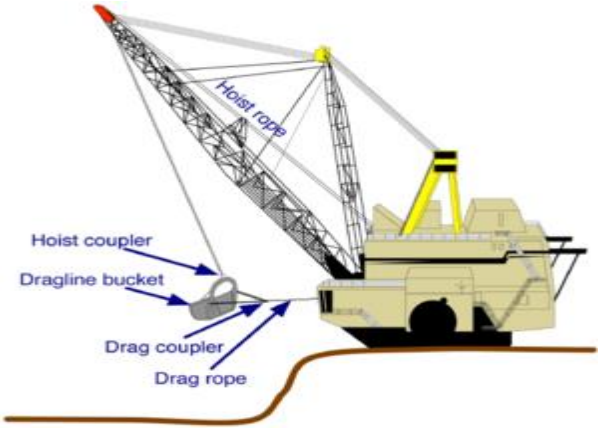
ADVANCE CONSTRUCTION TECHNOLOGY

COURSE CODE : 3350605

LABORATORY MANUAL



DEPARTMENT OF CIVIL ENGINEERING

Prepared By: Prof. H.S.Patel

Approved By : IQAC committee

CERTIFICATE

This is to certify that Ms. _____

having Enrollment No. : _____ of 5th semester of the DEPARTMENT OF CIVIL ENGINEERING has satisfactorily completed the experiments under the course of ADVANCE CONSTRUCTION TECHNOLOGY (3350604) as prescribed by Gujarat Technological University in the Laboratory of this college in the Year _____

.

Name & Signature of the Course Coordinator	**Signature of the Head of the Department**

SYLLABUS

ADVANCE CONSTRUCTION TECHNOLOGY LABORATORY

Subject Code : 3350604 No. of Practical Hours/Week: 02 Total No. of Practical Hours : 28	Examination Scheme Practical Marks

ESE	PA
20	30

Lab Evaluation Process

Student will be evaluated on her ability to correctly complete the experiment and analysis, as well as her ability to clearly communicate methodology, results, and ideas to others.

Assessments Parameters	**Marks Allocated**	**Rubrics**
Drawing of sketch and its Nomenclature. 33 %	10	**Excellent: (10 marks)** The whole experiment write up , design, drawing work done excellently.
		Good: (08 marks) Drawing of sketch and its Nomenclature is done with good effort.
		Fair: (06marks) Drawing of sketch and its Nomenclature is done with reasonably fair way.
		Poor: (3 marks) Drawing of sketch and its Nomenclature is not done satisfactory or not completed or not sufficient or done with poor accuracy.
Short detail of sketch. 33 %	10	**Excellent: (10 marks)** Short detail of sketch is complete and excellent.
		Good: (08 marks) Short detail of sketch is good and satisfactory.
		Fair: (06marks) Short detail of sketch is fair and reasonable.
		Poor: (3 marks) Poor understanding on working and suitability of equipment.

Assessments Parameters	Marks Allocated	Rubrics
Understanding of working and suitability of equipment 17 %	05	**Excellent: (05 marks)** Understand working and suitability of equipment perfectly.
		Good: (04 marks) Understand working and suitability of equipment with good knowledge.
		Fair: (03marks) Understand working and suitability of equipment with reasonably fair way.
		Poor: (02 marks) Poor understanding on working and suitability of equipment.
Attedence and interaction with faculty and groupe members.17 %	05	**Excellent: (05 marks)** Attedence and interaction with faculty and team is Excellent
		Good: (04 marks) Attedence and interaction with faculty and team is Good.
		Fair: (03 marks) Attedence and interaction with faculty and team is fair.
		Poor: (02 marks) Attedence and interaction with faculty and team is Poor.

Course outcomes:

After a successful completion of the course, the students will be able

1. Select suitable equipment and material for heavy construction.
2. Supervise construction related activities for deep foundations, pile foundations, cofferdam and caissons following safety norm
3. Supervise erection of temporary and permanent structure.
4. Prepare a report on construction activities visited where new techniques, machines and materials are used.
5. Carry out drilling and blasting work following safety norms.

