

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Water Supply & Waste Water Disposal
 Subject Code : 131CE61

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	-	2	3	80	32	20	100	40	-	-	25	10	25	10	150

Oral Examination will be assessed by internal & external examiner.

Rationale: Water is the basic need for all living beings. Maintaining this basic necessity in adequate quantity and in desired form is of great importance which is possible by detail study of Water Supply System. Some part of used water and solid wastes become sewage whose safe disposal is essential from environmental point of view. If solid and liquid wastes are not disposed off in scientific and hygienic manner which ultimately leads to health hazards. Hence Waste Water Disposal, being an essential part of Civil engineering has been included in Civil engineering course.

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

- Know the necessity of water supply scheme.
- Estimate the total quantity of water required for a particular locality.
- Know standards of drinking water.
- Understand different steps and methods of water treatment.
- Understand the distribution system.
- Know different units of sewage treatment, their operation.
- Know various methods of disposal of sewage effluents and dewatered sludge.

Syllabus

Part I -Theory

Sr. No	Contents	L	M
Section-I			
1.0	Water - 1.1 Demand of water, objectives of public water supply, Population Forecasting, estimation of water demand, fluctuations in demand of water. 1.2 Components of water supply scheme. Flow diagram of water treatment plant.	03	06
2.0	Quality of water- Physical, Chemical and Bacteriological impurities & analysis. Quality of water at source, Drinking water	02	04

	standards.		
3.0	Treatment of Water- 3.1 Water treatment processes such as sedimentation, Aeration, Sedimentation: factors affecting sedimentation, Horizontal flow type sedimentation tank. 3.2 Coagulation : coagulants and coagulant aids, Jar test, choice of coagulant. 3.3 Aeration : Objective, methods 3.4 Filtration: types of filters- rapid sand filter, slow sand filter, pressure filters : construction & operation, types of under drainage system, methods of cleaning. Comparison between rapid sand & slow sand filter. 3.5 Disinfection : various methods, free and combined residual chlorine, chlorine demand, break point chlorination, Superchlorination, dechlorination, Well water disinfection.	12	14
4.0	Miscellaneous treatment – Removal of iron and manganese, Taste, odour and colour, principles and methods, de-fluoridation.	02	05
5.0	Dissolved solids removal- Reverse osmosis, Distillation, Electrodialysis.	02	05
6.0	Transmission and Distribution – Methods of water distribution systems, systems of supplying water, appurtenances (only list). Layout of water distribution pipe system-dead end, grid iron, circular, radial, their advantages & disadvantages.	03	06
Total of Section I		24	40
Section-II			
7.0	Waste water : 7.1 Characteristics of sewage – Composition of sewage. 7.2 Sewerage system- Separate, combined and partially separate ,Sanitary and Storm water sewers, Comparison of separate and combined system, quantity fluctuations, 7.3 Shape of sewer & sewer materials, laying of sewer, Sewer appurtenances- manholes, drop manholes.	03	05
8.0	8.1 Design of sewer-maximum and minimum velocities to be generated in sewers, self cleaning velocity, Non Scouring Velocity, problems on design of sewers. 8.2 Sewage strength, BOD, COD, uses of BOD & COD test.	05	10
9.0	9.1 Sewage treatment- Objective, flow diagram using TF & ASP Preliminary sewage treatment- Screens, grit chamber, skimming tank. 9.2 Primary treatment- sedimentation 9.3 Secondary or Biological treatment-by Trickling filters construction and working, merits and demerits of trickling filter. 9.4 Secondary or Biological treatment- through activated sludge process. 9.5 Sludge disposal, digestion of sludge, dewatering of sludge, sludge drying beds	10	15
10.0	Low cost sanitation-	03	05

	Septic tank, treatment and disposal of septic tank effluent. Design of septic tank		
11.0	Disinfection & Disposal of sewage- 11.1 Disinfection of sewage 11.2 Sewage disposal – Discharge of raw and treated sewage on land and water , limits of dilution.	03	05
	Total of Section II	24	40
	Total of Section I & II	48	80

Part II- Practicals

A) Tests on Water

- 1) To determine pH of the given water sample
- 2) To determine Total solids, Dissolved solids & suspended solids of the given water sample
- 3) To determine Turbidity of the given water sample
- 4) To determine Optimum Alum Dose by Jar test for the given water sample
- 5) To determine Residual chlorine of the given water sample
- 6) To determine Chloride content of the given water sample
- 7) To determine Total hardness of the given water sample
- 8) To determine Total Alkalinity of the given water sample
- 9) To determine Dissolved Oxygen of the given water sample

B) Tests on Waste water

- 1) To determine Sludge Volume Index of the given waste water sample.
- 2) To determine BOD of the given waste water sample
- 3) To determine COD of the given waste water sample
- 4) To determine Dissolved Oxygen of the given waste water sample
- 5) To determine Total solids, Dissolved solids & Suspended solids of the given waste water sample

Term work:

Students shall submit journal containing at least 10 practicals, 5 assignments based on syllabus.

Learning Resources:

Text Books:

1. Water Supply Engineering- Vol-I by S. K. Garg, Publisher-Khanna Publishers Edition 2004
2. Environmental Engineering- Vol-II by S. K. Garg, Publisher-Khanna Publishers Edition 2006.

Reference Books:

1. Water supply Engineering by Dr. P. N. Modi, Publisher Standard Book House, New Delhi 2nd edition , 2006
2. Sewage treatment & disposal and waste water engineering, Dr. P. N. Modi, Publisher Standard Book House, New Delhi 2nd edition, 2008.

Manuals:

1. **CPHEEO** Manual on Water Supply and Treatment, Ministry of urban development, May 1999.
2. **CPHEEO** Manual on Sewerage and Sewage Treatment, Ministry of urban development, May 1999.
3. Relevant Indian Standards Specifications

Website

www.iwwa.info

Visits – 1. Water Treatment Plant

2. Waste Water Treatment Plant

Students shall submit above visit report.

