.d., Bukingham, P.L., and Evans, J.C., Hazardous Waste Management, McGraw Hill, Inc. Singapore, 1994.

SYLLABUS

Subject Code:	CE7TPE3B	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Air Pollution Control Engineering	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT-1: INTRODUCTION: Sources and classification of Air pollutants: Natural contaminants, Aerosols, Gases & Vapours; Primary & Secondary Air pollutants; Stationary & Mobile Sources. Meteorology and Air pollution: Factors influencing Air pollution; Atmospheric stability & temperature inversions; Mixing height; Plume behaviour; Wind rose; Stack effluent dispersion theories; Stack height.

UNIT-2: SAMPLING PROCEDURES: Sampling Methods, Difficulties in sampling, Stages & considerations of air sampling, Instruments for sampling waste gases & atmosphere, sampling period & methods, High volume sampler, Stack sampling techniques, selection of sampling location, procedure for collection & sampling of particulate matter, Gaseous sampling, recent trends in sampling of stack effluents.

UNIT-3: Control of Particulates / aerosols: Objectives & types of Collection equipment; Principle, application, working, advantages & disadvantages of: i) Settling chambers, ii) Inertial separators, iii) Cyclones, iv) Filters, v) Electrostatic Precipitators & vi) Scrubbers; Choice of equipment.

UNIT-4: Control of Smoke -Gaseous Contaminants & Odour: Smoke: Sources, measurement by Ringelmaan chart, miniature chart & other method; Prevention & control of smoke. Control of exhaust emissions. Gaseous Contaminants: Methods of control viz. combustion, absorption, adsorption, closed collection & masking. Odour Control.

UNIT-5: Control measures for Industrial Applications: Introduction to control of air pollution by process changes. Control measures for industries such as Cement Industry, Concrete batching plant, Asphaltic concrete plant, Glass manufacture, Asbestos processing, Thermal Power plant and Coal tar industry.

REFERENCES:

- Richard W. Boubel et al "Fundamentals of Air pollution", Academic Press, New York, 1994.
- Noel de Nevers, Air Pollution control Engineering, McGraw Hill, New York, 1995.
- M.N. Rao et al, "Air Pollution" Tata McGraw Hill, 1989.

SYLLABUS									
Subject Code:	CE7TPE3C	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Industrial Wastewater Management	L	T	P	CT	MS E	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT-1: Introduction: Industrial scenario in India– Industrial activity and Environment - Uses of Water by industry – Sources and types of industrial wastewater – Nature and Origin of Pollutants - Industrial wastewater and environmental impacts – Regulatory requirements for treatment of industrial wastewater – Industrial waste survey – Industrial wastewater monitoring and sampling -generation rates, characterization and variables –Toxicity of industrial effluents and Bioassay tests – Major issues on water quality management

UNIT-2: Industrial Pollution Prevention: Prevention and Control of Industrial Pollution – Benefits and Barriers – Waste management Hierarchy - Source reduction techniques – Pollution Prevention of Assessment - Material balance - Evaluation of Pollution prevention options –Cost benefit analysis – payback period - Waste minimization Circles

UNIT-3: Industrial Wastewater Treatment: Equalisation - Neutralisation – Oil separation – Flotation – Precipitation – Heavy metal Removal– Aerobic and anaerobic biological treatment – Sequencing batch reactors –High Rate reactors - Chemical oxidation – Ozonation – carbon adsorption -Photo catalysis – Wet Air Oxidation – Evaporation – Ion Exchange – Membrane Technologies – Nutrient removal.- Treatability studies.

UNIT-4: Wastewater Reuse And Residual Management: Individual and Common Effluent Treatment Plants – Joint treatment of industrial and domestic wastewater - Zero effluent discharge systems - Quality requirements for Wastewater reuse – Industrial reuse , Present status and issues - Disposal on water and land – Residuals of industrial wastewater treatment – Quantification and characteristics of Sludge – Thickening, digestion, conditioning, dewatering and disposal of sludge – Management of RO rejects.

UNIT-5: Case Studies: Industrial manufacturing process description, wastewater characteristics, source reduction options and waste treatment flow sheet for Textiles – Tanneries – Pulp and paper – metal finishing – Oil Refining – Pharmaceuticals – Sugar and Distilleries.

REFERENCES:

Eckenfelder, W.W., 'Industrial Water Pollution Control', Mc-Graw Hill, 2000.
 Nelson Leonard Nemerow, "Industrial waste treatment – contemporary practice and vision for the future", Elsevier, Singapore, 2007
 Frank Woodard, 'Industrial waste treatment Handbook', Butterworth Heinemann, New Delhi, 2001.
 World Bank Group, 'Pollution Prevention and Abatement Handbook – Towards Cleaner Production', World Bank and UNEP, Washington D.C., 1998
 Paul L. Bishop, 'Pollution Prevention: - Fundamentals and Practice', Mc-Graw Hill International, Boston, 2000.

SYLLABUS

Subject Code:	CE7TPE3D	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Water Resources Planning & Management	L	T	P	CT	MS E	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT 1: Introduction: Role of water in national development, assessment of water resources of country, scope of water resources development vis-a-vis environment, Irrigation development in India, utilisation of Irrigation potential.

UNIT 2: Planning: Water resources planning process; planning for single purpose and multipurpose projects, estimation of different water needs and project formulations, comparison of alternatives, cost-benefit analysis.

UNIT 3: Water Resources Systems: Definition, types of system, optimization techniques, system approach, system analysis, linear programming, and formulation of a linear programming problem, formulation with different types of constraints, graphical analysis, graphical solution, simplex method, optimization techniques and systems approach.

UNIT 4: Management: Evaluation and monitoring of water quantity and quality, managing water distribution networks for irrigation, flood control and power generation, inter-basin transfer of water, conjunctive use of surface and ground water.

UNIT 5: Modelling: Water quantity and quality modelling, evaluation of impacts of water resources projects on river regimes and environment, reservoir sedimentation and watershed management.

NAME OF TEXT BOOKS:

Principles of Water Resources Planning – Good Man, A.S., (Prentice Hall, Inc., Englewood Cliffs, N.J. 1984.)

Water Resources Engineering – Linsley, R.K. and Franzini, J.B., (3rd Edition) (McGraw Hill, New York, 1979)

Name of Reference Books:

Water Resources System, Planning and Management – M.C. Chaturvedy (Tata McGraw Hill)

System Approach to Water Management – Biswas A.K. (Tata McGraw Hill)

Water Resources System, Planning and Management – Helweg O.J. (John and Wiley & Sons)

SYLLABUS										
Subject Code:	CE7TPE3E	CREDITS: 3			SESSIONAL - TA				ESE	
Subject:	Environmental Impact Assessment	L	T	P	CT	MSE	TA	TOTAL	60	
		3	-	-	10	20	10	40		

UNIT-1: Introduction: Historical development of Environmental Impact Assessment (EIA). EIA in Project Cycle. Legal and Regulatory aspects in India. – Types and limitations of EIA – Cross sectoral issues and terms of reference in EIA – Public Participation in EIA. EIA process- screening – scoping - setting – analysis – mitigation

UNIT-2: Components And Methods For EIA: Matrices – Networks – Checklists – Connections and combinations of processes – Cost benefit analysis – Analysis of alternatives – Software packages for EIA – Expert systems in EIA. Prediction tools for EIA – Mathematical modelling for impact prediction – Assessment of impacts – air – water – soil – noise – biological — Cumulative Impact Assessment – Documentation of EIA findings – planning – organization of information and visual display materials – Report preparation. EIA methods in other countries.

UNIT-3: Socio-Economic Impact Assessment: Definition of social impact assessment. Social impact assessment model and the planning process. Rationale and measurement for SIA variables. Relationship between social impacts and change in community and institutional arrangements. Individual and family level impacts. Communities in transition - neighbourhood and community impacts. Selecting, testing and understanding significant social impacts. Mitigation and enhancement in social assessment. Environmental costing of projects.

UNIT-4: Environmental Management Plan: Environmental Management Plan - preparation, implementation and review – Mitigation and Rehabilitation Plans – Policy and guidelines for planning and monitoring programmes – Post project audit – Ethical and Quality aspects of Environmental Impact Assessment.

UNIT-5: Sectoral EIA: EIA related to the following sectors - Infrastructure –construction and housing Mining – Industrial - Thermal Power - River valley and Hydroelectric – coastal projects- Nuclear Power. EIA for coastal projects.

REFERENCES:

Lawrence, D.P., Environmental Impact Assessment – Practical solutions to recurrent problems, Wiley-Inter science, New Jersey, 2003.

World Bank –Source book on EIA

Petts, J., Handbook of Environmental Impact Assessment, Vol., I and II, Blackwell Science, London, 1999.

Canter, L.W., Environmental Impact Assessment, McGraw Hill, New York.

SYLLABUS

Subject Code:	CE7TPE4X	CREDITS: 3			SESSIONAL - TA			
Subject:	Professional Elective -4X	L	T	P	CT	MSE	TA	TOTAL
		3	-	-	10	20	10	40
Professional Elective-4A or Professional Elective-4B or Professional Elective-4C or Professional Elective-4D or Professional Elective-4E		Any one subject to be Selected from the Professional Electives Group-4 (i.e. CE7TPE4A or CE7TPE4B or CE7TPE4C or CE7TPE4D or CE7TPE4E)						
Professional Electives Group -4								
CE7TPE4A	Ground Water Hydrology							
CE7TPE4B	Ground Improvement Techniques							
CE7TPE4C	Geo-Informatics & GIS Applications							
CE7TPE4D	Rock Mechanics							
CE7TPE4E	Design of Hydraulic Structures							

SYLLABUS										
Subject Code:	CE7TPE4A	CREDITS: 3			SESSIONAL - TA				ESE	
Subject:	Ground Water Hydrology	L	T	P	CT	MSE	TA	TOTAL		
		3	-	-	10	20	10	40	60	

UNIT 1: Hydrologic cycle, Water balance, Occurrence of ground water: Origin, geological formations as aquifers, type of aquifers, groundwater basins, springs. Darcy's Law, validity of Darcy's Law permeability,

UNIT 2: Laboratory and field measurement of permeability, groundwater Flow lines. Steady flow to a well, steady radial flow to a well in confined aquifer and unconfined aquifer, Unsteady radial flow into a confined aquifer, Non equilibrium Theis equation, Theis method of solution, multiple well system; Methods of constructions of deep and shallow wells: The percussion (or cable tool) method of drilling, Direct circulation hydraulic rotary method, Down the hole hammer method, well logs-receptivity logging, testing of wells for yield, Effect of irrigation, stream flow, rainfall on groundwater fluctuations, seasonal and secular variations, fluctuation due to miscellaneous causes;

UNIT 3: Surface and Subsurface investigations of groundwater: Geophysical exploration, Electrical resistivity method, aerial photo interpretation, remote sensing applications to ground water exploration, test drilling, Artificial recharge by water spreading, through pits and shaft, recharge through other methods;

UNIT 4: Ground water pollution: Municipal sources, liquid wastes from domestic uses, solid wastes, Industrial sources, tank and pipeline leakage, Mining activity, agricultural sources, septic tank and cesspools, saline water intrusion in coastal aquifers, methods to control saline water intrusion ;

UNIT 5: Groundwater management: Concepts of Basin management, Equation of hydrologic equilibrium, groundwater basin investigations, conjunctive use of surface and groundwater.

TEXT BOOK:

K. C. Patra, Hydrology and Water Resources Engg., Narosa Publishing house, New Delhi.
D. K. Todd, Groundwater Hydrology, John Wiley and Sons.

REFERENCES:

H. M. Raghunath, Ground Water.
S. P. Garg, Groundwater and Tube Wells, Oxford and IBH Publishing Co., New Delhi.
V. T. Chow, Hand book of Applied Hydrology, McGraw-Hill Publishing Company, New York.

SYLLABUS

Subject Code:	CE7TPE4B	CREDITS: 3			SESSIONAL - TA			ESE	
Subject:	Ground Improvement Techniques	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	
									60

UNIT 1: Introduction: Engineering properties of soft, weak and compressible deposits, Natural on land, off-shore and Man-made deposits.

UNIT 2: Role of ground improvement in foundation engineering, methods of ground improvement, Selection of suitable ground improvement techniques

UNIT 3: In-situ methods: In-situ densification soils, Dynamic compaction and consolidation, Vibroflotation, Sand pile compaction, Preloading with sand drains and fabric drains, Granular columns, Micro piles, Soil nailing, Ground Anchors, Lime piles, Injections, Thermal, Electrical and Chemical methods, Electro osmosis, Soil freezing ;

UNIT 4: Reinforced Soil: The Mechanism, Reinforcement materials, Reinforcement - Soil Interactions, Geosynthetics, Principles, Analysis and Design of Reinforced Retaining Structures, Embankments and Slopes, soil nailing.

UNIT 5: Worldwide Case studies of various methods of ground improvement techniques applied for ground improvement.

