

Environmental Engineering Lab

(GR18A3011)

III - B.Tech - I Semester

Dr. Srikanth / Mr. A. Prakash / Mr. C. Vanadeep

Associate and Assistant Professors



Department of Civil Engineering

Gokaraju Rangaraju Institute of Engineering and Technology

Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
Environmental Engineering Lab

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Gokaraju Rangaraju Institute Of Engineering And Technology

Department of Civil Engineering

Environmental Engineering Lab - GR18A3011

III Year B. Tech. CE – I Semester	L	T/P/D	C
(2021-22)	0	-/2/-	2

LIST OF EXPERIMENTS

1. Determination of pH and Turbidity
2. Determination of conductivity and total dissolved salts
3. Determination of Alkalinity/Acidity
4. Determination of Chlorides
5. Determination and Estimation of total solids, organic solids and inorganic solids
6. Determination of Iron
7. Determination of Dissolved oxygen
8. Determination of Nitrogen
9. Determination of total phosphorous
10. Determination of B.O.D.
11. Determination of C.O.D.
12. Determination of optimum coagulant dose
13. Determination of chlorine demand
14. Presumptive coli form test



Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Hyderabad-500090

DEPARTMENT OF CIVIL ENGINEERING

III - YEAR (A)

ROOM NO: 4202

W.E.F: 16-08-2021

	1	2	3	4	8
	9:00-10:00	10:10-11:10	11:20-12:20	12:30-1:20	1:20-2:20
Monday				LUNCH BREAK	
Tuesday					
Wednesday					
Thursday					
Friday	EE Lab				
Saturday	EE Lab				

CODE	Subject	Faculty
GR18A3011	Environmental Engineering Lab	Mr. A. Prakash / Mr. C. Vanadeep

CLASS COORDINATOR

PROGRAMME COORDINATOR

HOD



Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)
Bachupally, Hyderabad-500090

DEPARTMENT OF CIVIL ENGINEERING

III - YEAR (B)

ROOM NO: 4202

W.E.F: 16-08-2021

	1	2	3	4	8
	9:00-10:00	10:10-11:10	11:20-12:20	12:30-1:20	1:20-2:20
Monday				LUNCH BREAK	
Tuesday					
Wednesday					
Thursday					
Friday		EE Lab			
Saturday		EE Lab			

CODE	Subject	Faculty
GR18A3011	Environmental Engineering Lab	Dr K Srikanth / Mr. C Vanadeep

CLASS COORDINATOR

PROGRAMME COORDINATOR

HOD



Gokaraju Rangaraju Institute of Engineering and Technology (Autonomous)

Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

Programme Educational Objectives

1. Graduates of the program will be successful in technical and professional career of varied sectors of Civil Engineering.
2. Graduates of the program will have proficiency to analyse and design real time Civil Engineering projects.
3. Graduates of the program will exhibit management and leadership qualities with good communication skills facilitating to work in a multidisciplinary team.

Programme Outcomes

Graduates of the Civil Engineering programme will be able to

- a. Apply knowledge of mathematics, science and fundamentals of Civil Engineering.
- b. Analyse problem and interpret the data.
- c. Design a system component, or process to meet desired needs in Civil Engineering within realistic constraints.
- d. Identify, formulate, analyse and interpret data to solve Civil Engineering problems.
- e. Use modern engineering tools such as CAD and GIS for the Civil Engineering practice.
- f. Understand the impact of engineering solutions in a global, economic and societal context.
- g. Understand the effect of Civil Engineering solutions on environment and to demonstrate the need for sustainable development.
- h. Understanding of professional and ethical responsibility.
- i. Work effectively as an individual or in a team and to function on multi-disciplinary context.
- j. Communicate effectively with engineering community and society.
- k. Demonstrate the management principles in Civil Engineering projects.
- l. Recognize the need for and an ability to engage in life-long learning.

Programme Specific Outcomes

1. Recognize the need for a sustainable environment and design smart infrastructure considering the global challenges.
2. Create and develop innovative designs with new era materials through research and development.



