DEPARTMENT OF ENVIRONMENTAL ENGINEERING

SYLLABUS

WITH EFFECT FROM JUNE 2023

G-SCHEME

DIPLOMA IN ENVIRONMENTAL ENGINEERING

Dr.DHARMAMBAL GOVERNMENT POLYTECHNIC COLLEGE FOR WOMEN

THARAMANI, CHENNAI-113.

(AN AUTONOMOUS INSTITUTION)

MEMBERS PRESENT IN THE DEPARTMENT MEETING

HELD ON 22.12.2021

TEACHING MEMBERS

1. **M.KALAISELVI M.E.,**
   HOD / Civil,
   Dr.DGPCW,
   Tharamani, Chennai-113.

2. **S.MEENAKSHI B.E.,**
   Vice Principal/Lecturer (Sel.Gr) / Civil,
   Dr.DGPCW,
   Tharamani, Chennai-113.

3. **K.MARICHELVAM B.E.,**
   Lecturer (Consolidated) / Civil,
   Dr.DGPCW,
   Tharamani, Chennai-113.

4. **S.VELVIZHI M.E.,**
   Lecturer (Consolidated) / Civil,
   Dr.DGPCW,
   Tharamani, Chennai-113.

5. **K.JANSI RANI B.E.,**
   Lecturer (Consolidated) / Civil,
   Dr.DGPCW,
   Tharamani, Chennai-113.

6. **R.SARANRAJ B.Tech., M.E.,**
   Lecturer (Consolidated) / Civil,
   Dr.DGPCW,
   Tharamani, Chennai-113.

7. **M.MADHUBALA M.E.,**
   Lecturer (Part Time) / Civil,
   Dr.DGPCW,
   Tharamani, Chennai-113.

NON TEACHNING MEMBERS

1. **A.SARAVANAN**
   Instructor / Workshop,
   Dr.DGPCW,
   Tharamani, Chennai-113.

2. **T.RAMESH RAO**
   Skilled Asst / Workshop,
   Dr.DGPCW,
   Tharamani, Chennai-113.

3. **V.SIVAMAYAM**
   Skilled Assistant / Civil
   Dr.DGPCW,
   Tharamani, Chennai-113.

4. **K.VIJAYARAJAN**
   Skilled Assistant / Civil
   Dr.DGPCW,
   Tharamani, Chennai-113.

MEMBERS PRESENT IN THE DISCIPLINE WISE TASK FORCE MEETING

HELD ON 06.01.2022

EXTERNALS EXPERTS

T.UDHYA BANU,
Associate Professor / Civil,
DMI College of Engineering,
Palnchur, Chennai.

Dr. S. BHAGAVATHI PERUMAL,
Professor & HOD/Civil,
Sri Sairam Engineering College,
West Tambaram, Chennai-600 044.

R. Baskar,
HOD/CIVIL, Principal(i/c)
Goverment Polytehnic College,
Sevvapettai – 600 025

P.JAYAKODI,
Managing Partner, Enrec Engineers,
Chrompet, Chennai -600 044

Er. V. MUNIYAPPAN
Project Manager,
Siva Sakthi Construction,
GST Road, Cengalpattu -603 001

M. INDHUMATHI,Alumini.

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INTERNAL EXPERTS

S.MEENAKSHI B.E.,
Vice Principal/Lecturer (Sel.Gr) / Civil,
Dr.DGPCW,
Tharamani, Chennai-113

R.SARANRAJ B.Tech., M.E.,
Lecturer (Consolidated) / Civil,
Dr.DGPCW,
Tharamani, Chennai-113.

MEMBERS PRESENT IN THE APEX BODY MEETING

HELD ON 15.02.2022

EXTERNALS EXPERTS	INTERNAL EXPERTS

EXTERNALS EXPERTS

Dr. A. LATHA M.E., Ph.D.,
Professor in Civil Engineering
Specialization in Environmental Engineering
Panimalar Engineering College,
Chennai – 600 123.

BALASUBRAMANIYAN MALATHI,
Lecturer/Civil,
P.T,LEE Chengalvarayan Naicker Polytechnic
College, Chennai.

Er. S. RAJAVENKATESH B.E.,
Team Leader in Rebar Detailing
Hochtief india pvt.ltd,
Guindy, Chennai.

INTERNAL EXPERTS

S.MEENAKSHI B.E.,
Vice Principal/Lecturer (Sel.Gr) / Civil,
Dr.DGPCW,
Tharamani, Chennai-113

R.SARANRAJ B.Tech., M.E.,
Lecturer (Consolidated) / Civil,
Dr.DGPCW,
Tharamani, Chennai-113.

Dr. DHARMAMBAL GOVERNMENT POLYTECHNIC COLLEGE FOR WOMEN

THARAMANI, CHENNAI-113.

(An Autonomous Institution)

(Implemented from 2022 – 2023)

G – SCHEME

R U L E S & R E G U L A T I O N S

(APPLICABLE TO THE THREE YEARS REGULAR DIPLOMA PROGRAMME IN ENGINEERING / COMMERCIAL PRACTICE, 3½ YEARS SANDWICH DIPLOMA PROGRAMME IN ARCHITECTURAL ASSISTANTSHIP AND ONE YEAR DIPLOMA PROGRAMME IN COSMETOLOGY)

(For the batches of students admitted during 2022-2023 and subsequently)

INTRODUCTION:

Dr. Dharmambal Government Polytechnic College for Women, Chennai-113, was established in 1962. As many as 10(ten) diploma programmes are offered in this Polytechnic College. Semester system is followed during the entire course of study.

1. Description of the Course:

a. Full Time (3 years)

The Course for the Full Time Diploma in Engineering shall extend over a period of three academic years, consisting of 6 semesters* and the First Year is common to all Engineering Branches.

b. Sandwich (3½ years)

The Course for the Sandwich Diploma in Engineering shall extend over a period of three and half academic years, consisting of 7 semesters* and the First Year is common to all Engineering Branches. The subjects of three years full time diploma course being regrouped for academic convenience.

During 7th semester the students undergo industrial training for six months. Industrial training examination will be conducted after completion of 7th semester.

* Each Semester will have 16 weeks duration of study with 35 hrs. / Week for Regular Diploma Courses.

The Curriculum for all the 6 Semesters of Diploma courses (for three years Regular Diploma Programme in Engineering / Commercial Practice , 3½ years sandwich Diploma Programme in Architectural Assistantship and one year Diploma Programme in Cosmetology) have been revised and revised curriculum is applicable for the candidates admitted from 2022 – 2023 academic year onwards.

2. Condition for Admission:

Condition for admission to the Diploma courses shall be required to have passed in the S.S.L.C Examination of the Board of Secondary Education, Tamil Nadu.

(Or)

The Anglo Indian High School Examination with eligibility for Higher Secondary Course in Tamil Nadu.

(Or)

The Matriculation Examination of Tamil Nadu.

(Or)

Any other Examinations recognized as equivalent to the above by the Board of Secondary Education,Tamil Nadu.

Note: In addition, at the time of admission the candidate will have to satisfy certain minimum requirements, which may be prescribed from time to time.

3. Admission to Second year (Lateral Entry):

A pass in HSC (academic) or (vocational) courses mentioned in the Higher Secondary Schools in Tamil Nadu affiliated to the Tamil Nadu Higher Secondary Board with eligibility for University Courses of study or equivalent examination & Should have studied the following subjects.

A pass in 2 Years ITI with appropriate Trade or Equivalent examination.

Sl. No	Courses	H. Sc Academic	H. Sc Vocational		Industrial Training Institutes Courses
		Subjects Studied	Subjects Studied		
			Related Subjects	Vocational Subjects	
1.	All the Regular and Sandwich Diploma Courses	Physics and Chemistry as compulsory along with Mathematics / Biology	Maths / Physics / Chemistry	Related Vocational Subjects Theory & Practical	2 years course to be passed with appropriate Trade

2.	Diploma Course in Commercial Practice	English & Accountancy	English & Accountancy,	Accountancy & Auditing,.	-
		English & Elements of Economics	English & Elements of Economics,	Banking	
				Business Management,	
		English & Elements of Commerce	English & Management Principles & Techniques,	Co-operative Management, International Trade,	
			English & Typewriting	Marketing & Salesmanship,	
				Insurance & Material Management,	
				Office Secretary ship	

- For the Diploma Courses related with Engineering / Technology, the related / equivalent subjects prescribed along with Practicals may also be taken for arriving the eligibility.

- Branch will be allotted according to merit through counseling by the respective Principal asper communal reservation.

- For admission to the Commercial Practice Diploma course, the candidates studied the related subjects will be given first preference.

- *Candidates who have studied Commerce Subjects are not eligible for Engineering Diploma Courses.*

- Cosmetology Diploma Course minimum requirement for eligibility to admit is Higher Secondary pass whereas S.S.L.C is not eligible.

4. Age Limit : **No Age limit.**

5. Medium of Instruction : **English**

6. BRANCHES OF STUDY   :

Candidates may be offered at the time of admission, one of the following branches of study.

S.no	BRANCHES	TYPE OF DIPLOMA PROGRAMME
1	Architectural Assistantship	Sandwich
2	Civil Engineering	Regular
3	Computer Engineering	Regular
4	Electronics & Communication Engineering	Regular
5	Environmental Engineering	Regular
6	Interior Decoration	Regular
7	Instrumentation & Control Engineering	Regular
8	Garment Technology	Regular
9	Commercial Practice	Regular
10	Cosmetology	Regular (one year)

7. Eligibility for the Award of Diploma:

No candidate shall be eligible for the award of Diploma unless he/she has undergone the prescribed course of study for a period of not less than 3 academic years in any institution affiliated to the State Board of Technical Education and Training, Tamil Nadu, when joined in First Year and two years if joined under Lateral Entry scheme in the second year and passed the prescribed examination.

The minimum and maximum period for completion of Diploma Courses are as given below:

Diploma Course	Minimum Period	Maximum Period
Full Time	3 Years	6 Years
Full Time (Lateral Entry)	2 Years	5 Years
Sandwich	3½ Years	6½ Years

This will come into effect from G Scheme onwards i.e. from the academic Year 2022-2023.

8. Subjects of Study and Curriculum outline:

The subjects of study shall be in accordance with the syllabus prescribed from time to time, both in theory and practical subjects.

The curriculum outline is given in Annexure - I.

9. Examinations:

Autonomous Examinations in all subjects of all the semesters under the scheme of examinations will be conducted at the end of each semester.

The internal assessment marks for all the subjects will be awarded on the basis of continuous internal assessment earned during the semester concerned. For each subject 25 marks are allotted for internal assessment. Autonomous Examinations are conducted for 75 marks.

The total marks for result are 75 + 25 = 100 Marks.

10. Continuous Internal Assessment:

A. For Theory Subjects:

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i) Subject Attendance   5 Marks

(Award of marks for subject attendance to each subject Theory/Practical will be as per the range given below)

80%	-	83%	1 Mark
84%	-	87%	2 Marks
88%	-	91%	3 Marks
92%	-	95%	4 Marks
96%	-	100%	5 Marks

ii) Test #   10 Marks

Two Tests: Test – I and Test – II each of 2 hours duration for a total of 50 marks are to be conducted. Average of these two test marks will be taken and the marks to be reduced to   **5 Marks**

Test – III is the Model Examination covering all the five units and the marks obtained will be reduced to   **5 Marks**

TEST	UNITS	WHEN TO CONDUCT	MARKS	DURATION
Test I	Unit – I & II	End of 6th week	50	2 Hrs
Test II	Unit – III & IV	End of 12th week	50	2 Hrs
Test III	**Model Examination:** Covering all the 5 Units. (Autonomous Examination question paper - pattern).	End of 16th week	75	3 Hrs

From the Academic Year 2022 – 2023 onwards.

Question Paper Pattern for the Test - I and Test – II is as follows. The tests should be conducted by proper schedule. Retest marks should not be considered for internal assessment.

TEST MARK ALLOCATION

<u>**Without Choice**</u>:

Part A Type questions:	3 Questions $\times$ 5 mark	15 Marks
Part B Type questions:	5 Questions $\times$ 7 marks	35 Marks
	Total	**50 Marks**

<u>iii)</u> Assignment   **5 Marks**
For each subject Three Assignments are to be given each for 20 marks and the average marks scored should be reduced for 5 marks.

<u>iv)</u> Seminar Presentation   **5 Marks**

The students have to select the topics either from their subjects or general subjects which will help to improve their grasping capacity as well as their capacity to express the subject in hand. The students will be allowed to prepare the material for the given topic using the library hour / free hour and they will be permitted to present seminar (For First and Second Year, the students will be permitted to present the seminar as a group not exceeding six members and each member of the group should participate in the presentation. For the Third Year, the students should present the seminar individually.) The seminar presentation is mandatory for all theory subjects and

carries 5 marks for each theory subject. The respective subject faculty may suggest topics to the students and will evaluate the submitted materials and seminar presentation. (2 ½ marks for the material submitted in writing and 2 ½ marks for the seminar presentation). For each subject minimum of two seminars are to be given and the average marks scored should be reduced to 5 marks.

All Test Papers, Assignment Papers / Notebooks and the seminar presentation written material after getting the signature with date from the students must be kept in safe custody in the department for verification and audit. It should be preserved for one semester after publication of Autonomous Exam results and produced to the flying squad and the inspection team at the time of inspection/verification.

B. **For Practical Subjects:**

The Internal Assessment mark for a total of 25 marks which are to be distributed as follows:-

a	Attendance	**: 5 Marks** (Award of marks same as theory subjects)
b	Procedure observation and tabulation/ Other Practical related Work	**: 10 Marks**
c	Record writing	**: 10 Marks**
	TOTAL	**25 Marks**

- *All the Experiments/Exercises indicated in the syllabus should be completed and thesame to be given for final examinations.*

- The observation note book / manual should be maintained for 10 marks. The observation note book / manual with sketches, circuits, programme, reading and calculation written by the students manually depends upon the practical subject during practical classes should be evaluated properly during the practical class hours with date.

- The Record work for every completed exercise should be submitted in the subsequent practical classes and marks should be awarded for 10 marks for each exercise as per the above allocation.

- At the end of the Semester, the average marks of all the exercises should be calculated for 20 marks (including Observation and Record writing) and the marks awarded for attendance is to be added to arrive at the internal

assessment mark for Practical. (20+5=25 marks).

- Only regular students, appearing first time have to submit the duly signed bonafide record note book/file during the Practical Autonomous Examinations.

All the marks awarded for Assignments, Tests, Seminar presentation and Attendance should be entered periodically in the Personal Theory Log Book of the staff, who is handling the theory subject. The marks awarded for Observation, Record work and Attendance should be entered periodically in the Personal Practical Log Book of the staff, who is handling the practical subject.

11. Communication Skill Practical, Computer Application Practical and Physical Education:

The Communication Skill Practical and Computer Application Practical with more emphasis are being introduced in First Year. Much stress is given to increase the Communication skill and ICT skill of students.

As per the recommendation of MHRD and under Fit India Scheme, the Physical Education is introduced to encourage students to remain healthy and fit by including physical activities and sports.

12. Attendance:

Minimum attendance of 80% is prescribed for each courses of study (includes lecture hours, tutorial hours, assignment and test hours). Students falling to get 80% attendance will not be allowed to appear for the examination under any circumstances. However, a candidate who has secured attendance between 70% to 79% in the current semester due to medical reasons(hospitalization / accident / specific illness) or due to participation in College / District / State / National / International level sports events with prior permission from the Principal shall be given exemption from the prescribed attendance requirements and

he / she shall be permitted to appear for the current semester examinations, if her progress has been satisfactory and her conduct has been satisfactory.

Candidates who do not qualify to appear for final examinations of any semester from second to sixth for want of attendance and / or progress must get readmitted at the immediate available opportunity and redo that semester courses. Candidates who do not qualify to appear for the final examinations of first semester have to discontinue the programme.

13. Entrepreneurship and Startup:

In V Semester Entrepreneurship and Startup subject is mandatory and common subject for all the departments. The total marks for this subject is 75 marks.

TEST MARK ALLOCATION

Theory		**35 Marks**
Part A Type questions:	10 Questions × 2 marks	20 Marks
Part B Type questions:	3 Questions × 5 marks (Either or Pattern)	15 Marks
Practical		**30 Marks**
Submission on Business Plan / Feasibility Report or Report on Unit IV & V		30 Marks
Viva Voce		**10 Marks**
	Total	**75 Marks**

Internal Assessment Mark

Assignment (Unit I & II)	- 10
Seminar (Unit III)	- 10
Attendance	- 5
Total	**- 25**

14. Project Work and Internship:

The students of all the Diploma Courses have to do a Project Work as part of the Curriculum   and in partial fulfillment for the award of Diploma by the State Board of Technical Education and Training, Tamil Nadu. In order to encourage students

to do worthwhile and innovative projects, every year prizes are awarded for the best three projects i.e. institution wise, region wise and state wise. **The Project work must be reviewed twice in the same semester. The project work is approved during the V semester by the properly constituted committee with guidelines.**

a) Internal assessment mark for Project Work & Internship:

Project Review I   :   **10 marks**

Project Review II   :   **10 marks**

Attendance   :   **05 marks** (Award of marks same as theory subject pattern)

Total   :   **25 marks**

Proper record should be maintained for the two Project Reviews and preserved for one semester after the publication of Autonomous Exams results. It should be produced to the flying squad and the inspection team at the time of inspection/verification.

b)   Allocation of Marks for Project Work & Internship in End Examinations:

Demonstration/Presentation   : 20 marks

Report   : 20 marks

Viva Voce   : 15 marks

Internship Report   : 20 marks

Total   **: 75 marks**

c) Internship Report:

The internship training for a period of two weeks shall be undergone by every candidate at the end of IV / V semester during vacation. The certificate shall be produced along with the internship report for evaluation. The evaluation of internship training shall be done along with final year "Project Work & Internship" for 20 marks. The internship shall be undertaken in any industry / Government or Private certified agencies which are in social sector / Govt. Skill Centres / Institutions / Schemes.

A neatly prepared PROJECT REPORT as per the format has to be submitted by individual student during the Project Work & Internship Autonomous examination.

15. **Scheme of Examination:**

   The Scheme of Examination for subjects are given in Annexure II

16. **Criteria for Pass:**

   1. No candidate shall be eligible for the award of Diploma unless he/she has undergone the prescribed course of study successfully in an institution approved by AICTE and affiliated to the State Board of Technical Education & Training, Tamil Nadu and pass all the subjects prescribed in the curriculum.

   2. *A candidate shall be declared to have passed the examination in a subject if he / she secures not less than 40% in theory subjects and 50% in practical subjects out of the total prescribed maximum marks including both the Internal Assessment and the Autonomous Examinations marks put together, subject to the condition that he / she secures at least a minimum of 30 marks out of 75 marks in the Autonomous End Theory / Drawing / Shorthand / Typewriting Examinations and a minimum of 35 marks out of 75marks in the Autonomous End Practical Examinations.*

17. **Classification of successful candidates:**

   Classification of candidates who will pass out the final examinations from April 2025 onwards (Joined first year in 2022 -2023) will be done as specified below.

   <u>First Class with Superlative Distinction:</u>

   A candidate will be declared to have passed in **First Class with Superlative Distinction** if he / she secures not less than 75% of the marks in all the subjects and passes all the semesters in the first appearance itself and passes all subjects within the stipulated period of study 2 / 3 / 3½ years [Full time / Full Time (Lateral Entry) / Sandwich] without any break in study.

   <u>First Class with Distinction:</u>

   A candidate will be declared to have passed in **First Class with Distinction** if he / she secures not less than 75% of the aggregate marks in all the semesters put together and passes all the semesters except the I and II semester in the first appearance itself and passes all subjects within the stipulated period of study 2 / 3 / 3½ years [Full time / Full Time (Lateral Entry) / Sandwich] without any break in study.

First Class:

A candidate will be declared to have passed in **First Class** if he / she secures not less than 60% of the aggregate marks in all the semesters put together and passes all the subjects within the stipulated period of study 2 / 3 / 3½ years [Full time / Full Time (Lateral Entry) / Sandwich] without any break in study.

Second Class:

All other successful candidates will be declared to have passed in **Second Class** who are all pass out in Autonomous End Examination from April 2025 / October 2025 onwards which is applicable for all regular and sandwich students.

18. **Duration of a period in the Class Time Table:**

The duration of each period of instruction is 1 hour and the total period of instruction hours excluding interval and lunch break in a day should be uniformly maintained as 7 hours corresponding to 7 periods of instruction (Theory & Practical).

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ANNEXURE – I

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G - SCHEME

CURRICULUM OUTLINE

THIRD SEMESTER (FULL TIME)

Subject Code	Subject Name	Hours Per Week			
		Theory	Drawing	Practical	Total
EEG301	Engineering Mechanics	6	-	-	6
EEG302	Construction Materials and Construction Practice	5	-	-	5
EEG303	Surveying	6	-	-	6
EEG304	Civil Engineering Drawing	-	4	-	4
EEG375	Surveying Practice –I	-	-	4	4
EEG376	Material Testing Laboratory– I	-	-	3	3
EEG377	CADD in Civil Engineering Drawing Practice	-	-	4	4
Co-curricular activities	Physical Education	-	-	-	2
	Library	-	-	-	1
	TOTAL	**17**	**4**	**11**	**35**

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G - SCHEME

CURRICULUM OUTLINE

FOURTH SEMESTER (FULL TIME)

Subject Code	Subject Name	Hours Per Week			
		Theory	Drawing	Practical	Total
EEG401	Theory of Structures	6	-	-	6
EEG402	Hydraulics	6	-	-	6
EEG403	Environmental Science and EIA	5	-	-	5
EEG474	Hydraulics Laboratory	-	-	4	4
EEG475	Surveying Practice –II	-	-	4	4
EEG476	Material Testing Laboratory–II	-	-	3	3
EEG477	Construction Practice Laboratory	-	-	4	4
Co-curricular activities	Physical Education	-	-	-	2
	Library	-	-	-	1
	TOTAL	**17**	**-**	**15**	**35**

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G - SCHEME

CURRICULUM OUTLINE

FIFTH SEMESTER (FULL TIME)

Subject Code	Subject Name	Hours Per Week			
		Theory	Drawing	Practical	Total
EEG501	Structural Engineering	6	-	-	6
EEG502	Water Supply and Wastewater Engineering	5	-	-	5
Elective Theory–I					
EEG581	Transportation Engineering and Urban Planning	5	-	-	5
EEG582	Occupational Hazards and Industrial Safety				
EEG583	Soil Mechanics and Foundation Engineering				
EEG573	Environmental Engineering Laboratory	-	-	3	3
EEG574	Environmental Structural Drawing in CADD	-	-	6	6
Elective Practical –I					
EEG584	Advanced Surveying and Basic GIS Practical	-	-	3	3
EEG585	Highway Engineering laboratory				
EEG586	Geotechnical Engineering Laboratory				
EEG575	Entrepreneurship and Startups	-	-	4	4
Co-curricular activities	Physical Education	-	-	-	2
	Library	-	-	-	1
	TOTAL	**16**	**-**	**16**	**35**

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G - SCHEME

CURRICULUM OUTLINE

SIXTH SEMESTER (FULL TIME)

Subject Code	Subject Name	Hours Per Week			
		Theory	Drawing	Practical	Total
EEG601	Solid Waste Management	5	-	-	5
EEG602	Estimating Costing and Valuation	5	-	-	5
EEG603	Sustainable and Green Building Technology	5	-	-	5
Elective Theory–II		5	-	-	5
EEG681	Air Pollution and Control				
EEG682	Advanced Concrete Technology				
EEG683	Water Resources Engineering				
EEG673	Computer Applications in Civil Engineering Practice	-	-	4	4
Elective Practical – II		-	-	4	4
EEG684	Estimation and Costing Laboratory				
EEG685	Concrete Technology Practical				
EEG686	Water Resource Engineering Laboratory				
EEG674	Project Work and Internship	-	-	4	4
Co-curricular activities	Physical Education	-	-	-	2
	Library	-	-	-	1
	TOTAL	**20**	**-**	**12**	**35**

ANNEXURE – II

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

SCHEME OF EXAMINATION

THIRD SEMESTER (FULL TIME)

Subject Code	Subject Name	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal Assessment Marks	Autonomous Examination Marks	Total Marks		
EEG301	Engineering Mechanics	25	75	100	40	3
EEG302	Construction Materials and Construction Practice	25	75	100	40	3
EEG303	Surveying	25	75	100	40	3
EEG304	Civil Engineering Drawing	25	75	100	40	3
EEG375	Surveying Practice –I	25	75	100	50	3
EEG376	Material Testing Laboratory– I	25	75	100	50	3
EEG377	CAD in Civil Engineering Drawing Practice	25	75	100	50	3
TOTAL				**700**		

ANNEXURE – II

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

SCHEME OF EXAMINATION

FOURTH SEMESTER (FULL TIME)

Subject Code	Subject Name	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal Assessment Marks	Autonomous Examination Marks	Total Marks		
EEG401	Theory of Structures	25	75	100	40	3
EEG402	Hydraulics	25	75	100	40	3
EEG403	Environmental Science and EIA	25	75	100	40	3
EEG474	Hydraulics Laboratory	25	75	100	40	3
EEG475	Surveying Practice –II	25	75	100	50	3
EEG476	Material Testing Laboratory–II	25	75	100	50	3
EEG477	Construction Practice Laboratory	25	75	100	50	3
	TOTAL			**700**		

ANNEXURE – II

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

SCHEME OF EXAMINATION

FIFTH SEMESTER (FULL TIME)

Subject Code	Subject Name	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal Assessment Marks	Autonomous Examination Marks	Total Marks		
EEG501	Structural Engineering	25	75	100	40	3
EEG502	Water Supply and Wastewater Engineering	25	75	100	40	3
Elective Theory – I						
EEG581	Transportation Engineering and Urban Planning	25	75	100	40	3
EEG582	Occupational Hazards and Industrial Safety					
EEG583	Soil Mechanics and Foundation Engineering					
EEG573	Environmental Engineering Laboratory	25	75	100	50	3
EEG574	Environmental Structural Drawing in CADD	25	75	100	50	3
Elective Practical–I						
EEG584	Advanced Surveying and Basic GIS Practical	25	75	100	50	3
EEG585	Highway Engineering laboratory					
EEG586	Geotechnical Engineering Laboratory					
EEG575	Entrepreneurship and Startups	25	75	100	50	3
TOTAL				**700**		

ANNEXURE – II

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

SCHEME OF EXAMINATION

SIXTH SEMESTER (FULL TIME)

Subject Code	Subject Name	Examination Marks			Minimum for pass	Duration of Exam Hours
		Internal Assessment Marks	Autonomous Examination Marks	Total Marks		
EEG601	Solid Waste Management	25	75	100	40	3
EEG602	Estimating Costing and Valuation	25	75	100	40	3
EEG603	Sustainable and Green Building Technology	25	75	100	40	3
Elective Theory – II						
EEG681	Air Pollution and Control	25	75	100	40	3
EEG682	Advanced Concrete Technology					
EEG683	Water Resources Engineering					
EEG673	Computer Applications in Civil Engineering Practice	25	75	100	50	3
Elective Practical – II						
EEG684	Estimation and Costing Laboratory	25	75	100	50	3
EEG685	Concrete Technology Practical					
EEG686	Water Resource Engineering Laboratory					
EEG674	Project Work and Internship	25	75	100	50	3
	TOTAL			**700**		

LIST OF EQUIVALENT SUBJECTS FOR E SCHEME AND G SCHEME

SEM	E SCHEME		G SCHEME	
	SUB CODE	**SUBJECT NAME**	**SUB CODE**	**SUBJECT NAME**
III	**EEE311**	Engineering Mechanics	**EEG301**	Engineering Mechanics
	EEE312	Construction Materials and Construction Practice	**EEG302**	Construction Materials and Construction Practice
	EEE313	Environmental Science	**EEG403**	Environmental Science and EIA
	EEE314	Surveying -I	**EEG303**	Surveying
	EEE315	Civil Engineering Drawing -I	**EEG304**	Civil Engineering Drawing
	EEE316	Material Testing Lab - I	**EEG376**	Material Testing Laboratory- I
	EEE317	Survey Practical -I	**EEG375**	Survey Practice -I
IV	**EEE411**	Theory of Structures	**EEG401**	Theory of Structures
	EEE412	Environmental Engineering and Pollution Control	No Equivalent	
	EEE413	Surveying-II	**EEG303**	Surveying
	EEE414	Soil Mechanics and Foundation Engineering	**EEG583**	Soil Mechanics and Foundation Engineering
	EEE415	Material Testing Lab - II	**EEG476**	Material Testing Laboratory - II
	EEE416	Survey Practical -II	**EEG475**	Survey Practice-II
	EEE417	Communication Skills		
V	**EEE511**	Structural Engineering	**EEG501**	Structural Engineering
	EEE512	Estimating & Costing -I	**EEG602**	Estimation, Costing and Valuation
	EEE513	Advanced Construction Technology	**EEG682**	Advanced Concrete Technology
	EEE514	Water and Sewage Treatment Plants	**EEG502**	Water Supply and Wastewater Engineering
	EEE515	Environmental Engineering Lab	**EEG573**	Environmental Engineering Lab
	EEE516	CAD in Civil Engineering Drawing	No Equivalent	
	EEE517	Hydraulics Lab	**EEG474**	Hydraulics Laboratory

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	EEE611	Environmental Management system		**No Equivalent**
	EEE612	Estimating & Costing -II	**EEG602**	Estimation, Costing and Valuation
	EEE613	Hydraulics	**EEG402**	Hydraulics
	Elective I			
	EEE614	Transportation Engineering	**EEG581**	Transportation Engineering and Urban Planning
VI	**EEE615**	Water Resources Management	**EEG683**	Water Resources Engineering
	EEE616	Building Services		**No Equivalent**
	EEE617	Computer Application in Civil Engineering Lab	**EEG673**	Computer Application in Civil Engineering Practice
	EEE618	Construction Practice Lab	**EEG477**	Construction Practice Laboratory
	EEE619	Project work	**EEG674**	Project work and Internship

III SEMESTER

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS
G-SCHEME

Subject Code   **:** EEG301

Semester   **:** III Semester

Subject Title   **: ENGINEERING MECHANICS**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks		Total	Duration
			Internal Assessment	Autonomous Examination		
ENGINEERING MECHANICS	**6 Hrs**	**96 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

Unit	Topics	Hours
I	Simple Stresses and Strains	18
II	Shear Force and Bending Moment	18
III	Geometrical Properties of Sections	18
IV	Stresses in Beams and Shafts	17
V	Pin Jointed Frames	18
	Test & Model Exam	7
TOTAL		**96**

EEG301 ENGINEERING MECHANICS

OBJECTIVES:

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

➢ The mechanical properties of engineering materials, elastic constants, relationship between elastic constants, different types of stresses and strains, the deformation of elastic bodies under simple stresses, the use and principles of composite sections;

➢ Analysis the structural behavior of materials under various loading conditions.