ESSENTIAL READING:

R. M. Korner, Design with Geosynthetics, Prentice Hall, New Jersey, 3rd Edn. 2002.
P. P. Raj, Ground Improvement Techniques, Tata McGraw Hill, New Delhi, 1995.

SUPPLEMENTARY READING:

B. M. Das, Principles of Foundation Engineering Thomson, Indian Edition, 2003.
G. V. Rao & G. V. S. Rao, Text Book on Engineering with Geotextiles, Tata McGraw Hill
T. S. Ingold & K. S. Miller, Geotextile Hand Book, Thomas Telford, London.
N. V. Nayak, Foundation Design Manual, Dhanpat Rai and Sons, Delhi.

SYLLABUS

Subject Code:	CE7TPE4C	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Geo-Informatics & GIS Applications	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT-1: Data base system levels of abstraction in DBMS principles of data base. Model of real world. Data organization, information management system preliminary study of INGRES, ORACLE, RDBMS and DBASE. GIS: maps and spatial information. Computer assisted mapping and map analysis, Components. Future directions and trends in GIS.

UNIT-2: Data structures for Thematic maps & GIS. Points, lines and areas. Map Geographic data. File and data processing, data base structures, perceived structures and computer representation and geographical data. Raster data structure, Vector data structures for geographical entities. Data structures for thematic maps - The choice between raster and vector. DEMs: The need of DEMs, methods of representing DEMs. Image methods, data sources and sampling methods for DEMs. Products from a DEM. Automated landform delineation from DEMs. Map projections in GIS

UNIT-3: Data input, data verification, correction and storage data output; data user interfaces. Methods of Data Analysis and Spatial Modelling: Introduction, definition of the database. Simple data retrieval. A general approach to map overlay, Cartographic modelling using natural language commands. Linking command sequences into cartographic models, advantages and disadvantages of cartographic modelling in land evaluation and planning.

UNIT-4: Data Quality, Errors and Natural Variation: Sources, Errors resulting from natural variation of from original measurements. Errors arising through processing, problem; and errors arising from overlay and boundary intersections. Errors resulting from rasterizing a vector map. Errors associated with overlaying two or more polygon networks. The nature of boundaries. The statistical nature of boundaries. Combining attributes from overlaid maps. Classification methods: Classification, Multivariate analysis and classification, allocating individuals to existing classes. Expert systems for GIS. Classification methods in GISs.

UNIT-5: Methods of Spatial interpolation, Global methods, location interpolators, optimal interpolation. Extensions of kriging to large areas. Comparing kriging with other interpolation techniques. Choosing a GIS. Designing the needs for GIS. The procedure for GIS Setup. Tools for Map analysis: Single maps, Map reclassification, operations and attribute tables, spatial topological and geometric modelling and operations on spatial Neighbourhood. Tools for map Analysis: Map pairs, map overlay and map modelling correlation between two maps. Tools for map analysis: Multiple maps, types of models, Boolean logic models, Index overlay models, Fuzzy logic methods.

LIST OF TEXT BOOKS

Principles of Geographical Information System for Land Resource Assessment, P.A. Burrough Clarendon Press, Oxford, 1986.

Geographic Information Systems, T.R. Smith & Piquent, London Press, 1985.

Principles of data base systems, J.D. Ullman, Computer Science Press.

SYLLABUS

Subject Code:	CE7TPE4D	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Rock Mechanics	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT – 1: INTRODUCTION TO ROCK MECHANICS: Definition, Scope and importance, development, application in mining, Discontinuities; Description of discontinuities, Introduction to mapping and hemispherical projection of discontinuities, Barton’s shear strength of joints. ANALYSIS OF STRESS: Introduction, Definition and basic concepts, stress in a plane, (two dimensional stresses), Mohr’s Circle of stress, Secondary principal stress, equations of equilibrium, plane stress equations.

UNIT – 2: ANALYSIS OF STRAIN: Introduction, Definition and basic concepts, strain in a plane, (two dimensional stress), Mohr’s Circle of strain, equations of compatibility, stress-strain relationship, basic equations in elastic theory, plain strain equations, elasto plastic behaviour of rocks. Stress – strain curves of various rocks. PHYSICAL PROPERTIES: Definition and determination of Density, hardness, porosity, permeability, moisture content, degree of saturation. Electrical and thermal properties of rocks.

UNIT – 3: MECHANICAL PROPERTIES: Definition and determination of Compressive Strength, tensile strength, shear strength, triaxial testing. Time dependent properties. Scaling of laboratory data to in-situ values. Rock Indices: protodyakanov strength index, point load strength index, RQD. In-situ strength properties of rocks, Necessity and requirement, methods of in-situ stress measurements. Plate load test, cable jack test, bore hole test, dilatometer test, flat jack test, hydraulic fracture and velocity propagation.

UNIT – 4: RHEOLOGICAL MODELS: Relationship and rate of change of stress-strain for idealizing materials – Models representing elastic, plastic, viscous, elasto plastic, non-elastic and brittle rock properties.

UNIT – 5: STATIC AND DYNAMIC ELASTIC CONSTANTS OF ROCKS: Static: Introduction, definition, instrument, measurement of deformation: mechanical, optical, electrical gauges, LVDT, calculation of elastic constants of rocks. Dynamic: Introduction, elastic wave, calculation of modulus of elasticity.

TEXT

BOOKS:

Strata Mechanics in Coal Mining - Jeremic, K. L. Jeremic, Rotterdam, Balkema, 1985.

Fundamentals of Rock Mechanics - Jager & Cook, Methuen andco. London, 1969.

REFERENCE BOOKS:

- 1)Hand Book on Mechanical Properties of rocks - R.D. Lama, V. S. Vutukuri, Vol. I to IV, Transtech Publications, 1978., 2) Mechanics and Engineering - Charles Jaeger, Cambridge University Press, 1979. 3) Rock Mechanics for Underground Mining - 2nd edition, Brady and Brown, Kluwer Academic Publishers, 1993. 4) Ground Mechanics in Hard rock Mining - M. L. Jeremic, Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi, 1987. 5)Rock Mechanics and Design of Structures in Rock - L. Obert & W.I. Duvall, John wiley and Sons, 1966.6) Rock Mechanics for Engineers - B. P. Verma, 2nd edition, Khanna Publishers, 1989. 7) Introduction to Rock Mechanics - R. E. Goodman, 2nd edition, John wiley and Sons, 1989. 8) The elements of Mechanics of Mining Ground - B. S. Verma Vol. I. Julin & Co. Lucknow 1981. 9) Engineering Rock Mechanics, An Introduction to the Principles - John A. Hudson and John. P. Harrison Pergamon Press 1997.

SYLLABUS									
Subject Code:	CE7TPE4E	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Design of Hydraulic Structures	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT 1: Introduction - Classification of dams, Gravity dams, Earth dams, Arch dam, Buttress dam, Steel dams, Timber dams, selection of site for dam, selection of type of dam, investigations of dam sites, Engineering surveys, Geological investigations, Types of hydropower plants, site selection for power plant, General arrangement of a hydropower project.

UNIT 2: Principles of Design of Hydraulic Structures - Hydraulic structures on permeable foundations, Theories of subsurface floor, Khosla's method of independent variables, Exit gradient, Location of Hydraulic jump, water surface profiles, scour due to subsurface flow, Design Principles, Energy dissipation principles.

UNIT 3: Gravity Dams - Types of storage head works, Forces acting on gravity dams, Analysis of gravity dams, Profile of a gravity dam, Finite Element Method, Design of gravity dam, joints in gravity dam, Galleries in gravity dam, Adits and shafts, Construction of gravity dam, Foundation Grouting, Instrumentation of gravity dams.

UNIT 4: Earth dams - Types of earth dams, Causes of failure of earth dams, Seepage analysis, phreatic line, flow net construction, criteria for safe design of gravity dams, typical cross sections of earth dams, Stability analysis, Seepage control, and design of filters.

UNIT 5: Spillways and energy dissipation systems - Essential requirements of spillways, Required spillway capacity, component parts of spillway, Types of spillways, Design of Ogee spillway, Design of shaft spillway, Design of siphon spillway, Design of stilling basins. Hydropower structures - Storage power plant, Runoff River plant, Pumped storage plant, Water conveyance systems, Tunnels and Penstocks, Gates, Surge tanks, Power house layout.

Reading:

1. Golze, A. R., Handbook of Dam Engineering, Von Rostrand Reinhold Co., 1977
2. Sharma, H.D., Concrete Dams, CBIP Publication, 1998.
3. Siddiqui, I H, Dams and Reservoirs: Planning, Engineering, Oxford University Press, USA, 2009.
4. Novak, P., Moffat, A. I. B., Nalluri, C and Narayan, R., Hydraulic Structures, Taylor & Francis, 2006.
5. Modi P.M., Irrigation Water Resources and Hydropower Engineering, Standard Publishing Company, New Delhi, 2000.
6. Arora K.L. Irrigation Water Resources Engineering, Standard Book Publishing Co., Delhi, 1996.

SYLLABUS

SYLLABUS								
Subject Code:	CE7TPE5X	CREDITS: 3			SESSIONAL - TA			
Subject: Professional Elective -5X		L	T	P	CT	MSE	TA	TOTAL
		3	-	-	10	20	10	40
Professional Elective-5A or Professional Elective-5B or Professional Elective-5C or Professional Elective-5D or Professional Elective-5E		Any one subject to be Selected from the Professional Electives Group-5 (i.e. CE7TPE5A or CE7TPE5B or CE7TPE5C or CE7TPE5D or CE7TPE5E)						
Professional Electives Group -5								
CE7TPE5A	Industrial Structures							
CE7TPE5B	Systems Analysis in Civil Engineering							
CE7TPE5C	Railway Engineering							
CE7TPE5D	Pavement Construction and Maintenance							
CE7TPE5E	Planning & Design of Building Services							

SYLLABUS									
Subject Code:	CE7TPE5A	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Industrial Structures	L	T	P	CT	MSE	TA	TOTAL	
			3	-	-	10	20	10	40

UNIT 1:

Detailed Design of Steel Gantry Girders.

Detailed Design of Portal Frames-Single bay two storeys.

UNIT 2:

Detailed Design of Gable Structures.

Detailed Design of Knee Brace.

UNIT 3:

Detailed Design of Light weight metal structures.

Design of connections-Shear and Flexure Design.

UNIT 4:

Detailed Design of Steel Bunkers.

Detailed Design of Silos.

UNIT 5:

Detailed Design of Self Supported Chimneys.

Reading:

1. Design of Steel Structures, Arya and Azmani, Nem Chand Brothers, Roorkee, 2004
2. Punmia B.C, Ashok Kr. Jain, Arun Kr. Jain, RCC Designs (Reinforced Concrete Design), 10th Edition, Lakshmi Publishers, 2006.
3. Ramachandra, Design of Steel Structures, 12th Edition, Standard Publishers, 2009.

SYLLABUS

Subject Code:	CE7TPE5B	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Systems Analysis in Civil Engineering	L	T	P	CT	MSE	TA	TOTAL	
			3	-	-	10	20	10	40

UNIT 1: Concept of systems approach: system, boundaries of system, goals and objectives, optimality, mathematical models, objective function and constraints, problem solving mechanism, types of problems, modelling / problem formulation, sub-optimization, solution techniques, sensitivity analysis. Basic concepts of probability and probability distributions, regression and curve fitting.

UNIT 2: Decision theory: classification of decision situations, decision tables and decision tree, criteria for decision making under certain, uncertain and risk conditions. Index numbers: basic requirements of index numbers, constructing index numbers: using relatives, using aggregates.

UNIT 3: Linear programming: general nature of problem, graphical method of solution, simplex method, dual, sensitivity analysis.

UNIT 4: Distribution models: transportation and assignment problems and their solutions. Queuing models: various situations, queue discipline and customer behaviour, single server model.

UNIT 5: Simulation: general approach, Monte Carlo simulation, simple problems using hand calculations.

Text/Reference Books:

1. Benjamin J R & Cornell C A, "Probability, Statistics and Decisions for Civil Engineers", McGraw Hill
2. Jewell T K, " A Systems Approach to Civil Engineering Planning and Design", Harper & Row
3. Ossenbruggen P J, "Systems Analysis for Civil Engineers".
4. Shrivastava, Shenoy and Sharma, "Quantitative Techniques for Managerial Decisions", Wiley Eastern.

SYLLABUS									
Subject Code:	CE7TPE5C	CREDITS: 3			SESSIONAL - TA			ESE	
Subject:	Railway Engineering	L	T	P	CT	MSE	TA	TOTAL	60
			3	-	-	10	20	10	

UNIT 1: Introduction to Railways in India: Role of Indian Railways in National Development – Railways for Urban Transportation –LRT & MRTS.
Alignment of Railway Lines: Engineering Surveys for Track Alignment.
Permanent Way: Components and their Functions

UNIT 2: Rails - Types of Rails, Length of rail, Weight of Rail, Rail Joints, Creep of rail, Buckling of rail, Kinks of Rail Fastenings, Coning of Wheels& tilting of rails.
Sleepers –Types, Functions, sleeper density
Ballasts- Types, function, advantage & disadvantage of each type.