**Gokaraju Rangaraju Institute of Engineering and Technology
(Autonomous)**

Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

COURSE OBJECTIVES

Academic Year : 2021-2022

Semester : I

Name of the Program: B. Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor **Dept.:** Civil Engineering

On completion of this Subject/Course the student shall be able to:

1.	Gain knowledge in various parameters of water.
2.	Identify the significance to conduct experiments on water purity.
3.	Explain current environmental issues through laboratory experiments.
4.	Prepare the students to excel in experiment research Programme or to succeed in industry
5	Develop problem solving and laboratory skills using modern instrumentation

Signature of HOD

Signature of faculty

Date:

Date:



**Gokaraju Rangaraju Institute of Engineering and Technology
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Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

COURSE OUTCOMES

Academic Year : 2021-2022

Semester : I

Name of the Program: B.Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

Dept.: Civil Engineering

On completion of this Subject/Course the student shall be able to:

Outcomes
1. Develop skills in low cost water treatment methods.
2. Describe the knowledge of physical, chemical and biological parameters of water and their importance
3. Develop the social responsibility to eradicate water borne diseases.
4. Recognize the methods to control environmental pollution.
5. Develop ability to work effectively in teams
6. Express water quality parameters in written reports
7. Generalize the various quality control aspects of industrial effluents by performing the

Signature of HOD

Signature of faculty

Date:

Date:



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering

COURSE SCHEDULE

Academic Year : 2021-2022

Semester : I

Name of the Program: B.Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

The Schedule for the whole Course / Subject is:

S.NO	DATE	EXPERIMENT NAME
1	20/08/2021	Determination of pH
2	21/08/2021	Determination of Turbidity
3	27/08/2021	Determination of Conductivity
4	28/08/2021	Determination of Total dissolved solids.
5	03/09/2021	Determination of Alkalinity/Acidity.
6	04/09/2021	Determination of Chlorides
7	10/09/2021	Determination and Estimation of total solids
8	11/09/2021	Determination and Estimation of Organic solids
9	17/09/2021	Determination and Estimation of Inorganic solids.
10	18/09/2021	Determination of iron.
11	24/09/2021	Determination of Dissolved Oxygen.
12	25/09/2021	Determination of Nitrogen.
13	01/10/2021	Determination of total Phosphorous.
14	02/10/2021	Determination of B.O.D
15	08/10/2021	Determination of C.O.D
16	09/10/2021	Determination of Optimum coagulant dose.
17	15/10/2021	Determination of Chlorine demand.
18	16/10/2021	Presumptive coliform test.
19	22/10/2021	Video Lectures on Determination of pH & Turbidity
20	23/10/2021	Video Lectures on Determination of Conductivity
21	29/10/2021	Video Lectures on Determination of Total dissolved solids.
22	30/10/2021	Video Lectures on Determination of Alkalinity/Acidity.
23	05/11/2021	Video Lectures on Determination of Chlorides
24	06/11/2021	Video Lectures on Determination and Estimation of total solids, Organical and Inorganic Solids
25	12/11/2021	Video Lectures on Determination of iron.
26	13/11/2021	Video Lectures on Determination of Dissolved Oxygen.
27	19/11/2021	Video Lectures on Determination of Nitrogen & Total Phosphorous
28	20/11/2021	Video Lectures on Determination of B.O.D and C.O.D

29	26/11/2021	Video Lectures on Determination of Optimum coagulant dose.
30	27/11/2021	Video Lectures on Determination of Chlorine demand.
31	03/12/2021	Video Lectures on Presumptive coliform test.
32	04/12/2021	Determination of pH & Turbidity & Conductivity
33	10/12/2021	Determination of Total dissolved solids, Alkalinity/ Acidity , Chlorides
34	11/12/2021	Determination and Estimation of total solids
35	17/12/2021	Determination of Iron , D.O
36	18/12/2021	Determination of Nitrogen, Phosphorous
37	24/12/2021	Determination of B.O.D , C.O.D, Optimum Coagulant Dose
38	25/12/2021	Determination of Chlorine demand.
39	31/12/2021	Presumptive coliform test.
40	01/01/2022	Revision
41	07/01/2022	Revision
42	08/01/2022	Lab Internal Exam

1. Total No. of Instructional periods available for the course:**75** Hours / Periods



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
SCHEDULE OF INSTRUCTIONS

Academic Year : 2021-2022

Semester : I

Name of the Program: B. Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code :** GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

The Course plan for the whole Course / Subject is:

Exercise.	Lesson No.	Date	No. of Periods	Topics / Sub-Topics	Objectives & Outcomes Nos.	References (EE Lab Manual) Page Nos.: ___ to ___
1.	1.		3	Determination of pH and Turbidity	COB's - 1,2 CO's - 1,5	5
	2.		3	Determination of conductivity and total dissolved salts	COB's - 1,2 CO's - 1,5	12
	3.		3	Determination of Alkalinity/Acidity	COB's - 1,2,3,4 CO's - 1,2,5	14
2.	4.		3	Determination of Chlorides	COB's - 1,2,3,4 CO's - 1,2,5	20
	5.		3	Determination and Estimation of total solids, organic solids and inorganic solids	COB's - 1,2,3,4 CO's - 1,2,5	23
	6.		3	Determination of Iron	COB's - 1,2,3,4 CO's - 1,2,5	26
	7.		3	Determination of Dissolved oxygen	COB's - 1,2,3,4	28

					CO's 1,2,5	-	
3.	8.		3	Determination of Nitrogen	COB's 1,3,5 CO's 1,2	-	32
	9.		3	Determination of total phosphorous	COB's 1,3,5 CO's 1,2	-	34
	10.		3	Determination of B.O.D.	COB's 1,3,5 CO's 1,2	-	36
4.	11.		3	Determination of C.O.D.	COB's 1,3,5 CO's 1,2	-	43
	12.		3	Determination of optimum coagulant dose	COB's 1,3,5 CO's 1,2	-	47
	13.		3	Determination of chlorine demand	COB's 1,3,5 CO's 1,2	-	50
	14.		3	Presumptive coli form test	COB's 1,3,5 CO's 1,2	-	51

Signature of HOD
Date:

Signature of faculty
Date:



Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : I

Name of the Program: B.Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

Lesson No: 1 **Duration of Lesson:** 3 hr

Lesson Title: Determination of pH and Turbidity

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

1. Know pH and turbidity of drinking water, bore water, industrial water

TEACHING AIDS : Lab Manual, Demonstration.

TEACHING POINTS :

- This test is performed to determine pH of water
- This test is performed to determine turbidity of water
- pH and turbidity are used to determine the quality of water

Assignment / Questions: **CObj: 1,2** **CO 1,5**

1. Define Ph.
2. Define turbidity.

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
LESSON PLAN

Academic Year : 2021-2022

Semester : I

Name of the Program: B.Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

Lesson No: 2 **Duration of Lesson:** 3 hr

Lesson Title: Determination of conductivity and total dissolved salts

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Know the conductivity and total dissolved salts present in water

TEACHING AIDS : Lab Manual, Demonstration.

TEACHING POINTS :

- This test is performed to determine conductivity of water
- Conductivity is used to know the amount of dissolved salts present in water

Assignment / Questions: **COBj: 1,2** **CO 1,5**

1. Define conductivity and its importance.

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
LESSON PLAN

Academic Year : 2021-2022

Semester : I

Name of the Program: B.Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

Lesson No: 3 **Duration of Lesson:** 3 hr

Lesson Title: Determination of Alkalinity/Acidity

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Know about acidity or alkalinity present in water

TEACHING AIDS : Lab Manual, Demonstration.

TEACHING POINTS :

- This test is performed to determine acidity of water
- This test is performed to determine alkalinity of water
- Used to know the quality of water

Assignment / Questions: **COBj: 1,2,3,4** **CO 1,2,5**

1. Define acidity and its importance.
2. Define alkalinity and its importance

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : I

Name of the Program: B.Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

Lesson No:4 **Duration of Lesson:**3 hr

Lesson Title: Determination of Chlorides

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Know about chlorides present in water

TEACHING AIDS : Lab Manual, Demonstration.

TEACHING POINTS :

- This test is performed to determine chlorides of water
- Used to determine quality of water

Assignment / Questions: Assignment / Questions: **CObj: 1,2,3,4** **CO 1,2,5**

1. What is the range of chlorides present in water?

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
LESSON PLAN

Academic Year : 2021-2022

Semester : I

Name of the Program: B.Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

Lesson No: 5 **Duration of Lesson:** 3 hr

Lesson Title: Determination and Estimation of total solids, organic solids and inorganic solids

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Develop & understand the concept of total solids and various types of solids

TEACHING AIDS : Lab Manual, Demonstration.