➢ Interpret shear force and bending moment diagrams for various types of beams and loading Conditions, application of stress and strain in engineering field.

➢ Articulate practical applications of moment of inertia of symmetrical and unsymmetrical structural sections.

➢ Determine the different types of stresses induced in beams and shafts due to bending and twisting moments respectively.

➢ Analysis of perfect frames for vertical loads by analytical as well as graphical methods.

UNIT - I SIMPLE STRESSES AND STRAINS

1.1 INTRODUCTION TO STRESSES AND STRAINS

Definitions of: Force, Moment of force, Actions and reactions, Statics, Static equilibrium of bodies, Mechanics, Engineering Mechanics - Conditions of static equilibrium - Types of forces on structural members - Study of strength of material - Mechanical properties of materials ─ Rigidity, Elasticity, Plasticity, Compressibility, Hardness, Toughness, Stiffness, Brittleness, Ductility, Malleability, Creep, Fatigue, Tenacity, Durability - Definitions of stress and strain - Types of stresses - Tensile, Compressive and Shear stresses - Types of strains - Tensile, Compressive and Shear strains - Elongation and Contraction - Longitudinal and Lateral strains - Poisson's Ratio - Volumetric strain - Simple problems in computation of stress, strain, Poisson's ratio, change in dimensions and volume etc- Hooke's law - Elastic Constants - Definitions of: Young's Modulus of Elasticity ─ Shear modulus (or) Modulus of Rigidity - Bulk Modulus - Relationship between elastic constants **(Derivations not necessary)-** Simple problems.

1.2 APPLICATION OF STRESS AND STRAIN IN ENGINEERING FIELD

Behaviour of ductile and brittle materials under direct loads - Load Extension curve (or) Stress Strain curve of a ductile material - Limit of proportionality, Elastic limit, Yield stress, Ultimate stress, Breaking stress, Actual/Nominal stresses-Working stress- Factor of safety - Percentage elongation – Percentage reduction in area -Significanceof percentage elongation and reduction inarea of cross section - Deformation of prismatic and stepped bars dueto uniaxial load - Deformation of prismatic bars due to its self weight - Numerical problems.   **18 Hrs**

UNIT – II SHEAR FORCE AND BENDING MOMENT

2.1 TYPES OF LOADS AND BEAMS

Definitions of: Axial load, Transverse load, Concentrated (or) Point load, Uniformly Distributed load (UDL), Varying load – Types of Supports and Reactions: Simple support, Roller support, Hinged support, Fixed support; Vertical reaction, Horizontal reaction, Moment reaction- Types of Beams based on support conditions- Diagrammatic representation of beams, loads and supports– Static equilibrium equations – Determinate and indeterminate beams.

2.2 SHEAR FORCE AND BENDING MOMENT IN BEAMS

Definitions of Shear Force and Bending Moment – Conventional signs used for S.F. and B.M – S.F and B.M of general cases of determinatebeams – S.F and B.M diagrams for Cantilevers, Simply supported beams– Position of maximum BM - Derivation of Relation between intensity of load , S.F and B.M. – Numerical problems on S.F and B.M. (Determinate beams with concentrated loads and UDL Only).   **18 Hrs**

UNIT- III GEOMETRICAL PROPERTIES OF SECTIONS

3.1 CENTROID

Geometrical properties – Definitions and examples of Symmetrical, Anti Symmetrical, Asymmetrical shapes - Definitions of centre of gravity and centroid - Centroid of Symmetrical shapes (solid/hollow square, rectangular, circular, I Sections) - Centroid of Asymmetrical shapes (triangular, semi circular, quadrant, trapezoidal, parabolic sections) - Centroid of Anti Symmetric shapes (S, Z sections) – Built up structural sections – Problems.

3.2 MOMENT OF INERTIA

Definitions of: Inertia, Moment of Inertia, Polar moment of inertia, Radius of gyration, Section Modulus, Polar modulus - Parallel and perpendicular axes theorems - Derivation of expressions for M.I / Polar M I, Section modulus and Radius of gyration of regular geometrical plane sections (rectangle and circle only) – M.I about centroidal axis / base, Section modulus, Radius of gyration of symmetric, asymmetric, anti symmetric and built up symmetrical sections – Numerical problems.   **18 Hrs**

UNIT – IV STRESSES IN BEAMS AND SHAFTS
4.1 STRESSES IN BEAMS DUE TO BENDING
Types of Bending stresses – Neutral axis – Theory of simple bending – Assumptions – Moment of resistance – Derivation of flexure/bending equation $M / I = E / R = \sigma/y$ – Bending stress distribution – Curvature of beam – Position of N.A and centroidal axis – Stiffness equation – Flexural rigidity – Strength equation – Significance of Section modulus – Numerical problems.

4.2 STRESSES IN SHAFTS DUE TO TORSION

Definitions of: Shaft, Couple, Torque (or) Twisting moment - Types of Shafts (one end fixed and

the other rotating, both ends rotating at different speeds) - Theory of Pure Torsion – Assumptions -Derivation of Torsion equation, $T / I_p = \tau_{max} / R = G\theta / l$ - Shear stress distribution in circular section due to torsion - Strength and Stiffness of shafts — Torsional rigidity - Torsional modulus - Power transmitted by a shaft - Numerical problems.   **17 Hrs**

UNIT – V PIN JOINTED FRAMES

5.1   ANALYSIS BY ANALYTICAL METHOD (METHOD OF JOINTS)

Definitions of: Frame / Truss, Pin Joint, Nodes, Rafters, Ties, Struts,Slings-Determinate and indeterminate frames -Classification of frames- Perfect and imperfect frames — Deficient / Instable and redundant frames - Formulation of a perfect frame - Common types of trusses - Support conditions - Resolution ofa force - Designation of a force - Nature of forces in the frame members - Analysis of Symmetrical Frames — Assumptions - Methodsof analysis - Analytical methods - Method of Joints and Method ofSections - Problems on Analysis ofcantilever   and simply supportedperfect frames (with not more than ten members) with vertical nodalloads by method of joints only. Identification of members with nil force in a determinate truss.

5.2   ANALYSIS BY GRAPHICAL METHOD

Graphic statics - Advantages - Space diagram - Bow‟s notation- Resultant force (or) Equivalent force -Equilibrant force - Vector diagram - Determination of magnitude and nature of forces in the members of a cantilever / simply supported determinate trusses (with not more than eight members) with vertical nodal loads only.   **18 Hrs**

Test & Model Exam   **7 Hrs**

Reference Books

1. R.S.Khurmi "Strength of Materials", S.Chand & Company Ltd, New Delhi

2. S.Ramamirtham, "Strength of Materials", Dhanpat Rai (2003)

3. Vazirani & Ratwani, "Analysis of Structures-Vol 1", Khanna Publishers(2003)

4. S.B.Junnarkar, "Mechanics of Structures- Vol 1", Charotar Publishing House

5. Sanchayan Mukherjee,"Elements of Engineering Mechanics", PHI LearningPvt. Ltd.

6. R K Bansal, "Engineering Mechanics", Laxmi Publications Pvt.Ltd.

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG302

Semester   **:** III Semester

Subject Title   **: CONSTRUCTION MATERIALS AND CONSTRUCTION PRACTICE**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks		Total	Duration
			Internal Assessment	Autonomous Examination		
CONSTRUCTION MATERIALS AND CONSTRUCTION PRACTICE	5 Hrs	80 Hrs	25	75	100	3 Hrs

Topics and Allocation of Hours

Unit	Topics	Hours
I	Building Materials	15
II	Building Materials (Contd)	15
III	Foundations And Masonries	15
IV	Doors, Floors, Roofs, etc.,	14
V	Pointing, Plastering, Painting, Form Work, etc.,	14
	Test & Model Exam	7
	TOTAL	**80**

EEG302 CONSTRUCTION MATERIALS AND CONSTRUCTION PRACTICE

OBJECTIVES:

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

- ➢ State different construction materials and their properties.
- ➢ Explain the different types of cement, grades of cements and tests on cement.
- ➢ State and explain the different types of modern building materials such as ceramic products, glass, metals and plastics.
- ➢ Explain the method of preparation of mortar, cement concrete and state the differenttypes of structures.
- ➢ Describe the different types of foundations.
- ➢ Describe the classification of stone masonry & brick masonry. State the differenttypes of doors, windows, lintels & stairs.
- ➢ Describe the types of floors and roofs.
- ➢ Describe the different methods of pointing, plastering and termite proofing.
- ➢ Explain the methods of scaffolding, shoring & underpinning and form work.
- ➢ Describe procedure of colour washing, white washing, painting and varnishing.

UNIT – I CONSTRUCTION MATERIALS

1.1   INTRODUCTION

Physical properties of materials - Density, Bulk density, Specific gravity, porosity, water absorption, permeability, chemical resistance, fire resistance, weathering resistance, thermal conductivity, Durability. (Definitions only).

1.2 ROCKS AND STONES

Rocks - Classification of Rocks - Geological, Physical and Chemical classification - Uses of stones - Requirements of agood building stone - Natural and Artificial stones for flooring - Examples (Detailed description not required).

1.3 BRICKS

Definition - Brick earth - Composition of good brick earth - Manufacturing process - classification of bricks - properties of bricks - special types of bricks and their uses - compressive strength of bricks - Tests on bricks(Names only) - grades and corresponding requirements of bricks as per BIS.

1.4 LIME AND POZZOLANAS

Sources of lime - classification of lime - Fat, Hydraulic and Poor lime - uses of lime -

Pozzolanic materials - Surki, Flyash, Ground blast furnace slag, Rice husk ash – Advantages of adding pozzolanas to cement.

1.5 CEMENT

Definition - Composition of ordinary Portland cement - Functions of cement ingredients - Different types of cements - Grades of cement (33,43 and 53) - Storage of cement - Tests on cement (Names only) - objects of each test - Test requirements/ BIS specifications of OPC– Admixtures - Definition, types and uses.

1.6 GLASS

Definition - Constituents of glass - Classification of glass - Functions and Utility - Types of glass, sizes and thickness used in buildings.   **15 Hrs**

UNIT – II

2.1 MORTAR

Definition - Properties and uses of mortar - M sand for mortar - Types of mortar - Cement and Lime mortar - Mix ratio of cementmortars for different works.

2.2 CONCRETE

Definition - Constituents of concrete and their requirements - uses of concrete - Types of concrete: Lime concrete, cement concrete and ready mixed concrete - Definitions only.

2.3 PAINTS AND VARNISHES

Definition - Functions of paint Types of paints and their uses - Oil, Enamel, Emulsion, Distemper, Cement, Aluminium, Bituminous and Plastic paints - Varnishes, Definition Characteristics of a good varnish -Types of varnish and their uses Oil, Turpentine, Spirit and water varnish.

2.4 METALS AND PLASTICS

Types of metals used in construction - Cast Iron, Steel, Aluminium, GI, Stainless steel - Market forms of steel for reinforced concrete - steel for pre stressed concrete - Plastics Characteristics and Uses of plastics -Types - Thermoplastics and Thermosetting plastics - Various plastic products: pipes, taps, tubs, basins, doors, windows, water tanks, partitions sizes, capacity and uses - Advantages and disadvantages of plastic products- Asbestos - uses of asbestos.

2.5 TIMBER AND TIMBER PRODUCTS

Types of Timber -Teak, Sal, Rosewood, Mango, and Jack - Defects in timber seasoning of timber- objectives - Timber Products - Veneers, Ply woods, Particle Board, Fibre board, Hard board, Block board, Laminated board Uses.

2.6 ROOF COVERINGS

Definition - objectives and uses - AC Sheets - FRP Sheets - G.I. sheets- Steel sheets- Polycarbonate sheets- Shell roof - R C C roof Advantages - Types**.**

2.7 DAMP PROOFING MATERIALS

Materials used for damp proofing - Properties and functions of various types of water proofing materials - commonly available chemicals used for grouting / Coating   porous   concrete surfaces - Admixtures for cement mortar and cement concrete - Functions of Admixtures, Accelerators, Retarders, Air repelling chemicals.   **15 Hrs**

UNIT – III CONSTRUCTION PRACTICE

3.1 INTRODUCTION TO STRUCTURES

Permanent and temporary structures - Life of structures - Sub structure - super structure - load bearing structure - framed structure - concept of framed structure - advantages of framed structure.

3.2 FOUNDATION

Definition - objectives of foundation - Bearing capacity of soil — Definition - maximum/ultimate and safe bearing capacity - Bearing capacity of different types of soils - Requirements of a good foundation - Types of foundations - Shallow foundation: Spread foundation, Isolated column footing, combined footing, continuous footing, Raft foundation - Deep foundation: Pile, Stone columns Types of piles : Bearing pile, Friction pile, under reamed pile - Causes of failure of foundation - Remedial measures.

3.3 STONE MASONRY

Definition - Common terms used : Natural bed, sill, corbel, course, cornice, coping, weathering, throat, spalls, quoins, string course, lacing course, through stone, plinth, jambs Classification of stone masonry - Rubble masonry : Coursed, un coursed & Randomrubble masonry - Ashlar masonry - points to be considered in the construction of stone masonry - Tools used(Names only).

3.4 BRICK MASONRY

Definition - Common terms used - Header, stretcher, bed joint, lap, perpend, closer, king, queen & bevelled, bat permissible loads in brick masonry - Bond - Types Header, stretcher, English bond & Flemish bond one brick thick and one and a half brick thick - „T" junction in English bond - Points to be considered in the construction of brick masonry - Cavity bond masonry - Defects in brick masonry - Maintenance of brick masonry - Reinforced brick masonry - purpose - Its Advantage with respect to strength and Earthquake resistance.

3.5 PARTITION

Definition - Requirements of good partition wall - Types Brick, Concrete, glass, Aluminums frame with Glass sheet, timber, straw board, wood wool, Asbestos Cement board and plastic

board partitions.

3.6 WATER PROOFING AND DAMP PROOFING

Dampness - Causes of dampness - Effects of dampness - Damp proofing - Damp proof courses (DPC) - Method of mixing - Bad effects of excessive Admixtures in RCC - Water proofing coats for sump / overhead tank wall - Methods of grouting. **15 Hrs**

UNIT – IV

4.1 DOORS, WINDOWS AND VENTILATORS

Standard sizes of doors and windows - Location of doors andwindows - Different materials used - Doors Component parts Types - Framed and panelled, glazed, flush, louvered, collapsible, rolling shutter and sliding doors - Windows Types - Casement, Glazed, Bay, Corner, Pivoted, Circular and Dormer windows- Ventilators — Definition, purpose,Types - Ventilator combined with windows / doors.

4.2 HOLLOW BLOCK CONSTRUCTIONS

Hollow blocks - Advantages of hollow blocks -   load bearing and non load bearing hollow blocks - Open cavity blocks - face shells, web, gross area, nominal dimensions of blocks, minimum thickness of face shells and web, grades of hollow concrete blocks- Materials used, admixtures added - mixing, moulding, placingand compacting, curing, drying.

4.3 STAIRS

Definition - Terms used - Location of stair types - Straight, Dog legged, Open well, bifurcated and spiral stairs - Moving stairs (Escalators) - Lift components uses and advantage of lifts over stairs.

4.4 FLOORS AND FLOORING

Floors - Definition – Types – Timber, Composite, RCC floors – Flooring - Definition- Materials used – Selection of flooring – types — Construction Methods (As per C.P.W.D / P.W.D Specifications) - Mosaic, Granolithic, Tiled, Granite, Marble, Pre cast concrete flooring, Plastic & PVC tile flooring- – Carpet tile & Rubber flooring.

4.5 ROOFS

Definition –Types of roof – Flat roof – RCC roof – Pitched roof –Tile roof – Shell roof – Technical terms - Steel roof truss – Types: King post, Raised chord , Howe truss, Fan, fink , northlight and Modified north light trusses.

4.6 WEATHERING COURSE

Weathering course –Purpose-Materials Required- Brick Jelly Concrete preparation – Laying procedure- Preparation of mortar with Damp Proof materials for laying pressed clay tiles- Pointing and finishing of clay tiles - Use of Thermal Resistant Weathering Tiles. **14 Hrs**

UNIT - V

5.1 POINTING

Objectives - Mortar for pointing - Methods of pointing (As per C.P.W.D. / P.W.D Specifications) - Types of pointing - Flush,recessed, weathered, keyed or grooved pointing.

5.2 PLASTERING

Definitions - Objectives - Cement mortars for Plastering - Requirements of a good plaster - Methods of Plastering - Defects in plastering - Stucco plastering - Acoustic plastering - Granites silicon – plastering – Sand faced Pebble dash - Wall paper finishing- Wall tiling.

5.3 WHITE WASHING, COLOUR WASHING ,DISTEMPERING, PAINTING & VARNISHING

White washing – preparation of surface – Application of white wash – Colour washing - Distempering – Preparation of surfaces – Application of distemper - Painting & Varnishing **-** Preparation ofsurface – Application of Painting & Varnishing.

5.4 ANTI-TERMITE TREATMENT

Definition – objectives and uses – Methods of termite treatment.

5.5 SCAFFOLDING, SHORING AND UNDER PINNING

Scaffolding – Definition – Component parts – Types – Single,double & Steel scaffolding, Shoring – Definition – Types – Raking, flying and dead shores – Underpinning – definition –Purpose – Types – Pit Methods – Pile Method.

5.6 FORM WORK

Definition – Materials used – Requirements of a good formwork – Form work for column, RC beams and RC slab.   **14 Hrs**

TEST & MODEL EXAM   7 Hrs

Reference Book:

1. P.C.Varghese, "Building Materials", Prentice-Hall of India (P) Ltd., IEdition, 2011.
2. S.K.Duggal, "Building Materials", New Age International (P) Ltd., II Edition,2003.
3. S.C.Rangwala, "Building Materials",Charotar Publishing House, VIIEdition, 1982.
4. P.C.Varghese, "BuildingConstructions", Prentice-Hall of India (P) Ltd., IEdition, 2011.
5. Dr. B.C. Punmia, "Building Construction", Laxmi publications (p) Ltd NewDelhi.
6. S.C.Rangwala, "Building Construction",Charotar Publishing House, VIIEdition.
7. Ashokkumar Jain, "Building Construction", Laxmi publications (p) LtdChennai.
8. I S 2185 Part I & II
9. PWD & CPWD Specifications.

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG303

Semester   **:** III Semester

Subject Title   **:** **SURVEYING**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks		Total	Duration
			Internal Assessment	Autonomous Examination		
SURVEYING	**6 Hrs**	**96 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

Unit	Topics	Hours
I	Introduction to Surveying and Chain Surveying and Compass Surveying	21
II	Levelling	17
III	Theodolite Surveying	17
IV	Curves & Contour Surveying	17
V	Total Station, Global Positioning system, Remote Sensing and GIS	17
	Test & Model Exam	7
	TOTAL	**96**

DETAILED SYLLABUS

EEG303 SURVEYING

OBJECTIVES:

On completion of the course, the students will posses knowledge about:

➤ Chain surveying

➤ Compass surveying

➤ Levelling

➤ Theodolite surveying

➤ Curves

➤ Preparation of Contour layouts

➤ Total Station Surveying

➤ Global Positioning System

➤ Remote Sensing and GIS

UNIT – I INTRODUCTION TO SURVEYING AND CHAIN SURVEYING AND COMPASS SURVEYING

1.1 INTRODUCTION TO SURVEYING

Definition - Objectives and uses of surveying -Classification of Surveying - Principles of surveying.

1.2 CHAIN SURVEYING

Introduction - Instruments used for chaining- Chains and Tapes — Types - Definitions of terms commonly used in chain surveying: Survey stations, base line, check line and tie line - Ranging: Direct and Indirect ranging Offsets: Definition, types, Instruments used - Errors in Chaining, Tape corrections and its necessity.

1.3 COMPASS SURVEYING

Angular measurements-Necessity Instruments used Prismatic compass - Construction details, functions and Temporary adjustment - Types of meridians - Types of bearings - Whole circle and Reduced bearings, Fore and Back bearings- Computation of included angles from bearings – Computation of bearings from included angles – Problems-Errors in compass surveying.

21 Hrs

UNIT – II LEVELLING

Levelling - Definition - Level Parts, Functions, Accessories- Types of levels **:** Dumpy level, Quick setting level, Automatic and Laser level -Levelling staff **-** Types Component parts of Levelling instrument - Definitions of terms used **:** Level surface, Horizontal and Vertical surfaces, Datum, Bench marks, Reduced level, Rise, Fall, Line of collimation, Axis of telescope, Axis of bubble tube, Station, Back sight, Fore sight, Intermediate sight, Change point, Height of instrument, Focusingand Parallax - Temporary adjustment of a level - Balancing - Back sight and Foresight- Principle of leveling - Simple leveling -Levelling field

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book - Reduction of levels - Height of collimation and Rise and Fall method - Comparison of methods - Problems on reduction of levels - Missing entry calculations **:** Problems.

17 Hrs

UNIT – III THEODOLITE SURVEYING

Introduction - Types of Theodolites: Transit and non- transit Theodolite, Vernier and Micrometer Theodolites, Electronic Theodolite (Principles and description only) - Component parts of a transit Theodolite - Functions - Technical terms used in Theodolite surveying - Temporary adjustments- Measurement of horizontal angle by method of repetition and reiteration- Measurement of vertical angle and deflection angle - Reading bearing of a line- Theodolite traversing - Methods - Field checks in closed traverse - Latitude and departure - Consecutive coordinates - independent coordinates - Problems on computation of area of closed traverse - Omitted measurements- Problems.   **17 Hrs**

UNIT – IV CURVES AND CONTOUR SURVEYING

4.1 CURVES
Introduction – Types of curves – Designation of curves – Elements of simple circular curve – Setting out simple circular curve by: Offsets from long chords, Offsets from tangents, Offsets from chords produced and Rankine's method of deflection angles – Simple problems – Transition curves : Objectives – Vertical curves : Definition and types.

4.2 CONTOUR SURVEYING
Definition – Contour – Contouring – Characteristics of contours – Methods of contouring – Direct and Indirect methods – Tacheometric contouring - Interpolation of contours – Differentmethods – Contour gradient – Uses of contour plan and map – Calculation of capacity of reservoir **:** Simple problems.   **17Hrs**

UNIT V TOTAL STATION, GLOBAL POSITIONING SYSTEM, REMOTE SENSING AND GIS
5.1 TOTAL STATION
Introduction - Application of total station - Component parts of a Total Station - Accessories used - Summary of total station characteristics - Features of total station - Electronic display and data reading - Field procedure for co-ordinate measurement - Instrument preparation, Setting and Measurement (Distance, Angle, Bearing, Curve etc.).

5.2 GLOBAL POSITIONING SYSTEM (GPS)
Introduction - Maps - Types of Maps - Various Satellites used by GPS - Differential GPS - Fundamentals of GPS - Application of GPS - GPS Receivers - Hand held GPS Receiver - Function Field procedure - Observation and processing applications in
Civil Engineering.

5.3 REMOTE SENSING AND GIS
Remote sensing – Definition – Basic Process – Methods of remote sensing – Applications.

Introduction – Geographical information – Development of GIS –Components of GIS – Steps in GIS mapping - Ordinary mapping to GIS – Comparison of GIS with CAD and other system – Fields of Applications : Natural resources, Agriculture,Soil, Water resources, Wasteland management and Social resources. **17Hrs**

TEST & MODEL EXAM **7 Hrs**

Reference Book:
1. Kanetkar.T.P. & S.V.Kulkarni, "Surveying and levelling part 1 & 2 ", Puna vidyarthi griha, Prakashan,23rd edition, Reprint 2008.

2. Punmia.B.C, Ashok K.Jain & Arun K. Jain,"Surveying Volume I", Laxmi,Publications Private Limited., 16 th edition, 2011.

3. Punmia.B.C, Ashok Jain & Arun K. Jain,"Surveying Volume II & III", Laxmi, Publications Private Limited., 15 th edition, 2011.

4. Mimi Das Saikia, Bhargab Mohan Das & Madan Mohan Das, "Surveying", PHILearning Private Limited, Edition 2010.

5. S. K. Roy, "Fundamentals of Surveying", PHI Learning Private Limited, Edition2010.

6. Sathesh Gopi, R.Sathikumar & N.Madhu, Advanced Surveying, (Total Station,GIS, Remote Sensing), Pearson Education, Chennai, 2007.