UNIT 3: Geometric Design of Railway Tracks: Gradients and Grade Compensation, Super-Elevation, Widening of Gauges in Curves, Transition Curves, Horizontal Curves.

UNIT 4: Points and Crossings, Turnouts: Working Principles, Cross overs.

UNIT 5: Signalling: Types and their function.
Station and Yards: Types, Requirements, factors for site selection.

Reading:

1. Chandra S. and M.M. Agarwal, Railway Engineering, Oxford University Press, New Delhi, India, 2007.
2. Saxena, S.C. and S.P. Arora, Railway Engineering, Dhanpat Rai and Sons, New Delhi, India, 1997.
3. Agarwal, M.M., Indian Railway Track, Prabha and Co., New Delhi, India, 1988.
4. Rangwala, S.C., Principles of Railway Engineering, Charotar Publishing House, Anand, India, 1988.
- 5.

SYLLABUS

Subject Code:	CE7TPE5D	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Pavement Construction and Maintenance	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	20	40	60

UNIT 1: Pavement Inventories And Evaluation - Factors affecting Pavement Deterioration, Functional Condition Evaluation Techniques: Roughness Measurements, serviceability concepts: Visual & Ride Rating Techniques, structural Condition Evaluation Techniques: NDT Procedures, Rebound Deflection, Measurement and Analysis, Destructive Testing, Remaining Life Concept, AI's Equivalency Factors, Overlay Design methods, IRC, Overlay Design methods, AASHTO methods, Evaluation of Pavement Safety: Skid Resistance, Factors, evaluation, Hydroplaning Reduction with Porous Overlays & Popcorn Friction overlay,

UNIT 2: Deterioration Modelling Concepts: Factors Influencing Structural & Functional Condition Deterioration, Examples of Initiation and Progressing Deterioration Models, Use of Deterioration Models by HDM Software.

UNIT 3: Pavement Construction - Construction of Subgrade layers, Sub-base and Base Courses, Bituminous Surface Courses, Cement Concrete Surface Courses, MORTH specifications, Quality control.

UNIT 4: Pavement Maintenance & Quality Control - Routine, Periodic Maintenance, Special Repairs, Responsive Maintenance Programmes, Rehabilitation and Reconstruction, Components of Pavement Maintenance Management System (PMMS), Stages in Implementing PMMS.

UNIT 5: Total Quality Management (TQM): Quality Assurance/Quality Control Concepts, Sampling, Tolerances and Controls Related to Profile & Compaction, Role of ISO 9000 in TQM.
Reading:

1. RCC Haas, W. Ronald Hudson, et al, Modern Pavement Management, Krieger Publishing Company.
2. ISTE Summer School Report on PMSS by Bangalore University. ISTE, New Delhi.
3. Mohammed Y. Shahin, Pavement Management for Airports, Roads & Parking Lots, Chapman & Hall Publishers.
4. Instructor's Guide-Asphalt Institute, Asphalt Technology and Construction Practices, Educational series.
5. A.F. Stocks, Concrete Pavements, Elsevier Applied Science Publishers, New York.
6. Harold N. Atkins, Highway Materials, Soils & Concrete 3rd Edition, Prentice Hall.
7. MORTH, Govt. of India, Specifications for Roads & Bridge Works, New Delhi.
8. Peurifoy, R.L., and Clifford, JS "Construction Planning Equipment and Method"- McGraw Hill Book Co. Inc.
9. Sharma S.C., "Construction Equipment and its Management"- Khanna Publishers.
10. Freddy L Roberts, Prithvi S Kandhal et al, "Hot Mix Asphalt Materials, mixture design and construction"- (2nd Edition), NAPAR and Education Foundation, Maryland, USA.

SYLLABUS										
Subject Code:	CE7TPE5E	CREDITS: 3			SESSIONAL - TA				ESE	
Subject:	Planning & Design of Building Services	L	T	P	CT	MSE	TA	TOTAL		
			3	-	-	10	20	10	40	60

UNIT 1: Integrated design: factors affecting selection of services/systems. Provision of space in the building to accommodate building services. Structural integrity of building services equipment.

UNIT 2: Sound and vibration attenuation features. Provisions for safe operation and maintenance. Building services engineering system for intelligent buildings: introduction to information transmission systems, communication and protection system, call systems, public address system and Building automation/management systems.

UNIT 3: The concepts and importance of energy conservation and energy efficiency for environmental protection, environmental protection and maintenance of building services systems, selection of environmentally friendly products and materials used in building services systems.

UNIT 4: Co-ordination and management of design and installation of various building services systems during the design and construction stages in particular the builder's works. Computer-aided design and installations of building services. Testing and commissioning of building services systems: fire safety systems, vertical transportation equipment ventilation systems, etc. Sick building syndrome.

UNIT 5: The impacts of life-cycle-cost on planning and implementation. An appreciation of capital and operating costs. Implication of low cost inefficient equipment, poor installation, inadequate access for maintenance.

TEXT BOOKS

Stein B. Reynolds J.S. & McGuiness W.J. (1986) Mechanical and Electrical Equipment for Buildings, 7th Edition, Volume 1 & 2, John Wiley & Sons Chadderton D.V. (1991) Building Services Engineering, E. & F.N. Spon Hassan G. (1996) Building Services, Macmillan Greeno R. (1996) Building Services and Design, Longman

(SEMESTER-VII)

CE7TOE2X	CREDITS: 3			SESSIONAL - TA			
Open Elective -2X	L	T	P	CT	MSE	TA	TOTAL
	3	-	-	10	20	10	40
Open Elective-2A or Open Elective-2B or Open Elective-2C or Open Elective-2D	Any one subject to be Selected from the Open Electives Group 2 (i.e. CE6TOE2A or CE6TOE2B or CE6TOE2C or CE6TOE2D)						
Open Electives Group 2							
CE7TOE2A	Value Engineering						
CE7TOE2B	Supply Chain Management-Planning						
CE7TOE2C	Travel Demand Analysis						
CE7TOE2D	Quality Control Assurance and Safety in Construction						

SYLLABUS

<i>Subject Code:</i>	CE7TOE2A	CREDITS: 3			SESSIONAL - TA				ESE
<i>Subject:</i>	Value Engineering	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT-1: Basic Concepts: Meaning of the term value, basic kind, reasons for poor value, value addition, origin and history. Benefits, relevance in Indian scenario.

UNIT-2: Techniques: Different techniques, organizing value engineering study, value engineering and quality.

UNIT-3: Job Plan: Different phases, General phase, Information phase, Functional Phase, Creation Phase, Evaluation Phase, Investigation Phase, Implementation Phase, Audit.

UNIT-4: Selection of evaluation of VE Projects: Project selection, method selection, value standard, application of methodology.

UNIT-5: Value Engineering Program: VE operations in maintenance and repair activities, VE Cost, life cycle, cost model, training for VE, general value engineering, case studies.

TEXT BOOKS

Value Engineering – S.S. Iyer – New Age International Publishers, New Delhi

Industrial Engineering & Management – O.P. Khanna – Dhanpat Rai & Sons

REFERENCES

Techniques of Value Analysis and Engineering – L.D. Miles – McGraw Hill, New York

Value Engineering, A Systematic Approach – A.E. Mudge – McGraw Hill, New York

Compendium on Value Engineering – H.G. Tufty – Indo American Society

SYLLABUS

Subject Code:	CE7TOE2B	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Supply Chain Management- Planning	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT 1: Introduction to Supply Chain- Supply chain systems, stages and decision phases and Process view of supply chain; supply chain flows; examples of supply chains; competitive supply chain strategies; drivers for supply chain performance.

UNIT 2: Designing the Supply Chain Network- Distribution Networking – role, design; Supply Chain Network – SCN- Role, factors; framework for design decisions.

UNIT 3: Facility Location and Network Design- Models for facility location and capacity location; Impact of uncertainty on SCN – discounted cash flow analysis; evaluating network design decisions using decision trees; analytical problems.

UNIT 4: Planning and Managing Inventories in a Supply Chain- Inventory concepts, trade promotions; managing multi-echelon cycle inventory, safety inventory determination; impact of supply uncertainty aggregation and replenishment.

UNIT 5: Sourcing, Transportation and Pricing Products-Role of sourcing, supplier- scoring and assessment, selection and contracts, design collaboration; role of transportation, models of transportation and designing transportation network; revenue management.

Text Books:

1. Sunil Chopra and Peter M, Supply Chain Management, Pearson publishing, 2001
2. Blanchard D., Supply chain management: Best practices. New Jersey: John Wiley & Sons. 2007

Reference Books:

1. Hugos, M., Essentials of supply chain management. (2nd ed.). New Jersey: John Wiley & Sons, 2006
2. Kim, B., Supply chain management in the mastering business in As

SYLLABUS										
Subject Code:	CE7TOE2C	CREDITS: 3			SESSIONAL - TA				ESE	
Subject:	Travel Demand Analysis	L	T	P	CT	MSE	TA	TOTAL		
		3	-	-	10	20	10	40	60	

UNIT 1: Transportation Issues - Population, Urbanization and Migration, Findings of Commission on Urbanization Introduction to Urban Transportation Urban Issues, Travel Characteristics, Concept of Region, Issues Related to Regional Transportation Planning, Methods of Delineation Regions.

UNIT 2: Travel Demand - Trends, Overall Planning process, Long term Vs. Short term planning, Demand Function, Independent Variables, Travel Attributes, Assumptions in Demand Estimation, Sequential, and Simultaneous Approaches, Aggregate and Disaggregate Techniques.

Data Collection And Inventories - Collection of data – Organisation of surveys and Analysis, Study Area, Zoning, Screen Lines, Types and Sources of Data - Road Side Interviews - Home Interview Surveys - Commercial Vehicle Surveys, Sampling Techniques, Expansion Factors - Accuracy Checks, Use of Secondary Sources, Economic data – Income – Population – Employment – Vehicle Owner Ship. Four Stage Demand Forecasting - UTPS Approach.

UNIT 3: Trip Generation Analysis: Zonal Models, Category Analysis, Household Models, Trip Attraction models, Commercial Trip Rates.
Trip Distribution: Growth Factor Methods, Gravity Models, Opportunity Models, Time Function Iteration Models.

UNIT 4: Mode Choice Analysis: Mode Choice Behaviour, Competing Modes, Mode Split Curves, Models and Probabilistic Approaches.

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

UNIT 5: Regional Travel Demand Estimation - Factors Affecting Goods and Passenger Flows, Use of Mathematical Models to Estimate Freight and Passenger Demand, Abstract Mode Models, Mode Specific Models, Direct Demand Models, IVF Models, IO Model.

Reading:

1. Jotin Khisty C, Transportation Engineering - An Introduction, Prentice Hall, Englewood Cliffs, New Jersey, 2004.
2. Kadiyali L.R., Traffic Engineering and Transportation Planning, Khanna Publication, N.D, 2011.
3. Papakostas. C.S., Fundamentals of Transportation Engineering, PHI Pvt. Ltd., New Delhi, 2003.
4. Subhash C. Saxena, A Course in Traffic Planning and Design, Dhanpat Rai and Sons, New Delhi, 1989.

SYLLABUS

Subject Code:	CE7TOE2D	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Quality Control Assurance and Safety in Construction	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT 1: Construction Projects: Agencies involved in Construction Projects, mutual relationship, quality control at site; and whose job is it.

UNIT 2: ISO / IS Requirements: IS 9000 (Parts 1 to 4) (Pt 1; 1994, Pt 2; 1993, Pt 3; 1991, Pt 4; 1993) for Total Quality Management. ISO 14000 – 1988 for environment – Impact of large construction projects.

UNIT 3: Quality Control on Construction Projects: Inspection of reinforced concrete, masonry and steel works, testing techniques and quality at reports.

UNIT 4: Statistical Analysis: Sampling frequencies, statistical and reliability analysis, optimum sample size.

UNIT 5: Quality Assurance: Quality Assurance in construction.

Name of Text Books:

ISO 9000 in Construction – Nee, Paul A. (Wiley Inter science Publication, 1994)

IS: 14000, – Quality System – Guidelines for Selection and Use of Standards on Quality System 1988.

NAME OF REFERENCE BOOKS:

ISO 9000 in Construction – Wah, L.S., Min., L.C. & Ann, T.W. (McGraw Hill Book Company, 199 Construction Engineering and Management – S. Seetaraman (Umesh Publication)

SYLLABUS	(SEMESTER-VII)					
Subject Code:	CE7LPS01	CREDITS: 2			SESSIONAL - TA	ESE
Subject:	Seminar	L	T	P	IA	
		-	-	3	50	-

SYLLABUS	(SEMESTER-VII)					
Subject Code:	CE7LPS02	CREDITS:4			SESSIONAL - TA	ESE
Subject:	Minor project	L	T	P	IA	
		-	-	8	60	40

SEMESTER VIII

SYLLABUS		(SEMESTER-VIII)							
Subject Code:	CE8TPC18	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Earthquake Resistant Design of Structures	L	T	P	CT	MSE	TA	TOTAL	
		3	1	-	10	20	10	40	60

UNIT-1: Elements of structural dynamics, Sources of vibrations; Types of vibrations; Degrees of freedom; Spring action and damping; Free vibration of undamped system having single degree of freedom; Free vibration of viscous damped system having single degree of freedom; Forced vibration of a viscous damped single degree freedom system subjected to harmonic excitation;

UNIT-2: Elements of Earth Quake Ground motion, Earthquake size- Intensity and magnitude; Seismic Zoning-Introduction; Analysis of single storey and single bay RCC Plane Frame (Columns vertical): (As per IS: 1893(part-I)). Calculation of lateral force due to earthquake using equivalent static method; Analysis for different load combinations.