Course Name: Diploma in Civil Engineering
 Course Code: DCE
 Semester :VI
 Subject Title: Construction Management
 Subject Code: 131CE62

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	2	-	3	80	32	20	100	40	-	-	-	-	25	10	125

Rationale:

One of the important activities of Civil Engineer is that he should learn the managerial processes involved in construction industries like management of labour, material and equipment to minimize the project cost and project duration and also to optimize the quality of works.

In this course, the student will learn the application of available techniques used in the management of construction industries for the purpose stated above.

Objective:

Students will be able to know:

- Stages in project planning
- Different Planning Techniques
- Cost Optimization
- Safety in Construction
- Quality Control

Syllabus

Part I -Theory:

Sr. No.	Contents	L	M
Section -I			
1	Construction Management : 1.1 Construction in India 1.2 Classification of Construction work 1.3 Various stages in construction from conception to realization. 1.4 Agencies involved and their method of execution. 1.5 Objective & Function of Construction Management	06	10

2	<p>Construction Planning:</p> <p>2.1 Stages of project planning –pretender planning, pre construction planning, detailed planning. level of details</p> <p>2.2 Process of development of plans and schedules, work break-down structure, activity list, estimation of duration ,sequence of activity</p> <p>2.3 Planning Tools- Bar chart, Mile stone chart, Critical Path Method, Activity early and late time computations,Activity On Node(AON) or Precidance Digraming Mathod(PDM), float computations.</p> <p>2.4 PERT – Assumption underlying PERT analysis, three time estimate, slack computation, Probability of completion time for a project.</p>	12	20
3	<p>Construction Cost:</p> <p>3.1 Classification of cost</p> <p>3.2 Time cost trade-off in construction projects(compression and decompression)</p>	03	05
4	<p>Resource Scheduling :</p> <p>4.1 Line of balance techniques</p> <p>4.2 Resources constraints and conflict</p> <p>4.3 Resources smoothing and levelling</p>	03	05
Total of Section I		24	40
Section -II			
5	<p>Planning and organizing construction site and resources:</p> <p>5.1 Site- site lay out, developing site organization , record keeping</p> <p>5.2 Manpower – planning , organizing, staffing, motivation</p> <p>5.3 Materials and Equipment - concept of planning , procurement and inventory control</p> <p>5.4 Fund- Cash flow, sources of fund.</p>	09	14
6	<p>Monitoring and Control :</p> <p>6.1Control of progress- supervision, record keeping, periodic progress reports, periodical progress meetings.</p> <p>6.2 Updating of plans – purpose ,data required for updating, methods of updating</p> <p>6.3 Quality Control- concept of quality, quality of constructed structure, check-lists for quality control, role of inspection,</p>	12	18

	sampling techniques. 6.4 Safety on site- importance of safety, causes of accidents, safety measures, approaches to improve safety, measuring safety.		
7	Introduction of importance law related to construction industry: 7.1 Factory Act 7.2 Minimum Wages Act 7.3 Workmen's Compensation Act 7.1 Contract labour Act	03	08
	Total of Section II	24	40
	Total of Section I & II	48	80

Term Work: At least ten assignment and ten problems covering entire syllabus.

Learning Resources:

Text Books

1. Techniques for construction Network scheduling by Stevens, edition 1990
2. Project management by B. M. Naik Publisher Vani Educational Books, edition
3. Construction Project Management by Chitkara K.K., Tata McGraw Hill Publishing Co, Ltd
4. Construction Planning and Management, Gahlot P.S., International Publishers, Delhi.

Reference Books:

Handbook of Construction Management by P. K. Joy

Reference Code:

IS code 15883: 2009- Construction Project Management – Guidelines.

Visits – 1. Visit to any construction company shall be arranged to study Construction Management.

2. Visit to any construction company shall be arranged to study Safety Management.

Students shall submit above visit report.

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Irrigation Engineering
 Subject Code: 131CE63

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	2	-	3	80	32	20	100	40	-	-	-	-	25	10	125

Rationale:

India is an agricultural country as about 70% of Indian population is directly dependent on agriculture which makes the Agricultural industry as the backbone of Indian economy. India is a tropical country with non uniform rainfall, so artificial application of water is enviable to get assured and increased yield.

Irrigation is an age-old art. The aim of the subject is to present the science and practice of irrigation engineering in a concise form comprising practically all the modern development. The input to the subject is the knowledge of survey for investigation, hydrology for calculation of yield from rainfall records and hydraulics for designing the storage, conveyance and outlet structures.

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

- Know various types irrigation systems.
- Collect the required data for the design of various irrigation projects.
- Classify the Canals and Design the canal sections with the capacity of canal.
- Calculate the yield from catchments.
- Decide the type and section of Dams, Weirs and Barrages.
- Understand types of wells and the theoretical concept of their interference.

Content: Theory

Sr. No	Topic	L	M
Section I			
01	Introduction- 1.1. Definition – Irrigation and irrigation engineering, necessity of irrigation, advantages of irrigation, ill effects of over irrigation and types of irrigation. 1.2. Introduction to lift irrigation scheme. 1.3. Irrigation department design standards and specifications.	03	04
02	Water Requirement of Crops- 2.1 Principle Indian crops, Cropping seasons. 2.2 Definitions – Crop period, base period, Duty & Delta,	05	08