7. M.Anji Reddy, Remote sensing and Geographical information system, B.SPublications, Edition 2006.

8. Burrough P A, Principles of GIS for Land Resources Assessment, OxfordPublication, 2000.

9. Learning Material Development Project – NITTTR, Taramani,Chennai, CDprogramme on GPS and GIS.

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code : EEG304

Semester : III Semester

Subject Title : **CIVIL ENGINEERING DRAWING**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			
			Internal Assessment	Autonomous Examination	Total	Duration
CIVIL ENGINEERING DRAWING	**4 Hrs**	**64 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

Unit	Topics	Hours
I	Introduction	5
II	Planning of Building	5
III	Basic Drawings	9
IV	Building Drawings	38
	Test & Model Exam	7
	TOTAL	**64**

EEG304 CIVIL ENGINEERING DRAWING

OBJECTIVES:

On completion of the course, the student will be :

- Able to study Conventions and Abbreviations.
- Prepare layout of buildings.
- Gain thorough knowledge of the rules, regulations and standards of buildings.
- Able to read the line sketch and prepare plan, sections and elevationsof buildings.

UNIT I INTRODUCTION

General – Conventions- Title block- Scales- Line work- Lettering - Symbols – Abbreviations. Objects of bye-laws- Importance of bye-laws- Function of local authority- Set-backs- Plot Coverage- Number of floors- Height of building- Built upArea- Floor space index (FSI) - Views and details necessary for thepreparation of a civil engineering drawing- Site Plan — Necessity forApproval of plans from local body- Layout plan and key plan-Requirements for submission of drawing for approval- Rules and bye-laws of sanctioning authorities for construction work.

5 Hrs

UNIT II PLANNING OF BUILDINGS

Types of residential buildings- Usual requirements-Types of Rooms — Minimum Size requirement for each type of rooms - Furniture arrangement in each room- Position of stairs / lifts- Position of Doors/Windows House drainage and Sanitary fittings — Sump/Water tanks- Plumbing Pipes -Preparation of line drawing for given requirements with dimensions, not to scale.

Planning aspects - Requirements of industrial units - Sheets for pitched roof coverings — Rolling Shutters - Ramps- Stores- Public Toilets/ Bath rooms- Dining / Resting halls- Ventilation and Lighting - Preparation of line drawing for given requirement with measurements (not to scale).

Types of public buildings - Miscellaneous public buildings - General requirements of Public Buildings -Landscape architecture - Preparation of line plan with dimensions for the given requirements (not to scale).   **5 Hrs**

UNIT III BASIC DRAWINGS

Standard symbols used in Civil Engineering Drawing.

Draw the elevation of:

1. Fully panelled double leaf door.

2. Fully Panelled single leaf door

3. Flush door

4. Fully Panelled window with grill

5. Partly glazed and partly panelled window

6. Lean- to – roof

7. King post roof truss

8. Rain water Harvesting– Recharging into the ground

    a. Shallow well system   b. Percolation pit system.

9. Prepare the Water supply layout and sanitary layout.   **9 Hrs**

UNIT IV BUILDING DRAWINGS

Preparation of plan, section and elevation of buildings with specifications for the given line

drawing to suitable Scale:

1. A Reading room with R.C.C flat roof

2. A House with single bed room and attached bathroom with R.C.C.flat roof.
3. A residential building with two bed rooms with R.C.C. flat roof

4. A Two roomed house with RCC slope roof with gable ends

5. A Small workshop with north light steel roof truss (6 to 10m Span)over R.C.C. Columns.

6. A Primary health center for rural area with R.C.C roof.

7. A Village Library building with R.C.C flat roof

8. A small Restaurant building with R.C.C flat roof

9. A Single storied School building with R.C.C flat roof

10. A Bank building with R.C.C flat roof.

11. A House with fully tiled roof with hips and valleys.   **38 Hrs**

NOTE: All the drawing should containing title block, specification and other details as followed in practice.

TEST & MODEL EXAM   **7 Hrs**

In Examination questions will be given as shown below:

PART A From unit I and II (2 x 3), Unit III – (1 x 9)	15 marks
PART B From Unit IV	60 marks
TOTAL	**75 Marks**

Reference Books

1. National Building code of India 2016
2. Tamil Nadu District Municipal building rules and by-laws
3. Civil Engineering Drawing and house planning – by B.P.Verma
4. Elements building drawings and design – by R.S.Deshpande and N.K.Karandikar
5. Design of Houses – by J.S.Yadav
6. A Guide to Civil Engg. Drawing – by V.R.Thothathri Dr
7. Building Planning and Drawing by N. Kumaraswamy and A. Kameswara Rao.
8. Civil Engineering Drawing by S.C.Rangwala
9. Building Planning and Construction Companion", G. Vaidhyanathan, I. Kulasekaran, G. Sathish Kumar"

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG375

Semester   **:** III Semester

Subject Title   **: SURVEYING PRACTICE I**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks		Total	Duration
			Internal Assessment	Autonomous Examination		
SURVEYING PRACTICE I	**4 Hrs**	**64 Hrs**	**25**	**75**	**100**	**3 Hrs**

DETAILED SYLLABUS

EEG375 SURVEYING PRACTICE I

OBJECTIVES:

On completion of the course, the student:

➢ Will have experience in handling surveying equipments and do practicalexercises in Chain surveying, Compass surveying, Levelling and GPS.

PART A

1 CHAIN AND COMPASS SURVEYING

1.1 Study of chain, tape and accessories used for chainsurvey.

1.2 Study of Prismatic compass, setting up over a station andobserve bearings of lines.
1.3   Running closed traverse and finding the included angles– Use Chain / Tape and Compass. Minimum 5 points.
1.4 Determination of distance between two points when theirbase is accessible. Use Chain / Tape and Compass.
1.5 Determination of distance between two points when theirbase is inaccessible. Use Chain / Tape and Compass.   **10 Hrs**

PART B

2   LEVELLING

2.1. Study of a Level - Temporary adjustment, taking readingsand booking in a field book.

2.2. Fly levelling – Reduction by Height of Collimation method - Minimum 6 points with two change points (MinimumThree exercises)

2.3. Fly levelling – Reduction by Rise and Fall method - Minimum 6 points with two change points (Minimum Three exercises)

2.4. Fly levelling covering minimum 6 points with 2 invertedreadings (Minimum Two exercises).

2.5. Check levelling and reduction of levels (Minimum Two exercises)   **40 Hrs**

PART C

3   GLOBAL POSITIONING SYSTEM (GPS)

3.1. Reading of various Maps like Taluk map, District Mapand Topo sheets.

3.2. Study of Hand held GPS.

3.3. Measurement of Latitude, Longitude and Altitude usinghand held GPS.

3.4. Selection and marking of routings (Way points) usinghand held GPS.   **8 Hrs**

REVISION & TEST   **6 Hrs**

In Examination questions will be given as shown below:

PART A
By lot **ONE** Question
(Either Chain survey or Compass Survey)   - 25 Marks
PART B
Levelling (Compulsory)   - 35 Marks
PART C
ONE Question from GPS   - 10 Marks
Viva Voce   - 5 Marks

TOTAL   - **75 Marks**

DETAILED ALLOCATION OF MARKS

S.No	Description	Part - A Max.Marks (25)	Part - B Max.Marks (35)	Part - C Max. Marks (10)
1.	Procedure, Handling Instruments / Tools	5	10	2
2.	Field works, Observation and Tabulation	10	15	6
3.	Calculations and Check / drawings.	10	10	2

LIST OF EQUIPMENTS

S.No.	List of the Equipments	Quantity Required
1.	Chain with (arrows)	6 nos.
2.	Prismatic compass	6 nos.
3.	Dumpy level	6 nos.
4.	Levelling staff	10 nos.
5.	Cross staff	6 nos.
6.	Ranging rod	2 nos.
7.	Hand held GPS	3 nos.

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS
G-SCHEME

Subject Code   **:** EEG376

Semester   **:** III Semester

Subject Title   **: MATERIAL TESTING LABORATORY I**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks		Total	Duration
			Internal Assessment	Autonomous Examination		
MATERIAL TESTING LABORATORY I	**3 Hrs**	**48 Hrs**	**25**	**75**	**100**	**3 Hrs**

DETAILED SYLLABUS

EEG376 MATERIAL TESTING LABORATORY I

OBJECTIVES:

On completion of the course, the student will be familiar with:

➢ Study of UTM, Torsion testing machine, Hardness tester, Compression testingmachine.

➢ To determine the Material Properties- test conducted on steel, wood, cement,Aluminium, Brass and Brick.

PART A

1. Tension test on mild steel **/** deformed steel bars.

2. Deflection test on Simply Supported Beams of (a) wood and (b) steel to find Young's modulus

3. Torsion test on mild steel bar to determine the ModulusRigidity.

4. Double Shear test on M.S.bar.

5. Impact Test on mild steel by performing Izod /Charpytests

6. Finding Brinnel's hardness numbers of thefollowing materials.

       (a) Mild steel (b) Brass (c) Aluminium.

7. Finding Rockwell's hardness numbers of thefollowing materials.

       (a) Mild steel (b) Brass (c) Aluminium.   **21 Hrs**

PART B

(a)   Compression Test on Wooden cube.

(b)   Compression test on Bricks.

(c)   Compression test on Solid Blocks

(d)   Water absorption test on Bricks /pressed tiles.

(e)   Casting of Cement Mortar cubes after determining the normal consistency of cement.

(f)   Determining the compressive strength of Cement Mortarcubes.   **21 Hrs**

PART C

Collection of different kinds of building materials available in the market and widely used in the construction field and preparation of specification on their qualities, Reports on their uses, Merits, demerits etc and cost statement. (Not for Examination)

(5 Marks will be awarded by class teacher in the Internal Marks of 25)   **3 Hrs**

REVISION & TEST   **3 Hrs**

In Examination questions will be given as shown below:

PART A
By lot **ONE** Question   - 30 Marks
PART B
By lot **ONE** Question   - 40 Marks
Viva Voce   - 5 Marks

TOTAL   **- 75 Marks**

DETAILED ALLOCATION OF MARKS

S.No	Description	Part - A Max. Marks (30)	Part - B Max. Marks (40)
1.	Procedure	5	5
2.	Tabulation and Observation	10	20
3.	Calculations	10	10
4.	Sketch / Graph	5	5

LIST OF EQUIPMENTS

S.No.	List of the Equipments	Quantity
1.	UTM	1 no.
2.	Rock well-cum-Brinell Hardness testing machine	1 no.
3.	Torsion testing machine	1 no.
4.	Impact testing machine for Izod and Charpy test	1 no.
5.	Deflection test verification of Maxwell theorem with magnetic stand, deflection gauge, weights and sets of beam (floor type)	1 no.
6.	Weighing balance-digital 10 kg capacity one gram accuracy with battery backup 8 hours/direct electrical connection	1 no.
7.	Compression testing machine 100 tons capacity (electrical operated)	1 no.
10.	Double shear test apparatus	1 no.
11.	Vicat"s Appratus	1 no.

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG377

Semester   **:** III Semester

Subject Title   **:** **CAD IN CIVIL ENGINEERING DRAWING PRACTICE**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	**Hours / Semester**	**Marks**		**Total**	**Duration**
			Internal Assessment	**Autonomous Examination**		
CAD IN CIVIL ENGINEERING DRAWING PRACTICE	**4 Hrs**	**64 Hrs**	**25**	**75**	**100**	**3 Hrs**

<u>DETAILED SYLLABUS</u>

EEG377 CAD IN CIVIL ENGINEERING DRAWING PRACTICE

OBJECTIVES:

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

➢ To Know about CAD commands.

➢ To Understand building components.

➢ To Draw building drawing using CAD software.

➢ To Prepare approval drawing for submission to authority.

LIST OF EXPERIMENTS

Preparation of drawing using CAD Software

Introduction of CAD software for Preparation of Drawings   **6 Hrs**

1. Definition of various commands used in CAD software.

2. Simple Exercises for familiarizing the drawing commands in CAD software.

PART A   **14 Hrs**

Draw the given drawings in Computer and take print out of all drawings in A4 sheetusing Inkjet / laser printer or plotter and produced in file forms as record.

3. Section of semicircular Arch

4. Elevation of door, partly panelled and partly glazed

5. Preparation of Plan showing arrangement of furniture / fixtures and other features with standard sizes for the followings (Each room to be drawn separately- features and furniture may be pasted from the Blocks available in the packages)

      (i)   Living   (ii) Bed Room   (iii) Kitchen   (iv) Toilet

6. Steel Structures: Cross section of I, Channel, T, Angle and Tubular section,Compound Beams.

7. Section of Load bearing wall from parapet to foundation showing all the details across the section. (Single storey)

8. Rain water Harvesting– Recharging into the ground

      (a) Shallow well system (b) Percolation pit system.

(b) Prepare the Water supply layout and Sanitary layout.

PART B   **40 Hrs**

Draw the building drawing using available CAD software

(c) Plan, Section and Elevation of a single bed roomed building (R.C.C. Roof)

(d) Plan, Section and Elevation of a Double bed roomed building (R.C.C. Roof)

(e) Plan, Section and Elevation of a Primary School Building

(f) Plan, Section and Elevation of a Hospital Building

(g) Plan, Section and Elevation of a Workshop with steel columns, Steel roof truss andMetal sheet Roofing of about 300 m^2 area.

(h) Preparation of approval drawing to be submitted to Corporation or Municipality

showing required details in one sheet such as

      a) Site Plan (Land boundary, Building boundary, Car Parking, Passage, sanitary layout, septic tank location etc.

      b) G.F. Plan, F.F. Plan, Section and Elevation (line diagram is enough)

      c) Key Plan

      d) Septic tank Plan and section (line diagram)

      e) Rain water harvesting pit (with all detail)

      f) Typical foundation details (Column foundation or spread footing)

g) Title block showing – joinery details, Specification, Area statement, colour Index, Title of the property, space for owners Signature and Licensed Surveyor's Signature with address.

REVISION & TEST **4 Hrs**

In Examination questions will be given as shown below:
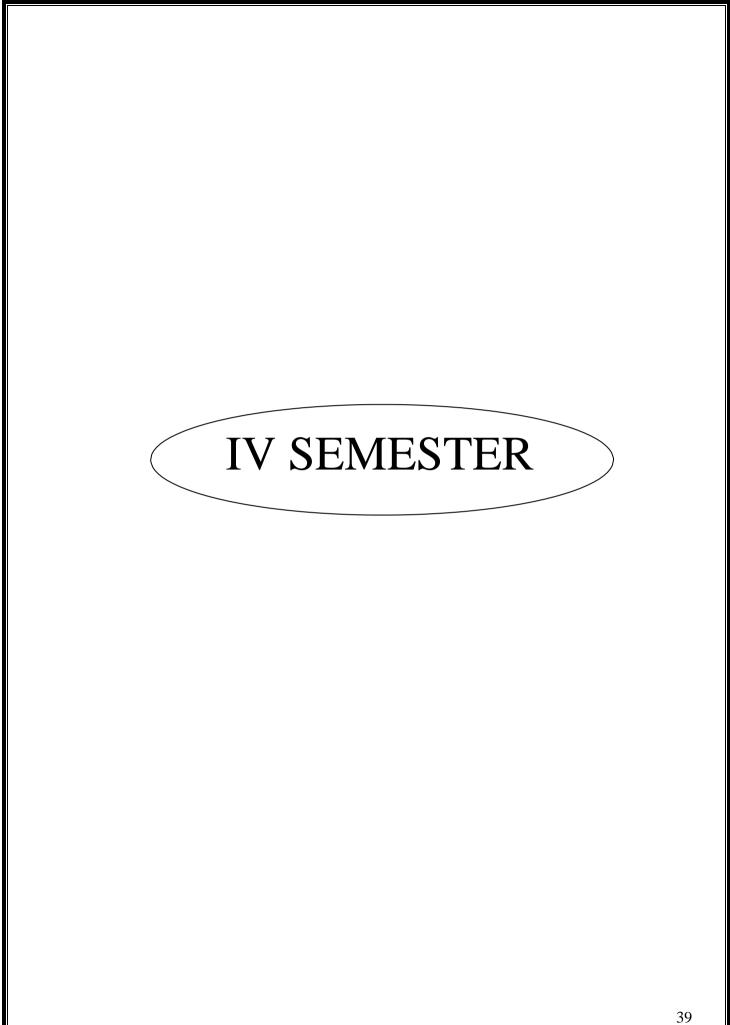
PART A
By lot **ONE** Question   - 20 Marks
PART B
By lot **ONE** Question   - 50 Marks
Viva Voce   - 5 Marks

TOTAL   **- 75 Marks**

LIST OF EQUIPMENTS

S.No.	List of the Equipments	Quantity Required
1.	Computers	20 Nos.
2.	Laser printer	2 Nos.
3.	CAD software	20 Users

IV SEMESTER

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG401

Semester   **:** IV Semester

Subject Title   **: THEORY OF STRUCTURES**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks		Total	Duration
			Internal Assessment	Autonomous Examination		
THEORY OF STRUCTURES	**6 Hrs**	**96 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

Unit	Topics	Hours
I	Slope and Deflection of beams, Propped Cantilever	18
II	Fixed Beams- Area Moment Method Continuous Beams – Theorem of Three Moments Method	18
III	Continuous Beams – Moment Distribution Method Portal Frames - Moment Distribution Method	18
IV	Columns and Struts Combined bending and Direct stresses	18
V	Masonry Dams Earth pressure and Retaining walls	17
	Test & Model Exam	7
	TOTAL	**96**

EEG401 THEORY OF STRUCTURES

OBJECTIVES:

On completion of the course, the student will be familiar with:

➢ Determine the Slope and Deflection of Determinate beams by area moment method.

➢ Analyze Propped cantilevers and Fixed beams by Area-Moment method and draw SFD, BMD.

➢ Analyse Continuous beams by Theorem of Three moments and draw SFD,BMD.

➢ Analyse Continuous beams, Portal frames and Substitute frames by Moment Distribution Method and draw SFD, BMD.

➢ Define different types of Columns and find critical loads of Columns.

➢ Analyse Columns and Chimneys subject to eccentric loading / moment / horizontal loads and find maximum and minimum combined stresses in their sections.

➢ Calculate maximum and minimum bearing pressures and check the stability of Masonry Dams and Retaining walls.

UNIT I

1.1 SLOPE AND DEFLECTION OF BEAMS

Deflected shapes / Elastic curves of beams with different support conditions –Definition of Slope and Deflection- Flexural rigidity and Stiffness of beams- Mohr‟s Theorems – Area Moment method for slope and deflection of beams – Derivation of expressions for maximum slope and maximum deflection of standard cases by area moment method for cantilever and simply supported beams subjected to symmetrical UDL & point loads – Numerical problems on determination of slopes and deflections at salient points of Cantilevers and Simply supported beamsfrom first principles and by using formulae.

1.2 PROPPED CANTILEVERS

Statically determinate and indeterminate Structures- Stable and Unstable Structures- Examples-Degree of Indeterminacy- Concept of Analysis of Indeterminate beams - Definition of Prop– Types of Props- Prop reaction from deflection consideration — Drawing SF and BM diagrams by area moment method for UDL throughout the span, centraland non-central concentrated loads – Propped cantilever with overhang – Point of Contra flexure.   **18 Hrs**

UNIT II
2.1 FIXED BEAMS – AREA MOMENT METHOD

Introduction to fixed beam - Advantages –Degree of indeterminacy offixed beam- Sagging and Hogging bending moments – Determination of fixing end(support) moments(FEM) by Area

Moment method ─ Derivation of Expressions for Standard cases ─ Fixed beams subjected to symmetrical and unsymmetrical concentrated loads and UDL ─ Drawing SF and BM diagrams for Fixed beams with supports at the same level (sinking of supports or supports at different levels are not included) ─ Points of Contra flexure ─Problems- Determination of Slope and Deflection of fixed beams subjected to only symmetrical loads by area moment method ─ Problems.

2.2 CONTINUOUS BEAMS – THEOREM OF THREE MOMENTSMETHOD

Introduction to continuous beams ─ Degree of indeterminacy of continuous beams with respect to number of spans and types of supports ─Simple/Partially fixed / Fixed supports of beams- General methods of analysis of Indeterminate structures ─ Clapeyron"s theorem of three moments ─ Application of Clapeyron"s theorem of three moments for the following cases ─ Two span beams with both ends simply supported or fixed ─ Two span beams with one end fixed and the other end simply supported ─ Two span beams with one end simply supported or fixed and other end overhanging ─Determination ofReactions at Supports- Application of Three moment equations to Three span Continuous Beams and Propped cantilevers ─Problems-Sketching of SFD and BMD for all the above cases. **18 Hrs**

UNIT III

3.1 CONTINUOUS BEAMS – MOMENT DISTRIBUTION METHOD

Introduction to Carry over factor, Stiffness factor and Distribution factor –Stiffness Ratio or Relative Stiffness- Concept of distribution of un balanced moments at joints - Sign conventions ─ Application of M-D method to Continuous beams of two / three spans and to Propped cantilever (Maximum of three cycles of distribution sufficient) –Finding Support Reactions- Problems - Sketching SFD and BMD for two / three span beams.

3.2 PORTAL FRAMES – MOMENT DISTRIBUTION METHOD

Definition of Frames ─ Types ─ Bays and Story - Sketches of Single/Multi Story Frames, Single/Multi Bay Frames- Portal Frame ─ Sway and Non- sway Frames- Analysis of Non sway (Symmetrical) Portal Frames for Joint moments by Moment Distribution Method and drawing BMD only– Deflected shapes of Portal frames under different loading / support conditions. **18 Hrs**

UNIT IV

4.1 COLUMNS AND STRUTS

Columns and Struts ─ Definition ─ Short and Long columns ─ End conditions ─ Equivalent length / Effective length– Slenderness ratio ─ Axially loaded short column - Axially loaded long column ─ Euler"s theory of long columns ─ Derivation of expression for Critical load of Columns with hinged ends ─ Expressions for other standard cases of end conditions (separate derivations not required) ─ Problems ─ Derivation of Rankine"s formula for

Crippling load of Columns– Factorof Safety- Safe load on Columns- Simple problems.

4.2 COMBINED BENDING AND DIRECT STRESSES

Direct and Indirect stresses – Combination of stresses – Eccentric loads on Columns – Effects of Eccentric loads / Moments on Short columns – Combined direct and bending stresses – Maximum and Minimum stresses in Sections– Problems – Conditions for no tension –Limit of eccentricity ─ Middle third rule ─ Core or Kern for square, rectangular and circular sections – Chimneys subjected to uniform wind pressure –Combined stresses in Chimneys due to Self weight and Wind load- Chimneys of Hollow square and Hollow circular cross sections only – Problem.   **18 Hrs**

UNIT V

5.1 MASONRY DAMS

Gravity Dams – Derivation of Expression for maximum and minimum stresses at Base – Stress distribution diagrams – Problems – Factors affecting Stability of masonry dams – Factor of safety- Problems on Stability of Dams– Minimum base width and maximum height of dam for no tension at base – Elementary profile of a dam – Minimum base width of elementary profile for no tension - Middle third rule.

5.2 EARTH PRESSURE AND RETAINING WALLS

Definition – Angle of repose /Angle of Internal friction of soil– State of equilibrium of soil – Active and Passive earth pressures – Rankine"s theory of earth pressure – Assumptions – Lateral earth pressure with level back fill / level surcharge (Angular Surcharge not required)– Earth pressure due to Submerged soils – (Soil retained on vertical back of wall only) – Maximum and minimum stresses at base of Trapezoidal Gravity walls – Stress distribution diagrams – Problems – Stability of earth retaining walls – Problems to check the stability of walls-Minimum base width for no tension.   **17 Hrs**

TEST & MODEL EXAM   **7 Hrs**

Reference Books :

1.   S. Ramamrutham, "Theory of structures", Dhanpat Rai Publications, New Delhi

2.   B.C. Punmia, Ashok Jain & Arun Jain," Theory of structures ",Laxmi Publications,9th Edition, April1992.

3.   S.B. Junnarkar, Mechanics of structures (Vol.II) Charator Publishing HouseAnand, Gujarat.

4.   V.N. Vazirani & M.M. Ratwani, "Analysis of structures", Khanna Publishers, NewDelhi.

5.   R.L. Jindal , "Elementary Theory of Structures", S.Chand Pvt., Co. Ltd.New Delhi.

6.   Madhan Mohan Dass, " Structural Analysis" PHI Learning Pvt. Ltd., New Delhi.

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG402

Semester   **:** IV Semester

Subject Title   **: HYDRAULICS**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
HYDRAULICS	**6 Hrs**	**96 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

Unit	Topics	Hours
I	Introduction of measurement of Pressure Hydrostatic Pressure on Surfaces	20
II	Flow of fluids, Flow through Orifices and Mouthpieces, Flow through Pipes	20
III	Flow through Notches and Flow through weirs	16
IV	Flow through Open channels	15
V	Pumps	18
	Test & Model Exam	7
	Total	**96**

EEG402 HYDRAULICS

OBJECTIVES:

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

➢ Define the properties of fluids and their physical quantities.

➢ List the different types of pressures and various pressure measuring devices.

➢ Calculate hydrostatic forces on plane surfaces immersed in water.

➢ Understand types of forces, energy and application of Bernoulli"s theorem.

➢ Know the different types of Orifices and Mouthpieces and to derive discharge formulae and their Practical applications.

➢ State the different losses of head of flowing liquids in pipes and their equations.

➢ Know the different types of Notches and Weirs, and deriving the discharge formulas and their Practical applications.

➢ Study the different types of Channels and their discharge formulas and to determine the condition for maximum discharge.

➢ Learn the construction details, specifications and efficiencies of Reciprocating Pumps and Centrifugal Pumps.

UNIT I

1.1 INTRODUCTION

Hydraulics – Definition - Properties of fluids - Mass, force, weight, specific volume, specific gravity, specific weight, density, relative density, compressibility, viscosity, cohesion, adhesion, capillarity and surface tension - Dimensions and Units for area, volume, specific volume, velocity, acceleration, density, discharge, force, pressure and power.

1.2 MEASUREMENT OF PRESSURE

Pressure of liquid at a point – Intensity of pressure - Pressure head of liquid – Conversion from intensity of pressure to pressure head and vice-versa - Formula and Simple problems - Types of pressures - Static pressure, Atmospheric pressure, Gauge pressure, Vacuum pressure and Absolute pressure – Simple problems - Measurement of pressure - Simple mercury barometer - Pressure measuring devices- Piezometer tube - Simple U-tube manometer - Differential manometer – Micrometer - Problems.

1.3 HYDROSTATIC PRESSURE ON SURFACES

Pressure on plane surfaces - Horizontal, vertical and inclined surfaces-Total pressure-Centre of pressure - Depth of centre of pressure - Resultant pressure – Problems on Practical application - Sluice gates, Lock gates and Dams- Descriptions. **20 Hrs**

UNIT II

2.1 FLOW OF FLUIDS

Types of flow – Laminar and turbulent flow - Steady and unsteady flow – Uniform and Non-uniform flow - Equation for continuity of flow (law of conservation of mass) – Energy possessed by a fluid body - Potential energy and Potential Head – Pressure energy and Pressure Head - Kinetic Energy and Kinetic Head - Total Energy and Total Head – Bernoulli"s theorem – (No proof) – Problems on Practical applications of Bernoulli"s theorem – Venturimeter - Orificemeter (Derivation not necessary) - Simple problems.

2.2 FLOW THROUGH ORIFICES AND MOUTHPIECES

Definitions- Types of orifices - Vena contracta and its significance – Hydraulic coefficients Cd, Cv and Cc - Formula - Simple problems - Large orifice – Definition – Discharge formula – Simple problems - Practical applications of orifices – Types of mouthpieces - External and internal mouthpieces - Discharge formula - Simple problems.

2.3 FLOW THROUGH PIPES

Definition of pipe-Losses of head in pipes – Major losses - Minor losses - Sudden enlargement, sudden contraction, obstruction in pipes (no proof) - Simple problems – Energy / Head losses of flowing fluid due to friction - Darcy"s equation - Chezy"s equation (No derivation) – Problems - Transmission of power through pipes – Efficiency - Pipes in parallel connected to reservoir - Discharge formula - Simple problems. **20 Hrs**

UNIT III

3.1 FLOW THROUGH NOTCHES

Definitions- Types of notches – Rectangular, Triangular and Trapezoidal notches – Derivation of equations for discharges - Simple problems - Comparison of V-Notch and Rectangular Notch

3.2 FLOW THROUGH WEIRS

Definitions - Classification of weirs - Discharge over a rectangular weir and trapezoidal weir – Derivation – Simple problems – End contractions of a weir – Franci"s and Bazin"s formula – Simple problems - Cippoletti weir – Problems - Narrow crested weir – Sharp crested weir with free over fall - Broad crested weir - Drowned or Submerged weirs - Suppressed weir - Stepped weir – Problems - Definition of terms - Crest of sill, Nappe or Vein, Free discharge - Velocity of approach – Spillways.