UNIT 3: Design forces and moments in beam and columns (As per IS: 456 and IS13920). Design of column; Design of beam.

UNIT-4: Ductility factor, Ductility of singly reinforced rectangular beam, Detailing of beam, column, beam-column junction as per relevant IS codes (IS13920). Introduction and basic principle of design of shear wall.

UNIT-5: Masonry Structures: House types and damages, cause and location of damage, Making houses earthquake resistant, Earthquake resistant features, summary of earthquake resistant features, improving housing designs.

TEXT BOOKS:

Elements of Earthquake Engineering by Jai Krishna, A.R.Chandrasekaran and Brijesh Chandra, Second Edition (1994), South Asian Publishers, New Delhi.

Geotechnical Engineering - S.K.Gulati & Manoj Datta, Tata McGraw-Hill Publishing Company Ltd.

Earthquake Resistant Design of Structures by Pankaj Agarwal, Manish Shrikhande , First edition(2006), Prentice Hall of India Private Ltd., New Delhi .

Earthquakes and Buildings – A.S.Arya, A.Revi, Pawan Jain

CODES: IS:1893(part-I), IS13920, IS:456-2000, SP34

REFERENCE BOOK

Dynamics of Structures by A.K.Chopra, Second edition (2001), Prentice Hall India Private Ltd

SYLLABUS		(SEMESTER-VIII)							
<i>Subject Code:</i>	CE8TPE6X	CREDITS: 3			SESSIONAL - TA			ESE	
<i>Subject:</i>	Professional Elective -6X	L	T	P	CT	MSE	TA		TOTAL
			3	-	-	10	20	10	40
Professional Elective-6A or Professional Elective-6B or Professional Elective-6C or Professional Elective-6D or Professional Elective-6E		Any one subject to be Selected from the Professional Electives Group-6 (i.e. CE8TPE6A or CE8TPE6B or CE8TPE6C or CE8TPE6D or CE8TPE6E)							
Professional Electives Group -6									
CE8TPE6A		Machine Foundation							
CE8TPE6B		Earthquake Geotechnical Engineering							
CE8TPE6C		Bridge Engineering							
CE8TPE6D		Solid and Hazardous Waste Management							
CE8TPE6E		Construction Equipment & Techniques							

SYLLABUS	(SEMESTER-VIII)								
Subject Code:	CE8TPE6A	CREDITS: 3			SESSIONAL - TA			ESE	
Subject:	Machine Foundation	L	T	P	CT	MSE	TA		TOTAL
		3	-	-	10	20	10	40	60

UNIT 1: General Principles of Machine Foundation Design: Introduction, Types of Machines and Foundations, General requirements, Permissible Amplitude, Allowable soil pressure, Permissible stress of concrete and steel, Permissible stresses of Timber.

UNIT 2: Foundations of Reciprocating Machines: Modes of vibration of a rigid foundation block, methods of analysis, linear elastic weightless spring methods, elastic half space method, effect of footing shape on vibratory response, dynamic response of embedded block foundations, soil mass participating in vibrations, design procedure for a block foundation.

UNIT 3: Foundations of impact machines: Introduction, Dynamic analysis; single degree freedom system, Multi degree freedom system, determination of initial velocity of hammer, stress in the pad, stresses in the soil, Design procedure for a hammer foundation.

UNIT 4: Foundations of Rotary Machines: Introduction, special considerations, design criteria, loads on a turbo generator foundation, methods of analysis and design, resonance method, amplitude method, combined method, three dimensional analysis.

UNIT 5: Vibration isolation and screening: Introduction, force isolation, motion isolation, screening of vibrations by use of open trenches, passive screening by use of pile barriers, problems.

Reading:

1. "Handbook of Machine Foundations" Srinivasulu, P. And Vaidyanathan, C. V., Tata McGraw-Hill, New Delhi, 2001
2. "Foundations for Machines, Analysis and Design" PrakashShamsher and Puri Vijay K, John Wiley and Sons, USA, 1988.

SYLLABUS	(SEMESTER-VIII)								
Subject Code:	CE8TPE6B	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Earthquake Geotechnical Engineering	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT 1: Seismology and earthquakes: Basic earthquake principles: Introduction – Internal structure of earth – Plate tectonics faults – seismic waves – Seismograph – Classification of earthquakes – Magnitude and intensity of earthquakes - Seismic zones in India. Common Earthquake effects: Surface rupture – Regional subsidence – liquefaction – slope movement – Tsunami and seiche. Earthquake structural Damage: Earthquake induced settlement – Resonance of structures.

UNIT 2: Soil dynamics: Dynamics of discrete system – Soil structure interaction – Vibratory system – free and forced vibration without and with damping – Base shaking – Dynamic soil properties – problems.

Geotechnical earthquake engineering analysis: Site investigation: Scope of investigation – quantitative evaluation – subsurface investigation – laboratory testing – peak ground acceleration – report preparation – problems.

UNIT 3: Liquefaction: Introduction – mechanism – laboratory liquefaction studies – factors that govern Liquefaction in the field – Liquefaction analysis – cyclic stress ratio from the SPT, DCPT and shear wave velocity- FS against liquefaction – Anti Liquefaction measures – problems.

Earth quake induced settlement: Introduction – settlement VS factor of safety against Liquefaction induced ground damage – volumetric compression – settlement due to dynamic loads caused by rocking – problems.

UNIT 4: Bearing capacity analysis for earthquakes: Introduction – one third increases in bearing capacity pressure for seismic condition – Bearing capacity analysis for liquefied soil – granular soil with earthquake induced pore water – Bearing capacity analysis for cohesive soil weakened by the earthquake – problems.

Slope stability analysis for earthquake: Introduction – inertia slope stability: pseudo static method, new mark method – weakening slope stability: flow slides, liquefaction induced lateral spreading, strain softening soil – restrained retaining walls and temporary retaining walls – problems.

UNIT 5: Other geotechnical earthquake engineering analysis: Introduction – pavement design – pipe line design – problems.

Site improvement methods to mitigate earthquake effects: Soil improvement Methods: Introduction – Grading, soil replacement, water removal, site strengthening, grouting, thermal, and ground water control methods.

Foundation analysis: Introduction – shallow and deep foundations.

Reading:

1. Kramer, S. L. (2003): "Geotechnical Earthquake Engineering", Pearson Education.
2. Day, R. W. (2003): "Geotechnical Earthquake Engineering handbook", McGraw Hill.
3. Kamalesh Kumar, (2008): "Basic Geotechnical Earthquake Engineering", New Age.
4. IS-1893(part-1) 2002, "Criteria for Earthquake resistant design of structures" part 1- general provision of buildings.

SYLLABUS	(SEMESTER-VIII)								
Subject Code:	CE8TP6C	CREDITS: 3			SESSIONAL - TA				ESE
Subject:		L	T	P	CT	MSE	TA	TOTAL	
	Bridge Engineering	3	-	-	10	20	10	40	60

UNIT-1: Brief historical review, Different types of Bridges and span range, Bridge codes, Importance of hydrologic factors in bridge design, Hydraulic geometry, linear water ways, economic span, afflux and scour.

UNIT-2: Design of Reinforced concrete deck slab bridges.

UNIT-3: Design of Reinforced Concrete Tee beam bridges.

UNIT-4: Design of Box culverts.

UNIT-5: Design of Piers and Abutments.

Text Books:

- 1) Xanthakos, P. P. (1993) Reinforced Concrete Bridges, in Theory and Design of Bridges, John Wiley & Sons, Inc., Hoboken, NJ, USA. doi: 10.1002/9780470172889.ch3
- 2) Design of Bridge Structures by M A Jayaram, Prentice-Hall Of India Pvt. Limited, 01-Aug-2004 - Bridges - 292 pages
- 3) Design of Bridges by N. Krishna raju , Oxford and IBH Publishing, ISBN 8120417410, 9788120417410
- 4) Essentials Of Bridge Engineering, 6/E, Viktor , Oxford and IBH Publishing, 2007, ISBN 8120417178, 9788120417175

SYLLABUS	(SEMESTER-VIII)								
Subject Code:	CE8TPE6D	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Solid and Hazardous Waste Management	L	T	P	CT	MSE	TA	TOTAL	60
		3	-	-	10	20	10	40	

UNIT-1: Municipal Solid Waste Management: Legal and Organizational foundation: Definition of solid waste – waste generation technological society – major legislation, monitoring responsibilities, sources and types of solid waste – sampling and characterization – Determination of composition of MSW – storage and handling of solid waste – Future changes in waste composition.

UNIT-2: Collection and Transport of Solid Waste: Collection of Solid Waste: Type of waste collection systems, analysis of collection system –alternative techniques for collection system. Separation and Processing and Transformation of Solid Waste: UNIT operations user for separation and processing, Materials Recovery facilities, Waste transformation through combustion and aerobic composting, anaerobic methods for materials recovery and treatment – Energy recovery – Incinerators
Transfer and Transport: Need fir transfer operation, transport means and methods, transfer station types and design requirements. Landfills: Site selection, design and operation, drainage and leachate collection systems – requirements and technical solution, designated waste landfill remediation – Integrated waste management facilities.

UNIT-3: Hazardous Waste Management: Definition and identification of hazardous wastes- sources and characteristics – hazardous wastes in Municipal Waste – Hazardous wastes regulations – minimization of Hazardous Waste-compatibility, handling and storage of hazardous waste-collection and transport, e-waste sources, collection, treatment and reuse management.

UNIT-4: Hazardous waste treatment and Design: Hazardous waste treatment technologies - Design and operation of facilities for physical, chemical and thermal treatment of hazardous waste – Solidification, chemical fixation and encapsulation, incineration. Hazardous waste landfills: Site selection, design and operation – remediation of hazardous waste disposal sites.

UNIT-5: Laboratory Practice: Sampling and characterization of Solid Wastes; TCLP tests and leachate studies.

REFERENCES:

George Tchobanoglous et al, "Integrated Solid Waste Management", McGraw-Hill Publication, 1993.
Charles A. Wentz; ""Hazardous Waste Management", McGraw Hill Publication, 1995.

SYLLABUS	(SEMESTER-VIII)								
Subject Code:	CE8TPE6E	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Construction Equipment and Techniques	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT 1: Large and heavy engineering projects- characteristics and complexities, methods statement for major activities like excavation, concreting, steel fabrication and erection for projects like earthen dams, hydropower projects, nuclear power plant, refineries and other industrial projects,

Excavation for heavy engineering projects- Excavation in various types of soils, selection of equipment, safety measures in excavation, drainage in excavation.

UNIT 2: Concrete construction for heavy engineering projects-Selection of equipment for batching, mixing, transporting, placing and compacting for various types of jobs, safety measures during concreting, Special concretes and mortars-preplaced aggregate concrete, roller compacted concrete, grouting

Prefabricated construction- Planning for pre-casting, selection of equipment for fabrication, transport and erection, quality measures, safety measures during erection.

UNIT 3: Steel construction-Planning for field operations, selection of equipment and erection tools, tools and methods of welding, tools and methods of cutting and joining,bridge erection, quality measures, safety measures during fabrication and erection.

UNIT 4: Specific issues related to planning, site layouts, equipment selection and pre-project activities for large size construction projects like earthen dams, concrete dams, thermal power stations, nuclear power stations, light houses, airports and ports, bridges.

Information related to special equipments and their applications to off-shore construction, underground utility construction.

UNIT 5: New materials and equipment for construction; Case studies of heavy construction projects.

Text/Reference Books:

1. Thomas baron, Erection of steel structures
2. Stubbs, handbook of heavy construction
3. Journals of Civil Engineering and Construction Engineering

SYLLABUS	(SEMESTER-VIII)								
Subject Code:	CE8TPE7X	CREDITS:4			SESSIONAL - TA			ESE	
Subject:	Professional Elective - 7X	L	T	P	CT	MSE	TA		TOTAL
		3	1	-	10	20	10	40	60
Professional Elective-7A or Professional Elective-7B or Professional Elective-7C or Professional Elective-7D or Professional Elective-7E		Any one subject to be Selected from the Professional Electives Group-7 (i.e. CE8TPE7A or CE8TPE7B or CE8TPE7C or CE8TPE7D or CE8TPE7E)							
Professional Electives Group -7									
CE8TPE7A	Air and Water Transportation								
CE8TPE7B	Theory of Plates & Shells								
CE8TPE7C	Repair and Rehabilitation of Structures								
CE8TPE7D	Finite Element Analysis								
CE8TPE7E	Hydropower Engineering								

SYLLABUS	(SEMESTER-VIII)								
<i>Subject Code:</i>	CE8TPE7A	CREDITS: 4			SESSIONAL - TA				ESE
<i>Subject:</i>	Air and water transportation	L	T	P	CT	MSE	TA	TOTAL	60
		3	1	-	10	20	10	40	

UNIT 1: Air Transportation: Aircraft Characteristics - Landing gear configurations, aircraft weight, engine types, Aircraft performance characteristics: speed, payload and range, runway performance, declared distances, wingtip vortices.