Do's :

1. Bring observation note books, lab manuals and other necessary things for the class.
2. Safety is a prime concern at all times. It is your moral duty to follow.
3. The performance of unauthorized experiments is strictly prohibited.
4. Consult Your Guide on Your Being There.
5. Wear Appropriate Safety Gear

Don'ts :

1. The use of Cell phones, personal audio or video equipment is prohibited in the laboratory.
2. Don't Wander Off the site without permission.
3. Don't Touch wire, material, machinery without permission.

Government Girls Polytechnic Ahmedabad

Department: Civil Engg. Course: Advance Construction Technology. Course code : 3350605

Index

Sr No	Relavent CO	Topic	Page No.	Marks	Sign
1		**Part-A (Sketches With Nomenclature and Short Details-Study and Information Based in Sketch book)**			
	CO1	Sketches on cofferdam: 1. Earth fill cofferdam 2. Rockfill cofferdam 3. Rock filled crib cofferdam 4. Singled walled cofferdam 5. Double walled cofferdam 6. Cellular cofferdam Sketches on caissons: 1. Box caissons 2. Well foundation 3 Pneumatic caissons.			
	CO2	(1)Equipment for Excavation (a) Power shovel (b) Dragline (c) Clamshell (d) Hoe (2)Earth-moving equipment (a) Crawler tractor (b) Bull dozers (c) Scrapers (3) Hoisting equipment (a) Power driven scotch derric crane & locomotive crane (b) Gantry crane (c) Tower crane (4) Conveying equipment (a) Belt conveyors (5) Pumping equipment (a) Recprocating pump (b) Centrifugal pump (6) Compacting equipment (a) Pneumatic roller (b) Sheep foot roller (7) Concrete vibrating equipment			

		(8) Pile-driving equipment (9) Concrete batch mixing plant. (10) Grouting equipment (11) Gunite system			
	CO2 & CO3 & CO5	1.Various types of timbering. a. Stay bracing b. Box sheeting c. Vertical sheeting d. Runners system. 2. Dewatering methods. a. Sumps and ditches b. Deep well system c. Well point system d. Multi-Stage well point system e. Freezing process 3. Different types of pile foundations. a. End bearing pile, Friction pile, Composite pile, Tension pile. b. Anchor pile, Fender pile, Better pile, Sheet pile. c. Raymond pile d. Precast concrete piles e. Under reamed piles. 4. Form work. a. Column formwork b. Slab and beam formwork c. Slip form work d. Crib and Trestle 5. Explosion process blast hole.			
2	**CO4**	Visit a construction site and prepare detailed site visit report.			
3	**CO1& CO2 &CO3 &CO5**	Seminar preparation and Presentation			
4	**CO4**	Prepare a case study report.			

EXPERIMENT NO. 1. Sketches With Nomenclature and Short Details-Study and Information Based in Sketch book

UNIT II Plants And Equipment Used In Construction

1 Earth-moving equipment

(a) Crawler tractor

(b) Bull dozers

(c) Scrapers

2.Equipment for Excavation

(a) Power shovel
(b) Dragline
(c) Clamshell
(d) Hoe

3.Hoisting equipment

(a) Power driven scotch derric crane & locomotive crane

(b) Gantry crane

(c) Tower crane

4.Conveying equipment

(a) Belt conveyors

5. Pumping equipment

(a) Reciprocating pump

(b) Centrifugal pump

6. Compacting equipment

(a) Pneumatic roller

(b) Sheep foot roller

7.Concrete vibrating equipment

8.Pile-driving equipment

9.Concrete batch mixing plant.

10. Grouting equipment

11. Gunite system

UNIT III Various types of timbering

- Stay bracing
- Box sheeting
- Vertical sheeting
- Runners system

UNIT III Dewatering methods.