16Hrs

UNIT IV

FLOW THROUGH OPEN CHANNELS

Definition - Classification - Rectangular and Trapezoidal channels – Discharge – Chezy"s formula, Bazin"s formula and Manning"s formula - Hydraulic mean depth – Problems - Conditions of rectangular/trapezoidal sections - Specific energy, critical depth –Conditions of maximum discharge and maximum velocity - Problems - Flow in a venturiflume – Uniform flow in channels – Flow through a sluice gate – Types of channels – Typical cross- sections of irrigation canals - Methods of measurements of velocities – Channel losses –Simple problems **15 Hrs**

UNIT V

PUMPS

Pumps – Definition – Difference between a pump and a turbine- Classification of pumps - Positive displacement pumps and roto- dynamic pressure pumps - Characteristics of modern pumps - Maximum recommended suction, lift and power consumed- Reciprocating pump - Construction detail and working principle - Types - Single acting and Double acting -Slip -Air vessels- Discharge and Efficiency- Problems - Centrifugal pump.

Advantages and disadvantages over a reciprocating pump - Layout -Construction details – Priming of centrifugal pump – Working of the pump – Classification – Functions of Foot valve, Delivery valve and Non-return valve – Fundamental equation of centrifugal pump - Characteristics of a centrifugal pump – Discharge, power and efficiency - Problems - Specifications of centrifugal pumps and their sections- Hand pump - Jet pump- Deep well pump - Plunger pumps - Piping system- Computation of power required for pumps, Other types of pumps (not for exam)- Selection and choice of pump.

18 Hrs

Test & Model Exam **7 Hrs**

Reference Books

1. Dr. Jagadish Lal - Hydraulics, Fluid Mechanics and Hydraulic Machines- Metropolitan Book Company- New Delhi

2. P.N. Modi & S.M. Sethi - Fluid Mechanics - Standard Publishers – New Delhi

3. S. Ramamirtham-Hydraulics,Fluid Mechanics and Hydraulics Machines- Dhanpat Rai & Sons, New Delhi

4. K.L.Kumar - Fluid Mechanics – Eurasa Publshing House – New Delhi

5. R.K. Bansal - Fluid Mechanics - Lakshmi Publications

6. Prof. S. Nagarathinam - Fluid Mechanics - Khanna Publishers – New Delhi

7. K.R. Arora - Hydraulics, Fluid Mechanics and Hydraulics Machines –Standard Publishers & Distributors, New Delhi

8. B C S Rao, "Fluid Mechanics and Machinery" Tata-McGraw-Hill Pvt. Ltd., New Delhi

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG403

Semester   **:** IV Semester

Subject Title   **: ENVIRONMENTAL SCIENCE and EIA**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks		Total	Duration
			Internal Assessment	Autonomous Examination		
ENVIRONMENTAL SCIENCE and EIA	**5 Hrs**	**80 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

Unit	Topics	Hours
I	ACIDS, BASES AND HARD WATER	14
II	IMPORTANCE OF IONS IN SOIL AND WATER	14
III	SUSPENDED SOLIDS TURBIDITY AND SALINITY	15
IV	AIR AND WATER POLLUTION	15
V	CHEMICAL TOXICITY AND EIA	15
	Test & Model Exam	7
	Total	**80**

EEG403 - ENVIRONMENTAL SCIENCE and EIA

OBJECTIVES:

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

➢ Define the Acids, Base and Hard water.

➢ List the methods to find the hardness and alkalinity.

➢ Know the different types of chemical available in the soil and water.

➢ Effects of chemicals on humans' animals and environment.

➢ List of remedies for the effects caused by the chemicals.

➢ Knowledge about Dissolved oxygen, suspended solids and turbidity.

➢ Methods to find the turbidity and dissolved solids on water sample.

➢ Relevant compartment of atmosphere

➢ Ozone hole and the harmful effect of CFC gases on the ozone hole, sources of Air pollution.

➢ Toxic chemicals in the environment, Toxic Trace elements in natural water and wastewater, toxicity of drugs and organic compounds.

➢ Environmental impact Assessment importance and procedures

UNIT I

1.1   ACIDS, BASES

pH Determines, Electrolytes – Strong and Week electrolytes – Strong acids and Strong base – Week Acids and Week base- Ionization constant of the week acid (Ka) acid and week base (Kb) – pKa and pKb of the week acid and week base- ionization of water- Kw – Ionic of water – pKw introduction to pH and pOH – Simple problems in pH Alkalinity – Definitions – Units of measurements - Simple Calculations.

1.2   HARDNESS

Hardness – Definition- Cause for Hardness – Adverse effect of industrial processes, Domestic life and personal health – methods of hardness Analysis- Calculation of Hardness in water – Spectrophotometry – Definition – Application of beer – Lambert law to determine the Concentration of sample solution by spectrophotometry – methods to remove Hardness   **14 Hrs**

UNIT II

2.1 IMPORTANCE OF IONS IN SOIL AND WATER

Nitrates, Phosphates, Sulphates and Chlorides, explanation for the importance of nitrogen and the

forms present in the environment "Nitrate Pollution, Blue Baby Syndrome" –Two types of nitrogen fixation – the process of Biological fixation that occurs -Correction between ammonia and nitrates with sources – Chemistry involved in three types of biological fixation – seven sources of nitrates in ground water – Sources, fractions and forms of Phosphates –Example of human effects on Phosphate level – Three methods of phosphate measurement in detail – Calculation of orthophosphate, Condensed phosphate and organic Phosphate in water sample – Explanation of " Eutrophication" and sources of Sulphate and Chlorides.   **14 Hrs**

UNIT III

3.1 DISSLOVED OXYGEN, CHEMICAL AND BIOLOGICAL OXYGEN DEMAND

Dissolved oxygen , Chemical oxygen demand and Biological Oxygen demand – Definitions – Relationship between Do Concentration and   water Pollution – List of factors influencing Do Concentration- Two methods used to analyze Do and BOD in a Sample Water – principles of the Winkler method along with relevant calculation that are used to Solve Do Concentration.

3.2 SUSPENDED SOLIDS, TURBIDITY, AND SALINITY

Definitions – sources, importance and relationship between suspended solids and turbidity – Causes of salinity of water – Soil Salivation – methods used to measure salinity and turbidity – Calculation for total suspended solids.   **15 Hrs**

UNIT IV

4.1 AIR AND WATER POLLUTION

Pollution and pollutant – Classification of Pollutants – Biodegradable and Non-biodegradable - Sources of Air Pollution – Common Air Pollutants and their harmful effects on human health- Acid Rain – Relevant compartments of Atmosphere – three sources of Sulphur – Sox sources of nitrogen oxide effect of Sulphur oxide on human, animals, and plants –chemical and photo chemical reactions in the atmosphere- oxygen and Ozone Chemistry – Greenhouse effect and global warming – ozone hole and harmful effect on of the CFC gas on the ozone hole – formation of fog – water pollutants – organic pollutions –inorganic pollutants – sediments –radioactive materials – thermal pollutants – Harmful effect of water pollution.   **15 Hrs**

UNIT V

5.1 CHEMICAL TOXICITY

Toxic chemical in the environment, air, natural water and wastewater – toxicity of heavy metals –

toxic effects of cadmium, lead, mercury – toxic elements in household like detergents soap, perfume, deodorants, Shampoos bleach, Air fresheners etc. Toxicity of pesticides organic phosphate and carbonate pesticides – synthetic chemicals – toxic honey – Phthalates – Toxicity of Dust – Asbestos, tac Silica – Toxicity of drugs – Analgesics, Cyclophosphamide, Morphine, Azathioprine. Toxicity of Organic Compounds – Vinyl Chloride, Epichlorohdrin, carcinogenic compounds, B- Naphthylamine. Toxic Chemicals in the effluents of oil refinery, textile and dye industries, leather industry, electro plating industry etc.

5.2 ENVIRONMENTAL IMPACT ASSESSMENT

Environmental management –Terminology in EIA – Objectives of EIA – Process and methodologies of EIA – Environmental impact statement – Risk analysis.   **15 Hrs**

TEST & MODEL EXAM   **7 Hrs**

Reference Books

1. Anil Kumar De and Arnab Kumar De–Environmental Chemistry - New Age
2. Kudesia V.P and Ritu Kudesia K.M – Environmental Health and Technology - Pragati Prakashan.
3. Krishna Murthi C.R and Pushpa Viswanathan – Toxic Metals in the Environmental

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG474

Semester   **: I**V Semester

Subject Title   **: HYDRAULICS LABORATORY**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
HYDRAULICS LABORATORY	**4 Hrs.**	**64 Hrs.**	**25**	**75**	**100**	**3 Hrs.**

DETAILED SYLLABUS

EEG474 - HYDRAULICS LABORATORY

OBJECTIVES:

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

➢ Understand parameters associated with fluid flow and hydrostatic pressure.

➢ Measure the fluid pressure using manometers

➢ Determine the co-efficient of discharges of Orifice, mouthpiece, orifice meter, venturimeter, notches etc.,

➢ Determine pipe friction factor

➢ Draw the characteristic curves for centrifugal and reciprocating pumps.

LIST OF EXPERIMENTS

Flow of Fluids: **60 Hrs**

1.   Verification of Bernoulli''s theorem.

2.   Flow through Venturimeter – Determination of Co-efficient of Discharge.

3.   Flow through Orificemeter – Determination of Co-efficient of Discharge.

Flow through orifice:

4.   Determination of Co-efficient of Discharge by Time fall - Head method

5.   Determination of Co-efficient of Discharge by Constant head method.

Flow through external cylindrical mouth piece:

6.   Determination of Co-efficient of Discharge by Timing fall in head method

7.   Determination of Co-efficient of Discharge by Constant head method

Flow through pipes:

8.   Determination of friction factor for the given GI pipe / PVC pipe.

Flow through notch:

9.   Determination of Co-efficient of Discharge for Rectangular Notch / V-Notch

Pumps:

10.   Reciprocating pump – To draw characteristic curves and determine the efficiency

11.   Centrifugal pump – To draw characteristic curves and determine the efficiency

REVISION & TEST   **4 Hrs**

SCHEME OF EXAMINATION:

In the examination the students have to be given ONE experiments from Above.

DETAILED ALLOCATION OF MARKS

S.No	Description	Max. Marks(75)
1.	Procedure	15
2.	Tabulation and Observation/ Execution	25
3.	Calculations	20
4.	Accuracy of result/ Finish/Graph	10
	Viva Voce	05
	Total	**75**

LIST OF EQUIPMENTS

S.No.	List of Equipments	Quantity required
1.	Bernoulli‟s theorem apparatus (closed circuit)	1 No.
2.	Venturimeter/Orificemeter apparatus (closed circuit) with all accessories	1 No.
3.	Pipe Friction apparatus (closed circuit) with all accessories	1 No.
4.	Orifice/Mouthpiece apparatus (closed circuit) with all accessories	1 No.
5.	Notch apparatus (closed circuit) with accessories	1 No.
6.	Reciprocating Pump test rig with accessories	1 No.
7.	Centrifugal Pump test rig with accessories	1 No.

G-SCHEME

Subject Code   **:** EEG475

Semester   **:** IV Semester

Subject Title   **: SURVEYING PRACTICE II**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks		Total	Duration
			Internal Assessment	Autonomous Examination		
SURVEYING PRACTICE II	**4 Hrs**	**64 Hrs**	**25**	**75**	**100**	**3 Hrs**

DETAILED SYLLABUS
EEG475 SURVEYING PRACTICE II

OBJECTIVE:

At the end of the course, students will have experiences:

- ➢   In handling surveying equipments
- ➢   To do practical exercises in theodolite surveying,
- ➢   To do Tachometric surveying
- ➢   To do surveying using Total station.

LIST OF EXPERIMENTS

PART A: THEODOLITE SURVEYING   **20 Hrs.**

1. Study of a Theodolite – Temporary adjustments Reading horizontal angles.

2. Measurement of horizontal angle by:

         i.   Reiteration method (not for Exam)

        ii.   Repetition method (not for Exam)

3. Determination of distance between two points when their bases are accessible, using Theodolite –

Measuring Horizontal angles by repetition method and distancesfrom a Theodolite Station.

4. Determination of distance between two points when their bases are inaccessible, using

   Theodolite — Measuring Horizontal angles by reiteration method from a baseline.

5. Measurements of vertical angles to different points.

6. Determination of Elevation of an object when the base is accessible.

7. Determination of Elevation of an object when the base is inaccessible by :

   a) Single plane method

   b) Double plane method.

8. Run a closed theodolite traverse for measuring length, included angles and bearing at initialStation and Plot the traverse.

PART B: TACHEOMETRIC SURVEYING   10 Hrs.

9. Determination of constants of a tacheometer.

10. Determination of distance and elevation of points by Stadia tacheometry.

11. Determination of gradient between two points (with different elevations) by Stadiatacheometry.

12. Determination of distance and elevation of points by Tangential tacheometry.

PART C: TOTAL STATION   10 Hrs

13. Study of Total Station General commands used – Instrument preparation and settingReading distances and angles.

14. Measurement of distances and co-ordinates of given points, using Total station.

15. Measurement of altitude of given elevated points, using Total Station.

16. Run closed traverse using Total Station and plotting the traverse.

17. Determination of area of a field / land / College Campus etc. using Total station.

REVISION & TEST   **3 Hrs**

SURVEY CAMP : (Outside/Inside the Campus) Duration: 3 days

The objective of the survey camp is to enable the students to get practical training in the field work. Groups of not more than six members in a group will carry out each exercise in Survey camp. The camp must involve work on a large area of not less than 10 acres outside/Inside the campus. At the end of the camp, each student shall have mapped and contoured the area. The camp record shall include all original field observations, calculations and plotting. Two working days and one Saturday

will be used for the Camp work during the 14th week.

15 Marks to be allotted for Survey file in the Autonomous Examination for the works carriedout by the students in survey camp:

i.   L.S and C.S for a road / canal alignment

ii.   Radial Tachometric contouring

iii.   Contouring by block levels

iv.   Curve setting by deflection angle

v.   Theodolite / Tacheometric traverse (Balancing the traverse by Bowditch rule)

vi.   Total Station (Closed Traverse) – Plotting & Finding the area of the given field.

ALLOCATION OF MARKS

PART- A & B by Lot One question   **- 35 Marks**

   (Either Theodolite surveying or in Tacheometry surveying)

   PART- C   One question   **- 20 Marks**

   Survey CampViva-   **- 15 Marks**

   Voce   **- 5 Marks**

                                        TOTAL   75 Marks

S.No	Description	Part – A &B Max. Marks (35)	Part – C Max. Marks (20)
1	Procedure, Handling Instruments /Tools	5	3
2	Field works, Observation andTabulation	15	7
3	Calculations and Check	10	7
4	Accuracy of result	5	3

LIST OF EQUIPMENTS

Sl.No.	List of the Equipments	Quantity Required
1.	Vernier Theodolite	6 nos.
2.	Total Station	2 nos.

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG476

Semester   **:** IV Semester

Subject Title   **: MATERIAL TESTING LABORATORY II**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks		Total	Duration
			Internal Assessment	Autonomous Examination		
MATERIAL TESTING LABORATORY II	**3 Hrs**	**48 Hrs**	**25**	**75**	**100**	**3 Hrs**

DETAILED SYLLABUS

EEG476 MATERIAL TESTING LABORATORY II

OBJECTIVES:

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

➢ Test the properties of fine aggregate and coarse aggregate.

➢ Test the properties of soil.

LIST OF EXPERIMENTS

PART A   **21 Hrs**

1. Determination of Voids ratio and porosity of sand.
2. Determination of liquid limit and plastic limit of the given soil.
3. Determination of bulk density and specific gravity of Fine aggregates.
4. Determination of bulk density and specific gravity of Coarse aggregates.
5. Proctor's compaction test on soil.
6. Direct shear test on sand.
7. Field Density of Soil by core cutter method / sand replacement method.

PART B 21 Hrs

8. Attrition test on Aggregate.

9. Abrasion test on Aggregate.

10. Aggregate crushing value test.

11. Aggregate impact value test.

12. Determination of Water absorption of coarse aggregate.

PART C

Collection of Photos about a Highway Project and Prepare the Report.(Not for Examination)

(5 Marks will be awarded by class teacher in the Internal Marks of 25) **3 Hrs**

REVISION & TEST **3 Hrs**

ALLOCATION OF MARKS

PART A
By lot **ONE** Question - 45Marks
PART B
By lot **ONE** Question - 25 Marks
Viva Voce - 5 Marks

TOTAL **- 75 Marks**

DETAILED ALLOCATION OF MARKS

S.No	Description	Part - A Max.Marks(45)	Part - B Max.Marks(25)
1.	Procedure	10	5
2.	Tabulation and Observation	20	9
3.	Calculations	10	8
5.	Accuracy of result	5	3

LIST OF EQUIPMENTS

S.No.	List of the Equipments	Quantity Required
1.	Pycnometer	4 nos.
2.	Liquid limit device with all accessories	2 nos.
3.	Field density of soil apparatus (sand pouring cylinder) with complete set	2 nos.
4.	Proctor compaction mould with all accessories	2 nos.
5.	Direct shear machine with complete accessories	1 no.
6.	Devals attrition testing machine with complete accessories	1 no.
7.	Dorry"s abrasion testing machine with complete accessories	1 no.
8.	Aggregate impact testing machine with complete accessories	1 no.
9.	Crushing strength apparatus	1 no.

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG477

Semester   **: I**V Semester

Subject Title   **: CONSTRUCTION PRACTICE LABORATORY**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours/ Week	**Hours/ Semester**	**Marks**			**Duration**
CONSTRUCTION PRACTICE LABORATORY	**4 Hrs.**	**64 Hrs.**	**Internal Assessment**	**Autonomous Examination**	**Total**	**Duration**
			25	**75**	**100**	**3 Hrs.**

DETAILED SYLLABUS

EEG477 - CONSTRUCTION PRACTICE LABORATORY

OBJECTIVES:

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

➢ Prepare center line plan and foundation plan for a building.

➢ Set out foundation in the field for spread footing and column footing for a building.

➢ Brick arrangement of using English Bond

LIST OF EXPERIMENTS

Part A   **30 Hrs.**

1. Identify various sizes of available coarse aggregates from sample of 10 kg in laboratory and prepare report (60,40, 20,10 mm)

2. Identify the available construction materials in the laboratory on the basis of their sources.

3. Identify the grain distribution pattern in given sample of teak wood in the laboratory and draw the various patterns. (along and perpendicular to the grains)

4. Identify various layers and types of soil in foundation pit by visiting at least 3 construction sites in different locations of city and prepare report consisting photographs and samples.

5. Select first class, second class and third class bricks from the stake of bricks and prepare report on the basis of its properties.

6. Measure dimension of 10 bricks and find average dimension and weight. Perform field tests - dropping, striking and scratching by nail and correlate the results obtained.

7. Apply the relevant termite chemical on given damaged sample of timber.

8. Apply two or more coats of selected paint on the prepared base of a given wall surface for the area of 1m x 1m using suitable brush/ rollers adopting safe practices.

9. Prepare mortar using cement and Sand/ Fly ash or Granite/marble polishing waste in the proportion 1:6 or 1:3.

Part B   **30 Hrs.**

10. Prepare and develop a centre line plan, foundation Plan and set out spread footing in the field for the given line sketch of a building.

11. Prepare and develop a centre line plan, foundation Plan and set out the layout of columns and footing in the field for the given line sketch of a building (Framed structure).

12. Arrangement of bricks using English bond for one brick thick wall and one and half brick thick wall for right angled corner junction.

13. Arrangement of bricks using English Bond for one brick thick wall, one and half brick thick wall for Tee junction.

14. Arrangement of bricks using English bond for one brick thick,one and half and two brick thick square pillars.

15. Straightening, cutting, hooking and bending and arrangement of Steel reinforcement bars.

   a. Singly reinforce beam **b**. Lintel and Sunshade **c**. Column and footing

REVISION & TEST   **4 Hrs**

SCHEME OF EXAMINATION:

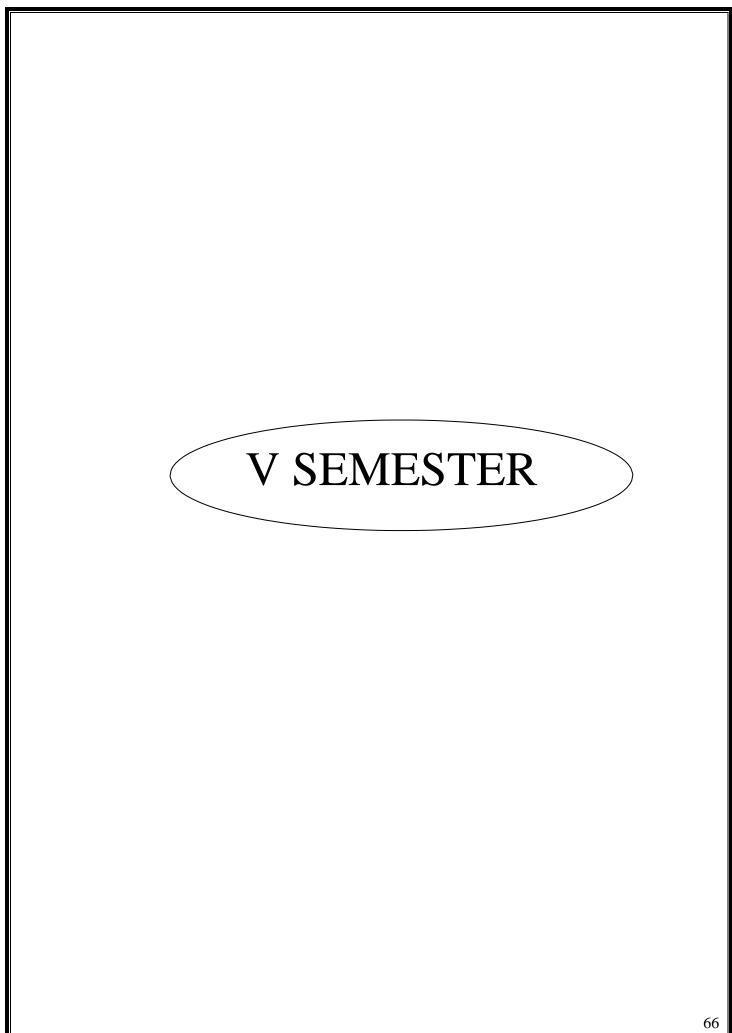In the examination the students have to be given two experiments one from Part A and another from Part-B.

DETAILED ALLOCATION OF MARKS

S.No	Description	Part – A Max. Marks(25)	Part – B Max.Marks (45)
1.	Procedure	5	5
2.	Tabulation and Observation	10	20
3.	Calculations/Field work		10
4.	Sketch / Graph		5
5.	Accuracy of result/ Report	10	5
	Viva Voce	5	
	Total	**75**	

LIST OF EQUIPMENTS

Sl.No.	List of Equipments Required	Quantity Required
1.	Pegs, thread, cranking tools	As required
2.	Consumables like Bricks, aggregate, paints, Fly ash, polish, steel rods	As required

V SEMESTER

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code **:** EEG501

Semester **:** V Semester

Subject Title **: STRUCTURAL ENGINEERING**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
			Marks			
	Hours / Week	Hours / Semester	Internal Assessment	Autonomous Examination	Total	Duration
STRUCTURAL ENGINEERING	**6 Hrs**	**96 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

Unit	Topics	Hours
I	Reinforced cement concrete structures	18
II	Design of T-beams and lintels for flexure by LSM Design of Continuous Beams for flexure and shear by LSM	17
III	Design of one way Slabs and Staircases by LSM Design of two way Slabs by LSM	20
IV	Design of columns by LSM Design of Column Footings	16
V	Steel Structures	18
	Test & Model Exam	7
	Total	**96**

EEG501 STRUCTURAL ENGINEERING

OBJECTIVES:

On completion of the course the students should be able to:

- Analyse and design simple RCC elements like singly / doubly reinforced rectangular beams, and singly reinforced T-beams (Cantilevers, Simply supported/ Continuous beams, Lintels etc.) for shear and flexure by limit state method
- Design One way/ Two way slabs and Staircases by limit state method.
- Design Axially loaded Columns and Footings by limit state method.
- Analyse and design simple RCC elements like singly/doubly reinforced rectangular beams, and singly reinforced T-beams (Cantilevers, Simply supported/ Continuous beams, Lintels etc.) for shear and flexure by limit state method;
- Design One-way/Two-way slabs and Staircases by limit state method;
- Design Axially loaded Columns and Footings by limit state method;
- Design simple Steel members like laterally supported Beams, Tension members, Compression members and Welded connections by limit state method.

UNIT I

1.1   INTRODUCTION TO WORKING STRESS AND LIMIT STATEMETHOD

Reinforced Cement Concrete- Materials used in R.C.C and their basic requirements – Purpose of providing reinforcement – Different types and grades of cement and steel ─ Characteristic strength and grades of concrete ─ Behaviour of R.C members in bending-Modular ratio and Equivalent area of R.C.Sections – Different types of loads on structuresas per IS: 875-1987 - Different methods of design.

Working Stress Method-Assumptions made in the W.S.M- Singly reinforced rectangular sections – Strain and stress distribution due to bending – Actual and Critical neutral axes – Under / Over reinforced sections- Balanced sections – Lever arm – Moment of resistance of singly reinforced rectangular sections (No problems).

Limit State Method – Concept –Advantages- Different limit states- Characteristic strength and design strength of materials – Characteristic loads and design loads - Partial safety factors for loads and material strength - Limit state of collapse in flexure – Assumptions – Stress Straincurves for concrete and steel ─ Stress block ─ Maximum strain in concrete – Limiting values of neutral axis of singly reinforced section for different grades of steel -Design stress in tension and compression steel– Moment of resistance of singly and doubly reinforced rectangularsections– Problems.

1.2   DESIGN OF RECTANGULAR BEAMS FOR FLEXURE BY L.S.M

Design requirements-Effective spans of cantilever and simply supported beams – Breadth and depth

requirements of beams — Control of deflection — Minimum depth requirement for stiffness — Minimum concrete cover to reinforcement steel for durability and fire resistance — Minimum and maximum areas/ spacing for main reinforcement and side face reinforcement as per IS 456 -2000 - Development Length- Anchorage values of bends and hooks - Curtailment of reinforcements- Design bending moments — Design of singly and doubly reinforced rectangular beams (Cantilevers and Simply supported beams carrying udl only)- Problems- Practice on using Design Aids, SP16 (Description only). **18 Hrs**

UNIT II

2.1 DESIGN OF T-BEAMS AND LINTELS FOR FLEXURE BY L.S.M

Cross sections of Tee and L-beams- Effective width of flange- Neutral Axis and M.R of Singly Reinforced T-Sections- Design of singly reinforced T-beams for flexure–Problems on Simply supported T- beams carrying udl only — Loads on Isolated Lintels over openings of masonry walls - Design B.M for isolated lintels carrying rectangular/triangular loads- Design of Lintel- Simple problems

2.2   DESIGN OF CONTINUOUS BEAMS FOR FLEXURE AND SHEAR BY L.S.M

Methods of analysis of continuous beams- Effective Span- Arrangement of Loading for Critical Bending Moments- B.M coefficients specified by IS:456-200-Design of rectangular continuous beams (Singly and Doubly Reinforced) using B.M. coefficients (equal spans &udl only) for sagging and hogging moments.