TEACHING POINTS :

- This test is performed to determine total solids present in water
- Used to determine quality of water

Assignment / Questions: **CObj: 1,2,3,4** **CO 1,2,5**

1. Define total solids, organic and inorganic solids.

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : I

Name of the Program: B.Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

Lesson No:6 **Duration of Lesson:**3 hr

Lesson Title: Determination of Iron

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Know about amount of iron present water

TEACHING AIDS :Lab Manual, Demonstration.

TEACHING POINTS :

- This test is performed to determine iron present in water
- Used to determine quality of water

Assignment / Questions: **CO**bj: 1,2,3,4 **CO** 1,2,5

1.What are the reagents required to determine iron

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
LESSON PLAN

Academic Year : 2021-2022

Semester : I

Name of the Program: B.Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

Lesson No: 7 **Duration of Lesson:** 3 hr

Lesson Title: Determination of Dissolved oxygen

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Know about dissolved oxygen present in water

TEACHING AIDS : Lab Manual, Demonstration.

TEACHING POINTS :

- This test is performed to determine dissolved oxygen present in water
- Used to determine quality of water

Assignment / Questions: **CO**bj: 1,2,3,4 **CO** 1,2,5

1. Define dissolved oxygen

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
LESSON PLAN

Academic Year : 2021-2022

Semester : I

Name of the Program: B. Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

Lesson No: 8 **Duration of Lesson:** 3 hr

Lesson Title: Determination of Nitrogen

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Know about amount of nitrogen present in water

TEACHING AIDS : Lab Manual, Demonstration.

TEACHING POINTS :

- This test is performed to determine nitrogen present in water
- Used to determine quality of water

Assignment / Questions: **COBj: 1, 3, 5** **CO 1,2,6**

1. What is the significance of nitrogen present in water?

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology

Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : I

Name of the Program: B. Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

Lesson No: 9 **Duration of Lesson:** 3 hr

Lesson Title: Determination of total phosphorous

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Know about total phosphorous present in water

TEACHING AIDS : Lab Manual, Demonstration.

TEACHING POINTS :

- This test is performed to determine total phosphorous present in water
- Used to determine quality of water

Assignment / Questions: **CObj: 1, 3, 5** **CO 1,2,5**

1. What is the significance of total phosphorus present in water?

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
LESSON PLAN

Academic Year : 2021-2022

Semester : I

Name of the Program: B. Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

Lesson No: 10 **Duration of Lesson:** 3 hr

Lesson Title: Determination of B.O.D.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Know about B.O.D. present in water

TEACHING AIDS : Lab Manual, Demonstration.

TEACHING POINTS :

- This test is performed to determine B.O.D. present in water
- Used to determine quality of water

Assignment / Questions: **CObj: 1, 3, 5** **CO 1,2**

1. Define B.O.D.

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
LESSON PLAN

Academic Year : 2021-2022
Semester : I
Name of the Program: B. Tech **Year:** III Year **Section:** A / B
Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011
Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep
Designation: Associate/Assistant Professor
Lesson No: 11 **Duration of Lesson:** 3 hr
Lesson Title: Determination of C.O.D.

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Know about C.O.D. present in water

TEACHING AIDS : Lab Manual, Demonstration.

TEACHING POINTS :

- This test is performed to determine C.O.D. present in water
- Used to determine quality of water

Assignment / Questions: **CObj: 1, 3, 5** **CO 1,2**

1. Define C.O.D. and its importance

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology
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LESSON PLAN

Academic Year : 2021-2022

Semester : I

Name of the Program: B. Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

Lesson No: 12 **Duration of Lesson:** 3 hr

Lesson Title: Determination of optimum coagulant dose

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Know about optimum coagulant dose

TEACHING AIDS : Lab Manual, Demonstration.

TEACHING POINTS :

- This test is performed to determine optimum coagulant dose
- Used to determine quality of water

Assignment / Questions: **CObj: 1, 3, 5** **CO 1,2**

1. What is the significance of optimum coagulant dose?

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
LESSON PLAN

Academic Year : 2021-2022

Semester : I

Name of the Program: B. Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

Lesson No: 13 **Duration of Lesson:** 3 hr

Lesson Title: Determination of chlorine demand

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Know about chlorine demand of water

TEACHING AIDS : Lab Manual, Demonstration.