	<p>factors affecting Duty, relation between Duty, Delta and base period.</p> <p>2.3 Definition – CCA, GCA, Intensity of irrigation, time factor, Kor Period, Kor depth, outlet factor.</p> <p>2.4 Modified Penman method and Problems on water requirement and capacity of canal.</p>		
03	<p>Dams And Spillways-</p> <p>3.1 Survey for irrigation project- Data to be collected for irrigation project: site selection for dams, reservoir and spillways.</p> <p>3.2 Types of dams – Earthen dams and Gravity dams (masonry and concrete), Comparison of earthen and gravity dams with respect to foundation, seepage, construction and maintenance.</p> <p>3.3 Earthen Dams – Components and their functions, typical cross section, seepage through embankment and foundation seepage control through embankment and foundation. Types of failure of earthen dams and remedial measures.</p> <p>3.4 Gravity Dams- Typical cross section, drainage gallery, joint In gravity dam, Concept of high dam and low dam, forces acting on dam and numericals to calculate forces.</p> <p>3.5 Spillways- Definition, function, location and components, various types.</p>	13	24
04	<p>Ground Water Hydrology-</p> <p>4.1 Specific capacity of well, interference among wells (theoretical concept).</p> <p>4.2 Open wells, tube wells and their types.</p>	03	04
Total of Section I		24	40
Section II			
05	<p>Hydrology-</p> <p>5.1 Definitions- rainfall, rain gauge and rain gauge station.</p> <p>5.2 Types of rain gauges in detail, average annual rain fall and its calculation.</p> <p>5.3 Definition of run off, factors affecting run off, calculation of run off by runoff coefficient, Inglis' formula, maximum flood discharge and methods of calculation, yield and dependable yield and methods of calculation.</p> <p>5.4 Hydrograph, Unit hydrograph and its uses.</p>	06	10
06	<p>Bandhara Irrigation and Percolation Tanks-</p> <p>6.1 Layout and component parts, Advantages and disadvantages of bandhara irrigation.</p> <p>6.2 Percolation Tanks– necessity and importance, selection of site.</p>	04	06
07	<p>Diversion Head Works-</p> <p>7.1 Weirs – components parts, functions and types, layout of diversion head works with its components and their function, canal head regulator, Purpose of silt</p>	06	10

	excluders and silt ejectors. 7.2 Barrages – components and their function. Difference between weir and barrage.		
08	Canals- 8.1 Classification of canals according to alignment and position in the canal network. Design of most economical canal section. Lacey's and Kennedy's Silt theories. 8.2 Canal lining – Definition, purpose, types of canal lining, advantages of canal lining. 8.3 Cross Drainage works- Concept and different types of C.D. works, 8.4 Uses of canal falls, escapes, cross regulators and canal outlets.	08	14
	Total of Section II	24	40
	Total of Section I & II	48	80
	Total	48	80

Tutorial –

Sr. No.	Tutorial Exercise	Hours
1.	Study of National Water Policy and Maharashtra Water Policy.	02
2.	Neat labeled sketches of Earthen dam, Gravity Dams, types of Spillways and types of Open and Tube Wells on A4 size plates.	08
3.	Collection of information and prepare list of documents and drawings required for irrigation project.	04
4.	Collection of information of various dams in the state and study of various watershed management techniques adopted in farms.	06
5.	Numerical on Calculation of Canal capacity.	02
6.	Six assignments based on the syllabus.	12
	TOTAL	32

Term Work- Students should submit journal of above exercises.

Text books-

1. Irrigation Engineering (Including Hydrology), by Sharma R.K. & Sharma T.K., Publisher S.Chand & Co.Ltd, 2nd Edition, 2004

Reference Books-

1. Irrigation and Hydraulic structure by S.K.Garg, Publisher Khanna publisher, New Delhi, 1981.
2. Irrigation Water Resources & Water Power Engineering by Dr.P.N.Modi, Standard Book House, 7th edition, 2008.
3. Irrigation Engineering by Basak N.N., Publisher Tata McGraw-Hill Publishing Co., 1st edition, October 1999.

4. Irrigation & Water Power Engineering by Dr.B.C.Punmia, Dr.Pande Brijbasi Lal & others, Laxmi Publications 16th editions 2009.

Visits – Visit to any type of dam shall be arranged to study Canal & Spillaway.

Students shall submit above visit report.

Course Name: Diploma in Civil Engineering

Course Code: DCE

Semester: Sixth

Subject Title: Theory of Structures

Subject Code: 131SE64

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	2	-	3	80	32	20	100	40	-	-	-	-	25	10	125

Rationale:

This course is in continuation of the course “Mechanics of Structures” in the III semester. The topics included here are of relatively of more advanced nature to enable the students to carry out the analysis of structures. This course is pre-requisite for the subject of R.C.C. and steel design.

Objective:

Students will be able to:

1. Understand the difference between determinate and indeterminate structures.
2. Solve the indeterminate structures with a maximum degree of indeterminacy of three by various methods.
3. Understand behavior of long columns & solve problems on the same.

Syllabus

Sr. No.	Contents	L	M
Section I			
1	Struts: Euler's theory of struts under axial loads, various end conditions, effective length, slenderness ratio, Rankin's formula and its use.	05	08
2	Strain Energy: Strain energy due to axial force, bending moment and shear force in beams.	05	05
3	Static Indeterminacy of structures: Type of structures occurring in practice and their classification such as statically determinate and indeterminate structures, stable and unstable structures.	01	05
4	Thin cylindrical and spherical shells:	03	07
5	Analysis of indeterminate structures: Methods of consistent deformation propped cantilevers and fixed beams.	10	15
	Total of Section I	24	40
Section II			
6	Theorem of three Moments: Application to propped cantilevers and continuous beams.	08	13

7	Slope Deflection Method: Application to continuous beams, sinking and rotation of supports.	08	12
8	Moment Distribution Method: Stiffness of Member, carry over factor, Distribution factor, application to continuous beams.	08	15
	Total of Section II	24	40
	Total of Section I & II	48	80

Term Work:

Set of minimum 20 problems covering all topics.

Text Books:

Theory of Structures by S. Ramamurthum. 8th Edition Reprint 2008, Publisher Dhanpat Rai and Sons.

Reference Books:

1. Analysis of structures Vol II by V.N. Vazirani & M.M. Ratwani, edition 2003, Khanna Publishers.
2. Basic Structural Analysis by C.S. Reddy. 2nd Edition, 16th Reprint 2007, McGraw-Hill Education.

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Advanced Structural Analysis
 Subject Code :131SE65E1

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
3	1	-	3	80	32	20	100	40	-	-	25	10	25	10	150

Oral Examination will be assessed by internal & external examiner.