Limit state of collapse in shear – Design shear strength of concrete – Design shear strengths of vertical / inclined stirrups and bent up bars – Principle of shear design **–** Critical sections for shear- S.F Coefficients specified by IS: 456- 2000– Nominal shear stress –Minimum shear reinforcement- Design of vertical stirrups for rectangular beams using limit state method –Simple problems- Practice on use of Design Aids (Description only). **17 Hrs**

UNIT III

3.1 DESIGN OF ONE WAY SLABS BY L.S.M

Classification of Slabs — Effective spans — Loads (DL and IL) on floor/roof slabs and stairs (IS: 875-1987) — Strength and Stiffnessrequirements –Minimum and maximum permitted size, spacing and area of main and secondary reinforcements as per IS 456 - 2000- Cover requirement to reinforcements in slabs- Design of cantilever/simplysupported one way slabs and sunshades by limit state method – Designof continuous slabs using B.M coefficients- Check for shear and stiffness — Curtailment of tension reinforcement –Anchoring of reinforcement– Practice in designing slabs using design aids (Description only).

Types of stairs according to structural behaviour- Requirements of Stairs- Planning a staircase – Effective span of stairs – Effective breadth of flight slab- Distribution of loads on flights – Design of cantilever steps – Design of doglegged stairs spanning parallel to the flight - Planning of open well staircase.

3.2 DESIGN OF TWO WAY SLABS BY L.S.M

Introduction –Effective spans –Thickness of slab for strength and stiffness requirements - Middle and Edge strips – B.M coefficients as per IS:456 – Design B.Ms for Simply supported, Restrained and Continuous slabs – Tension and Torsion reinforcement requirement– Design of twoway slabs using B.M. coefficients – Curtailment of reinforcement – Check for stiffness only.   **20 Hrs**

UNIT IV

4.1 DESIGN OF COLUMNS BY L.S.M

Limit state of collapse in compression – Assumptions - Limiting strength of short axially loaded compression members - Effective length of compression members – Slenderness limits for columns – Classificationof columns -Minimum eccentricity for column loads – Longitudinal andTransverse reinforcement requirements as per I S 456-2000 — Cover requirement - Design of axially loaded short columns with lateral ties / helical reinforcement — Practice on use of Design Aids (Description only).

4.2 DESIGN OF COLUMN FOOTINGS

Basic requirements of Footings-Types of R.C footings –Minimum depthbelow GL- Footings with uniform thickness and varying thickness (sloped footing) – Critical sections for BM, Transverse/Punching Shears — Minimum reinforcement, Distribution of reinforcement, Development length, Anchorage, Cover, Minimum edge thickness requirements as per IS 456- 2000 — Design of Isolated footing (square and rectangular) with uniform/ varying thickness by limit state method- For Examination : Problem either on (i) Designing Size of Footing and Area of tension steel for flexure only for the given Column load and SBC of soil, or on (ii) Checking the footing for Punching shear and Transverse shear only, for the given sizes and other required details of the footing.   **16 Hrs**

UNIT V

5.1 DESIGN OF TENSION AND COMPRESSION MEMBERS BY L.S.M

General- Characteristic Actions, Partial Safety Factors for Loads, Design Actions- Ultimate Strength, Partial Safety Factors for Materials, Design Strengths of Materials - Rolled Steel Sections - Different forms of Tension members – Gross area, Net area and Net Effective sectional area of Tension members– Maximum permitted values of Effective Slenderness Ratio–Design Strength of single angle Tension members against Yielding of Gross section and Rupture of Critical section- Block Shear (Description only)-Design of ties using single angles and channel sections.

Different forms of Compression members- Classification of Cross sections- Limiting Width to Thickness Ratio- Effective sectional area-End Conditions and Effective length of Compression members – Maximum permitted values of Slenderness ratio – Imperfection factor and Stress reduction factor– Design Strength of Compression members- Problems — Design of single angle and double angle Struts – Design of steel columns using rolled steel sections (Symmetrical sections only) without cover plates. (Lacing and battens not included).

5.2 DESIGN OF SIMPLE BEAMS AND WELDED CONNECTIONS BY L.S.M

Classification of Steel beams –Effective span- Design principles- Minimum thickness of Web-Design Strength in Bending/ Shear- Limiting deflection of beams - Lateral buckling of beams – Maximum

permitted Slenderness Ratio- Plastic Moment of Resistance and Plastic Section Modulus of Sections-Shape Factor — Design of laterally supported Simple beams using single / double rolled steel sections (symmetrical cross sections only) (Built-up beams not included).

Types of welds –Size, Effective area and Effective length of Fillet welds – Requirements of welds-Stresses in Welds –Design strength of fillet/ butt welds -– Lap and butt joints for angles only – Simple Problems - Procedure for design of welded connections for Plates and Angles (Theory only). **18 Hrs**

Test & Model Exam   **7 Hrs**

Reference Books:

1.   S.R.Karve and V.L.Shah,"Limit state Theory and Design of ReinforcedConcrete",Pune Vidya Griha

     Prakashan.
2.   P C Varghese," Limit state Design of Reinforced Concrete", PHI Learning Pvt.Ltd",2011.
3.   Dr.S.Ramachandra,"Limit State Design of Concrete Structures", Scientific publishers,2004.
4.   Mallick and Rangasamy,"Reinforced Cement Concrete" Oxford-IBH.

5.   N Krishnaraju, " Reinforced Concrete Design" New Age International Publications,2012

6.   B C Punmia, " Limit State Design of Reinforced Concrete", Laxmi Publications,2007

7.   B C Punmia, " R C C Designs", Laxmi Publications, 2006

8.   S S Bhavikatti, " Design of R C C and Structural Elements" (RCC Vol I), New Age

     International Publications, 2011
9.   IS 456-2000, I S 875-1987.

10. Explanatory hand book SP24, Design Aid SP 16, Detailing of Reinforcement,SP 34.

11. S S Bhavikatti,"Design of RCC and Structural Elements"(RCC Vol I),New Age

     International Publications, 2011

12. IS 456-2000; IS875-1987; IS800-2007.

13.   Explanatory hand book SP24, Design Aid SP16,Detailing of Reinforcement, SP 34

14.   M.R.Shiyekar"Limit State Designin Structural Steel",PHI Learning Pvt Ltd, 2011

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG502

Semester   **:** V Semester

Subject Title   **: WATER SUPPLY AND WASTEWATER ENGINEERING**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks		Total	Duration
			Internal Assessment	Autonomous Examination		
WATER SUPPLY AND WASTEWATER ENGINEERING	**5 Hrs**	**80 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

UNIT	Topics	Hrs.
I	Water Supply Engineering: Introduction, Quantity of Water, Source of Water, Intakes and conveyance	15
II	Quality of Water, Primary treatment of water, Filtration of water, Disinfection of water and water softening.	15
III	Distribution system and preparation of water supply scheme or project.	15
IV	Wastewater Engineering Collection and conveyance of sewage, Sewage appurtenances.	14
V	Primary Treatment of water, Secondary treatment of water,	14
	Test & Model Exam	7
	Total	**80**

EEG502 WATER SUPPLY AND WASTEWATER ENGINEERING

OBJECTIVES:

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

➢ Know the procedure of estimating water requirements for a water supply scheme.

➢ Select suitable sources of water supply and pipe materials.

➢ Determine the quality of water, testing procedures and standards for drinking water.

➢ Understand the methods of purification of water.

➢ Understand the systems of distribution for a water supply scheme.

➢ Understand the basic facts of wastewater engineering, the methods of collection and conveyance of sewage.

➢ Understand the primary and secondary treatment of sewage and disposal.

➢ Know the methods of disposal of sludge.

UNIT I

PART I – WATER SUPPLY ENGINEERING

1.1 INTRODUCTION

Water Supply – Salient Features of a Water Supply Scheme –Flow Chart of a Water Supply Scheme-Agencies responsible for protected water supply.

1.2 QUANTITY OF WATER

Water Supply - Need for Protected Water Supply - Objectives of Public Water Supply System Demand-Types of Demand –PerCapita Demand- Prediction of Population - Problems in Arithmetical Increase Method, Geometrical Increase Method, Incremental Increase Method.

1.3 SOURCES OF WATER

Sources of Water – Surface Sources – Underground Water Sources – Selection of Source of Water

1.4 INTAKES AND CONVEYANCE

Intakes - Types of Intakes - Description of Intakes -Infiltration Galleries and Infiltration Wells in River Beds - Pipes for Conveyance of Water - Cast Iron, Steel, G.I., Cement Concrete, R.C.C., Hume and PVC Pipes - Pipe Joints - Laying and Testing of Pipe Lines. **15 Hrs**

UNIT II

2.1 QUALITY OF WATER

Impurities in Water - Testing of Water - Collection of Water Sample - Physical, Chemical, Bacteriological Tests - Standards of Drinking Water - Water Borne Diseases and their Causes.

2.1   PRIMARY TREATMENT OF WATER

Object of Water Treatment – Flow Diagram of a Treatment Plant – Function of Units – Sedimentation – Purpose of Sedimentation – Types of Sedimentation Tank – Coagulation – Coagulants – Flocculation – Coagulation Process.

2.3 FILTRATION OF WATER

Theory of Filtration – Classification of Filters – Slow Sand Filter – Rapid Sand Filter –Pressure Filter - Comparison between slow sand filter and rapid sand filter.

2.4 DISINFECTION OF WATER AND WATER SOFTENING

NecessityofDisinfection–MethodsofDisinfection–Chlorination–Action of Chlorine – Methods of Chlorine – Forms of Chlorination –Water Softening – Necessity of Water Softening – Hardness – Types of Hardness – Effects of Hardness – Removal of Hardness (names only) - Miscellaneous Water treatment (names only) – Mineral water – requirements – Treatment Process – Reverse of Osmosis (RO).   **15 Hrs**

UNIT III

3.1 3.1DISTRIBUTION SYSTEM

Distribution System - Methods of Distribution Gravity System, Pumping System, Combined System - Systems of Water Supply - Continuous and Intermittent Supply of Water-Layouts of Distribution-Dead End, Grid Iron, Radial and Circular Systems – Service Reservoirs - Types.

3.2 PREPARATION OF WATER SUPPLY SCHEME OR PROJECT

Reconnaissance of Survey–Demand of Water–Source of Water– Preparation of Topographical Map – Layout Map of the Scheme – Map and Drawing to be Prepared – Office Work – Project Report.   **15 Hrs**

PART II– WASTEWATER ENGINEERING

UNIT IV

4.1 COLLECTION AND CONVEYANCE OF SEWAGE

Sanitation Purpose Terms -Systems of Sanitation -Quantity of Sewage - Variation in Rate of Flow of Sewage -Estimation of strom water - problems -Minimum Size of Sewer – Shapes of Sewer (names only) - Materials used for Sewer - Joints in Sewer Line - Laying and Testing of Sewer Lines – Ventilation of Sewers - Cleaning of Sewers

4.2 SEWER APPURTENANCES

Sewer Appurtenances Manhole-Lamp Hole-Catch Basin-Street-Inlet -Grease and Oil Trap-Flushing Tanks Drainage Arrangements in Buildings - Sanitary Fittings - Sewage Pumps Necessity -Types of Sewage Pumps (names only).   **14 Hrs**

UNIT V

5.1 PRIMARY TREATMENT OF SEWAGE

Introduction–Flow Diagram of Primary Treatment–Screens–Grit Chamber–Skimming Tank–Primary

Sedimentation Tank.

5.2 SECONDARY TREATMENT OF SEWAGE
Introduction–Flow Diagram of Secondary Treatment–Function of the Units of Secondary Treatment-Secondary Sedimentation Tank–Filters –Types-Trickling Filters-Activated Sludge Process–Oxidation Ditches - Aerobic Lagoons - Anaerobic Lagoons - Rotary Biological Disc. Tertiary treatment – Activated sand filter and chlorination. Septic tanks for isolated buildings–Construction and working of septic tanks–Soak Pits–Dispersion Trenches. Constructed wetlands for sewage treatment in rural areas.

5.3. SEWAGE & SLUDGE DISPOSAL
Sewage Disposal- Dilution - Self-purification of streams - factors affecting self-purification. Disposal in Sea water - Disposal on Lands -. Recycle of wastewater (Grey water technology) Sludge treatment & Disposal - Sludge treatment & disposal methods. Sludge digestion tank – Sludge drying bed.   **14 Hrs**

Test & Model Exam   **7 Hrs**

Reference Books:
1. S.K. Garg,"Water Supply Engineering", PHI Kanna publishers, New Delhi".
2. S.K. Garg," Sewage waste disposal and air pollution engineering", PHI Kanna publishers, New Delhi".
3. S.C.Rangwala,Water Supply and Sanitary Engineering,Charotar Publishing House, New Delhi, 2007
4. G.S.BirdieandJ.S.Birdie, Water Supply and Sanitary Engineering, Dhanpat Rai Publishers, New Delhi, 2010.
5. N.N.BASAK,Environmental Engineering,Tata McGraw hill publishing Company Ltd., New Delhi, 2010
6. A.Kamala D.l.kanthrao,Environmental Engineering,Tata McGraw hill publishing Company Ltd., New Delhi, 1985
7. Gurcharan Singh, Water supply and Sanitary Engineering vol.I& II, Standard publishers & distributors, New Delhi, 2007.
8. Dr. SureshK. Dhameja, Environmental Engineering and Management, S. K. Kataria& Sons, New Delhi. 2005.
9. B C Punmia, Water Supply Engineering ,Laxmi Publications,New Delhi,2019
10.B C Punmia,Wastewater Engineering ,Laxmi Publications,New Delhi,2019

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG581

Semester   **:** V Semester

Subject Title   **: TRANSPORTATION ENGINEERING AND URBAN PLANNING**

(Elective Theory I)

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks		Total	Duration
			Internal Assessment	Autonomous Examination		
TRANSPORTATION ENGINEERING AND URBAN PLANNING	**5 Hrs**	**80 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

Unit	Topics	Hours
I	HIGHWAYENGINEERING	16
II	RAILWAYENGINEERING	16
III	URBAN PLANNING	14
IV	URBAN PLANNING (Contd.)	12
V	URBAN PLANNING (Contd.)	15
	TEST AND REVISION	07
	Total	**80**

EEG581 TRANSPORTATION ENGINEERING AND URBAN PLANNING (Elective Theory I)

OBJECTIVES:

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

- ➢ Know the importance of roads, geometric design, highway materials
- ➢ Learn the construction of different types of roads
- ➢ Understand about Railway fixtures, Types of stations, Signalling and Interlocking
- ➢ Understand the principle of Urban Planning
- ➢ Know the requirements of housing and slum clearance
- ➢ Learn the requirements of Public buildings, Master plan and Re-planning of existing towns
- ➢ Understand the requirements and types of Urban roads and Traffic management
- ➢ Know the importance of housing and slum clearance programmes
- ➢ Learn the Building bye laws and other miscellaneous topics

UNIT I HIGHWAY ENGINEERING

1.1 INTRODUCTION

General – Development of Roads in India – Modes of transportation – Nagpur Plan – Ribbon Development – Advantages of roads – Importance of roads in India – Requirements of an ideal road – Indian Road Congress – Objects of Highway planning – Classifications of Highways

1.2 GEOMETRICAL DESIGN OF HIGHWAYS

General – Road structure – Right of way – Land width – Width of formation – Road camber – Super elevation – Sight distance – Road gradient – Road curves – Horizontal curves – Vertical curves – Types

1.3 SUB GRADE SOIL

Significance – Soil mass as a three phase system – Grain size classification – Atterberg limits – Definition and description – I.S. Classification of soils – Compaction – Definition – Objects of Compaction – Standard Proctor Compaction test – Shear strength – Definition – Importance – Direct shear test

1.4 TESTS FOR HIGHWAY MATERIALS

General – Types of road aggregates –Requirements of a good road aggregates- Tests for road aggregates – Abrasion test – Crushing test – Impact test – Shape test – Specific gravity test and Water absorption test – Functions of Bituminous materials – Test for bituminous materials – Ductility test – Flash and Fire point test – Penetration test – Softening point test

1.5 TYPES OF ROADS

General – Classifications – Earthen road, Gravel road - Water Bound Macadam road – Construction of WBM road - Bituminous roads – Surface dressing bituminous road - Construction procedure – Construction of concrete road (step – by – step procedure) Formation of Hill roads – Hair pin bends – Retaining and Breast walls.   **16 Hrs**

UNIT II RAILWAY ENGINEERING

2.1 INTRODUCTION

Introduction of Railways – Classifications of Indian Railways – Rail Gauges – Types – Rails – Functions of rails – Requirements of an ideal rail – Types of rail sections – Coning of wheels – Hogged rails – Bending of rails – Creep of rails – Causes and prevention of creep

2.2 SLEEPERS, BALLAST AND RAIL FASTENINGS

Sleepers – Functions of sleepers- Materials for sleepers –   Sleeper density – Ballast – Functions of Ballast – Materials used as ballast – Rail joints – Types – Rail fastenings – Fish plates – Fish bolts – Spikes – Chairs and Keys – Bearing plates – Blocks – Elastic fastenings – Anchors and anti-creepers

2.3 STATIONS AND YARDS

  Definition of station – Purpose of railway station – Types of stations – Wayside, Junction and Terminal stations – Platforms – Passenger and Goods platforms – Definition of Yard – Types of Yard – Passenger yard, Goods yard, Marshalling yard and Locomotive yards – Level crossings

2.4 POINTS AND CROSSIGNS

 Purpose – Definitions – Turnouts – Right hand and Left hand turnouts – Types of switches – Crossings – Types of crossings

2.5 SIGNALLING AND INTERLOCKING

  General – Types of signalling – Based on function and location – Special signals – Control of movement of trains – Absolute block system Automatic signalling – Centralized traffic control system – Interlocking system – Principle of interlocking – Tappets and locks system.   **16 Hrs**

UNIT III URBAN PLANNING

3.1 TOWN PLANNING PRINCIPLES

General – Objects of town planning – Principles of Town planning – Necessity of town planning – Origin of towns – Growth of towns – Stages in town development – Personality of town - Distribution of land – Forms of planning – Site for an ideal town – Requirements of new towns – Planning of a modern town – Powers required for enforcement of town planning scheme – Cost of town planning – Present position of town planning in India

3.2 ZONING

Meaning of the term – Uses of land, objects and Principles of Zoning – Advantages of zoning – Importance of Zoning – Aspects of Zoning – Transition Zone – Economy of zoning – Special Economic Zone (SEZ) – Zoning powers – Maps for Zoning.

3.3   HOUSING

General - Importance of housing - Demand for houses - Building site - Requirements of residential buildings -Classification of residential buildings - Design of residential areas - Rural Housing - Agencies for housing -Investment in housing - HUDCO — CIDCO - Housing problems in India.

3.4 SLUMS

General - Causes of slums - Characteristics of slums - Effects of slums - Slum clearance - Problems in removing slums - Improvement Works - Open plot scheme - Slum clearance and rehousing - Prevention of slum formation - Resources for slum clearance programmes - The Indian slums.   **14Hrs**

UNIT IV URBAN PLANNING (Contd.)

4.1 PUBLIC BUILDINGS

General – Suitable location of Public buildings – Classification – of Public Buildings – Principles of design of public buildings – Town Centres – Grouping of public buildings – Requirements of Public buildings – Green House – Civic aesthetics

4.2 MASTER PLAN

General – Objects – Necessity – Factors to be considered –Data to be collected – Drawings to be prepared – Features of master plan – Planning standards – Report – Stages of preparation – Method of Execution – Conclusion

4.3 RE-PLANNING EXISTING TOWNS

General – Objects of re-planning – Analyzing the defects of existing towns – Data to be collected – Difficulties in Master Planning existing Towns / Cities – Urban renewal projects – merging of suburban areas – Decentralization – Satellite towns – Smart cities – definition and features – Surface drains – Refuses of Towns – Refuse disposal methods

4.4 URBAN ROADS

General – Objects – Requirements of good city road – Factors to be considered – Classification of urban roads – Types of street systems – Through and By-pass roads – Outer and inner ring roads – Expressways – Freeways – Precincts – Road aesthetics   **12 Hrs**

UNIT V URBAN PLANNING (Contd.)

5.1 TRAFFIC MANAGEMENT

General – Object – Traffic Survey – Traffic congestion – Traffic control – Traffic diversion – Road

junction – Parking – Traffic capacity of road – One way traffic – Road traffic problems – Use of Islands and Flyovers at crossings – Causes of road accidents – Traffic signal – Advantages and disadvantages of Automatic light signals – Road sign – Road marking – Name boards of streets – Direction boards – Street lighting in a town – Traffic problem of existing towns – Peculiarities of traffic

5.2 BUILDING BYE -LAWS

General - Objects of bye-laws - Importance of bye-laws - Function   of   local   authority   - Responsibility of owner -Applicability of bye-laws - Set backs to buildings – Necessity of setbacks - Light plane – Plot coverage - Floor space index- Maximum Height of buildings - Off-street parking – Fire protection - Minimum width of streets and plot sizes – Some other terms - Principles underlying in framing building bye- laws – Building bye-laws for residential area of a typical town planning scheme – Building bye-laws for other types of buildings -Development control rules - General rules of metropolitan Area - CMDA rules.

5.3 MISCELLANEOUS TOPICS

Airports – Location - size - Noise control - Parts of an airports - Betterment and compensation – City blocks –Conurbations - Cul-de-sac streets - Focal point - Green belt - Public utility services - Rapid transit –Remote sensing application – Urbanplanning using remote sensing – Site suitability analysis Location of Bus Terminus, Whole sale markets, Exhibition Centres etc., – Location for water/sewage treatment plants, location for waste disposal etc.,– Transportation planning. **15 Hrs**

Test & Model Exam   **7 Hrs**

Reference Books

1. Town Planning - S.C. Rangwala,: Charotar Publisher (2011), Publisher

2. K.S.Rangwala and P.S.Rangwala,.Town Planning ”,Charotar Publishing House,15[th]Edition,1999.

3. Michael Hord, R. Remote sensing methods and application, John Wiley and Sons,NewYork, 1986.

4. National Building Code of India- Part-III.(2005).

5. Municipal and Panchayat bye-laws, CMDA Rules and Corporation bye-laws.

6. KA. Ramegowda, Urban and regional planning , University of Mysore

7. Principles and practice of town and country planning Lewis B. Keeble, Estates Gazette,University of Michigan, 2010

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG582

Semester   **:** V Semester

Subject Title   **: OCCUPATIONAL HAZARDS AND INDUSTRIAL SAFETY**

       (Elective Theory I)

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks		Total	Duration
			Internal Assessment	Autonomous Examination		
OCCUPATIONAL HAZARDS AND INDUSTRIAL SAFETY	**5 Hrs**	**80 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

UNIT	Topics	Hrs.
I	INDUSTRIAL ATMOSPHERIC CONTAMINANTS AND HEALTH HAZARDS	14
II	INDUSTRIAL TOXICOLOGY AND INDUSTRIAL HYGIENE SURVEY	15
III	INDUSTRIAL VENTILATION	15
IV	CONTROL MEASURES	15
V	INDUSTRIAL ILLUMINATION AND INDUSTRIAL PLANT SANITATION	14
	Test & Model Exam	7
	Total	**80**

81

EEG582 OCCUPATIONAL HAZARDS AND INDUSTRIAL SAFETY (Elective Theory I)

OBJECTIVES:

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

➢ An Understanding of industrial toxicology, health hazards of industrial environment and control measures.

➢ Ability to recognise and report industrial hazards, follow safe work practices and participate in hazard inspection.

➢ Understanding of emergency procedures, safety law and employer and employee responsibilities.

➢ Understanding Air cleaning Devices and their relative efficiencies.

➢ Understanding Industrial plant sanitation, housekeeping and worker facilities.

UNIT I INDUSTRIAL ATMOSPHERIC CONTAMINANTS AND HEALTH HAZARDS

Industrial atmospheric contaminants – types. Industrial Health Hazards - effects of pressure - humidity - temperature - radiation - light - noise - electricity - accidents - occupational diseases - infections.

.   **14 Hrs**

UNIT II INDUSTRIAL TOXICOLOGY AND INDUSTRIAL HYGIENE SURVEY

Modes of entry of toxic substances into the human body - long term and short term effects - industrial toxicology. Threshold Limit Values - kinds of exposure standards - pollutant concentrations - Industrial Hygiene Survey – Diagnosis – Remedial measures – Occupational Health and Safety Management System (OHSMS)   **15 Hrs**

UNIT III INDUSTRIAL VENTILATION
Industrial Ventilation - general principles of air flow - general dilution ventilation - comfort ventilation. Local exhaust ventilation - principles of hood and duct design - duct system design -

15 Hrs

UNIT IV CONTROL MEASURES

 Air cleaning Devices - relative efficiencies - Testing of local exhaust ventilation systems. Industrial Noise Control - general engineering principles of control – standards.

15 Hrs

UNIT V INDUSTRIAL ILLUMINATION AND INDUSTRIAL PLANT SANITATION

Industrial illumination - glare – types & levels of illumination. Industrial plant sanitation - housekeeping - worker facilities

14 Hrs

Test & Model Exam **7 Hrs**

TEXTBOOKS:

- Patty, "Industrial Hygiene and Toxicology", Wiley Inter science, 1979.
- John.V .Grimaldi and Rollin. H Simonds, "Safety Management", All India traveller book seller, New Delhi, 1989.
- Krishnan N.V, "Safety in Industry", Jaico Publisher House, 1996.

REFERENCE:

- Industrial Ventilation Manual, American Conference of Government Industrial Hygienists, 1993

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code : EEG583

Semester : V Semester

Subject Title : **SOIL MECHANICS AND FOUNDATION ENGINEERING**
(Elective Theory I)

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
SOIL MECHANICS AND FOUNDATION ENGINEERING	5 Hrs	80 Hrs	25	75	100	3 Hrs

Topics and Allocation of Hours

Unit	Topics	Hours
I	Index properties and Hydraulic Properties of Soil	15
II	Classification and Strength of Soil, Stabilization of Soil and Sub-soilSampling	15
III	Seepage Analysis and Seepage below Hydraulic Structures,Bearing Capacity and Settlement of foundations	15
IV	Foundations and Foundations in Expansive Soil	14
V	Machine Foundation and Foundations of Transmission Line Towers	14
	Test & Model Exam	7
	Total	**80**

EEG583 SOIL MECHANICS AND FOUNDATION ENGINEERING

OBJECTIVES:

On completion of the course, the student will be familiar with:

➢ To study the Properties of Soil , Classification and Strength of soils

➢ To describe about the Sub-soil Sampling

➢ To study about the Seepage analysis , Bearing Capacity of soil andSettlement of Foundations

➢ To study about the Types of Foundations , Pile foundations and PileGroups

➢ To understand about the Foundations on Expansive soil and MachineFoundations

➢ To know about the Foundations of Transmission Line Towers

UNIT I

1.1 Soil Mechanics And Index Properties
Introduction - Development of Soil Mechanics - Fields of application of Soil Mechanics - Soil formation - Cohesive and Cohesionless soil - Soil Properties - 3 Phase System - General, Index and Engineering properties - Detailed description - Atter Berg limits - Simple problems.

1.2 Hydraulic Properties Of Soil
Introduction - Permeability - Co-efficient of permeability - Darcy's law - Factors affecting permeability - Permeability tests - Simple problems - Quick sand conditions.   **15 Hrs**

UNIT II

2.1 Classification and Strength of Soil
Classification of soil - Introduction - Necessity - Systems of soil classification - Field identification of soil - Shear strength of soil - Introduction - Shear strength - Mohr''s stress circle - Mohr- Coulomb failure theory - Shear strength test - Unconfined compression test - Mohr''s circle for unconfined compression test - Compaction - Consolidation - Consolidometer - Optimum moisture content - Proctor''s Compaction test - Methods of compaction - Degree of compaction - Field density of soil - Tests - Compaction and Consolidation - Comparison.