UNIT 2: Geometric Design of the Airfield - Airport classification, Runways, wind rose, estimating runway length, sight distance and longitudinal profile, transverse gradient, Taxiways and taxi lanes: design of taxiway curves and intersections, end-around taxiways, Aprons: holding aprons, terminal aprons and ramps, surface gradients, Control tower visibility requirements.

UNIT 3: Structural Design of Airport Pavements - Soil investigation and evaluation, FAA pavement design methods. Airport Lighting, Marking, and Signage. Terminal Area - Passenger terminal system and its components, Apron gate system: number of gates, gate size, aircraft parking type, apron layout, apron circulation, passenger conveyance to aircraft.

UNIT 4: Water Transportation: Ports and Harbours - Types of water transportation, water transportation in India, Ports and harbours: requirements, classification, ship characteristics, Harbour works: breakwaters, jetties, fenders, piers, wharves, dolphins, etc., Navigational aids: types, requirements, light house, beacon lights, buoys, Port facilities: general layout, development, planning, facilities, terminals. Docks, Dredging, Coastal Erosion and Protection.

UNIT 5: Docks and repair facilities: design, dry docks, wet docks, slipways, Locks and lock gates: materials, size, Dredging: classification, dredgers, uses of dredged materials, Coastal erosion and protection: seal wall, revetment, and bulkhead.

Reading:

1. Ashford, N. J., Mumayiz, S. A., and Wright, P. H. Airport Engineering: Planning, Design and Development of 21st Century Airports, Fourth Edition, John Wiley & Sons, New Jersey, USA, 2011.
2. Horonjeff, R., McKelvey, F. X., Sproule, W. J., and Young, S. B. Planning and Design of Airports, Fifth Edition, McGraw-Hill, New York, USA, 2010.
3. Kazda, A., and Caves, R. E. Airport Design and Operation, Second Edition, Elsevier, Oxford, U.K., 2007. ,
4. Khanna, S. K., Arora, M. G., and Jain, S. S. Airport planning and Design, Sixth Edition, Nem Chand and Bros, Roorkee, India, 2012. ,
5. Kumar, V., and Chandra, S. Air Transportation Planning and Design, Galgotia Publications Pvt. Ltd., New Delhi, India, 1999. ,
6. Neufville, R. D., and Odoni, A. Airport Systems: Planning, Design, and Management, McGraw-

Hill, New York, USA, 2003. ,

7. Young, S. B., and Wells, A. T. Airport Planning and Management, Sixth Edition, McGraw-Hill, New York, USA, 2011. ,

8. Bindra, S.P. A Course in Docks and Harbour Engineering, DhanpatRai and Sons, New Delhi, India, 1992. ,

9. Seetharaman, S. Dock and Harbour Engineering, Umesh Publications, New Delhi, India, 1999. ,

10. Srinivasan, R. Harbour, Dock and Tunnel Engineering, Charotar Publishing House, Anand, India, 1987.

SYLLABUS	(SEMESTER-VIII)								
Subject Code:	CE8TPE7B	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Theory of Plates & Shells	L	T	P	CT	MSE	TA	TOTAL	
		3	1	-	10	20	10	40	60

UNIT-1: Simple bending of Plates-Assumptions in thin plate theory-Different relationships-Different, Boundary Conditions for plates- Plates subjected to lateral loads – Navier’s method for simply supported plates – Levy’s method for general plates – Example problems with different types of loading.

UNIT-2: Circular plates subjected to Axi-symmetrical loads–concentrated load, uniformly distributed load and varying load – Annular circular plate with end moments.

UNIT-3: Rayleigh-Ritz method – Application to different problems – Finite difference method – Finite element methodology for plates-Orthotropic Plates

UNIT-4: Bending of anisotropic plates with emphasis on orthotropic plates – Material Orthotropy – Structural Orthotropy - Plates on elastic foundation.

UNIT-5: Shells- Classification of shells - Membrane and bending theory for singly curved and doubly curved shells - Various approximations - Analysis of folded plates

REFERENCES:

Rudolph Szilard, Theory and Analysis of Plates, Prentice Hall, New Jercey 1986.

SYLLABUS	(SEMESTER-VIII)								
Subject Code:	CE8TPE7C	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Repair and Rehabilitation of Structures	L	T	P	CT	MSE	TA	TOTAL	
		3	1	-	10	20	10	40	60

UNIT 1: Aging of structures – performance of structures – need for rehabilitation. Distress in concrete / steel structures – damage – source – cause – effects – case studies.

UNIT 2: Damage assessment and Evaluation models – Damage testing methods – NDT – Core samples.

UNIT 3: Rehabilitation methods – grouting – detailing – imbalance of structural stability – case studies.

UNIT 4: Methods of repairs – shotcreting – guniting – epoxy – cement mortar injection – crack ceiling.

UNIT 5: Repair and maintenance of buildings – IS standards – Bridge repairs – Seismic strengthening.

Reading:

1. Diagnosis and treatment of Structures in Distress – R N Raikar.
2. Bridge Rehabilitation – V K Raina.
3. Building Failures – Diagnosis and Avoidance – W H Ranson.
4. Forensic Engineering – Kenneth and Carper.

SYLLABUS	(SEMESTER-VIII)								
Subject Code:	CE8TPE7D	CREDITS: 4			SESSIONAL - TA				ESE
Subject:	Finite Element Analysis	L	T	P	CT	MSE	TA	TOTAL	
		3	1	-	10	20	10	40	60

UNIT 1: Matrix Methods of Structural Analysis – Review of concepts – Actions and displacements – compatibility – indeterminacy – Member and joint loads – Flexibility Matrix formulation - Stiffness Matrix formulation.

UNIT 2: Introduction to Finite Element Method – Background and general description of the method – summary of the analysis procedure.

UNIT 3: Theory of Finite element method – Concept of element – various elements shapes – displacement models – shape functions – isoparametric elements – formulation of element stiffness and loads – condensation of internal degrees of freedom.

UNIT 4: Overall problem – Assemblage of elements construction of stiffness matrix and loads – boundary conditions and solution of overall problem – Application to continuous beam – spring assemblage – stability of columns – curved beams and vibration problems - torsions of shafts.

UNIT 5: Generalization of FEM – Six step finite element procedures in general terms – application to structural engineering problems – analysis of plates, shells and frames.

Reading:

1. Finite element analysis, theory and Programming by CS Krishna Murthy.
2. Introduction to Finite element Method by TirupathichandraPatla and Belugundu.
3. Textbook of Finite Element Analysis, 1st Edition, PHI, 2009.

SYLLABUS	(SEMESTER-VIII)								
Subject Code:	CE8TPE7E	CREDITS: 4			SESSIONAL - TA				ESE
Subject:		L	T	P	CT	MSE	TA	TOTAL	
	Hydropower Engineering	3	1	-	10	20	10	40	60

UNIT 1: Stream flow analysis, Hydrograph, Mass curve, Runoff estimation methods, estimation of hydropower potential, flow duration curves, power duration curves, poundage and storage. Electrical load on hydro turbines, load curves, load duration curves, Performance factors.

UNIT 2: Types of hydropower plants, Storage power plant, Runoff River plant, Pumped storage plant, two unit and three unit arrangements, Reversible pump turbines, types of turbines, hydraulics of turbines, cavitation in turbine, efficiency of pumped storage plants.

UNIT 3: Intakes, losses in intakes, air entrainment at intake, inlet aeration, Water conveyance systems, fore bay, canals,

UNIT 4: Tunnels and Penstocks, classification of penstocks, design criteria of penstock, economical diameter of penstock, Anchor blocks, Conduit valves, types of valves, bends and manifolds.

UNIT 5 : Water hammer, resonance in penstocks, channel surges, Gates, Surge tanks, Power house layout, lighting and ventilation, variations in design of power house, underground power house, structural design of power house.

Reading:

1. Arora, K.R., Irrigation Water Power and Water Resources Engineering, Standard Book Company, Delhi, 2002
2. Dandekar, M.M., and Sharma, K.N., Water Power Engineering, Vikas Publishing Company, New Delhi, 2003
3. Garg, S.K., Irrigation Engineering and Hydraulic Structures, Khanna Publishers, 2009
4. Jog, M.G., Hydroelectric and Pumped Storage Plants, Wiley Eastern Ltd., New York, 1989.

SYLLABUS	(SEMESTER-VIII)							
Subject Code:	CE8TOE3X	CREDITS: 3			SESSIONAL - TA			
Subject:	Open Elective -3X	L	T	P	CT	MSE	TA	TOTAL
		3	-	-	10	20	10	40
Open Elective-3A or Open Elective-3B or Open Elective-3C or Open Elective-3D		Any one subject to be Selected from the Open Electives Group 3 (i.e. CE8TOE3A or CE8TOE3B or CE8TOE3C or CE8TOE3D)						
Open Electives Group 3								
CE8TOE3A		Management Information System						
CE8TOE3B		Enterprise Resource Planning						
CE8TOE3C		Engineering Risk-Benefit Analysis						
CE8TOE3D		Fluid Dynamics						

SYLLABUS	(SEMESTER-VIII)								
Subject Code:	CE8TOE3A	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Management Information System	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT 1: Management and System- Advance in management, the process of MIS development, MIAS organization, Information dynamics.

UNIT 2: Planning, Design and implementation of MIS, Strategic planning, MIS design- Group design concepts, Acquiring information system.

UNIT 3: System life cycle-Information flow, Entity relationship modelling, data modelling, detailed process analysis, data flow diagrams.

UNIT 4: Decision making system with MIS, System concepts for MIS.

UNIT 5: Data information and communication, problem solving and decision making, security, control and failure, Future trends in MIS.

TEXT BOOKS:

Management Information Systems, by S. Sadagopan, PHI Learning Pvt. Ltd

Management Information Systems By .Chatterjee, PHI Learning Pvt. Ltd

Management Information Systems (11th Edition), by Ken Laudon and Jane Laudon

SYLLABUS	(SEMESTER-VIII)								
Subject Code:	CE8TOE3B	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Enterprise Resource Planning	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT-1: Conceptual foundation of Business Process reengineering: Role of information Technology and BPR; Process improvement and Process redesign, Process identification and mapping; Role/Activity diagrams, Process Visioning, and benchmarking.

UNIT -2: Enterprise Resource Planning: Evolution of ERP- MRP and MRP II, structure of ERP- two tier architecture, three tier architecture, Electronic data processing, management information system, Executive information system, ERP as an integrator of information needs at various Levels.

UNIT -3: Typical Business Processes: Core processes, Product control, Sales order processing, Purchases, Administrative processes, Human resource, Finance support processes, Marketing, Strategic planning, Research and development, Problems in traditional view.

UNIT -4: ERP models/functionality: Sales order processing, Production scheduling, forecasting, distribution, finance, features of each of the models, description of data flow across each module, overview of supporting databases & packages.

UNIT -5: ERP implementation issues: Opportunities and problems in ERP selection, and implementation; ERP implementation: identifying ERP benefits, team formation, Consultant intervention, Selection of ERP, Process of ERP.

BOOKS:

V.K. GARG & N .K. VENKATKRISHNAN; ERP, Concepts and Practices, PM
Rahul V. Altekar, Enterprise wide Resource Planning-theory and practice, PHI

REFERENCES:

ALEXIS LEON: Enterprise Resource Planning, TMH S. SADAGOPAN: MIS,
PMV. RAJARAMAN: Analysis and Design of Information Systems, PHIMONK' & BRADY: Concepts in ERP, Vikas pub, Thomson

SYLLABUS	(SEMESTER-VIII)
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Subject Code:	CE8TOE3C	CREDITS: 3			SESSIONAL - TA				ESE
Subject:	Engineering Risk-Benefit Analysis	L	T	P	CT	MSE	TA	TOTAL	
		3	-	-	10	20	10	40	60

UNIT 1: Introduction- Knowledge and Ignorance, Information Uncertainty in Engineering Systems, Introduction and overview of class; definition of Engineering risk; overview of Engineering risk analysis. Risk Methods: Risk Terminology, Risk Assessment, Risk Management and Control, Risk Acceptance, Risk Communication, Identifying and structuring the Engineering risk problem; developing a deterministic or parametric model

UNIT 2: System Definition and Structure: System Definition Models, Hierarchical definitions of Systems, System Complexity. Reliability Assessment: Analytical Reliability Assessment, Empirical Reliability Analysis Using Life Data, Reliability Analysis of Systems

UNIT 3: Consequence Assessment-Types, Cause-Consequence Diagrams, Microeconomic Modelling, Value of Human Life, Flood Damages, and Consequence Propagation. Engineering Economics: Time Value of Money, Interest Models, Equivalence

UNIT 4: Decision Analysis: Risk Aversion, Risk Homeostasis, Influence Diagrams and Decision Trees, Discounting Procedures, Decision Criteria, Tradeoff Analysis, Repair and Maintenance Issues, Maintainability Analysis, Repair Analysis, Warranty Analysis, Insurance Models

UNIT 5: Data Needs for Risk Studies: Elicitation Methods of Expert Opinions, Guidance

Text Books:

1. Risk Analysis in Engineering and Economics, B. M. Ayyub, Chapman-Hall/CRC Press, 2003.

Reference Books:

1. Probability, Statistics, and Reliability for Engineers and Scientists, Ayyub&McCuen, 2003.

2. Probabilistic Risk Assessment and Management for Engineers and Scientists, by H. Kumamoto and E. J. Henley, Second Edition, IEEE Press, NY, 1996.