Rationale:

Some students might have a liking for designing of structures and may wish to perceive career in design of Structures. Such students will find this course useful.

Objective:

Students will be able to:

1. Understand importance & use of analysis of various structures like arches..
2. Analyze and determine forces developed in few more type of structures other than Beams..
3. Learn Unit load method of deflection which can be applied for any cause of deflection.

Syllabus

Sr. No.	Contents	L	M
Section I			
1	General theorems : Theorems relating to elastic structures, Principle of virtual work, Strain energy in elastic structures, complementary energy, Castigliano's theorem, Betti's and Maxwell's reciprocal theorems.	03	10
2	Deflection of statically determinate structures: Deflection of determinate beams by Double integration Method, Moment area and Conjugate beam methods, Principle of virtual work (unit load method) and Castigliano's theorem, Deflection of determinate pin jointed trusses by principle of virtual work (unit load method).	13	15
3	Influence lines for statically determinate structures : Influence lines for cantilever, simply supported beam,	08	15

	overhanging beam and pin jointed trusses, criteria for maximum shear force and bending moment under moving loads for simply supported beams, absolute maximum bending moment		
	Total of Section I	24	40
Section II			
4.	Elastic arches : Determination of normal thrust, shear force and bending moment for parabolic and segmental three hinged arches, Influence lines for normal thrust, shear force and bending moment for three hinged parabolic arch.	8	15
5.	Suspension bridges: Suspension cable with three hinged stiffening girder, influence line diagrams for horizontal tension in the cable, shear force and bending moment at any section of the stiffening girder	8	15
6.	Struts: Struts subjected to axial loads, concept of buckling, Euler's formula for strut with different support conditions, Euler's and Rankine's design formulae. Struts subjected to eccentric and lateral loads, struts with initial curvature.	8	10
	Total of Section II	24	40
	Total of Section I & II	48	80

Tutorials:

A set of 10 design problems covering each topic.

Text Books:

1. Structural Mechanics Vol I & II by Junnarkar S B, Charotar Publishers,2008.
2. Structural Analysis Volume – I by Devdas Menon Narosa Publication,2010.
3. Structural Analysis Volume – I by S. Bhavikatti, 3rd edition, Vikas Publishers., 2008.
4. Basic Structural Analysis by C S Reddy Tata McGraw Hill Publishing Co. Ltd., 2001.

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Advanced Construction Techniques
 Subject Code : 131CE65E2

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	1	-	3	80	32	20	100	40	-	-	25	10	25	10	150

Oral Examination will be assessed by internal & external examiner.

Rationale: Today the infrastructure development is at its peak and many advance techniques are used for various construction activities. Being civil engineering students are supposed to know the features and utility of various equipments used in construction activities, but it is necessary to have the preliminary knowledge of simple construction techniques before studying advanced techniques.

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

- Know various techniques and equipments required for construction activities.
- Know methods of excavation in rock and earth with advanced methods like micro tunneling.
- Use various techniques for dewatering the foundation depending upon the soil conditions.
- Understand advanced methods and equipments used for concreting
- Know the connections found in structural steel.
- Calculate the owing and operating cost of the equipments used on construction site.

Syllabus

Part I- Theory

Sr. No.	Contents	L	M
Section-I			
1	Excavation in Rock and Earth: 1.1 Definitions: Bits, Cuttings, Drifters, Drills Abrasion, Churn, Core, Diamond, percussion and shot), Blast hole, explosives, safety fuse and blasting cap. 1.2 Brief description of different types of bits (Carbide insert & button) and drills (Jack hammer, drifters, churn drill, shot drill & diamond drill), Selection of drilling method and equipment.	08	10

	1.3 Types of Explosives (Dynamite, Slurry, ANFO and Primers), Handling and storage explosives 1.4 Introduction of Equipments used for excavation (Shovel, Hoe, Loader)		
2	Dewatering of foundation: 2.1 Necessity and Techniques used.-Drains, sumps, pumps, well point system (Single and Multiple), Various methods of timbering to trenches.	03	06
3	Scaffolding and shoring: 3.1 Definition and utility, types of scaffolding according to use for masonry and finishing works. 3.2 Types of shoring -Raking, Dead and flying	04	08
4	Damp proofing: 4.1 Causes & effects of dampness. 4.2 Materials used for damp proofing, selection of material. 4.3 Damp proofing of 4.3.1 Basement & for existing basement. 4.3.2 Existing walls above ground. 4.3.3 Roofs.	05	08
5	Equipment Cost : 5.1 Definitions: Salvage value and depreciation. 5.2 Cost of owning and operating cost, numerical for calculation of depreciation by straight line method and sinking fund method.	04	08
Total of Section I		24	40
Section II			
6	Structural Steel: 6.1 Member Connections (Column-Beam Beam-Beam), Welding methods (Electric arc welding and oxyacetylene welding), advantages of welding over riveting, joint detailing, fabrication and erection. 6.2 Cranes: Classification and utility of cranes, Features of major types of mobile and tower cranes, selection criteria for types of cranes. 6.3 List of construction equipments- tractor , bull dozer, road roller, sheep's foot roller.	07	12
7	Concrete: 7.1 Concreting in different weather conditions (Hot and cold weather) Underwater concreting, Polymer concreting. 7.2 Formwork: Definition, Requirement of good formwork, Types of formwork according to material used (Timber, Plywood, Steel), Modern shuttering materials & techniques, formwork for structural members (Columns, Beam and slab), Causes of failure, Deshuttering period for structural members.	08	12

	7.3 Equipments used for concreting: Batchter, Mixer, Batching plant, Generator, Compressor, Concrete pump, Builders Hoist, Vibrator.		
8	Precast Concrete Construction : Member fabrication, storage, transport and erection, equipments used for transport and erection, comparison of Precast concrete and Cast in situ concrete. Artificial construction materials.	02	06
9	Caisson: 9.1 Types of caisson- Box, Open or Well foundations, Pnuematic. 9.2 Defects in cassions sinking-Tilting of caissons, sand blowing 9.3 Floting of cassions- Dry docks, floting from banks, use of compressed air.	04	06
10	Cofferdams : 10.1 Introduction, uses of cofferdam. 10.2 types of cofferdams- earth, rockfill, sand bag,single & double walled, rock filled crib ,concrete , cellular and suspended. 103 Leakage prevention in cofferdams.	03	04
	Total of Section II	24	40
	Total of Section I & II	48	80

Part II-Tutorials

Sr.No	List of Exercises
1.	Submit one site visit report on major equipments used on site from two site visits.
2.	20 sketches of types of scaffolding, shoring, formwork for various structural members, concrete pump, builders hoist, vibrator and various steel member connections.
3.	Numerical on calculation of depreciation by straight line method and sinking fund method
4.	5 assignments based on syllabus
5.	Power point presentation on advanced equipments used for construction activities.