2.1 Stabilization of Soil and Sub-Soil Sampling
Stabilization of soil - Introduction - Objects of stabilization - Methods of stabilization - Soil exploration - Introduction - Objects of soil exploration - Methods of soil exploration - Direct , Semi-direct and Indirect methods - Spacing and depth of test borings - Boring log - Sounding and Penetration tests-Standard Penetration Test (SPT)- Geophysical methods - Sub-soil Sampling - Disturbed and Undisturbed samples - Types of samplers - Split spoon sampler - Thin-walled sampler - Chunk sampling.   **15 Hrs**

UNIT III

3.1   Seepage Analysis and Seepage Below Hydraulic Structures

Seepage analysis - Introduction - Head, Gradient and Potential - Hydraulicgradient - Seepage pressure - Upward flow (Quick condition or Quicksand) - Types of flow lines - Types of flow (Definition only) - Twodimensional flow (Laplace equation) - Velocity potential -Properties of flownet - Uses of flow net - Seepage below Hydraulic structures - Introduction -Hydraulic gradient - Piping - Exit gradient - Khosla"s theory - Seepage flownets below hydraulic structures.

3.2 Bearing Capacity and Settlement of Foundations

Bearing capacity - Introduction - Terminology - Factors affecting bearing capacity of soils - Methods of determining bearing capacity - Types of failure in soil - General , Local and Punching shear failure - Analytical methods - Rankine"s analysis - Terzaghi"s analysis - Assumption and limitations - Effect of water table - Methods of improving bearing capacity of soil –Bearing capacity of different soil as per IS Settlement of foundation - Introduction - Causes and Effect of settlement — settlement values as per BIS provisions Plate load test - Simple problems.   **15 Hrs**

UNIT IV

4.1 Foundations

Introduction - Definitions - Objectives - Requirements of foundation - Criteria for selection of type of foundation - Types of foundations - Shallow foundation types-isolated, combined ,raft Deep foundations - Types - Foundation at different levels - Foundation on made up grounds - Deep foundation - Introduction - Pile foundation - Uses of piles - Types of piles - Caisson foundation - Types - Selection of piles - Pile Driving - Capacity of piles - Pile load test - Floating foundation - Negative skin friction - Pile groups - Bearing capacity of pile groups - BIS provision for Settlement of pile group — Design of foundation using software (Description only)

4.2 Foundations In Expansive Soil

Introduction - Identification of expansive soil - Free Swell Test - Differential free swell test - Indian expansive soil - Swell potential and Swelling pressure - Traditional Indian practice - Methods of foundation in expansive soils - Replacement of soils and "CNS" concept - Under reamed pile foundation - Remedial measures for cracked buildings.   **14 Hrs**

UNIT V MACHINE FOUNDATION AND TOWER FOUNDATIONS(TRANSMISSION LINE)

5.1   Machine Foundation

Introduction - Soil dynamics - Free vibration and Forced vibration - Definitions -Natural frequency - Barkan"s method Pauw"s method - Types ofmachines and machine foundation - General requirements - Design of machine foundations - Reciprocating type - Centrifugal type - Impact type - design steps- Couzen theory - In-situ dynamic investigation of soil - Methods - IS code of practice - Design criteria - Isolation of foundation - Simple problems.

5.2   Foundations of Transmission Line Towers

Introduction - Necessity - Forces on Tower Foundations - General designcriteria - Choice and type of foundations - Design procedures - Stability conditions – Description only.   **15 Hrs**

Test & Model Exam   **7 Hrs**

Reference Books :

1.   Dr.Punmia.B.C.- Soil Mechanics and Foundations - S Laxmi publications(P)Ltd.,New Delhi, 2005
2.   Dr.K.R.Arora, Soil Mechanics and Foundations Engineering, Standard publications,New Delhi, 2011/6th
3.   Gopal Ranjan &Rao , Basic and applied Soil Mechanics, New Age International,New Delhi, 2000/2nd
4.   Terzaghi, Soil Mechanics in Engineering Practice, John Wiley and Sons,New Delhi
5.   WAYNE C.TENG, Foundation Design, Prentice Hall of India (P) Ltd, New Delhi.
6.   Dr S B SEHGAL, A   Text   Book of   Soil Mechanics, CBS Publishers &

     Distributors,New Delhi,
7.   S. Kaur and R.Singh, Soil Mechanics and Foundation Engineering S.K. Kataria & Sons,New Delhi, 2003

DIPLOMA IN CIVIL ENVIRONMNTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG573

Semester   **:** V Semester

Subject Title   **: ENVIRONMENTAL ENGINEERING LABORATORY**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
ENVIRONMENTAL ENGINEERING LABORATORY	**3 Hrs.**	**48 Hrs.**	**Internal Assessment**	**Autonomous Examination**	**Total**	
			25	**75**	**100**	**3 Hrs.**

DETAILED SYLLABUS

EEG573 - ENVIRONMENTAL ENGINEERING LABORATORY

OBJECTIVES:

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

➢ Determine the quality of water, testing procedures and standards fordrinking water.

➢ Understand the Cutting, threading and joining of G.I.Pipes / cutting andpasting of PVC pipes using solvents.

➢ Make suction and delivery pipe connections to a centrifugal pump (makingindents, drawing a neat sketch of the connection with details).

LIST OF EXPERIMENTS

    PART A   **27 Hours**

1. Collection of water samples from sources and "Estimation of Sulphate content" inwater sample.
2. Determination of pH value by Electrometric method using pH meter/ Calorimetricmethod and comparison by paper method.
3. Determine the optimum dose of coagulant in a given raw water sample by jar test.

4. Determine the dissolved oxygen in the given sample of water.

5. Determination of Total solids, suspended solids and dissolved solids present in the given sample of water / waste water.

6. Determination of "Temporary and permanent Hardness" present in the given sample of water by EDTA titration method.

7. Estimation of chlorides in the given sample of water by silver Nitrate titration method.

8. Prepare a report of a field visit to water treatment plant.

9. Determination of Turbidity of water by Jackson Candle Turbidity meter.

10. Determination of settle able solids present in the given sample of waste water by Imhoff cone.

PART B   18 Hours

10. Study of pipe fitting used in water supply (with actual models displayed on board).

11. Study of sanitary wares (with actual models displayed on board).

12. Cutting, threading and joining of G.I.Pipes / cutting and pasting of PVC pipes using solvents.

13. Making a bathroom connection from an existing water supply main (making indents, drawing a neat sketch of the connection with details).

14. Making suction and delivery pipe connections to a centrifugal pump (making indents, drawing a neat sketch of the connection with details).

15. Study of air pollution control equipments (Gravity settling chamber, Cyclone filter with models/devices).

16. Prepare a report of a field visit to sewage treatment plant.

REVISION & TEST   3 Hrs
SCHEME OF EXAMINATION:

In the examination the students have to be given two experiments one from Part A and another from Part-B.

DETAILED ALLOCATION OF MARKS

S.No	Description	Part - A Max. Marks(40)	Part - B Max. Marks(30)
1.	Procedure	10	10
2.	Tabulation and Observation/ Execution	15	10
3.	Calculations	10	5
4.	Accuracy of result/ Finish	5	5
	Viva Voce	5	
	Total	**75**	

LIST OF EQUIPMENTS

S. No	List of the Equipment	Numbers Required
1.	pH meter	2 nos
2.	Spectrophotometer	1 no.
3.	Magnetic stirrer	1 no.
4.	Magnetic stirring device	1 set
5.	Turbidimeter	1 no.
6.	Dissolved oxygen meter	1 no.
7.	Drying oven	1 no.
8.	Analytical balance	1 no
9.	Dessicator	1 no.
10.	Dish tongs	1 no.
11.	Evaporating dish	1 no.
12.	Filter membrane	1 no.
13.	Vacuum pump	1 no.
14.	Crucible	1 no.
15.	Whattman filter paper	Required no.
16.	Wash bottle	2 nos.
17.	Pipette, Burette, Funnel, Conical flask, Beaker, Bunsen burner, Stand, Wire gauge, Filter paper	As required

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG574

Semester   **:** V Semester

Subject Title   **: ENVIRONMENTAL STRUCTURAL DRAWING IN CADD**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours/ Week	**Hours/ Semester**	**Marks**			**Duration**
ENVIRONMENTAL STRUCTURAL DRAWING IN CADD	**6 Hrs.**	**96 Hrs.**	**Internal Assessment**	**Autonomous Examination**	**Total**	
			25	**75**	**100**	**3 Hrs.**

DETAILED SYLLABUS

EEG574 - ENVIRONMENTAL STRUCTURAL DRAWING IN CADD

OBJECTIVES:

After completing this course, students will be able to:

➢ Prepare Water Supply Unit and Sanitary Layout Design using CAD

➢ Prepare Rain Water Harvesting Layout Design for given Building Specifications using CAD

➢ Prepare Layout design of Water Treatment Plant and Sewage Treatment Plant using CAD

LIST OF EXPERIMENTS

PART - A

LAY OUT PLAN   **18 Hours**

1. Develop Water supply layout for a building indicating necessary fixtures.

2. Develop sanitary arrangement layout in building with necessary fixtures.

3. Create Rainwater harvesting and recharge layout indicating necessary fixtures for the given building plan.

91

PART B

II. RCC DETAILING USING SOFTWARE   72 Hours

4. Develop the drawing showing the sectional elevation of various types of pipe joints.

5. Develop the drawing showing the sectional elevation of River Intake work for given design data

6. Develop the drawing showing the sectional elevation of Reservoir Intake work for given design data

7. Develop the drawing showing the plan and sectional elevation of Ground level service reservoir for given design data.

8. Develop the drawing showing the plan and sectional elevation of Sedimentation tanks for given design data

9. Develop the drawing showing the sectional elevation of slow sand filters for given design data

10. Develop the drawing showing the sectional elevation of Rapid gravity filters for given design data.

11. Develop the drawing showing the sectional elevation of Trickling filter for given design data.

12. Develop the drawing showing the plan and sectional elevation of Septic tank with soak pit for given design data.

REVISION & TEST   6 Hours

SCHEME OF EXAMINATION:

In the examination the students have to be given two experiments one from Part A and another fromPart-B.

DETAILED ALLOCATION OF MARKS

ALLOCATION OF MARKS

In examination, questions will be chosen as follows
By lot one question

Plan / Elevation	-	40 marks
Cross section / Longitudinal section	-	30 marks
Viva – voce	-	5 marks
Record works	-	25 marks
Total	**-**	**100 marks**

Note:

1. For all the drawings, detailed specifications shall be given. Designs are not to be included in the examinations. The drawings must include Layout plans, full plan, sections, etc., as applicable to each topic.

2. For all the drawings, detailed specifications shall be given and students should draw free hand sketch in the observation book based on the given specifications. The drawings to be drawn using computer and CAD Software.

3. In examination any one of drawings from 1 to 13 can be asked by lot.

LIST OF EQUIPMENTS

S.NO.	List of the Equipments	Quantity Required
1.	Computers	30 Nos.
2.	Laser printer	3 Nos.
3.	CAD software	30 Users

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code	**:** EEG584
Semester	**:** V Semester
Subject Title	**: ADVANCED SURVEYING AND BASIC GIS PRACTICAL**

(Elective Practical I)

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours/ Week	**Hours/ Semester**	**Marks**			**Duration**
ADVANCED SURVEYING AND BASIC GIS PRACTICAL	**3 Hrs.**	**48 Hrs.**	**Internal Assessment**	**Autonomous Examination**	**Total**	
			25	**75**	**100**	**3 Hrs.**

DETAILED SYLLABUS

EEG584 ADVANCED SURVEYING AND BASIC GIS PRACTICAL (Elective Practical I)

OBJECTIVES:

On the Completion of the course the students will be able to:

➢ Acquire practical knowledge in the use of Arc GIS and Arc Map.

LIST OF EXPERIMENTS

1.	Introduction to Remote Sensing and GIS and creating a map using tools.	**4 Hours**
2.	Introduction to ARC GIS Desktop.	**4 Hours**
3.	Geo referencing an image using ARC GIS.	**6 Hours**
4.	Creating and editing Shape files in ARC MAP.	**6 Hours**
5.	Editing in ARC MAP.	**6 Hours**
6.	Adding fields to a Shape file.	**6 Hours**
7.	Querying the data.	**4 Hours**
8.	Buffering and Clipping.	**4 Hours**

9.   Case study of creation of campus map using Arc GIS software.   **4 Hours**

REVISION & TEST   **4 Hours**

SCHEME OF EXAMINATION:

DETAILED ALLOCATION OF MARKS

S.No	Description	Max.Marks(75)
1.	Procedure	10
2.	Tabulation and Observation	25
3.	Calculations	15
4.	Sketch / Graph	10
5.	Accuracy of result	10
	Viva Voce	5
	Total	**75**

LIST OF EQUIPMENTS

S. no	List of the Equipment	Numbers Required
1.	Arc GIS software	No of users as per requirement
2.	Arc Map Software	No of users as per requirement

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG585

Semester   **:** V Semester

Subject Title   **: HIGHWAY ENGINEERING LABORATORY**

                            (Elective Practical II)

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
HIGHWAY ENGINEERING LABORATORY	**3 Hrs.**	**48 Hrs.**	**Internal Assessment**	**Autonomous Examination**	**Total**	
			25	**75**	**100**	**3 Hrs.**

DETAILED SYLLABUS

EEG585 - HIGHWAY ENGINEERING LABORATORY

OBJECTIVES:

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

*   Identify the types of roads as per IRC recommendations.

*   Understand the geometrical design features of different highways.

*   Perform different tests on road materials.

                     LIST OF EXPERIMENTS   **45 Hrs**

1.   Draw the sketches showing standard cross sections of Expressways, Freeways,NH/SH, MDR/ODR

2.   Flakiness and Elongation Index of aggregates.

3.   Angularity Number of aggregates.

4.   Los Angeles Abrasion test

5.   Softening point test of bitumen.

6. Penetration test of bitumen.

7. Ductility test of Bitumen.

8. Study of dense Bituminous macadam design

9. Visit the constructed road for visual inspection to identify defects and suggestremedial measures.

10. Prepare the photographic report containing details for exercise No.9

11. Visit the hill road constructed site to understand its components.

12. Prepare the photographic report containing details for exercise No.11

13. Visit the road of any one type (flexible or rigid) to know the drainage condition.

REVISION & TEST   **3 Hrs**

SCHEME OF EXAMINATION:

In the examination the students have to be given ONE experiments from Above.

DETAILED ALLOCATION OF MARKS

S.No	Description	Marks
1.	Procedure	15
2.	Tabulation and Observation	30
3.	Calculations	20
4.	Accuracy of result	05
5.	Viva-Voce	5
	Total	**75**

LIST OF EQUIPMENTS

S.NO.	LIST OF EQUIPMENTS	QUANTITY REQUIRED
1.	Sieve test for coarse aggregate made of brace 200mm dia complete set	2 sets
2.	Length gauge and Thickness gauge	2 Nos.
3.	Los Angeles Abrasion testing equipment	1 no.
4.	Viscometer	1 no.

5.	Ductility testing machine, briquette mould, water bath	1 No.
6.	Flash and Fire point apparatus	1 set
7.	Bitumen Penetration meter	1 No.
8.	Weigh balance-digital up to 10kg capacity with 1gm accuracy battery backup	1No

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG586

Semester   **:** V Semester

Subject Title   **: GEOTECHNICAL ENGINEERING LABORATORY**

(Elective Practical I)

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
GEOTECHNICAL ENGINEERING LABORATORY	**3 Hrs.**	**48 Hrs.**	**Internal Assessment**	**Autonomous Examination**	**Total**	
			25	**75**	**100**	**3 Hrs.**

DETAILED SYLLABUS

EEG586 GEOTECHNICAL ENGINEERING LABORATORY (Elective Practical I)

OBJECTIVES:

After completion of the course the students will be able to:

➢ Understand and determine physical and index properties of soil.

➢ Estimate the permeability and shear strength of soil.

➢ Compute optimum moisture content values for maximum dry density of soil through various tests.

➢ Know the procedure for performing CBR test.

➢ Learn various compaction methods for soil stabilization.

➢ Study the SPT at construction site.

LIST OF EXPERIMENTS

45 Hours

1. Identification of rocks from the given specimen.

2. Determine water content of given soil sample by oven drying method as per IS: 2720(Part-II).

3. Determine Shrinkage limit of given soil sample as per IS 2720 (Part- V).

4. Determine grain size distribution of given soil sample by mechanical sieve analysis asper IS 2720 (Part- IV).

5. Use different types of soil to identify and classify soil by conducting field tests-Through Visualinspection, Dry strength test, Dilatancy test and Toughness test.

6. Determine coefficient of permeability by constant head test as per IS 2720 (Part- XVII).

7. Determine coefficient of permeability by falling head test as per IS 2720 (Part- XVII).

8. Determine shear strength of soil by triaxial shear test as per IS 2720 (Part- XIII).

9. Determine shear strength of soil by vane shear test as per IS 2720 (Part-XXX).

10. Determine the consolidation properties of given soil sample.

11. Find the unconfined compressive strength of given clay sample.

12. Study of CBR value on the field as per IS2720 (Part – XVI).

13. Study on Standard Penetration Test to find SBC of soil.

REVISION & TEST   **3 Hours**

SCHEME OF EXAMINATION:

DETAILED ALLOCATION OF MARKS

SI.No	Description	Max.Marks(75)
1.	Procedure	10
2.	Tabulation and Observation	20
3.	Calculations	20
4.	Sketch / Graph	10
5.	Accuracy of result	10
	Viva Voce	5
	Total	**75**

100

LIST OF EQUIPMENTS

SI.No	Description	Number Required
1.	Glass cup, oven, Desiccators, Weighing balance and other accessories	1 Set
2.	Hot air oven	1 No.
3.	Shear testing machine	1 No.
4.	Triaxial testing machine	1 No.
5.	Permeameter mould, compacting equipment. Drainage bade, cap, graduated glass jar, stop watch	1 Set
6.	Vane shear test apparatus	1 No.
7.	Unconfined compressive strength apparatus	1 No.

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG575

Semester   **:** V Semester

Subject Title   **: ENTREPRENEURSHIP AND STARTUPS**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
ENTREPRENEURSHP AND STARTUPS	**4 Hrs.**	**64 Hrs.**	**25**	**75**	**100**	**3 Hrs.**

Topics and Allocation of Hours

Unit	Topics	Hours
I	Entrepreneurship – Introduction and Process	10
II	Business Idea and Banking	10
III	Startups, E-cell and Success Stories	10
IV	Human Resource Management, Industrial Legislation andMicro and Small Enterprises	10
V	Preparation of Project Reports	10
	Field visits and preparation of case study report	12
	Revision & Test	2
Total		**64**

EEG575 ENTREPRENEURSHIP AND STARTUPS

OBJECTIVES:

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

➢ Excite the students about entrepreneurship

➢ Acquire Entrepreneurial spirit and resourcefulness

➢ Understand the concept and process of entrepreneurship

➢ Acquire entrepreneurial quality, competency and motivation

➢ Learn the process and skills of creation and management of entrepreneurial venture

➢ Familiarize with various uses of human resource for earning dignified means of living

➢ Know its contribution in and role in the growth and development of individual and thenation

➢ Understand the formation of E-cell

➢ Survey and analyze the market to understand customer needs

➢ Understand the importance of generation of ideas and product selection

➢ Learn the preparation of project feasibility report

➢ Understand the importance of sales and turnover

➢ Familiarization of various financial and non financial schemes

➢ Aware the concept of incubation and starts ups

UNIT I ENTREPRENEURSHIP – INTRODUCTION AND PROCESS

Concept, Functions and Importance-Myths about Entrepreneurship-Pros and Cons of Entrepreneurship-Process of Entrepreneurship-Benefits of Entrepreneur-Competencies and Characteristics-Ethical Entrepreneurship-Entrepreneurial Values and Attitudes-Motivation-Creativity-Innovation-Entrepreneurs - as problem solvers-Mindset of an employee and an entrepreneur-Business Failure – causes and remedies-Role of Networking in entrepreneurship.   **10 Hours**

UNIT II BUSINESS IDEA AND BANKING

Types of Business: Manufacturing, Trading and Services-Stakeholders: sellers, vendors, consumer and Competitors-E- commerce Business Models-Types of Resources : Human, Capital and Entrepreneurial tools-Goals of Business; Goal Setting-Patent, copyright and Intellectual property rights-Negotiations - Importance and methods-Customer Relations and Vendor Management-Size and Capital based classification of business enterprises-Role of financial institutions-Role of Government Policy-Entrepreneurial support systems-Incentive schemes for state government-Incentive schemes for Central governments.   **10 Hours**

UNIT III STARTUPS, E-cell and SUCCESS STORIES

Concept of Incubation centre's-Activities of DIC, financial institutions and other relevanceinstitutions-Success stories of Indian and global business legends-Field Visit to MSME's-Various sources of Information-Learn to earn-Startup and its stages-Role of Technology – E-commerce and Social Media-Role of E-Cell-E-Cell to Entrepreneurship.   **10 Hours**

UNIT IV

4.1 HUMAN RESOURCE MANAGEMENT

Meaning of Manpower Planning-Recruitment and Selection procedure-Payment of wages, factors determining the wage-Methods of payment of wages – Time rate and Piece rate-Labour Turnover – definition, its causes, impact and remedy-THE BOCW ACT– The Building and Other Construction Workers (Regulation of Employment and Condition of Services) Act, 1996. The Building and Other Construction Workers (Regulation of Employment and Condition of Services) Central Rules, 1998

4.2 INDUSTRIAL LEGISLATION

Need of Industrial legislation-Indian Factories Act – 1948 – Definition of Factory, mainprovisions regarding health, Safety and Welfare of Workers-Industrial Dispute Act – 1947 – Definition of Industrial dispute, Machineries for settlement of Industrial dispute in India.

4.3 MICRO AND SMALL ENTERPRISES

Definition of Micro & Small enterprises-Meaning and characteristics of Micro and Small enterprise-Scope of SSI with reference to self-employment-Procedure to start SSI – idea generation, SWOT analysis-Selection of site for factories.   **10 Hours**

UNIT V PREPARATION OF PROJECT REPORTS

5.1 PROJECT IDENTIFICATION AND FORMULATION REPORT

Introduction **-** Collection of Data-Compilation of Data-Analysis and Assimilation of Data-Product Selection-Report Finalization and Report Writing.

5.2 PROJECT PROFILE/PRE-FEASIBILITY REPORT

Introduction of the product-Market-Man Power (Personnel Required)-Manufacturing Process- Plant and Machinery-Means of Finance-Cost of Production-Annual Turnover-Profit - Profit on Investment.

5.3TECHNO-ECONOMICAL FEASIBILITY REPORT (TEFR)

Introduction on product-Market Prospects and Marketing-Location-Manufacturing Programme and Annual Turnover-Manufacturing Process-Cost of Project-Means of Finance-Requirement of Raw materials, Consumables, Utilities and Working Capital-Organisational Structure, Management and Man Power-Project Implementation Schedule-Profitability and Cash Flow.

5.4 MARKET SURVEY REPORT FOR CONSTRUCTIONPROJECT

Data Collection & Processing through Primary & SecondarySources-Questionnaire - method, e-mail, by post, by phone -Present Status - Growth of the Industry- Import and Export - Present market Demand Forecast - Future Prospect/Scope - Market Segmentation.   **10 Hours**

REVISION & TEST 2 Hours

Reference Books:

1. Dr. G.K. Varshney, Fundamentals of Entrepreneurship, Sahitya Bhawan Publications,Agra - 282002
2. Dr. G.K. Varshney, Business Regulatory Framework , Sahitya Bhawan Publications,Agra - 282002
3. Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd, Entrepreneurship , McGrawHill (India) Private Limited, Noida - 201301
4. M.Scarborough, R.Cornwell, Essentials of Entrepreneurship and small businessmanagement, Pearson Education India, Noida - 201301
5. Charantimath Poornima M. Entrepreneurship Development and Small BusinessEnterprises, Pearson Education, Noida - 201301
6. Trott, Innovation Management and New Product Development, Pearson Education,Noida - 201301
7. M N Arora, A Textbook of Cost and Management Accounting, Vikas Publishing HousePvt. Ltd., New Delhi-110044
8. Prasanna Chandra, Financial Management, Tata McGraw Hill education private limited,New Delhi
9. V. Trivedi, Renu Jatana, Indian Banking System, RBSA Publishers, Rajasthan
10. Simon Daniel, HOW TO START A BUSINESS IN INDIA, BUUKS, Chennai - 600018
11. Ramani Sarada, The Business Plan Write-Up Simplified - A practitioners guide to writingthe Business Plan, Notion Press Media Pvt. Ltd., Chennai 600095.

Autonomous Examination – Evaluation Pattern Internal Mark Allocation

Assignment (Theory portion)*	-	10
Seminar Presentation	-	10
Attendance	-	5
Total	**-**	**25**

Note:

* Two assignments should be submitted. The same must be evaluated and Converted to **10 marks.** Each assignment should have **five three marks** questions and **two five marks** questions.

Guidelines for assignment:

First assignment – Unit I

Second assignment – Unit II

Guidelines for Seminar Presentation – Unit III

AUTONOMOUS EXAMINATION

Note:

1. The students should be taught all units and proper exposure and field visit alsoarranged. All the portions should be completed before examinations.

2. The students should maintain theory assignment and seminar presentation. The assignment and seminar presentation should be submitted during the Autonomous Practical Examinations.

3. The question paper consists of **Theory and Practical portions**. All students should write the answers for theory questions **(35 Marks)** and practical portions **(30 Marks)** should be completed for Autonomous examinations.

4. All exercises should be given in the question paper and students are allowed to select by lot. If required the dimensions of the exercises may be varied for every batch. No fixed time allotted for each portion and students have liberty to do the examination for 3 Hrs.

5. For Written Examination: Theory question and answer: **35 Marks**

   Ten questions will be asked for 2 marks each. Five questions from each Unit I & II. **(10 X 2 = 20).**
   Three questions will be asked for 5 marks each. One question from each Unit I, II & III. **(3 X 5 = 15)** (Either or Pattern)

6. For Practical Examination: The business plan/Feasibility report or Report on Unit IV & V should be submitted during the Autonomous practical examinations. The same have to be evaluated for the report submission **(30 marks).**

DETAILED ALLOCATION OF MARKS

S. No	Description	Marks
Part A	Written Examination - Theory Question and answer (10 Questions x 2marks:20 marks & (3 Questions x 5 marks: 15 marks) (Either or Pattern)	35
Part B	Practical Examination – Submission on Business Plan/Feasibility Reportor Report on Unit 4 & 5	30
Part C	Viva voce	10
	TOTAL	**75**

VI SEMESTER

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG601

Semester   **:** VI Semester

Subject Title   **: SOLID WASTE MANAGEMENT**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	**Hours / Semester**	**Marks**		**Total**	**Duration**
			Internal Assessment	**Autonomous Examination**		
SOLID WASTE MANAGEMENT	**5 Hrs**	**80 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

UNIT	Topics	Hrs.
I	SOURCES AND TYPES	14
II	STORAGE METHODS	15
III	METHODS WASTE COLLECTION	15
IV	WASTE PROCESSING	15
V	DISPOSAL OF SOLID WASTE	14
	Test & Model Exam	7
	Total	**96**

EEG601 SOLID WASE MANAGEMENT

OBJECTIVES:

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

- ➢ To make the students conversant with the types, sources, generation, storage,
- ➢ collection, transport, processing and disposal of municipal solid waste.
- ➢ An Understanding of the nature and characteristics of municipal solid wastes and the regulatory requirements regarding municipal solid waste management
- ➢ Ability to plan waste minimization and design storage, collection, transport,
- ➢ processing and disposal of municipal solid waste

UNIT I SOURCES AND TYPES

Sources and types of municipal solid wastes-waste generation rates-factors affecting generation, characteristics-methods of sampling and characterization; Effects of improper disposal of solid wastes- Public health and environmental effects. Elements of solid waste management –Social and Financial aspects – Municipal solid waste (M&H) rules – integrated management-Public awareness; Role of NGO"s **14 Hrs**

UNIT II ON-SITE STORAGE AND PROCESSING

On-site storage methods – Effect of storage, materials used for containers – segregation of solid wastes – Public health and economic aspects of open storage – waste segregation and storage – case studies under Indian conditions – source reduction of waste – Reduction, Reuse and Recycling.