3. Bedford, T. and Cooke, R. Probabilistic Risk Analysis: Foundations and Methods. New York: Cambridge University Press, 2001.

4. Normal Accidents, Living with High-Risk Technologies, C. Perrow, Princeton University Press, 1999.

5. Accident Precursor Analysis and Management - Reducing Technological Risk Through Diligence, National Academy of Engineering, the National Academies Press, Washington, DC, 2004.

SYLLABUS	(SEMESTER-VIII)								
Subject Code:	CE8TOE3D	CREDITS: 3			SESSIONAL - TA				ESE
Subject:		L	T	P	CT	MSE	TA	TOTAL	
	Fluid Dynamics	3	-	-	10	20	10	40	60

UNIT 1: Introduction & overview of Fluid Dynamics, units and basic flow concepts. Continuums, velocity fields, viscosity, classifications of fluids. Fluid statics, hydrostatic forces on surfaces, rigid body motion, Pressure measurements.

UNIT 2: Incompressible potential flow, Bernoulli's equation, Flow metering. Introduction to differential approach to flow analysis, Stream functions, Material Derivative, Reynolds Transport Theorem

UNIT 3: Integral approach to flow analysis, control volume concepts, Conservation of mass, momentum and energy, applications. Differential approach to flow analysis, continuity, momentum and energy equations.

UNIT 4: Overview of dimensional analysis, basic equations in non-dimensional form. Introduction to viscous flow in conduits, Moody diagrams, Minor losses, analysis of piping networks, flow metering.

UNIT 5: External incompressible viscous flow, boundary layers, Lift and drag forces. Introduction to compressible flow, speed of sound, isentropic stagnation properties, isentropic flows, normal shock waves,

Text Books:

Fundamental of Fluid Mechanics" by Munson, Young and Okiishi, 5th edition.

SYLLABUS	(SEMESTER-VIII)							
Subject Code:	CE8LPS03	CREDITS: 8			SESSIONAL - TA			ESE
Subject:	Major Project	L	T	P	IA	TOTAL		
		-	-	15	120	120		80

SYLLABUS	(SEMESTER-VIII)								
Subject Code:	CE8LPC07	CREDITS: 2			SESSIONAL - TA				ESE
Subject:	Structural Detailing Lab	L	T	P	CT	MSE	TA	TOTAL	
		-	-	3	-	-	30	30	20

Part A: (Steel Structures)

1. Detailing of Tension Members.
2. Detailing of Built up Compression Members.
3. Detailing of Column Bases.
4. Detailing of connections.
5. Detailing of an Industrial shed.
6. Detailing of a Plate girder/Gantry girder.

Part B: (Reinforced Concrete Structures)

1. Details of reinforcement in RCC Continuous Beams.
2. Details of reinforcement for RCC column with isolated footings.
3. Details of reinforcement in a one way/two way slabs.
4. Details of reinforcement in stair cases.
5. Detailing of Combined footings.
6. Detailing of Retaining walls/Water Tanks.

CODE OF CONDUCT FOR STUDENTS

CODE OF CONDUCT FOR STUDENTS

The students are admitted to Guru Ghasidas Vishwavidyalaya to achieve excellence and shape their character to become responsible citizens. They must realize their responsibility towards the Vishwavidyalaya and to its components like faculty, staff and fellow students. Failure to maintain a good standard of conduct shall result in disciplinary action.

Attendance: 75% attendance is compulsory in each subject.

Misconduct: Any of the following activities (but not limited to these only) will be treated as misconduct.

1. Disruption of teaching activities or disturbing the learning process of other students on the campus.
2. Any act on the part of the students, which disrupts functioning of the university, endangers health and safety of campus residents and damages Vishwavidyalaya properties.
3. Cheating in examination and supplying of false documents / information in order to seek any consideration / favour from the University.
4. Possession or consumption of intoxicating beverages on the campus.
5. Failure to return back loaned material, settle University dues.
6. Possession of weapons.
7. Use of unparliamentarily language while in conversation with Vishwavidyalaya Staff and fellow students.

Disciplinary Actions:

Failure to adhere to good conduct may result in disciplinary actions like:

1. A warning by the authorities.
2. Suspension from a particular class.
3. Suspension / expulsion from the University.
4. Suspension of campus privileges e.g. hostel, accommodation etc.
5. Withholding of examination result or withdrawal of awarded diploma / degree certificate.
6. Any other disciplinary action deemed appropriate by the University authorities.

ABOUT RAGGING

ABOUT RAGGING

UGC DRAFT REGULATIONS ON CURBING THE MENACE OF RAGGING IN HIGHER EDUCATIONAL INSTITUTIONS, 2009

In exercise of the power conferred by Clause (g) of Sub-Section (1) of Section 26 of the University Grants Commission Act, 1956, the University Grants Commission hereby makes the following Regulations, namely-

1. Title, commencement and applicability:-

- 1.1. These regulations shall be called the “UGC Regulations on Curbing the Menace of Ragging in Higher Educational Institutions, 2009”.
- 1.2. They shall come into force with immediate effect.
- 1.3. They shall apply to all the universities established or incorporated by or under a Central Act, a Provincial Act or a State Act, to all institutions deemed to be university under Section 3 of the UGC Act, 1956, to all other higher educational institutions, including the departments, constituent units and all the premises (academic, residential, sports, canteen, etc) of such universities, deemed universities and other higher educational institutions, whether located within the campus or outside, and to all means of transportation of students whether public or private.

2. Objective:-

To root out ragging in all its forms from universities, colleges and other educational institutions in the country by prohibiting it by law, preventing its occurrence by following the provisions of these Regulations and punishing those who indulge in ragging in spite of prohibition and prevention as provided for in these Regulations and the appropriate law in force.

3. Definitions:-

For the purposes of these Regulations:-

- 3.1 “college” means any institution, whether known as such or by any other name, which provides for a programme of study beyond 12 years of schooling for obtaining any qualification from a university and which, in accordance with the rules and regulations of such university, is recognized as competent to provide for such programmes of study and present students undergoing such programmes of study for the examination for the award of such qualification.
- 3.2 “Head of the institution” means the ‘Vice-Chancellor’ in case of a university/deemed to be university, ‘Principal’ in case of a college, ‘Director’ in case of an institute.
- 3.3 “institution” means a higher educational institution (HEI), like a university, a college, an institute, etc. imparting higher education beyond 12 years of schooling leading to a degree (graduate, postgraduate and/or higher level).
- 3.4 Ragging” means the following: Any disorderly conduct whether by words spoken or written or by an act which has the effect of teasing, treating or handling with rudeness any other student, indulging in rowdy or undisciplined activities which causes or is likely to cause annoyance, hardship or psychological harm or to raise fear or apprehension thereof in a fresher or a junior student or asking the students to do any act or perform something which such student will not in the ordinary course and which has the effect of causing or generating a sense of shame or embarrassment so as to adversely affect the physique or psyche of a fresher or a junior student.

3.5 "University" means a university established or incorporated by or under a Central Act, a Provincial Act or a State Act, an institution deemed to be university under Section 3 of the UGC Act, 1956, or an institution specially empowered by an Act of Parliament to confer or grant degrees

4 Punishable ingredients of Ragging:-

- Abetment to ragging;
- Criminal conspiracy to rag;
- Unlawful assembly and rioting while ragging;
- Public nuisance created during ragging;
- Violation of decency and morals through ragging;
- Injury to body, causing hurt or grievous hurt;
- Wrongful restraint;
- Wrongful confinement;
- Use of criminal force;
- Assault as well as sexual offences or even unnatural offences;
- Extortion;
- Criminal trespass;
- Offences against property;
- Criminal intimidation;
- Attempts to commit any or all of the above mentioned offences against the victim(s);
- All other offences following from the definition of "Ragging".

5 Measures for prohibition of ragging at the institution level:-

- 5.1 The institution shall strictly observe the provisions of the Act of the Central Government and the State Governments, if any, or if enacted, considering ragging as a cognizable offence under the law on a par with rape and other atrocities against women and ill-treatment of persons belonging to the SC/ST, and prohibiting ragging in all its forms in all institutions.
- 5.2 Ragging in all its forms shall be totally banned in the entire institution, including its departments, constituent units, all its premises (academic, residential, sports, canteen, etc) whether located within the campus or outside and in all means of transportation of students whether public or private.
- 5.3 The institution shall take strict action against those found guilty of ragging and/or of abetting ragging.

6 Measures for prevention of ragging at the institution level:-

6.1 Before admissions:-

- 6.1.1 The advertisement for admissions shall clearly mention that ragging is totally banned in the institution, and anyone found guilty of ragging and/or abetting ragging is liable to be punished Appropriately (for punishments, ref. section 8 below).
- 6.1.2 The brochure of admission/instruction booklet for candidates shall print in block letters these Regulations in full (including Annexures).
- 6.1.3 The 'Prospectus' and other admission related documents shall incorporate all directions of the Supreme Court and / or the Central or State Governments as applicable, so that the candidates and their parents/ guardians are sensitized in respect of the prohibition

and consequences of ragging. If the institution is an affiliating university, it shall make it mandatory for the institutions under it to compulsorily incorporate such information in their 'Prospectus'.

- 6.1.4 The application form for admission/ enrolment shall have a printed undertaking, preferably both in English/Hindi and in one of the regional languages known to the institution and the applicant (English version given in Annexure I, Part I), to be filled up and signed by the candidate to the effect that he/she is aware of the law regarding prohibition of ragging as well as the punishments, and that he/she, if found guilty of the offence of ragging and/or abetting ragging, is liable to be punished appropriately.
- 6.1.5 The application form shall also contain printed undertaking, preferably both in English/Hindi and in one of the regional languages known to the institution and the parent/ guardian (English version given in Annexure I, Part II), to be signed by the parent/ guardian of the applicant to the effect that he/ she is also aware of the law in this regard and agrees to abide by the punishment meted out to his/her ward in case the latter is found guilty of ragging and/or abetting ragging.
- 6.1.6 The application for admission shall be accompanied by a document in respect of the School Leaving Certificate/ Character Certificate which shall include a report on the behavioral pattern of the applicant, so that the institution can thereafter keep intense watch upon a student who has a negative entry in this regard.
- 6.1.7 A student seeking admission to the hostel shall have to submit another undertaking in the form of Annexure I (both Parts) along with his/ her application for hostel accommodation.
- 6.1.8. At the commencement of the academic session the Head of the Institution shall convene and address a meeting of various functionaries/agencies, like Wardens, representatives of students, parents/ guardians, faculty, district administration including police, to discuss the measures to be taken to prevent ragging in the Institution and steps to be taken to identify the offenders and punish them suitably.
- 6.1.9. To make the community at large and the students in particular aware of the dehumanizing effect of ragging, and the approach of the institution towards those indulging in ragging, big posters (preferably multicolored with different colours for the provisions of law, punishments, etc.) shall be prominently displayed on all Notice Boards of all departments, hostels and other buildings as well as at vulnerable places. Some of such posters shall be of permanent nature in certain vulnerable places.
- 6.1.10 The institution shall request the media to give adequate publicity to the law prohibiting ragging and the negative aspects of ragging and the institution's resolve to ban ragging and punish those found guilty without fear or favour.
- 6.1.11 The institution shall identify, properly illuminate and man all vulnerable locations.
- 6.1.12 The institution shall tighten security in its premises, especially at the vulnerable places. If necessary, intense policing shall be resorted to at such points at odd hours during the early months of the academic session.
- 6.1.13 The institution shall utilize the vacation period before the start of the new academic year to launch wide publicity campaign against ragging through posters, leaflets, seminars, street plays, etc.
- 6.1.14 The faculties/ departments/ units of the institution shall have induction arrangements (including those which anticipate, identify and plan to meet any special needs of any

specific section of students) in place well in advance of the beginning of the academic year with a clear sense of the main aims and objectives of the induction process.