Termwork: Students shall submit journal and sketch book of above exercises.

Learning Resources:

Text Books:

1. Building Construction, Planning Techniques and method of construction by Arora S.P. and Bindra S.P. publisher Dhanpat Rai and Sons,edition 1997
2. Construction Planning, Equipments and Methods of Peurifoy, R.L, Ledbetter W.B. and

Schexnayder, C. publisher McGrawHill, Singapore, 5th edition 1995

Reference Books:

1. Construction Equipment and its planning and application by Dr Mahesh Verma publisher Metropolitan Book Company New Delhi 1983.
2. Construction Equipment and Management by Sharma S.C. publisher Khanna Publisher New Delhi.

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Airports & Tunnel Engineering
 Subject Code : 131CE65E3

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Practical		Oral		Term work		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	1	-	3	80	32	20	100	40	-	-	25	10	25	10	150

Oral Examination will be assessed by internal & external examiner.

Rationale

Transportation engineering has become the most important part of developing societies. This subject caters to the need of technician engaged in the investigation, planning, construction and maintenance of airports & Tunnels. Each component of transportation is a specialized branch of engineering. This subject aims at basic knowledge about Tunnels and airports with respect to their various types, materials used, functions of component parts, methods of construction, planning principles, aspects of supervision and maintenance.

Objective

At the end of this course students will be able to

- Know component parts of airports.
- Understand methods of survey for Airports and its geometric design.
- Understand, supervise and coordinate the construction activities related to airport & Tunnels

Syllabus

Part I Theory

Sr. No.	Contents	L	M
Section I			
1	Airport Engineering		
	1	2	4
	1.1 Introduction		
	Component parts of an aero plane, definitions of aircraft, aerodrome, airport, airfield, landing area, terminal area, runway, gate, taxiway, apron.	2	4
	1.2 Aircraft characteristics	3	4
	Aircraft weight, turning radius, wheel load & configuration.	5	5
	1.3 Airport planning-site selection.		
	1.4 Airport layout		

	Runway orientation & configuration. Taxiway geometric standards, wind rose diagram, terminal buildings, Terminal area, planning of terminal building, Apron: size of the gate position, number of gate position, aircraft parking system; Hanger: general planning considerations.	2	4
	1.5 Air traffic control: Need, Air traffic control aids.	2	4
	1.6 Airport lighting Rotating beacon, runway lighting, taxiway lighting and lighting of wind direction indicator.	2	4
	1.5 Airport marking Runway marking, taxiway marking, apron marking, wind direction.	2	4
	1.6 Airport Drainage Requirement of airport, design data, methods of surface & subsurface drainage.	2	3
	1.7 Maintenance of Airport Pavements	2	4
	1.8 Environmental Guidelines for Airport Project		
Total of Section I		24	40
Section II			
2	Tunnel Engineering		
	2.1 Introduction Definition, need, Advantages & Disadvantages, Classification of tunnels	2	3
	2.2 Tunnel Surveying Features, Alignment, selection of alignment, gradient, shapes& sizes of tunnels	4	4
	2.3 Explosives & Detonators Types & application	2	4
	2.4 Shafts Classification, Location of shafts, construction.	2	4
	2.5 Mucking & Hauling Methods, Muck Cars, Loading Machines	4	5
	2.6 Methods of tunneling Tunneling in Rocks-methods & features Tunneling in soft strata-types& features	2	4
	2.7 Tunnel Lining Objectives, types.	2	4
	2.8 Drainage Need, Sources of water, Ground water removal, drainage system	2	4
	2.9 Ventilation Methods , features	2	4
	2.10 Tunnel Safety Causes of accidents, Safety Measures, Tunnel lighting		
Total of Section II		24	40
Total of Section I & II		48	80

Part II -Term Work

The term work shall comprise of-

- I) 8-10 assignments based on above syllabus
- II) Study of Existing Airport / Visit to tunnel Site

Learning Resources

A) Text Book

1. Airport Planning and Design by Khanna & Arora publisher Nemchand Bros.,2009
2. A text book of Transportation Engineering by S.P. Chandola publisher S. Chand & Co. Ltd.2001
3. Harbour dock and tunnel engineering by R. Shrinivasan publisher Charotar Publishing house, Anand.2006

B) Reference Books

1. Roads, Railways, Bridges & Tunnels Engineering by T.D.Ahuja, G.S.Birdi, Standard Book House,1985
2. Airport Engineering by G. Venkatappa Rao publisher Tata McGraw-Hill Publishing Co. Ltd.,1992.

Visits – 1. Visit to airport shall be arranged.

2. Visit to tunnel shall be arranged.

Students shall submit above visit report.

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Air Pollution
 Subject Code : 131CE65E4

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	1	-	3	80	32	20	100	40	-	-	25	10	25	10	150

Oral Examination will be assessed by internal & external examiner.

Rationale:

Air is the basic need for all living beings. Maintaining this basic necessity in pure quantity is of great importance which is possible by detail study of air pollution & its control. Personnel in charge of pollution control in industries and government departments often have a vital interest in air pollution. Hence air pollution has been included in Civil Engineering course.