15 Hrs

UNIT III COLLECTION AND TRANSFER

Methods of Residential and commercial waste collection – Collection vehicles – Manpower– Collection routes – Analysis of collection systems; Transfer stations – Selection of location, operation & maintenance; options under Indian conditions – Field problems- solving. **15 Hrs**

UNIT IV OFF-SITE PROCESSING

Objectives of waste processing – Physical Processing techniques and Equipment's; Resource recovery

from solid waste composting and biomethanation; Thermal processing options – case studies under Indian conditions. **15 Hrs**

UNIT V DISPOSAL

Land disposal of solid waste; Sanitary landfills – site selection, design and operation of sanitary landfills – Landfill liners – Management of leachate and landfill gas- Landfill bioreactor– Dumpsite Rehabilitation

14 Hrs

Test & Model Exam **7 Hrs**

Text Books:

1. William A. Worrell, P. Aarne Vesilind (2012) Solid Waste Engineering, Cengage Learning, 2012.
2. John Pitchel (2014), Waste Management Practices-Municipal, Hazardous and industrial -CRC Press, Taylor and Francis, New York.
3. Tchobanoglous, G., Theisen, H. M., and Eliassen, R. "Solid. Wastes: Engineering Principles and Management Issues". McGraw Hill, New York, 1993.
4. Vesilind, P.A. and Rimer, A.E., "Unit Operations in Resource Recovery Engineering", Prentice Hall, Inc., 1981
5. Paul T Willams, "Waste Treatment and Disposal", John Wiley and Sons, 2000

References:

1. CPHEEO (2014), Manual on Municipal Solid waste management, Central Public Health and Environmental Engineering Organization, Government of India, New Delhi.
2. George Tchobanoglous and FrankKreith (2002).Handbook of Solid waste management, McGraw Hill, New York.
3. Government of India, "Manual on Municipal Solid Waste Management", CPHEEO, Ministry of Urban Development, New Delhi, 2000.
4. Bhide A.D. and Sundaresan, B.B. "Solid Waste Management Collection", Processing and Disposal, 2001
5. Manser A.G.R. and Keeling A.A.," Practical Handbook of Processing and Recycling of Municipal solid Wastes", Lewis Publishers, CRC Press, 1996
6. George Tchobanoglous and Frank Kreith"Handbook of Solid waste Management", McGraw Hill, New York, 2002

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS
G-SCHEME

Subject Code   **:** EEG602

Semester   **:** VI Semester

Subject Title   **: ESTIMATION, COSTING AND VALUATION**

TEACHING AND SCHEME OF EXAMINATION

<div align="right">No. of weeks per semester: 16 weeks</div>

Subject	Instructions		Examination			
			Marks			
	Hours / Week	**Hours / Semester**	**Internal Assessment**	**Autonomous Examination**	**Total**	**Duration**
ESTIMATION, COSTING AND VALUATION	**5 Hrs**	**80 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

Unit	Topics	Hours
I	Introduction, Approximate Estimates, Measurements and Material Requirement and Specifications	15
II	Preparation of Data and Rate Analysis	16
III	Detailed Estimate : Taking of quantities by Trade System	20
IV	Detailed Estimate : Taking of quantities by Group System	20
V	Report Writing, Valuation and Rent Calculation	18
	Test & Model Exam	7
	Total	**96**

EEG602 ESTIMATION, COSTING AND VALUATION

OBJECTIVES:

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

➢ Learn the procedure for estimating and costing of Civil Engineering works. To write specifications for various materials and for different items of works.

➢ Perform rate analysis for various items of works using Standard data and Scheduleof Rates.

➢ Prepare detailed estimate of quantities of various items of works.

➢ Write Technical reports on the proposed projects.

➢ Calculate the value of a building / property; to fix rent for a building adopting suitablemethod.

UNIT I

1.1   INTRODUCTION

Estimation – Definition of Estimate – Approximate estimate – Detailed estimate - Main estimate - Revised estimate – Supplementary estimate – Sub estimate – Annual maintenance estimate – Repair estimate –Complete estimate.

1.2 APPROXIMATE ESTIMATES

Necessity – Types – Plinth area method – Cubical content method – Service unit method – Typical bay method – Simple problems on preliminary estimate of a building project.

1.3 MEASUREMENTS & MATERIAL REQUIREMENTS

Units of measurements for works and materials – Degree of accuracy in measurements - Deduction for openings in masonry, plastering and white washing area – Painting co- efficient – out turn of works - workingout of materials requirements ─ cement, sand, bricks, aggregates etc based on thumb rules for different works.

1.4 SPECIFICATIONS:
Specification ─ Necessity ─ Types of specifications ─ Essential requirements of specifications – Specification for various materials like Cement, Sand, Brick, Timber, Reinforcement Steel, Stone Aggregate, Water - Specifications for various items of works – General Specifications for a building - Culvert - Concrete Roads - Detailed specifications for works such as, earthwork excavation, foundation concrete, Reinforcement cement concrete in column, beam and slab -Weathering course - Steps involved in writing standard specifications.   **15 Hrs**

UNIT II

2.2   PREPARATION OFDATA

Data – Types – Main and sub data – Observed data – lead statement - Schedule of rates – Standard data book – Sundries – Lump sum provision – Preparation of data using standard data and schedule of rates.

2.3   RATE ANALYSIS

Brick and stone masonry – Plain cement concrete in foundation – Cement concrete for flooring works - Weathering course – R.C.C worksfor slab, sunshade, beam and column – Partition wall – Form works forbeams and slabs – Road works, WBM and surface dressing – White washing and painting works – A.C. sheet roofing – Apron and revetmentworks in canals – Wall plastering – Ceiling plastering – Pointing – Plumbing and sanitary works in buildings.   **16 Hrs**

UNIT III

3.1 TRADE SYSTEM:

Introduction - Taking off Quantities: Systems – Trade system – Group system – Methods – Long wall and Short wall method – Centre linemethod – Preparation of data – Lump sum provision and contingencies – Quantity surveyor – Duties – Essential Qualities.

3.2 TAKING OFF QUANTITIES USING TRADE SYSTEM:

Prepare detailed estimate using Trade system and Take off quantities for all items of works in the following types of buildings:

i.   A small residential building with two rooms with RCC roof.

ii.   Industrial buildings with AC/GI sheet roof with steel trusses.

iii. Community Hall with R C C columns and T- beams

iv.   Septic tank with dispersion trench / soak pit

v.   R.C.C slab culvert

 vi. Water bound Macadam Road   **20 Hrs**

UNIT IV
4.1 GROUP SYSTEM:

Advantages of group system – Taking off and Recording Dimensions – Squaring Dimensions– Abstracting or Working up – Billing –Abbreviations.

Dimension paper – Entering, Dimension, Squaring, Descriptive column – Cancellation of Dimensions – Descriptions – Spacing of Dimensions – Order of taking off – Squaring the Dimensions - Method of Squaring –Checking the Squaring – Casting up the dimensions.

Function of the Abstract – Order in the Abstract – Preparing the abstract – Casting and reducing the Abstract – Method of writing Bill – Checkingthe Bill.

4.2 TAKING OFFQUANTITIES USING GROUP SYSTEM:

Prepare detailed estimate using Group system and Take off quantities for all items of works in the following types of buildings:
i.   A single roomed building using Group system
ii.   A small residential building with two/three rooms with RCC roof.   **20 Hrs**

UNIT V

5.1 REPORT WRITING

Report Writing –Points to be considered while writing a report- Writing Typical reports for work such as:
i.Buildings- Residential / Hospital / School
ii. Laying a village road
iii.Construction of a bridge
iv.Water supply system for a village

5.2 VALUATION

Purpose of valuation ─ Types -Book value- Market value- Salvage value-Scrap Value- Depreciation – Obsolescence-Sinking fund-Land Valuation –Mortgage & Lease- Problems on Valuation- Annuity- Definition & types only.

5.3 RENT CALCULATION

Fixation of rent ─ Outgoing – Gross & Net income – Years" Purchase – Capital cost – Standard rent – Market rent – Economical rent – Problems on rent calculation.   **18 Hrs**

Test & Model Exam   **7 Hrs**

REFERENCE BOOKS:

1.   Rangawala, "Estimating & Costing" , Charotor Publishing;

2.   N.A.Shaw, "Quantity Surveying & Valuation", Khanna Publishers;

3.   L.N.Dutta, "Estimating & Costing", Dhanpat Rai & Sons

4.   Bridie, "Estimating & Costing"

5.   Civil Estimating, Casting and Valuation – Kalson Publication, Ludhiana.

6.   Vazirani & Chandola," Estimating and Costing" 2001.

7.   IS:1200 - Methods of Measurement of Building and Civil Engineering works.

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS
G-SCHEME

Subject Code   **:** EEG603

Semester   **:** VI Semester

Subject Title   **: SUSTAINABLE AND GREEN BUILDING TECHNOLOGY**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks		Total	Duration
			Internal Assessment	Autonomous Examination		
SUSTAINABLE AND GREEN BUILDING TECHNOLOGY	**5 Hrs**	**80 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

Unit	Topics	Hours
I	Introduction to Green Building and Design Features	15
II	Energy Audit and Environmental Impact Assessment (EIA)	15
III	Energy and Energy conservation	15
IV	Principles and planning of Green building	14
V	Rating System	14
	Test & Model Exam	7
	Total	**80**

EEG603 - SUSTAINABLE AND GREEN BUILDING TECHNOLOGY

OBJECTIVES:

After the completion of this course, the students will be able to:
- Know various aspects of green buildings
- Use different steps involved in measuring environmental impact assessment.
- Relate the construction of green building with prevailing energy conservation policyand regulations.
- Know and identify different green building construction materials.
- Learn different rating systems and their criteria

UNIT I

Definition of Green Building, Benefits of Green Building, Components/ features of Green Building, Site selection, Energy Efficiency, Water efficiency, Material Efficiency, Indoor Air Quality.
Site selection strategies, Landscaping, building form, orientation, building envelope and fenestration, material and construction techniques, roofs, walls, fenestration and shaded finishes, advancedpassive heating and cooling techniques, waste reduction during construction   **15 Hrs**

UNIT II
ENERGY AUDIT AND ENVIRONMENTAL IMPACT ASSESSMENT(EIA)

2.1 ENERGY AUDIT:

Meaning, Necessity, Procedures, Types, Energy Management Programs.   **07 Hrs**

2.2 ENVIRONMENTAL IMPACT ASSESSMENT (EIA):

Introduction, EIA regulations, Steps in environmental impact assessment process, Benefits of EIA, Limitations of EIA, Environmental clearance for civil engineering projects.   **08 Hrs**

UNIT III

ENERGY AND ENERGY CONSERVATION

3.1 ENERGY:

Renewable Energy Resources: Solar Energy, Wind Energy, Ocean Energy, Hydro Energy, Biomass Energy. Non-renewable Energy Resources: Coal, Petroleum, Natural Gas, Nuclear Energy, Chemical Sources of Energy, Fuel Cells, Hydrogen, Biofuels.

08 Hrs

3.2 ENERGY CONSERVATION

Introduction, Specific objectives, present scenario, Need of energy conservation, LEED India Rating System and Energy Efficiency. Energy-saving houses, Green House, Passive house, Passive house construction, Low-energy house, Zero-energy house, Energy consulting, Energy efficiency.   **07 Hrs**

UNIT IV
PRINCIPLES AND PLANNING OF GREEN BUILDING

Features: Salient features of Green Building, Environmental design (ED) strategies for building construction.
Process: Improvement in environmental quality in civil structure Materials: Green building materials and products- Bamboo, Rice husk ash concrete, plastic bricks, Bagasse particle board, Insulated concrete forms. reuse of waste material-Plastic, rubber, Newspaper wood, Nontoxic paint, Green roofing.
Housing modernization and management (building and construction safety, energy efficiency in housing, Property Refurbishment / Upgrade / Modernization / Renovation - Modular kitchens, bathrooms)   **14 Hrs**

UNIT V
RATING SYSTEM

Introduction to (LEED) criteria, Indian Green Building council (IGBC)Green rating, Green Rating for Integrated Habitat Assessment. (GRIHA) criteria Heating Ventilation Air Conditioning (HVAC) unit in green Building Functions of Government organization working for Energy conservation and Audit(ECA) - National Productivity council(NPC) Ministry of New and Renewable *Energy* (MNRE) Bureau of Energy efficiency (BEE) - BER (Building Energy Rating) - Certificates ─ Plumbing and Electrical to heating efficiency   **14 Hrs**

Test & Model Exam   **7 Hrs**

REFERENCE BOOKS:

1.   Kibert, C.J., Sustainable construction: Green Building design and Delivery, John WileyHobouken, New Jersey.

2.   Chauhan, D S Sreevasthava, S K., Non-conventional Energy Resources, New AgeInternational Publishers, New Delhi.

3.   O.P. Gupta, Energy Technology, Khanna Publishing House, New Delhi

4.   Jagadeesh, K S, Reddy Venkatta Rama & Nanjunda Rao, K S., Alternative BuildingMaterials and Technologies, New Age International Publishers, Delhi.

5.   Sam Kubba., Handbook of Green Building Design and Construction, Butterworth-Heinemann.

6.   Means R S, Green Building - Project Planning and Cost Estimating, John Wiley & Sons

7.   Sharma K V, Venkataseshaiah P., Energy Management and Conservation, IK International.

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG681

Semester   **:** VI Semester

Subject Title   **: AIR POLLUTION AND CONTROL (Elective Theory II)**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks		Total	Duration
			Internal Assessment	Autonomous Examination		
AIR POLLUTION AND CONTROL	**5 Hrs**	**80 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

UNIT	Topics	Hrs.
I	INTRODUCTION & METEOROLOGY AND AIR POLLUTION	12
II	EFFECT OF AIR POLLUTANT ON HUMAN AND ANIMALS AND PLANTS & ECONOMIC EFFECT OF AIR POLLUTION	16
III	AIR POLLUTION SAMPLING & ANAYLSIS OF AIR SAMPLES	16
IV	CONTROL EQUIPMENTS & CONTROL OF PARTICULATE CONTAMINANTS	15
V	AIR POLLUTION IN INDUSTRIES & INDOOR AIR QUALITY MANAGEMENT	14
	Test & Model Exam	7
	Total	**80**

EEG681 AIR POLLUTION AND CONTROL (Elective Theory II)

OBJECTIVES:

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

➢ Know the importance of Air pollution and source of air pollution.

➢ Factor affecting human health, Health effects, Effect of specific pollutant on human and Effect of specific pollutant on animals.

➢ Sampling procedures, Basic consideration for air sampling and Air sampling devices for particulates and gases.

➢ Control of air pollution, Objectives of using control equipment's, Settling chambers, Cyclone, Bag Filters, Electrostatic precipitator, Scrubber.Gas Particle Interaction, Working principle, Gravity Separators, Centrifugal separators Fabric filters, Particulate Scrubbers, Electrostatic Precipitators.

➢ Air Pollution from major industrial operations, Cement and Thermal power plants, Smoke Pollution, sources and effects of smoke.

➢ Sources, types and control of indoor air pollutants, Sources and Effects of Noise Pollution,

➢ Measurement, Standards, Control and Preventive measures.

UNIT I

1.1 INTRODUCTION

Air pollution definition – importance - Structure and composition of Atmosphere – Definition, Scope and Scales of Air Pollution -Sources and classification of air pollutants. Ambient Air Quality and Emission standards.

1.2 METEOROLOGY AND AIR POLLUTION

Effects of meteorology on Air Pollution - Fundamentals, Atmospheric stability, Inversion, Wind profiles and stack plume patterns- Atmospheric Diffusion Theories – Dispersion models, Plume rise.   **12 Hrs**

UNIT II

2.1 EFFECT OF AIR POLLUTANT ON HUMAN AND ANIMALS

Factor affecting human health - Health effects - Effect of specific pollutant on human - Effect of specific pollutant on animals

2.2 EFFECT OF AIR POLLUTANT ON PLANTS

Structure of normal leaf - Air pollutants affecting plants - Forms of damage to leaves & injury to plants - Effect of specific air pollutants on plants

2.4 ECONOMIC EFFECT OF AIR POLLUTION

Mechanism of deterioration of materials by air pollution - Material damage and economical loss due to air pollution - Effect of air pollution on Taj Mahal and various case study.   **16 Hrs**

UNIT III

3.1 AIR POLLUTION SAMPLING

Sampling procedures: Basic consideration for air sampling - Air sampling devices for particulates and gases - Duration and location of sampling - List the Sampling methods.

3.2 ANAYLSIS OF AIR SAMPLES

Analysis of samples: Factors affecting accurate data - Chemical methods - and Instrumental methods. Absorption spectrometric methods –Thermal conductivity.   **16 Hrs**

UNIT IV

4.1 CONTROL EQUIPMENTS

Control of air pollution: Objectives of using control equipment's - Settling chambers - Cyclone - Bag Filters - Electrostatic precipitator - Scrubber - Factors affecting choice of equipment.

4.2 CONTROL OF PARTICULATE CONTAMINANTS

Gas Particle Interaction – Working principle - Gravity Separators, Centrifugal separators Fabric filters, Particulate Scrubbers, and Electrostatic Precipitators.   **15 Hrs**

UNIT V

5.1 AIR POLLUTION IN INDUSTRIES

Air Pollution from major industrial operations-Cement and Thermal power plants - Smoke pollution-sources and effects of smoke.

5.2 INDOOR AIR QUALITY MANAGEMENT

Sources, types and control of indoor air pollutants, sick building syndrome and Building related illness-Sources and Effects of Noise Pollution – Measurement – Standards –Control and Preventive measures.

14 Hrs

 Test & Model Exam   **7 Hrs**

Text Books:

1. Lawrence K. Wang, Norman C. Pareira, Yung Tse Hung, Air Pollution Control Engineering, Tokyo, springer science + science media LLC,2004.

2. Noel de Nevers, Air Pollution Control Engineering, Waveland press, Inc 2017.

3. Anjaneyulu. Y, Air Pollution and Control Technologies", Allied Publishers (P) Ltd., India 2002.

References:

1. David H.F. Liu, Bela G. Liptak, Air Pollution, Lweis Publishers, 2000.

2. Arthur C. Stern, Air Pollution (Vol.I – Vol.VIII), Academic Press, 2006.

3. Wayne T.Davis, Air Pollution Engineering Manual, John Wiley and Sons, Inc, 2000.

4. M.N Rao and HVN Rao, Air Pollution, TataMcgraw Hill Publishing Company limited, 2007.

5. C.S.Rao, Environmental Pollution Control Engineering, New Age International (P) Limited Publishers, 2006.

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG682

Semester   **:** VI Semester

Subject Title   **: ADVANCED CONCRETE TECHNOLOGY (Elective Theory II)**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks		Total	Duration
			Internal Assessment	Autonomous Examination		
ADVANCED CONCRETE TECHNOLOGY	**5 Hrs**	**80 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

Unit	Topics	Hours
I	Concrete: Introduction, Cement, Aggregates and water	15
II	Admixtures , Mix Design for Concrete	15
III	Special Concrete, Pre-stressed Concrete	15
IV	Light Weight Concrete, Formwork	14
V	Cracks in Concrete Structure and their Prevention, Joints, Repairs and Maintenance of Concrete	14
	Test & Model Exam	7
	Total	**80**

EEG682 ADVANCED CONCRETE TECHNOLOGY (Elective Theory II)

OBJECTIVES:

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

➢ Materials used

➢ Admixtures used in concrete

➢ Mix design method

➢ Special and prestressed concrete

➢ Forms works

➢ Cracks and maintenance of concrete

UNIT I

CONCRETE
Introduction of Concrete Technology and Concrete – Ingredients of Concrete.
Cement: Composition of Cement – Function of Cement Ingredients – Types of Cements (Names Only) – Uses of Cement.
Aggregates: Fine Aggregate – Sand – Types of Sand based on the purpose of use – Types of sand based on the Grain size – Properties of good Sand. Coarse Aggregates – Functions – Properties – Requirements – Classification of Aggregates.
Water – Functions – Water for Curing of Concrete.
Properties of Concrete – Production of Concrete – Types of Concrete and its uses – Test on Concrete (Names only). **15Hrs**

UNIT II

2.1 ADMIXTURES
Definition – Functions of Admixtures – Classification of Admixtures: Accelerating admixtures – Retarding admixtures – Grouting admixtures – Air entraining admixtures – Pozzolanic or mineral admixtures – Air detraining admixtures – Plasticizers – Super plasticizers.
2.2 MIX DESIGN FOR CONCRETE
Mix design – purpose of Mix design – object of Mix design – Factors influencing the choice of Mix design – variables in proportioning – Mix design methods – Mix design procedure I.S. Code method – Mix proportions for weigh batching and volume batching. **15Hrs**

UNIT III

3.1 SPECIAL CONCRETE
Polymer concrete – Fiber reinforced concrete – Light weight concrete – Shotcrete or guniting concrete (Applications and Advantages).
3.2 LIGHT WEIGHT CONCRETE

Classification of light weight concrete – Characteristics of light weight concrete – Applications of light concrete - Advantages of light weight concrete.   **15Hrs**

UNIT IV

4.1 Pre-stressed concrete
General principle of stressing – advantages of pre stressed –Concrete – Need for High strength steel and concrete- terminology – tendon – anchorage – pre tensioning-post tensioning – bonded pre stressed concrete – non bonded pre stressed concrete – methods of pre stressing – pretension method – post tension method – system of pre stressing – freyssinet system – Magnet blaton system – Lee-mc - call system – application of pre stressing elements – causes for losses in pre stress and remedial measures.
4.2 Formwork
Requirements of formwork – materials used for formwork –cleaning and treatments of forms - points to be kept in mind before placing concrete in form work.   **14Hrs**

UNIT V
5.1 Cracks in Concrete Structure and their Prevention
Cracks in concrete structures – assessment of cracks – types of cracking – preventive measures.
5.2 Joints, Repairs and Maintenance of Concrete
Types of joints – construction joints – contraction joints – expansion joints – isolation joints – methods of repairing concrete works   **14Hrs**

Test & Model Exam   **7 Hrs**

Reference Books :

1. M.S.Shetty - Concrete Technology (Theory and Practice) - S.Chand & Company Pvt. Ltd. New Delhi.

2. M L GAMBHIR - Concrete Technology - TATA McGraw-Hill Publishing Company Limited, New Delhi

3. Vineet Kumar (Edited)- Concrete Technology - Khanna Publishers, New Delhi.

4. A.R.Santhakumar, Concrete Technology , Oxford University press.

5. A.M.Neville, Concrete Technology, Pearson Education.

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG683

Semester   **:** VI Semester

Subject Title   **: WATER RESOURCES ENGINEERING (Elective Theory II)**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	**Hours / Semester**	**Marks**		**Total**	**Duration**
			Internal Assessment	**Autonomous Examination**		
WATER RESOURCES ENGINEERING	**5 Hrs**	**80 Hrs**	**25**	**75**	**100**	**3 Hrs**

Topics and Allocation of Hours

Unit	Topics	Hours
I	Introduction and Hydrology	15
II	Ground Water and Management of Ground Water	15
III	Rivers and River Training Works, Storage Works	15
IV	Distribution Works and Management of Canal Irrigation	14
V	Water Shed Management and Water Harvesting and Recycling	14
	Test & Model Exam	7
	Total	**80**

EEG683 WATER RESOURCES ENGINEERING

OBJECTIVES:

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

- ✓ Understand water resource potential in India and need for water resource management.

- ✓ Understand the components of hydrological cycle and hydrograph.

- ✓ Understand the occurrence of ground water and ground water exploration methods.

- ✓ Understand the ground water basin management concept.

- ✓ Learn the classification of rivers and river training works.

- ✓ Know the different types of storage works and dam structures.

- ✓ Understand the distribution system of canals and management of canal irrigation.

- ✓ Understand the concept of water shed management including GIS approach.

- ✓ Learn the types of detention basins and reclamation of water logged lands.

UNIT I

1.1 INTRODUCTION
Water resources – world water inventory - Importance of water resources - Necessity for conservation and development of water resources – water resources of India - water resources management - purpose - factors involved in water resources management.

1.2 HYDROLOGY
Introduction – Definition - Application of Hydrology in engineering - Hydrological cycle - Precipitation – forms of Precipitation - measurements of rain fall - Rain gauge - types of rain gauges - rain gauge network – mean rainfall over a drainage basin – methods - Radar and Satellite Measurements of rainfall - runoff - Estimation of runoff - losses – Hydrograph – Unit Hydrograph - uses   **15Hrs**

UNIT II

2.1 GROUND WATER
Ground water resources- zones of Ground water-Aquifer - types- terms used –porosity, permeability, yield, specific yield, specific retention, coefficient of storage, specific capacity – Darcy''s law- measurement of yield of well -pumping test- recuperation test- ground water exploration –geo physical methods -Electrical resistivity method – seismic resistivity method- logs.

2.2 MANAGEMENT OF GROUND WATER

Concept of basin management - Ground water basin investigations - data collection and field work - mining yield - perennial yield - salt balance - basin management by conjunctive use - artificial recharge of Ground water - recharge methods.   **15Hrs**

UNIT III

3.1 RIVERS AND RIVER TRAINING WORKS
Classification of river - Major rivers in India and Tamil Nadu - Inter linking of rivers in India and its importance – flood - flood forecasting - flood control in India. River training - objectives of river training - classification of river training - methods of river training – levees - guide banks – spurs – types - artificial cut-offs – launching apron - pitching of banks - pitched islands - miscellaneous methods.

3.2 STORAGE WORKS
Surface storage - purpose of surface storage – tanks – types - tank weirs – tank outlet – reservoirs – types - storage capacity of reservoir - methods of determination of storage capacity of reservoir – reservoir losses – dams - classification of dams - selection of dam site - Earth dams – types - methods of construction- causes of failure of earth dam - remedial measures – spillway - types - spillway crest gates- types – sluiceway - types.   **15Hrs**

UNIT IV

4.1 DISTRIBUTION WORKS
Irrigation Canal - Typical cross section of canal - components of canal section - classification of canal - alignment of canal - canal head works – types - components of diversion head works - cross drainage works – types - canal losses - lining of canal – necessity - types of lining.

4.2 MANAGEMENT OF CANAL IRRIGATION
Canal irrigation system - Need for canal irrigation management - objectives of canal irrigation management - methods of improving canal irrigation management - cropping pattern - need for crop rotation - crop water requirement - water delivery system - irrigation scheduling - frequency of irrigation - optimum use of irrigation water - irrigation efficiencies - conservation of water on the field - farmer"s participation - irrigation manager.   **14Hrs**

UNIT V

5.1 WATER SHED MANAGEMENT
Water shed - classification of water sheds - integrated approach for water shed management - role of remote sensing and GIS in water shed management - soil and water conservation – Necessity - soil erosion – causes - effects – remedial measures against erosion - contour bunding - strip cropping - bench terracing – check dams - vegetated water way – afforestation - crop residue - land drainage - surface drains - sub surface drains.