6.2 On admission:-

- 6.2.1 Every fresher admitted to the institution shall be given a printed leaflet detailing when and to whom he/she has to turn to for help and guidance for various purposes (including Wardens, Head of the institution, members of the anti-ragging committees, relevant district and police authorities), addresses and telephone numbers of such persons/ authorities, etc., so that the fresher need not look up to the seniors for help in such matters and get indebted to them and start doing things, right or wrong, at their behest. Such a step will reduce the freshers' dependence on their seniors .
- 6.2.2 The institution through the leaflet mentioned above shall explain to the new entrants the arrangements for their induction and orientation which promote efficient and effective means of integrating them fully as students.
- 6.2.3 The leaflet mentioned above shall also tell the freshers about their rights as bona fide students of the institution and clearly instructing them that they should desist from doing anything against their will even if ordered by the seniors, and that they have nothing to fear as the institution cares for them and shall not tolerate any atrocities against them.
- 6.2.4 The leaflet mentioned above shall contain a calendar of events and activities laid down by the institution to facilitate and complement familiarization of juniors with the academic environment of the institution.
- 6.2.5 The institution shall also organize joint sensitization programmes of 'freshers' and seniors.
- 6.2.6 Freshers shall be encouraged to report incidents of ragging, either as victims, or even as witnesses.

6.3 At the end of the academic year:-

- 6.3.1 At the end of every academic year the Vice-Chancellor/ Dean of Students Welfare/ Director/ Principal shall send a letter to the parents/ guardians who are completing the first year informing them about the law regarding ragging and the punishments, and appealing to them to impress upon their wards to desist from indulging in ragging when they come back at the beginning of the next academic session.
- 6.3.2 At the end of every academic year the institution shall form a 'Mentoring Cell' consisting of Mentors for the succeeding academic year. There shall be as many levels or tiers of Mentors as the number of batches in the institution, at the rate of 1 Mentor for 10 freshers and 1 Mentor of a higher level for 10 Mentors of the lower level.

6.4 Setting up of Committees and their functions:-

- 6.4.1 The Anti-Ragging Committee:- The Anti-Ragging Committee shall be headed by the Head of the institution and shall consist of representatives of faculty members, parents, students belonging to the freshers' category as well as seniors and non-teaching staff. It shall consider the recommendations of the Anti-Ragging Squad and take appropriate decisions, including spelling out suitable punishments to those found guilty.
- 6.4.2 The Anti-Ragging Squad:- The Anti-Ragging Squad shall be nominated by the Head of the institution with such representation as considered necessary and shall consist of members belonging to the various sections of the campus community. The Squad will have vigil, oversight and patrolling functions. It shall be kept mobile, alert and active at all times and shall be empowered to inspect places of potential ragging and make surprise raids on hostels and other hot spots. The Squad shall investigate incidents of ragging and make

recommendations to the Anti-Ragging Committee and shall work under the overall guidance of the said Committee.

6.4.3 Monitoring Cell on Ragging:- If the institution is an affiliating university, it shall have a Monitoring Cell on Ragging to coordinate with the institutions affiliated to it by calling for reports from the Heads of such institutions regarding the activities of the Anti-Ragging Committees, Squads, and Mentoring Cells, regarding compliance with the instructions on conducting orientation programmes, counseling sessions, etc., and regarding the incidents of ragging, the problems faced by wardens and other officials, etc. This Cell shall also review the efforts made by such institutions to publicize anti-ragging measures, cross-verify the receipt of undertakings from candidates/students and their parents/guardians every year, and shall be the prime mover for initiating action by the university authorities to suitably amend the Statutes or Ordinances or Bye-laws to facilitate the implementation of anti-ragging measures at the level of the institution.

6.5 Other measures:-

6.5.1 The Annexure mentioned in 6.1.4, 6.1.5 and 6.1.7 shall be furnished at the beginning of each academic year by every student, that is, by freshers as well as seniors.

6.5.2 The institution shall arrange for regular and periodic psychological counseling and orientation for students (for freshers separately, as well as jointly with seniors) by professional counselors during the first three months of the new academic year. This shall be done at the institution and department/ course levels. Parents and teachers shall also be involved in such sessions.

6.5.3 Apart from placing posters mentioned in 6.1.9 above at strategic places, the institution shall undertake measures for extensive publicity against ragging by means of audio-visual aids, by holding counseling sessions, workshops, painting and design competitions among students and other methods as it deems fit.

6.5.4 If the institution has B.Ed. and other Teacher training programmes, these courses shall be mandated to provide for anti-ragging and the relevant human rights appreciation inputs, as well as topics on sensitization against corporal punishments and checking of bullying amongst students, so that every teacher is equipped to handle at least the rudiments of the counseling approach.

6.5.5 Wardens shall be appointed as per the eligibility criteria laid down for the post reflecting both the command and control aspects of maintaining discipline, as well as the softer skills of counseling and communicating with the youth outside the class-room situations. Wardens shall be accessible at all hours and shall be provided with mobile phones. The institution shall review and suitably enhance the powers and perquisites of Wardens and authorities involved in curbing the menace of ragging.

6.5.6 The security personnel posted in hostels shall be under the direct control of the Wardens and assessed by them.

6.5.7 Private commercially managed lodges and hostels shall be registered with the local police authorities, and this shall be done necessarily on the recommendation of the Head of the institution. Local police, local administration and the institutional authorities shall ensure vigil on incidents that may come within the definition of ragging and shall be responsible for action in the event of ragging in such premises, just as they would be for incidents within the campus. Managements of such private hostels shall be responsible for not reporting cases of ragging in their premises.

- 6.5.8 The Head of the institution shall take immediate action on receipt of the recommendations of the Anti-Ragging Squad. He/ She shall also take action suo motto if the circumstances so warrant.
- 6.5.9 Freshers who do not report the incidents of ragging either as victims or as witnesses shall also be punished suitably.
- 6.5.10 Anonymous random surveys shall be conducted across the 1st year batch of students (freshers) every fortnight during the first three months of the academic year to verify and cross-check whether the campus is indeed free of ragging or not. The institution may design its own methodology of conducting such surveys.
- 6.5.11 The burden of proof shall lie on the perpetrator of ragging and not on the victim.
- 6.5.12 The institution shall file an FIR with the police / local authorities whenever a case of ragging is reported, but continue with its own enquiry and other measures without waiting for action on the part of the police/ local civil authorities. Remedial action shall be initiated and completed within the one week of the incident itself.
- 6.5.13 The Migration / Transfer Certificate issued to the student by the institution shall have an entry, apart from those relating to general conduct and behaviour, whether the student has been punished for the offence of committing or abetting ragging, or not, as also whether the student has displayed persistent violent or aggressive behaviour or any desire to harm others.
- 6.5.14 Preventing or acting against ragging shall be the collective responsibility of all levels and sections of authorities or functionaries in the institution, including faculty, and not merely that of the specific body/ committee constituted for prevention of ragging.
- 6.5.15 The Heads of institutions other than universities shall submit weekly reports to the Vice-chancellor of the university the institution is affiliated to or recognized by, during the first three months of new academic year and thereafter each month on the status of compliance with anti-ragging measures. The Vice Chancellor of each university shall submit fortnightly reports of the university, including those of the Monitoring Cell on Ragging in case of an affiliating university, to the Chancellor.
- 6.5.16 Access to mobile phones and public phones shall be unrestricted in hostels and campuses, except in class-rooms, seminar halls, library etc. where jammers shall be installed to restrict the use of mobile phones.

6.6 Measures for encouraging healthy interaction between freshers and seniors:-

- 6.6.1 The institution shall set up appropriate committees including the course-in-charge, student advisor, Warden and some senior students to actively monitor, promote and regulate healthy interaction between the fresher's and senior students.
- 6.6.2 Freshers' welcome parties shall be organized in each department by the senior students and the faculty together soon after admissions, preferably within the first two weeks of the beginning of the academic session, for proper introduction to one another and where the talents of the freshers are brought out properly in the presence of the faculty, thus helping them to shed their inferiority complex, if any, and remove their inhibitions.
- 6.6.3 The institution shall enhance the student-faculty interaction by involving the students in all matters of the institution, except those relating to the actual processes of evaluation and of faculty appointments, so that the students shall feel that they are responsible partners in managing the affairs of the institution and consequently the credit due to the institution for good work/ performance is due to them as well.

6.7 Measures at the UGC/ Statutory/ Regulatory bodies' level:-

- 6.7.1 The UGC and other Statutory /Regulatory bodies shall make it mandatory for the institutions to compulsorily incorporate in their 'Prospectus' the directions of the Supreme Court and/or the Central or State Governments with regard to prohibition and consequences of ragging, and that noncompliance with the directives against ragging in any manner whatsoever shall be considered as lowering of academic standards by the erring institution making it liable for appropriate action.
- 6.7.2 The UGC (including NAAC and UGC Expert Committees visiting institutions for various purposes) and similar Committees of other Statutory/Regulatory bodies shall cross-verify that the institutions strictly comply with the requirement of getting the undertakings from the students and their parents/ guardians as envisaged under these Regulations.
- 6.7.3 The UGC and other funding bodies shall make it one of the conditions in the Utilization Certificate for sanctioning any financial assistance or aid to the institution under any of the general or special schemes that the institution has strictly complied with the anti-ragging measures and has a blemish less record in terms of there being no incidents of ragging during the period pertaining to the Utilization Certificate.
- 6.7.4 The NAAC and other accrediting bodies shall factor in any incident of ragging in the institution while assessing the institution in different grades.
- 6.7.5 The UGC shall constitute a Board for Coordination consisting of representatives of the AICTE, the IITs, the NITs, the IIMs, the MCI, the DCI, the NCI, the ICAR and such other bodies which have to deal with higher education to coordinate and monitor the anti-ragging movement across the country and to make certain policy decisions. The said Board shall meet once in a year in the normal course.
- 6.7.6 The UGC shall have an Anti-Ragging Cell within the Commission as an institutional mechanism to provide secretarial support for collection of information and monitoring, and to coordinate with the State level and university level Committees for effective implementation of anti-ragging measures.
- 6.7.7 If an institution fails to curb ragging, the UGC/ the Statutory/ Regulatory body concerned may stop financial assistance to such an institution or take such action within its powers as it may deem fit and impose such other penalties as provided till such time as the institution achieves the objective of curbing ragging.

7 Incentives for curbing ragging:-

- 7.1 The UGC shall consider providing special/ additional annual financial grants-in-aid to those eligible institutions which report a blemish-less record in terms of there being no incidents of ragging.
- 7.2 The UGC shall also consider instituting another category of financial awards or incentives for those eligible institutions which take stringent action against those responsible for incidents of ragging.
- 7.3 The UGC shall lay down the necessary incentive for the post of Warden in order to attract the right type of eligible candidates, and motivate the incumbent.

8 Punishments:-

8.1At the institution level:

Depending upon the nature and gravity of the offence as established by the Anti-Ragging Committee of the institution, the possible punishments for those found guilty of ragging at the institution level shall be any one or any combination of the following:

- 8.1.1 Cancellation of admission
- 8.1.2 Suspension from attending classes
- 8.1.3 Withholding/ withdrawing scholarship/ fellowship and other benefits
- 8.1.4 Debarring from appearing in any test/ examination or other evaluation process
- 8.1.5 Withholding results
- 8.1.6 Debarring from representing the institution in any regional, national or international meet, tournament, youth festival, etc.
- 8.1.7 Suspension/ expulsion from the hostel
- 8.1.8 Rustication from the institution for period ranging from 1 to 4 semesters
- 8.1.9 Expulsion from the institution and consequent debarring from admission to any other institution
- 8.1.10 Fine of Rupees 25,000/-
- 8.1.11 Collective punishment: When the persons committing or abetting the crime of ragging are not identified, the institution shall resort to collective punishment as a deterrent to ensure community pressure on the potential raggers.

8.2 At the university level in respect of institutions under it:

If an institution under a university (being constituent of, affiliated to or recognized by it) fails to comply with any of the provisions of these Regulations and fails to curb ragging effectively, the university may impose any or all of the following penalties on it:

- 8.2.1 Withdrawal of affiliation/ recognition or other privileges conferred on it
- 8.2.2 Prohibiting such institution from presenting any students then undergoing any programme of study therein for the award of any degree/diploma of the university
- 8.2.3 Withholding any grants allocated to it by the university
- 8.2.4 Any other appropriate penalty within the powers of the university.

8.3 At the UGC level:

If an institution fails to curb ragging, the UGC may impose any or all of the following penalties on it:

- 8.3.1 Delisting the institution from section 2(f) and /or section 12B of the UGC Act
- 8.3.2 Withholding any grants allocated to it
- 8.3.3 Declaring institutions which are not covered under section 2(f) and or 12B as ineligible for any assistance like that for Major/ Minor Research Project, etc.
- 8.3.4 Declaring the institution ineligible for consideration under any of the special assistance programmes like CPE (College with potential for Excellence), UPE (University with Potential for Excellence) CPEPA (Centre with Potential for Excellence in a Particular Area), etc.
- 8.3.5 Declaring that the institution does not have the minimum academic standards and warning the potential candidates for admission accordingly through public notice and posting on the UGC Website.