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

- Know the fundamentals of air pollution.
- Understand meteorology of air pollution.
- Understand global environmental Issues.
- Know methods of air sampling.
- Understand air pollution control methods.
- Know Government of India's air pollution control laws & air quality standards.
- Know about air pollution index.

Syllabus

Part I -Theory

Sr. No	Contents	L	M
Section-I			
1.0	Sources & Classification of Air Pollutants - 1.1 Composition of dry ambient air. Properties of air. Functions of air, Definition of air. Definition of air pollution, 1.2 Classification of air pollutants, sources of air pollution, primary & secondary air pollutants, stationary & mobile sources.	06	08
2.0	2.1 Effects of air pollution – on Human health, animals & plants. 2.2 Economic effects of air pollution.	06	08
3.0	Meteorology of air pollution- 3.1 Meteorological parameters affecting air pollution, temperature	10	20

	lapse rates and atmospheric stability, inversions 3.2 Measurement of meteorological variables. 3.3 Plume behavior, Effective stack height, estimation of plume rise by Holland equation and by equation of ASME.		
4.0	Global Environmental Issues- 4.1 Acid rain, causes, remedy 4.2 Green house effect 4.3 Ozone depletion 4.4 Indoor air pollution, its causes. 4.5 Occupational diseases.	02	04
	Total of Section I	24	40
	Section-II		
4.0	Air Sampling – 4.1 Classification of air sampling methods- ambient & stack. 4.2 General sampling devices, sampling train. 4.3 Sampling methods- sedimentation (dustfall collector, High / Ambient air sampler, determination of mass concentration, filtration, impingement, electrostatic precipitation, centrifugal. 4.4 stack sampling probes, particulate stack sampling train, pitot tube for velocity determination.	06	10
5.0	Government of India's air pollution control laws. Indian standards - emission and air quality standards.	04	08
6.0	Air Pollution control methods– 6.1 zoning, at source, controlling devices and equipment, stack, vegetation. 6.2 objectives of using control equipment, simple hoods and ducts gravity settling chamber, cyclones, bag house filter, electrostatic precipitator, venturi & cyclone scrubber, advantages, disadvantages & applications of all control devices & equipment	12	18
7.0	Air Pollution Indices- 7.1 Air Pollution Index definition, its use and types. 7.2 Air Pollution parameters. 7.3 Determination of air pollution index. 7.4 Rating scale for indices. 7.5 Display of air pollution indices.	02	04
	Total of Section II	24	40
	Total of Section I & II	48	80

Part II- Practicals

1. Study of high / ambient air sampler.
2. Study of Anderson's air sampler.
3. Study of stack monitoring equipment.
4. Study of Kitgawa tubes.
5. Study of paper tape sampler.

Term work:

Term work shall include 5 assignments and a project report on at least one of the following:

1. A stack monitoring report of at least one stack describing the methods of sampling and analysis used
2. A report on ambient air quality survey of a particular location.

Students shall submit journal containing term work, at least 03 practicals and 5 assignments based on syllabus.

Learning Resources:**Text Books:**

1. Air Pollution - by M N Rao & H V Rao, Publisher- Tata McGrawHill Edition 5th reprint 1993
2. Environmental Pollution Control Engineering- by C. S. Rao, Publisher-New Age International Edition 2nd reprint 2006.

Reference Books:

Sewage Disposal and Air Pollution Engineering – by S K Garg Publisher- Khanna, 9th edition, 1993.

Visit – Visit to any air pollution monitoring laboratory.

Students shall submit visit report.

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester :Sixth
 Subject Title : Engineering Geology
 Subject Code : 131CE65E5

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Practical		Oral		Term work		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
3	1	-	3	80	32	20	100	40	-	-	25	10	25	10	150

Oral Examination will be assessed by internal & external examiner.

Rationale:

Geological Engineering integrates two disciplines—Geology and Engineering. Geologists study the earth—its origins, its composition, and its evolution. Engineers apply scientific principles to practical ends, such as the design and construction of facilities for practical use by society. Examples of engineering works with significant geological engineering components includes mines, dams, bridges, building foundations, highways, slope stabilization projects, landfill and wastewater treatment sites, waterways and port facilities. Geological engineers also conduct environmental impact assessments, develop and protect groundwater resources, and remediate contaminated sites.

Civil Engineer during construction activities faces variety of practical problems associated with rock and soils and that need to be solved using principles of sustainable engineering. They design and construct structures, transportation facilities, dams, tunnels, and power plants. They mitigate naturally occurring phenomena such as floods, landslides, and earthquakes, and hence need to develop safe and environmentally sound structure.

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

- Identify various rock forming minerals
- Identify and classify different types of rocks
- Different rock instability and the remedial measures
- Appreciate the consideration of geological concept in different civil engineering projects.
- Identify different building stone.

Part I : Theory

Sr.No.	Content	L	M
Section I			
01	1.1 Mineralogy: Definition of minerals and crystals. Classification of mineral . Definition of Geology. Different subdivision of geology 1.2 Detailed study of physical properties of minerals 1.3 Definition of Perfect crystal, crystalline, amorphous	04	05