- Sumps and ditches
- Deep well system
- Well point system
- Multi-Stage well point system
- Freezing process

UNIT III Different types of shallow and deep foundations

UNIT IV Different types of pile foundations.

- End bearing pile
- Friction pile
- Composite pile
- Tension pile.
- Anchor pile
- Fender pile
- Better pile
- Sheet pile.
- Raymond pile
- Precast concrete piles
- Under reamed piles.

UNIT VI Different types of caisson.

- Box caissons
- Well foundation
- Pneumatic caissons

UNIT VI Form work

- Column formwork

- Slab and beam formwork
- Slip form work
- Crib and Trestle

UNIT V Blast hole

EXPERIMENT NO.02

(Site visit and preparation of detailed report recording main operations (May be with photos) as observed and discusssed with site Officers. (Atleast One Visit)
I Prepare a site visit report regarding your visit in which construction work is going on with advanced equipment's stating list of equipment including its selection criteria and its advantages.
II Prepare a site visit report regarding your visit in which deep foundation work is going on including type of deep foundation selection criteria.
III Prepare a site visit report regarding your visit in which cassion / cofferdam construction work is going on.
IV Prepare a site visit report regarding your visit in which
drilling/ blasting work is going on.
V Prepare a site visit report regarding your visit in which erection of steel structure work is going on.

EXPERIMENT NO.2

AIM : Visit a construction site and prepare detailed site visit detailed report.

PROCEDURE:

(1) Select any one site suitable convenient for visit. The site should be
   (a) construction work is going on with advanced equipment
   (b) deep foundation work is going on
   (c) cassion / cofferdam construction work is going on.
   (d) drilling/ blasting work is going on.
   (e) erection of steel structure work is going on.
(2) Observe following points in detail with photographs.
(3) List advance construction equipment used at site. Take information about its use, working procedure, suitability, capacity, out turn, advantages, disadvantages, initial cost , operating cost, maintenance cost. Take photographs if possible or allowed.
(4) Obverse advance construction process or method used at site. Take information about construction process used with its advantages and disadvantages. Take photographs if possible or allowed by site incharge.

(5) Write detailed showing

(a)Location of site with google map key plan.

(b) Saline features of site in brief.

(c) Construction process used with technical discussion.

(d) Construction activities with photographs.

(e) Construction equipment used with technical discussion.

(f) Construction equipment working with photographs.

(g) Safety precautions taken at site.

(h) Conclusion.

EXPERIMENT NO.03

AIM : Topic of seminar shall be given to a group of students not more than three . The students are required to submit and present / defended the seminar in the presence of students and teachers and the report including power point presentation to be attached with submission.

PROCEDURE :

(1) Prepare the seminar assign to your Groupe in word file.
(2) .Use neat scan copy of figures.
(3) You can select suitable video from u-tube for presentation to clear the topic concept.
(4) Prepare PPT with visible template.
(5) Present the seminar with faculty and students.
(6) Defend with Q/A session with class mate.
(7) Upload the seminar on team.
(8) Follow comments and correct it as per instruction.

EXPERIMENT NO.04

Based on advanced construction technology curriculum, on any one related topic narrating the case with specific operations/ problems faced/resolved from nearby construction work area with short details.

PROCEDURE:

(1) Search near by construction site where construction activities run with the topic as per advanced construction technology curriculum.
(2) Collect and report site details showing key plan by google map, site address and key features in short.
(3) Find the schedule of specific operation from the site engineer in charge.
(4) Visit the site on that day. Collect information about specific operation with all sequential operation. Observe the operation with on site problems. Also understand how problems are trickle by construction team.
(5) Observe day by day progress of that site by visiting it with three times.
(6) Make case study report showing
    (a) Site details showing key plan by google map, site address and key features in short.
    (b) Main operation involved at construction site with detail.
    (c) Equipment used for that operation with their suitability. Inquire about initial, operational and maintenance cost. Also inquire about rent of equipment and its out put.
    (d) Photographs showing the events if possible.
    (e) Safety precautions taken at site.
    (f) Conclusion.