5.2 WATER HARVESTING AND RECYCLING
water harvesting - runoff collection - onsite detention basin - ponds - types - Seepage control – methods - evaporation control - Recycling of harvested water - waste water recharge for reuse – methods -water logging-remedial measures-soil reclamation.   **14Hrs**

Test & Model Exam **7 Hrs**

Reference Books :

1. Santhosh Kumar Garg, Hydrology and Water Resources Engineering, Khanna Publishers, Delhi.

2. G.L.Asawa, Irrigation and Water Resources Engineering, New age international(p) Ltd., Publishers, New Delhi.

3. David Keith Todd., Ground water Hydrology,John wiley &sons,Singapore.

4. Dilip Kumar Majumdar, Irrigation Water Management - Principles and Practice, PHI Pvt.Ltd. NewDelhi-1.

5. Madan Mohan Das & Mimi Das Saikia, Irrigation and water power Engineering,PHI learning pvt. Ltd., NewDelhi-1

6. K.Subramanya, Engineering hydrology, Tata McGraw-Hill publishing company ltd., New Delhi

Subject Code   **:** EEG673

Semester   **:** VI Semester

Subject Title   **: COMPUTER APPLICATION IN CIVIL ENGINEERING PRACTICE**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination				
	Hours/ Week	Hours/ Semester	Marks				Duration
			Internal Assessment	Autonomous Examination	Total		
COMPUTER APPLICATION IN CIVIL ENGINEERING PRACTICE	**4 Hrs.**	**64 Hrs.**	**25**	**75**	**100**		**3 Hrs.**

DETAILED SYLLABUS

EEG673 - COMPUTER APPLICATION IN CIVIL ENGINEERING PRACTICE

OBJECTIVES:

After completing this course, students will be able to:

➢ Prepare the estimate and abstract estimate using Electronics Spread sheet software.

➢ Know the RCC detailing using software.

➢ Analyse the simple frame structure using software.

➢ Use the Construction Project Management Software to develop the CPM/PERTnetwork.

➢ Practice the Aerial Map using GIS software.

LIST OF EXPERIMENTS

PART - A

I ELECTRONIC SPREAD SHEET USING SOFTWARE   **16 Hours**

Solving problems involving estimation, analysis and design using any one of the available packages mentioned below or any other suitable packages for the following exercises.

1. Prepare the Estimate sheet with given data (provide all the measurement details)and calculate the quantity using formula bar.

2. Prepare the Abstract sheet for the given data and calculate Amount and TotalAmount using Formula bar (Use separate column for rates and units)

3. Design and Analysis problems

4. Calculate Area and Elongation using Formula bar

5. Calculate Effective depth„d" and Area of Steel „A_{st} "using Formula Bar for givensingly reinforced section.

6. For given dimension of Masonry/R.C.C Dam ie. top width, bottom width, height of Dam , height of water, Specific weight of masonry/R.C.C. , Sp.wt of Water etc,. Findthe base pressure and check the stability of the dam.

7. Finding centre of gravity; I_{xx} and I_{YY} of I, L, T and channel sections.

Note : In addition to the above, similar exercises may be given for practice

Commercial Software	Similar Opensource	Download Link
Microsoft Office	Open office	http://download.openoffice.org/
	Libre Office	http://www.libreoffice.org/

PART B

III.   RCC DETAILING USING SOFTWARE   16 Hours

Generation of detailed drawings for the given specification and Preparation of Bar Bending schedule using any one of the software packages for the following exercises.

Cross section and longitudinal section of:

1. Continuous one way slab (with three equal spans)

2. Simply supported two-way slab

3. Restrained two - way slab

4. Singly reinforced rectangular beam

5. Doubly reinforced continuous rectangular beam with two equal span

6. Dog-legged staircase

7. R.C.C Column with square Isolated footing

III.   RCC STRUCTURES - ANALYSIS USING SOFTWARE   16 Hours

1.   Carry out the analysis and design of simple RCC structures using any one of theavailable packages like STAADPRO, ETAB, CADS3D or any other suitablepackages.

IV. CONSTRUCTION PROJECT MANAGEMENT USING SOFTWARE   9 Hours

1. Develop the CPM / PERT Network for the proposed simple building project using anyone of the available packages mentioned below or any other suitable packages.

CommercialSoftware	Similar Opensource	Download Link
Microsoft Project	GANTT PROJECT	http://www.ganttproject.biz/

V DRAWING MAPS USING GIS SOFTWARE   3 Hours
(Demonstration and Practice only)

1.   Develop Aerial map of given area using **any one** of the available packages mentionedbelow or any other suitable packages.

Commercial Software	Similar Opensource	Download Link
ARCGIS	QGIS	http://www.qgis.org/en/site/
	GRASS GIS	http://grass.osgeo.org/

REVISION & TEST   4 Hours

SCHEME OF EXAMINATION:

In the examination the students have to be given two experiments one fromPart A and another from Part-B.

DETAILED ALLOCATION OF MARKS

S.No	Description	Part-A Max.Marks(30)	Part-B Max.Marks (40)
1.	Procedure	5	5
2	Tabulation and Observation	10	15
3	Calculations	10	15
4	Sketch / Graph	5	5
	Viva Voce	5	
	Total	**75**	

LIST OF EQUIPMENTS

S.No.	List of the Equipments	Quantity Required
1.	Computers	20 Nos.
2.	Suitable Software for Electronic Spread Sheet	20 Users
3.	Suitable RCC Detailing Software	20 Users
4.	Suitable Structural Analysis Software	20 Users
5.	Suitable Project Management Software	20 Users
6.	Suitable GIS Software	20 Users

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG684

Semester   **:** VI Semester

Subject Title   **: ESTIMATION AND COSTING LABORATORY**

                               (Elective Practical II)

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
ESTIMATION AND COSTING LABORATORY	**4 Hrs.**	**64 Hrs.**	**25**	**75**	**100**	**3 Hrs.**

DETAILED SYLLABUS

EEG684 - ESTIMATION AND COSTING LABORATORY (Elective Practical II)

OBJECTIVES:

After completing this course, students will be able to:

➢ Select modes of measurements for different items of works.

➢ Prepare detailed estimate of a civil engineering works.

➢ Use relevant software for estimating the quantities and cost of items of works.

➢ Justify rate for given items of work using rate analysis techniques.

<div align="center">LIST OF EXPERIMENTS   60 Hrs</div>

1. Prepare the list of items to be executed with units for detailed estimate of a given structure from the given drawing.

2. Prepare a report on market rates for given material, labour wages, hire charges of tools & equipments

required to construct the given structure as mentioned in at Serialnumber 1 above.

3. Recording in Measurement Book (MB) for any four items

4. Prepare bill of quantities of given item from actual measurements. (any four items).

5. Prepare approximate estimate for the given engineering works.

6. Calculate the quantity of items of work from the given set of drawings using standard measurement sheet for load bearing residential structure using description of item from (1BHK Building with staircase).

7. Prepare detailed estimate from the given set of drawings using "standard measurement and abstract format" for RCC framed structure using description ofitem (G+1 Building)

8. Calculate the reinforcement quantities from the given set of drawings for a room size of 3 m x 4m with bar bending schedule.

9. Prepare detailed estimate of bitumen road of one kilometer length from the given drawing.

10.Prepare detailed estimate of small Septic tank from the given set of drawings.

11.Prepare bar bending schedule for the given singly reinforced and doubly reinforced beams

12.Prepare bar bending schedule for the given continuous beam

13.Prepare bar bending schedule for the given one way slab

14.Prepare bar bending schedule for the given two way slab

15.Prepare bar bending schedule for the given square column and square footing

REVISION & TEST   **4 Hrs**

Reference Books:

1.   Datta, B.N., Estimating and Costing in Civil engineering, UBS Publishers Distributors

2.   Rangwala,S.C., Estimating and Costing, Charotar Publishing House, Anand.

3.   Birdie,G.S., Estimating and Costing, Dhanpat Rai Publishing Company(P) Ltd. Delhi.

4.   Patil,B.S., Civil Engineering Contracts and Estimates, Orient Longman, Mumbai..Monojit Chakraborti, Kolkata.

5.   PWD Schedule of Rates.

SCHEME OF EXAMINATION:

In the examination the students have to be given ONE experiments from Above.

DETAILED ALLOCATION OF MARKS

S.No	Description	Marks
1.	Tabulation and Observation	40
2.	Calculations	25
3.	Accuracy of result	05
4.	Viva-Voce	5
	Total	**75**

DIPLOMA IN CIVIL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG685

Semester   **:** VI Semester

Subject Title   **: CONCRETE TECHNOLOGY PRACTICAL (Elective Practical II)**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
CONCRETE TECHNOLOGY PRACTICAL	**3 Hrs.**	**48 Hrs.**	**Internal Assessment**	**Autonomous Examination**	**Total**	**Duration**
			25	**75**	**100**	**3 Hrs.**

DETAILED SYLLABUS

EEG685 CONCRETE TECHNOLOGY PRACTICAL (Elective Practical II)

OBJECTIVES:

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

➢ Find the fineness setting time of cement.

➢ Know the shape tests and fineness for modulus coarse aggregate.

➢ Determine the bulking characteristics of sand.

➢ Determine the workability of concrete using slump cone, compaction factor andVee Bee consistometer tests.

➢ Know the arrangement of steel reinforcement for concrete elements

➢ Study the workability properties of self compacting concrete.

LIST OF EXPERIMENTS

PART A   18 Hours

1. Determination of the fineness of cement by Blains Permeability Apparatus or by sieveanalysis.
2. Determination of Initial setting time of cement by using Vicat's Apparatus.

3. Determination of final setting time of cement by using Vicat's Apparatus.

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4. Shape Test for coarse aggregate – Flakiness Index test.

5. Shape Test for coarse aggregate – Elongation Index test.

6. Shape Test for coarse aggregate – Angularity number test.

7. Determine the Bulking characteristics of given sand sample.

     PART B   **27 Hours**

8. Determination of workability of concrete by slump cone test.

9. Determination of workability of concrete by compaction factor test.

10. Casting of concrete cube and compression test on concrete cube.

11. Determination of Fineness Modulus of fine aggregate sample and plot a particlesize distribution curve and also find the effective size and uniformity co-efficient.

12. Determination of Fineness Modulus of coarse aggregate sample by conducting sieveanalysis.

13. Vee- Bee Consistometer Test on concrete test.

14. Study of workability of self compacting concrete.

REVISION & TEST   **3 Hours**

SCHEME OF EXAMINATION:

In the examination the students have to be given two experiments one from Part A and another from Part-B.

DETAILED ALLOCATION OF MARKS

SI.No	Description	PART A (25 MARKS)	PART B (45 MARKS)
1.	Procedure	5	10
2.	Tabulation and Observation	10	15
3.	Calculations	5	10
4.	Sketch / Graph	3	5
5.	Accuracy of result	2	5
	Viva Voce	5	
	Total	**75**	

LIST OF EQUIPMENTS

SI.No.	List of the Equipments	Quantity Required
1.	Slump cone apparatus	2 Nos.
2.	Compaction factor apparatus	1 No.
3.	Concrete cube mould 150*150*150 3sets	3 sets(9 Nos)
4.	Concrete cube mould 100*100*100 3sets	3 sets (9 Nos)
5.	Sieve test for fine aggregate made of brace200mm dia complete set.	2 sets
6.	Sieve test for coarse aggregate made of brass200mm dia complete set	2 sets
7.	Concrete mixing tray	2 Nos
8.	Vee Bee Consistometer	1 No
9	Weigh balance-digital up to 10kg capacity with 1gm accuracy battery backup with 8 hours	1 No
10.	Apparatus to find Flakiness index, Elongation index and Angularity number for Coarse Aggregate	1 No. each
11	Blaine Permeability apparatus	1 No.
12	Sieve No 9	2 Nos
13	Vicats apparatus	2 sets

DIPLOMA IN ENVIRONMENTAL ENGINEERING SYLLABUS

G-SCHEME

Subject Code   **:** EEG686

Semester   **:** VI Semester

Subject Title   **: WATER RESOURCES ENGINEERING LABORATORY**

        (Elective Practical II)

TEACHING AND SCHEME OF EXAMINATION

No.of weeks per semester: 16weeks

Subject	Instructions		Examination			
	Hour/ Week	Hours / Semester	Marks			
			Internal Assessment	Autonomous Examination	Total	Duration
WATER RESOURCES ENGINEERING LABORATORY	**4Hrs.**	**64Hrs.**	**25**	**75**	**100**	**3Hrs.**

<u>DETAILED SYLLABUS</u>

EEG686 –WATER RESOURCES ENGINEERING LABORATORY (Elective Practical II)

OBJECTIVES:

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

➢ To learn estimation of hydrological parameters.

➢ To understand water demand of crops and provisions to meet the same.

➢ To know planning of reservoirs and dams.

➢ To design irrigation projects, canals and other diversion works.

LI ST OF EXPERIMENTS

EXERCISES

1. Calculate average rainfall for the given area using arithmetic mean method.
2. Calculate average rainfall for the given area using isohyetal,Theissen polygon method.
3. Delineation of contributory area for the given outlet from the given topo-sheet.
4. Estimate crop water requirement for the given data.
5. Estimate capacity of the canal for the given data.
6. Calculate reservoir capacity from the given data.
7. Calculate control levels for the given data for a given reservoir.
8. Draw a labeled sketch of the given masonry/earthen dam section.
9. Draw the theoretical and practical profile of the given gravity dam section.
10. Prepare a presentation on the technical details of any one micro or minor irrigation scheme.
11. Preparea model of any irrigation structure using suitable material.
12. Prepare a maintenance report for any major/minor irrigation project site in the vicinity of your area, based on field visit.
13. Prepare summary of the technical details of any existing water resource project in the vicinity of your area.
14. Draw a labeled sketch of the given diversion head works and Cross Drainage works.
15. Design a canal section for the given conditions with estimation of the quantity of material required for lining.

DETAILED ALLOCATION OF MARKS

S.No	Description	Marks
1.	Tabulation and Observation/ Procedure	35
2.	Calculations	45
3.	Accuracy of result	15
4.	Viva-Voce	5
	Total	**100**

Reference Books

1. Punmia,B.C.,Pande,B,Lal,Irrigation and water power engineering,Laxmi Publications
2. Subramanayan, Engineering Hydrology, McGrawHill.

3. Mutreja K N,Applied Hydrology, McGrawHill

4. Sharma,R.K.and Sharma,T.K.,Irrigation Engineering,S.Chand and Company

5. Basak,N.N.,Irrigation Engineering, McGraw Hill Education India Pvt.Ltd.

6. Asawa,G.L.,Irrigation and water resource Engineering, New Age International(P)

7. Dahigaonkar,J.G.,Irrigation Engineering, Asian Book Pvt.Ltd.,NewDelhi.

8. Garg,SK,Irrigation and Hydraulic structures,Khanna Publishers,Delhi.

9. PriyaniV.B.,Irrigation Engineering,Charotar BookStall,Anand.

Subject Code   **:** EEG674

Semester   **:** VI Semester

Subject Title   **: PROJECT WORK AND INTERNSHIP**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours/ Week	**Hours/ Semester**	**Marks**			**Duration**
PROJECT WORK AND INTERNSHIP	**4 Hrs.**	**64 Hrs.**	**Internal Assessment**	**Autonomous Examination**	**Total**	
			25	**75**	**100**	**3 Hrs.**

OBJECTIVES:

The objective of the project work is to enable the students to work in convenient groups of not more than six members in a group on a project involving theoretical and experimental studies related to Civil and Environmental Engineering. Every Project Work shall have a Guide who is a member of the faculty of ENVIRONMENTAL ENGINEERING of the college. The hours allotted for this course shall be utilized by the students to receive directions from the Guide, on library reading, laboratory work, computer analysis or field work and also to present in periodical seminars the progress made in the project. Each student shall finally produce a comprehensive reportcovering background information, literature Survey, problem statement, Project work details and conclusions.

This experience of project work shall help the student in expanding his / her knowledge base and also provide opportunity to utilize the creative ability and inference capability.

* Implement the theoretical and practical knowledge gained through the curriculuminto an application suitable for a real practical working environment preferably in an industrial environment

* Get exposure on industrial environment and its work ethics.

* Understand what entrepreneurship is and how to become an entrepreneur.

* Learn and understand the gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.

* Carry out cooperative learning through synchronous guided discussions within the class in

  key dates, asynchronous document sharing and discussions, as well as to prepare collaborative edition of the final project report.

WORKS INVOLVED IN PROJECT WORK:

Collection of Data from various Journals and Civil Engineering Magazines about the list of Projects given below- Select a suitable project based on the data collected and available resources in your locality -Surveyed Site Plan — Site particulars — Preparation of Architectural Drawings – soil type in the location – Specification for materials & construction procedure - Structural design — Preparation of Detailed Estimate, Data as per Current schedule of Rates - Abstract Estimate – Structural Drawings – Preparation of Report about the project.

IMPORTANT DOCUMENTS TO BE REFERRED FOR THE ABOVE ACTIVITIES:

S.No	Activity	Reference
1.	Preparation of Architectural Drawings	1. Building Regulations of Locality 2. National Building Code of India, etc
2.	Structural design, Concrete Reinforcement,Steel etc.	1. Relevant IS code for Masonry,Structures 2. IS 456 for Reinforced Cement Concrete 3. Hand book on Concrete Reinforcementand Detailing (SP-34)
3.	Specification of material and work procedure as per State Govt. Highways, Central Govt. Railways, etc	1. Construction procedure byorganization, viz. PWD 2. Construction procedure by organizationviz. CPWD 3. Specification by Architect etc.,

The Project work must be reviewed twice in the same semester. The project work is approved during the V semester by the properly constituted committee with guidelines.

a)   INTERNAL ASSESSMENT:

The internal assessment should be calculated based on the review of the progress of thework done by the student periodically as follows:

Details of Assessment	Period of Assessment	Max.Marks
First Review	6th Week	10
Second Review	12th week	10
Attendance	Entire semester	5
Total		**25**

b) Allocation of Marks for Project Work and Internship in Autonomous Examinations:

Details of Mark allocation	Max. Marks
Demonstration / Presentation	20
Report	20
Viva Voce	15
Internship report	20
Total	**75**

c) Internship Report:

The internship training for a period of two weeks shall be undergone by every candidate at the end of IV / V semester during vacation. The certificate shall be produced along with the internship report for evaluation. The evaluation of internship training shall be done along with final year "Project Work & Internship" for 20 marks. The internship shall be undertaken in any industry / Government or Private certified agencies which are in social sector / Govt. Skill Centers / Institutions / Schemes.

A neatly prepared PROJECT REPORT as per the format has to be submitted by individual student during the Project Work & Internship Autonomous examination.

LIST OF SUGGESTED PROJECTS

- **COMPARATIVE STUDY**

Conventional and Composite concrete mixtures Light weight construction materialsPrefabricated and

R.C.C. Structures

Cost and construction procedures for steel and R.C.C. Structures

Cost and Construction procedures for Prestressed and R.C.C. Structures

- **ADMIXTURES**

Economy of using fly ash in concrete

- **MIX DESIGN**

Comparative study of mix design by different methods

- **STUDY OF SPECIAL TYPES OF CONCRETE IN CONSTRUCTION BYEXPERIMENTS**
  - Bamboo as a reinforcing material
  - Baggase ash concrete
  - Flyash concrete
  - Concrete with Natural vegetative materials

- Concrete using Plastic waste
- Concrete using Steel slag
- Concrete using factory wastes
- Self Compacting concrete, Fibre reinforced concrete, Ferro cement products,

- **PAPER PROJECTS**
- Residential Houses, Primary Health center, School Buildings, Guest House
- Panchayat Union Office Building, Bank Building
- Post Office Building, College Building, Hospital Building, Hotel Building, Hostel Building, Factory Building, Auditorium, Shopping Centre, Community Hall, Theatre
- Market Building, Multistoried Car park, Rural Bus Stand , Stadium
- Swimming Pool
- Over head tank for a village, New village road with culvert, Small Bridge
- Plate girder bridge
- Septic Tank for a Colony
- Other Civil Engineering related structures
- **ENVIRONMENTAL MANAGEMENT PROJECTS**
- Treatment of Wastewater and recirculation for a Colony.
- Solid waste management in a Colony.
- Hydrological data Collection for a river basin/water shed Industrial effluent Collectionand analysis .

- **MISCELLANEOUS**
- Rain water Harvesting system for buildings
- Rain water Harvesting system for a small colony
- Low cost Housing techniques
- Rehabilitation of structures

FORMAT FOR PREPARATION OF PROJECT REPORT

1. ARRANGEMENT OF CONTENTS:

The sequence in which the project report material should be arranged and bound should beas follows:

1. Cover Page & Title Page
2. Bonafide Certificate
3. Abstract
4. Table of Contents

5. List of Tables

6. List of Figures

7. List of Symbols, Abbreviations and Nomenclature

8. Chapters

9. Appendices

10. References

The table and figures shall be introduced in the appropriate places.

2. PAGE DIMENSION AND BINDING SPECIFICATIONS:
The dimension of the project report should be in A4 size. The project report should be bound using flexible cover of the thick white art paper. The cover should be **printed inblack letters** and the text for printing should be identical.

3. PREPARATION OF FORMAT:

3.1 Cover Page & Title Page – A specimen copy of the Cover page & Title page of theproject report are given in **Appendix 1.**

3.2 Bonafide Certificate – The Bonafide Certificate shall be in double line spacing using Font Style Times New Roman and Font Size 14, as per the format in **Appendix 2.**

The certificate shall carry the guide"s signature and shall be followed by the guide"s name, academic designation (not any other responsibilities of administrative nature), department and full address of the institution where the supervisor has guided the student. The term **'GUIDE'** must be typed in capital letters between the guide"s name and academic designation.

3.3 Abstract – Abstract should be one page synopsis of the project report typed double line spacing, Font Style Times New Roman and Font Size 14.

3.4 Table of Contents – The table of contents should list all material following it as well as any material which precedes it. The title page and Bonafide Certificate will not find a place among the items listed in the Table of Contents but the page numbers of which are in lower case Roman letters. One and a half spacing should be adopted for typing the matter under this head. A specimen copy of the Table of Contents of the project report is given in **Appendix 3.**

3.5 List of Tables – The list should use exactly the same captions as they appear abovethe tables in the text. One and a half spacing should be adopted for typing the matter under this head.

3.6 List of Figures – The list should use exactly the same captions as they appearbelow the figures in the text. One and a half spacing should be adopted for typing thematter under this head.

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3.7 List of Symbols, Abbreviations and Nomenclature — One and a half spacing should be adopted or typing the matter under this head. Standard symbols, abbreviations etc. should be used.

3.8 Chapters – The chapters may be broadly divided into 3 parts

(i)   Introductory chapter,

(ii)   Chapters developing the main theme of the project work such as

        1. Objectives

        2. Collection of data and required survey work

        3. Management and construction procedure

        4. Resources scheduling and networking

        5. Design details

        6. Required drawing set

        7. Utility to society if any and Conclusion

The main text will be divided into several chapters and each chapter may be further dividedinto several divisions and sub-divisions.

- Each chapter should be given an appropriate title.
- Tables and figures in a chapter should be placed in the immediate vicinity of thereference where they are cited.
- Footnotes should be used sparingly. They should be typed single space and placeddirectly underneath in the very same page, which refers to the material they annotate.

3.9 Appendices – Appendices are provided to give supplementary information, which isincluded in the main text may serve as a distraction and cloud the central theme.

- Appendices should be numbered using Arabic numerals, e.g. Appendix 1,Appendix 2, etc.
- Appendices, Tables and References appearing in appendices should be numbered and referred to at appropriate places just as in the case of chapters.
- Appendices shall carry the title of the work reported and the same title shall bemade in the contents page also.

3.10 List of References –The listing of references should be typed 4 spaces below the heading "REFERENCES" in alphabetical order in single spacing left — justified. The reference material should be listed in the alphabetical order of the first author. The name of the author/authors should be immediately followed by the year and other details.

A typical illustrative list given below relates to the citation example quoted above.

Reference:

1. Code of practice for plain and reinforced concrete (fourth edition), IS456:2000, Bureauof India Standard, New Delhi

2. Neville, A. M., Concrete Technology, Fourth edition, Pearson Education, New Delhi.

3. Handbook on concrete mixes (based on Indian Standards), SP: 23- 1988, Bureau ofIndian Standards, New Delhi, India

3.10.1 Table and figures - By the word Table, is meant tabulated numerical data in the body of the project report as well as in the appendices. All other non- verbal materials used in the body of the project work and appendices such as charts, graphs, maps, photographs and diagrams may be designated as figures.

4.0   Typing Instructions:

The impression on the typed copies should be black in colour. One and a half spacing should be used for typing the general text.The general text shall be typed in the Font style Times New Roman and Font size 12.

****

TITLE OF PROJECT REPORT

<Font Size 18><1.5 line spacing>

A PROJECT REPORT
<Font Size 14>

Submitted by

<Font Size 14><Italic>

NAME OF THE CANDIDATE(S)

<Font Size 16>

Submitted for partial fulfillment of requirement for the award of the diploma

in

<Font Size 14><1.5 line spacing><Italic>

BRANCH OF STUDY

<Font Size 14>

NAME OF THE POLYTECHNIC COLLEGE
<Font Size 14>

DIRECTORATE OF TECHNICAL EDUCATIONCHENNAI 600 025

<Font Size 16><1.5 line spacing>

MONTH & YEAR

<Font Size 14>

PLANNING ANALYSIS AND DESIGNING OFMULTI- LEVEL CAR PARKING

A PROJECT REPORT

Submitted by

SANDHYA. A   **10200382**
GAYATHRI. R   **10293990**
MUTHUSAMY. G   **10293991**
RAJA. D   **10289898**

in partial fulfilment of requirement for the award of the diploma

in

ENVIRONMENTAL ENGINEERING

XXXXX POLYTECHNIC COLLEGE

DIRECTORATE OF TECHNICAL EDUCATIONCHENNAI 600 025

APRIL 20….

(A typical specimen of Bonafide Certificate)
<Font Style Times New Roman>

DIRECTORATE OF TECHNICAL EDUCATIONCHENNAI 600 025
<Font Style Times New Roman – size -18>

BONAFIDE CERTIFICATE
<Font Style Times New Roman – size -16>

<Font Style Times New Roman – size -14>

Certified that this project report entitled **"………TITLE OF THE PROJECT…………….."**is the bonafide work done by "......................**NAME OF THE CANDIDATE(S).…………"** with his/her batch-mates, in partial fulfilment of the requirement for the award of Diploma in ENVIRONMENTAL ENGINEERING under my guidance.

Signature of the Head of the Department>>   <<Signature of the Guide>>

SIGNATURE   **SIGNATURE**

<<Name>>   <<Name>>

HEAD OF THE DEPARTMENT   **GUIDE**
<<Academic Designation>>

<<Department>>   <<Department>>

<<Full address of the Dept & College >>   <<Full address ofthe Dept & College >>

Submitted   for Autonomous Examination held on_____at …..XXXXX… Polytechnic College.

INTERNAL EXAMINER   EXTERNAL EXAMINER

APPENDIX 3

(A typical specimen of table of contents)
<Font Style Times New Roman>

TABLE OF CONTENTS

QUESTION PAPER PATTERN

COURSE CODE: **TIME:3Hrs**
COURSE NAME: **MAX.MARKS:75**

PART –A (5x3=15)

Answer any FIVE Questions.

1.
2.
3.
4.
5.
6.
7.
8.

PART –B (5x12=60)

Answer all Questions choosing any one sub division from each question.

9.(a)

<div align="center">OR</div>

  (b)

10.(a)

<div align="center">OR</div>

  (b)

11.(a)

<div align="center">OR</div>

  (b)

12.(a)

<div align="center">OR</div>

  (b)

13.(a)

<div align="center">OR</div>

  (b)

INSTRUCTIONS TO QUESTION PAPER SETTERS

I.   Question No 1 to 5 should be chosen from each unit (Part A) and Question No 6, 7 & 8 can
      be from any three units not exceeding two questions from each unit. Answer any
      FIVE questions out of eight. All Questions carries **3 (Three)** marks only.

II.   Question No 9 TO 13 should be chosen from each unit (Part B) using either … or pattern.
      All Questions carries **12 (Twelve)** marks only. The weight age of marks should be
      mentioned clearly if subdivisions are mentioned in the question paper