**DISCIPLINE AMONG STUDENTS
IN
UNIVERSITY EXAMINATIONS**

DISCIPLINE AMONG STUDENTS IN UNIVERSITY EXAMINATIONS

I UNIVERSITY END SEMESTER EXAMINATIONS

1. The end –semester examination shall be held under the general supervision of the Head of Department by the faculty member concerned. He/she shall be responsible for the fair and orderly conduct of the examination
2. In case of detection of unfair means (as specified in clause 1 of General Guidelines below), the same shall be brought to the notice of the head of the department concerned for further action specified under clause 5 of the General Guidelines below

II ENTRANCE EXAMINATIONS

1. During an entrance examination the candidates shall be under the disciplinary control of the chief Superintendent of the centre who shall issue the necessary instructions. If a candidate disobeys instructions or misbehaves with any member of the supervisory staff or with any of the invigilators at the centre, he/she may be expelled from the examination for that session.
2. The Chief Superintendent shall immediately report the facts of such a case with full details of evidence to the Controller of Examinations who will refer the matter to the Examination Discipline Committee in terms of clause 4 of General Guidelines below. The committee will make recommendations for disciplinary action as it may deem fit to the Vice-Chancellor as provided under clause 7
3. Everybody, before an examination begins, the invigilators shall call upon all the candidates to search their persons, tables, desks, etc. and ask them to hand over all papers, books, notes or other reference material which they are not allowed to have in their possession or accessible to them in the examination hall. Where a late-comer is admitted this warning shall be repeated to him at the time of entrance to the examination hall. They are also to see that each candidate has his/her identification card and hall ticket with him/her.

III GENERAL GUIDELINES

1. Use of Unfair means:

A candidate shall not use means in connection with any examination. The following shall be deemed to unfair means:

- a. Found in possession of incriminating material related/unrelated to the subject of the examination concerned.
- b. Found copying either from the possessed material or from a neighbor.
- c. Inter-changing of answer scripts.
- d. Change of seat for copying.
- e. Trying to help others candidates.
- f. Found consulting neighbours
- g. Exchange of answer sheets or relevant materials.
- h. Writing some other candidate's register number in the main answer paper.
- i. Insertion of pre-written answer sheets (Main sheets or Additional sheets)
- j. Threatening the invigilator or insubordinate behavior as reported by the Chief Superintendent and / or Hall Superintendent.
- k. Consulting the invigilator for answering the questions in the examination.

I. Cases of impersonation

m. Mass copying

n. Using electronic devices for the purpose of malpractice.

The Executive Council may declare any other act of omission or commission to be unfair means in respect of any or all the examination.

2. If the Vice-Chancellor is satisfied that there has been mass-scale copying or use of unfair means on a mass-scale at particular center(s), he may cancel the examination of all the candidates concerned and order re-examination.

3. Where the invigilator incharge is satisfied that one third (1/3) or more students were involved in using unfair-means or copying in a particular Examination Hall. It shall be deemed to be a case of mass copying.

a) The Chief Superintendent of the examination centre shall report to the Controller of Examinations without delay and on the day of the occurrence if possible, each case where use of unfair means in the examination is suspected or discovered with full details of the evidence in support thereof and the statement of the candidate concerned, if any, on the forms supplied by the Controller of Examination for the purpose.

b) A candidate shall not be forced to give a statement but the fact of his /her having refused to make a statement shall be recorded by the Chief Superintendent and shall be got attested by two other members of the supervisory staff on duty at the time of occurrence of the incident.

c) A candidate detected or suspected of using unfair means in the examination may be permitted to answer the question paper, but on separate answer-book. The answer-book in which the use of unfair means is suspected shall be seized by the Chief Superintendent, who shall send both the answer-books to the Controller of Examination with his report. This will not affect the concerned candidate appearing in the rest of the examinations.

d) All cases of use of unfair means shall be reported immediately to the Controller of the Examination by the Centre Superintendent, examiner, paper-setter, evaluator, moderator, tabulator or the person connected with the University examination as the case may be, with all the relevant material.

4. Examination Discipline Committee

a) All the cases of alleged use of unfair means shall be referred to a committee called the Examination Discipline Committee to be appointed by the Vice-Chancellor.

b) The Committee shall consist of five members drawn from amongst the teachers and officers of the university. One member will be nominated as Chairman from amongst them by the Vice Chancellor.

c) A member shall be appointed for a term of two years, and shall be eligible for re-appointment.

d) Three members present shall constitute the quorum.

e) Ordinarily, all decisions shall be taken by the Committee by simple majority. If the members cannot reach a consensus, the case shall be referred to the Vice-Chancellor, whose decision shall be final.

- f) All decisions taken by the examination discipline committee will be placed before the Vice-Chancellor for approval
- g) A candidate within one month of the receipt of the decision of the university may appeal to the Vice-Chancellor, in writing for a review of the case. If the Vice-Chancellor is satisfied that the representation merits consideration, he/she may refer the case back to the Examination Discipline Committee for reconsideration.

5 The Examination Discipline Committee may recommend one of the following punishments for cases of unfair means

Nature of unfair means	Scale of Punishment
If the candidate has used unfair means specified in sub-clause (a) to (g) of clause 3	Cancel all the University Examinations registered by the candidate in that session.
If the candidate has repeated the unfair means shown at 3(a) to (g) a second time	Cancel the University Examination of all subjects registered by the candidate in that session and debar him/her for the next examination session (i.e. all university Examinations in the subsequent session)
If the candidate has repeated the unfair means shown at 3(a) to (g) third time	Cancel the University Examination of all subjects registered by the candidate for that session and debar him/her for two years from registering and appearing for the university Examination
If the candidate has used unfair means specified in sub-clause (h) of clause	Cancel the University Examination of all subjects registered by the candidate during that semester only.
If the candidate has used unfair means specified in sub-clause (i) of clause	Cancel the University Examination of all subjects registered by the candidate for that session and debar him/her for two subsequent Examination sessions.
If the candidate has used unfair means specified in sub-clause (j) of clause 3	Cancel the University Examination of all subjects registered by the candidate for that session and debar him/her for two years from registering and appearing for the university Examination
If the candidate has used unfair means specified in sub-clause (k) of clause	Cancel the University Examination of all subjects registered by the candidate for that session
If the candidate has used unfair means specified in sub-clause (l) of clause	Cancel the University Examination of all subjects registered by the candidate for that session and debar him/her for two years from registering and appearing for the examination sessions. Moreover, relevant legal action shall be initiated if an outsider is involved.
If the candidate used unfair means in sub-clause (m) of clause 3	ix) a) In the single Hall: Cancel the relevant examination taken by the students of that Hall. Debar the concerned Hall superintendent and other involved directly or

indirectly from the examination work such as invigilation, question paper-setting, valuation, etc. for the next six examination sessions.

b) In a Centre: Cancel the relevant examination taken by the students of the center. Debar the Hall Superintendents and the Chief Superintendent and other involved directly or indirectly from the examination work such as invigilation, question paper-setting, valuation, etc. for the next six examination sessions and cancel the examination center for two years

Contact Details of Staff And Faculty Members of Civil Engineering Department

S. No.	POSITION	NAME	Mobile No.
1	Professor	Dr. Shailendra Kumar	09806846850
2	Associate Professor & Head	Dr. M. Chakradhara Rao	09039522447
3	Assistant Professor	Mr. R.K. Choubey	09630526842
4	Assistant Professor	Mr. Nikhil Kumar Verma	09752652969
5	Assistant Professor	Mr. Ashish Kumar Parashar	09425502572
6	Assistant Professor	Dr. V V S Surya Kumar Dadi	09039545982
7	Assistant Professor(Adhoc)	Mr. Ankit Jain	08130561635
8	Assistant Professor(Adhoc)	Mr. Rochak Pandey	09630463707

Staff Members of Civil Engg.

S. No.	POSITION	NAME	Mobile No.
1	Office Assistant	Mr. S. D Awasthi	09827175324
2	Juniour Office Assistant	Mr. Prakash Soni	09424147123
3	Technical Assistant	Mr. M M S. Koshe	09827991489
4	Lab Attendant	Mr. Shoab singh Masram	09575042578
5	M.T.S	Mr. Laxminarayan Pandey	08717912148

Other Useful Numbers

S. No.	POSITION		PHONE NO.
1	Police Station, Koni		07752-260039
2	Post Office, Koni		07752-260032
3	Punjab National Bank, Koni		07752-260034

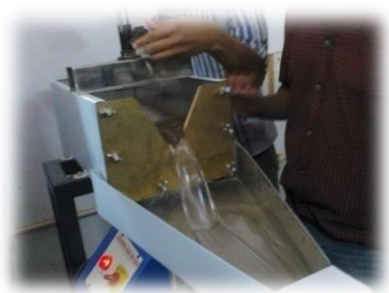
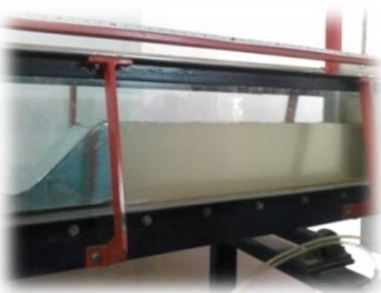
Important Contact Details

S. No.	POSITION	NAME	Mb. No. / PHONE NO. (07752)
1	Vice Chancellor	Prof. Anjila Gupta	07752-260283, 07752-260353
2	Registrar (Acting)	Prof. Prof. B. N. Tiwary	07752-260209
3	Assistant Registrar (Academic & Exam)	Mr. T.P. Singh	07752-260342
4	Assistant Registrar (Administration, RTI Cell)	Mr. Abhideep Tiwari	07752-260017
5	Controller of Exam	Dr. A. S. Randive	07752-260044
6	Dean Student Welfare (DSW)	Dr. M.N.Tripathi	07752-260204
7	Chief Proctor	Prof. V.S.Rathore	7587472651
8	Chief, Warden Hostel	Prof. S. S. Singh	094241-63260
9	Dean, School of Studies in Engineering & Technology	Prof. Mukesh Kumar singh	07752-260453
10	HOD (Civil Engineering)	Dr. M. Chakradhara Rao	07752-260429
11	HOD (Computer Science and Engineering)	Shri. Nishant Behar	07752-260456
12	HOD (Information Technology)	Shri. Santosh Kumar Soni	07752-260454
13	HOD (Electronics & Comm. Engg.)	Shri. Nipun Kumar Mishra	07752-260458
14	HOD (Industrial & Prod. Engg.)	Smt. Arpita Roy Choudhary	07752-260453
15	HOD (Chemical Engineering)	Prof. S.N. Saha	07752-260457
16	HOD (Mechanical Engineering)	Dr. Rajesh Kumar Bhushan	086024-03633
17	Adm. warden , Girl's Hostel	Dr. Manisha Dubey	07752-260412 09479227 600
18	Warden-1, Girl's Hostel	Dr, Arti Srivastava	07587 4488'0
19	Warden-2, Girl's Hostel	Dr, Alka Mishra	0940767831
20	Warden-3, Girl's Hostel	Dr. Somadas	07587195566
21	Warden.4 Girl's hostel	Dr. Namita Shar:ma	081035338
22	Matron- 1, Girl's Hostel	Ms. Geeta Sahu	08234003308 Girls Hostel office 07752-260462
23	Matron- 2, Girl's Hostel	Mrs. Janaki Sahu	09009146267
24	Warden -1 (Resident warden S.V.B.H) Boy's Hostel	Mr. Murali Manohar Singh	8602413983, 07752-260466
25	Warden - 2 Boy's Hostel (S.V.B.H)	Mr. Abhishek Awasthi	094252-30525, 07752-260466

26	Warden - 2 Boy's Hostel (S.V.B.H)	Dr. M. S .Dhapola	9425340051 07752-260466
27	Warden - 3 Boy's Hostel (S.V.B.H)	Dr. Jagdish Singh	7587312673 07752-260466
28	Warden - 4 Boy's Hostel (S.V.B.H)	Dr. Prashant Jangde	9098116702 07752-260466
29	Warden-1 (B. H. Type-IV)	Dr. VVS Surya Kr. Dadi	9039545982 07752-213203 07752-213204
30	Warden-2(B. H. Type-IV)	Mr. Santhosh Kumar Soni	8871140312 07752-213203 07752-213204
31	S. V. Boy's Hostel Office	--	07752-260466
32	S.V. Boy's Hostel Main Gate	--	07752-260479
33	Medical doctor	Dr. A. Mandal	094255-46165 07752-260427
34	Health Centre University -	---	07752-260427
35	University Guest House	---	07752-260024
36	Training and Placement officer	Mr. Premnath Kamlesh	09479218765
37	University Engineer	Er. Laxmikant Jaiswal	07752-260491, 093017-85608
38	SC / ST Cell	Mr S kispotta (Nodal officer)	07752-260412

Note: For current/other required contacts numbers of officers/staff refer the concerned dept./section in the university website

WELL EQUIPPED LABS
CIVIL ENGINEERING DEPARTMENT
GURU GHASIDAS VISHWAVIDYALAYA, BILASPUR





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