02	<p>A. Igneous Petrology;</p> <p>2.1 Definition of rocks, igneous rock, magma and lava</p> <p>2.2 Major subgroups of igneous rocks</p> <p>2.3 Composition, textures, types of textures, structures</p> <p>B. Sedimentary Petrology</p> <p>2.4 Definition of sediments, sedimentary rocks</p> <p>2.5 Grain size distribution of sediments</p> <p>2.6 Composition, textures and structure</p> <p>C. Metamorphic Petrology:</p> <p>2.7 Definition of metamorphism, metamorphic rock.</p> <p>2.8 Factors affecting metamorphism, Different kind of metamorphism</p> <p>2.9 Composition, textures, structures</p>	10	15
03	<p>Structural Geology</p> <p>3.1 Unconformable beds and Conformable beds-Definition</p> <p>3.2 Concept of Dip and Strike, Types of Dip and their significance, Outcrop pattern, outliers and inliers.</p> <p>3.3 Fault: Formation, Different terminology involved, types of fault</p> <p>3.4 Fold: Formation, Different component, types</p> <p>Joints: Definition, Types of joints</p> <p>Definition of Magnitude and intensity of earthquake Seismic Zone in India</p>	06	10
04	<p>Ground water</p> <p>4.1 Sources & zones, aquifer, aquiclude, aquifuge and water table,</p> <p>4.2 Definition of Confined and unconfined & perched aquifers, Pervious & impervious rocks and ground water.</p> <p>4.3 Percolation tank.</p>	04	10
	Total of Section I	24	40
Section II			
04	<p>Rock Instability and Slope movement:</p> <p>4.1 Concept of sliding blocks Types of landslide..</p> <p>4.2 Instability in vertical rock structures and measures to prevent collapse.</p> <p>4.3 Prevention by surface drainage, slope reinforcement by Rock bolting and Rock anchoring, Retaining wall, Slope treatment</p>	07	15
05	<p>Geology of dam and reservoir site:</p> <p>5.1 Required geological consideration for selecting dam and reservoir site</p> <p>5.2 Failure of Reservoir. Favorable & unfavorable conditions in different types of rocks in presence of various structural features</p> <p>5.3 Precautions to be taken to counteract unsuitable conditions,</p> <p>5.4 Significance of discontinuities on the dam site</p>	07	10

06	Tunneling: 6.1 Detailed knowledge of different governing factor for tunneling condition. 6.2 Over break, Tunneling in folded rock. 6.3 Pressure grouting for dams and tunnels,	05	07
07	Rock masses as construction material: 7.1 Definition of Rock masses. Main features constituting rock mass. 7.2 Main features affects the quality of rock engineering and design. 7.3 Measurement of velocity of sound in rock. 7.4 Classification of Rock material strength. 7.5 Core logging, Rock Quality Designation 7.6 Common rock as building material	05	08
	Total of Section II	24	40
	Total of Section I & II	48	80

Part II : Tutorials

During tutorial session, practicals will be conducted in Engineering Geology Laboratory.

Sr.no	List of Practicals
1.	Study of physical properties of minerals.
2.	Identification of minerals a. Silica group: Quartz, Amethyst, Opal b. Feldspar group: Orthoclase, Plagioclase c. Cryptocrystalline group: Jasper d. Carbonate group: Calcite e. Element group: Graphite f. Pyroxene group: Talc g. Mica group: Muscovite h. Amphibole group: Asbestos, Olivine, Hornblende, Magnetite, Hematite, Corundum, Kyanite, Garnet, Galena, Gypsum
3.	Identification of rocks(Igneous Petrology) a. Granite and its varieties, Syenite, Rhyolite, Pumice, Obsidian, Scoria, Pegmatite, Volcanic Tuff. b. Gabbro, Dolerite, Basalt and its varieties, Trachyte.
4.	Identification of rocks(Sedimentary Petrology): Conglomerate, Breccia, Sandstone and its varieties , Laterite, Limestone and its varieties, Shales and its varieties
5.	Identification of rocks(Metamorphic Petrology) : Marble, slate, Gneiss and its varieties, Schist and its varieties, Quartzite, Phyllite

Termwork:

Students shall submit journals and at least three geological maps for above Practical work. Also students shall submit three assignments based on the above topics.

Learning Resources:

Text Books:

1. Text Book of Engineering Geology by Dr. R.B. Gupte, Edition-Revised edition 2005, Publisher Pune Vidyarthi Griha
2. A Text Book of Engineering and General Geology by Parbin Singh Publisher S.K.Kataria & Sons
3. Text Book of Engineering Geology by Kesavalu Publisher MacMilan
4. A Textbook of Geology by P.K.Mukherjee, 11th Edition, Publisher World Press

Reference Books:

1. Geology Principle and Processes by Emmons, Thiel, Stauffer, Allison. Publisher McGraw-Hill Book Company, Inc.
2. Geology For Geotechnical Engineers by J.C.Harvey, Publisher Cambridge University Press
- 3 Geology for Engineers by F.G.H.Blyth, Publisher Edward Arnold & Co.
4. Manual of Field Geology by Rober R. Compton Edition 1968, Publisher Wiley Eastern University

Course Name: Diploma in Civil Engineering
 Course Code: DCE
 Semester :Sixth
 Subject Title: Construction Entrepreneurship
 Subject Code: 131CE66

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme											Total Marks
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max	Min	
-	2	-	-	-	-	-	-	-	-	-	-	-	25	10	25

Rationale:

Engineers can play very important role in economic development of the nation and wealth creation by innovation and entrepreneurship. This course aims to develop among the engineering students' awareness and abilities to be entrepreneurs.

Objective:

- To prepare a ground where the students view entrepreneurship as a desirable and feasible career option.
- To build the necessary competencies and motivation for making a career as entrepreneur.
- To educate civil engineering students in project economics & construction business management.

Syllabus

Part I- Theory

Sr. No.	Contents	T
Section-I		
1	Indian construction industry - 1.1 Projects, Unique features of construction, Project participants, method of project execution.	2
2	Business Organization – 2.1 Need & importance of an organization 2.2 Forms or types of ownership / business organization Proprietary concerns, Partnership firms (Indian Partnership Act-1932), Private & Public Ltd Companies (Companies Act –1956). 2.3 Features , advantages & disadvantages of various types of business enterprise. 2.4 Importance of government policies / regulations to business owner. 2.5 New Industrial Policy (latest) 2.6 Regulations affecting business – business registration,	4

	licensing requirements, sales tax, income tax, labour legislation, local legal requirements.	
3	Risk in construction – 3.1 Risks in running business. 3.2 Risks in construction.	2
4	Construction Economics - 4.1 Fundamental concepts- demand & supply , cost & revenue, price & income, consumer behaviour demand, elasticity of demand, demand forecasting. 4.2 Cost aspects, cost volume - profit analysis, break even analysis and its applications to decision making. 4.3 Engineering economy – equivalence, value of time, present value and annual equivalence cost, rate of return. 4.4 Market structure – Pricing & output decisions under different market conditions, technological considerations under competitive economical & global business environment.	8
Total of Section I		16
Section-II		
5	Entrepreneurship- 5.1 Qualities of entrepreneurship, strength, weaknesses, opportunities, threats, analysis of an organization, live examples of challenges faced by entrepreneurs. 5.2 Business Plan- 5.2.1 Necessity of good business plan, benefits of a business plan. 5.2.2 Phases of business plan - Phase I- data collection & Analysis Phase II- strategy formulation Phase III- forecasting results. 5.3 Business Plan Format- Part I – Business Concept - description of the business venture, business goals, marketing plan, sales forecast, production plan, corporate structure, risk assessment, action plan. Part II- Financial Plan – financial statements, financial forecasts, financing and capitalisation, operating plan, present financing, references, appendix. 5.4. Approaching lenders, attracting investors. 5.5 Development of a business plan for setting a construction company. 5.6 Valuation of a enterprise / business – 5.6.1 Methods of valuations of a business 5.6.2 Successor 5.6.3 Negotiating considerations 5.6.4 Exchange of shares.	16
Total of section II		16
Total		32

**Sr.
No.**

List of Exercises

1. Group assignments on business plan development for construction company.
2. 5 assignments based on the syllabus.

Term Work- Students should submit journal of above exercises.

Learning Resources:

Text books:

1. Entrepreneurial Development by Khanna S.S., Publisher S. Chand, 1999 edition, 2006 Reprint.
2. Construction Project Management by Jha K.N., Publisher Pearson, 2011
3. Entrepreneurship Development prepared by Colombo Plan Staff College for Technician Education, Publisher Tata McGraw –Hill ,1st reprint 1999.
4. Engineering Economics and financial accounting (ASCENT SERIES) : Aryasri, A Ramana Murthy, V. V. Publisher Tata McGraw Hill

Reference Books:

1. The successful Entrepreneur's Guidebook by Colin Barrow, Robert Brown and Liz Clarke
Publisher Kogan page India.

Visit -

1. Visit to any construction contracting firm's office to study organization structure and other business practices.
Students shall submit visit report.

Course Name : Diploma in Civil Engineering
 Course Code : DCE
 Semester : Sixth
 Subject Title : Project
 Subject Code : 131CE67

Teaching & Examination Scheme

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks		
L	T	P		Theory		Test	Total		Practical		Oral		Term work			
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min	
-	-	4	-	-	-	-	-	-	-	-	-	50 [#]	20	50 ^{\$}	20	100

Presentation / Seminar

\$ Project report

Oral Examination will be assessed by internal & external examiner.

Rationale

The students passing this course should have concept from design, drawing and estimation to completion of Civil Engineering projects. Accordingly suitable projects will be taken by the students to study the complete aspects of a project.

Objective

At the end of this course students will be able to

- Identify various problems and also to develop the attitude to seek a solution.
- Apply principles, theorems and bye-laws in the project planning and design.
- Interpret and analyze the data.
- Develop professional abilities.
- Enhance creative thinking.

Course content

A topic related to Civil Engineering will be allotted to a group of 5 -6 students. These students will study, collect data and perform related experiments or design the required system and submit a detailed report at the end of semester. Scope of project will be defined accordingly.

Term Work

1. Students are expected to submit hard copy of project report (3 no. + No. of students in group) and power point presentation.
2. Presentation and project report will be assessed by internal and external examiner (preferably from industry).
3. Students have to present detailed project report prepared in a professional manner.

Course Name : Diploma in Civil Engineering
 Course Code : -
 Semester : sem I to VI
 Subject Title : Student Center Activity/Test

Teaching Scheme			Paper Hours	Examination Scheme										Total Marks	
L	T	P		Theory		Test	Total		Pract		Oral		Termwork		
				Max	Min		Max	Min	Max	Min	Max	Min	Max		Min
-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-

Rationale:

A fresh student needs lot of help about institute and its working. During the subsequent years there is a need of general development of personality, in addition to educational progress. During later part of course, a student needs to prepare for future career. Due to globalization and competition in the industrial and service sectors; the selection for the job is based on campus interviews or competitive tests. While selecting candidates a normal practice adopted is to see general confidence, ability to communicate and attitude, in addition to basic technological concepts.

The purpose of introducing ‘Student Centered Activity (SCA)’ is to provide opportunity to students to undergo activities which will enable them to develop confidence on various fronts as stated above.

Following activities can be planned in the form of lectures, notes, presentations and group visits etc:

1. Introduction to institute and related activities –
 - a. Introduction to institute infrastructure and facilities
 - b. General conduct and discipline
 - c. Anti-ragging act
 - d. functions of student counseling cell
 - e. medical help center
 - f. library procedures
 - g. NCC activity
 - h. Gymkhana activities
 - i. cultural events
 - j. scholarship issues
 - k. hostel and mess functions
 - l. railway concession
 - m. academic calendar
 - n. registration process
 - o. examination rules
 - p. malpractices in exams and punishments
2. Expert lectures on
 - a. Introduction to E-learning sources
 - b. Use of E-library

- c. Use of internet for career and personality development
- d. Preparations for seminars on technical topics
- e. Group discussion techniques
- f. General mannerisms and personality development
- g. Interview techniques
- h. Career guidance and related counseling.
- i. Health, yoga and mediation

These activities are planned in different semester so that there will be increased participation of students in learning process.

SCA will exist till the start of Monday Tests ie till first 8 weeks.

Objectives:

The Student will be able to:

1. Acquire information from different sources
2. Prepare notes for given topic
3. Present given topic in a seminar
4. Interact with peers to share thoughts
5. Take the advantages of E-learning sources

Procedure:

Students will be taken in groups to various places with instructors. Will be attending expert lectures as and when planned. View slide shows, get information through handout and notes, refer notices etc