TEACHING POINTS :

- This test is performed to determine chlorine demand of water
- Used to determine quality of water

Assignment / Questions: **CObj: 1, 3, 5** **CO 1,2**

1. Define chlorine demand.

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering

LESSON PLAN

Academic Year : 2021-2022

Semester : I

Name of the Program: B. Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

Lesson No: 14 **Duration of Lesson:** 3 hr

Lesson Title: Presumptive coli form test

INSTRUCTIONAL/LESSON OBJECTIVES:

On completion of this lesson the student shall be able to:

Know about coli form test.

TEACHING AIDS : Lab Manual, and Demonstration.

TEACHING POINTS :

- Used to determine presence of coli form in water

Assignment / Questions: **CObj: 1,3,5** **CO 1,2,5**

1. What is the significance of coli form test?

Signature of faculty



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
COURSE COMPLETION STATUS

Academic Year : 2021-2022

Semester : I

Name of the Program: B. Tech **Year:** III Year **Section:** A

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Mr. A. Prakash / Mr. C Vanadeep

Designation: Assistant Professor

Actual Date of Completion & Remarks, if any

Units	Remarks	No. of Objectives Achieved	Outcomes Achieved
Exercise - I	Covered on time	1	1,2,5
Exercise – II	Covered on time	2	1,2,5
Exercise – III	Covered on time	3	1,2
Exercise - IV	Covered on time	4	1,2,3

Signature of HOD

Signature of faculty

Date:

Date:

Note: After the completion of each unit mention the number of Objectives & Outcomes Achieved.



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
COURSE COMPLETION STATUS

Academic Year : 2021-2022

Semester : I

Name of the Program: B. Tech **Year:** III Year **Section:** B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. C Vanadeep

Designation: Associate/Assistant Professor

Actual Date of Completion & Remarks, if any

Units	Remarks	No. of Objectives Achieved	No. of Outcomes Achieved
Exercise - I	Covered on time	1	1,2,5
Exercise – II	Covered on time	2	1,2,5
Exercise – III	Covered on time	3	1,2
Exercise - IV	Covered on time	4	1,2,3

Signature of HOD

Signature of faculty

Date:

Date:



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering

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120	20245A0121	Sangepaga Goutham
121	20245A0122	Sodadasi Rahul

122	20245A0123	Vanga Harshith
123	20245A0124	Choleti Vineetha
124	20245A0125	Gangula Grishma
125	20245A0126	Bollampalli Sai Poojith
126	20245A0127	Pamulapati Sumanth
127	20245A0128	T Sanghamithra
128	20245A0129	Abeda Akanksha
129	20245A0130	Doppalapudi Ramvineeth Sai
130	20245A0131	Pilly Uday Kiran

Signature of HOD

Date:

Signature of faculty

Date:

S.No	Reg No	Student Name	INTERNAL (30M)	EXTERNAL (70M)	Total (100M)
1	18241A0151	SOHEB PATEL	22	46	68
2	18241A0152	SRIAM SHIVA ADITYA	6	AB	6
3	19241A0101	RUHAIL AHMAD LONE	12	30	42
4	19241A0102	AITHA SAI TEJA	27	64	91
5	19241A0103	BARISETTY SHIVA KARTHIK	12	30	42
6	19241A0104	BENDHI VARUN THEJA GOUD	22	47	69
7	19241A0105	BHUKYA VAMSHI	22	46	68
8	19241A0106	BOGE VENKAT ROHITH	12	30	42
9	19241A0107	BONTHA PRANEETHKUMAR	18	44	62
10	19241A0108	CHILUKA RAHUL	12	30	42
11	19241A0109	DANDI KIRAN	25	60	85
12	19241A0110	DAYYA RAGNESH	12	30	42
13	19241A0111	E MANISH GOUD	12	31	43
14	19241A0112	ERRAM SAI PRIYA	23	61	84
15	19241A0113	G DEEPIKA	23	62	85
16	19241A0114	GORANTALA SAI	26	63	89
17	19241A0115	GUGULOTHU SANTHOSH	28	65	93
18	19241A0116	GURIJALA SAI KUMAR	12	30	42
19	19241A0117	GURUJALA SRIDHAR	12	30	42
20	19241A0118	IRUVANTI HEMANTH KUMAR	26	60	86
21	19241A0119	JANGITI VYSHNAVI	28	64	92
22	19241A0120	JARUPLA CHERAN	25	63	88
23	19241A0122	JETTI SREEVANI	26	61	87
24	19241A0123	K SOWMYA	28	63	91
25	19241A0124	KADALI KRISHNASRI SAI	23	60	83
26	19241A0125	KAMAREDDY AKSHAY	12	30	42
27	19241A0126	KATTA SAI KUMAR	27	64	91
28	19241A0127	KOLLURI TEJASWI	24	58	82
29	19241A0128	KONDAPURAM SRIJA	28	66	94
30	19241A0129	KOTTE VIVEK	12	30	42
31	19241A0130	KRUTHIKA VIJAY PALANGE	21	47	68
32	19241A0131	MADA AKHIL REDDY	17	41	58
33	19241A0132	MADARAM SHRAVAN KUMAR REDDY	27	64	91
34	19241A0133	MADDIGATLA AJAY SAGAR	15	37	52
35	19241A0134	CHANDANA MALPATEL	25	57	82
36	19241A0135	MANDALA CHINNI	12	30	42
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38	19241A0137	MOHD OBAID KASHIF	16	38	54
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40	19241A0139	NIMMALA ARSHITHA	22	53	75
41	19241A0141	P SIDDARTHA	6	AB	6
42	19241A0142	PAGIDIPALLY AJAY KUMAR	23	55	78
43	19241A0143	PALLAPU NAVEEN	22	55	77
44	19241A0144	PALLE SANATH KUMAR	19	50	69
45	19241A0145	PANTANGI PRANAY	26	62	88
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50	19241A0150	SATYA SAI PRASANNA REDDY SOLIPETA	6	35	41
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58	19241A0158	VELISHALA GAYATHRI	28	63	91
59	19241A0159	VENKATA SIDDHARTHA RAJU VEGESNA	12	30	42
60	19241A0160	YASWANTH KURUVA	16	40	56

61	19241A0161	ABDUL RAHEEM	16	29	45
62	19241A0162	ANEMONI MURALI MANOHAR	16	28	44
63	19241A0163	ASKANY HARISH SAGAR	14	29	43
64	19241A0164	BODLA AKSHITH	26	56	82
65	19241A0165	BURRA VAMSHI KRISHNA	24	52	76
66	19241A0166	CHERLAKOLA AKHILA	23	57	80
67	19241A0167	CHINTAPALLI VIKRAM	20	49	69
68	19241A0168	CHIRRIBOYINA DHANYA	28	62	90
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93	19241A0193	SHAIK PARVEZ ANSARI	2	0	2
94	19241A0194	SIDDELA THARUN KUMAR	15	37	52
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Gokaraju Rangaraju Institute of Engineering & Technology

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Bachupally, Kukatpally, Hyderabad - 500090

PRACTICAL EXAMINATION ANSWER BOOK INTERNAL

No. **23758**

H.T. No.

2 0 2 4 5 A 0 1 1 4

Name of the Examination III B TECH 5 SEM EE LAB INTERNAL

Course B TECH Branch CIVIL Date 3/12/21

Signature of the Invigilator

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START WRITING FROM HERE

5a.

Turbidity:-

It is the presence of colloidal & suspended particles present in the water. Turbidity is not the colour. It shows the aesthetic view of water whether they are drinkable or not. Mostly for drinking water the turbidity should be ranges between 1 to 5 NTU. The units of turbidity are Nephelometric turbidity units.

Procedure:-

- (1) Take 100 ml of distilled water in a beaker and 1 ml of Hydrazine sulphate.
- (2) Take another 100 ml of distilled water in a beaker and add 10 ml of Hexamethylene tetramine (Hexamine)
- (3) Now take 5ml from each of the sample and dilute it to 100 ml so that it's turbidity is 400 NTU

(4) Again take 10 ml from the previous sample & make or dilute it to 100 ml so that its turbidity is 40 NTU.

(5) Take the 40 NTU sample into the cuvette and put it in the nephelometer for calibration.

(6) Observe the value whether 40 NTU is reading on the screen or not. If it is not done adjust the value by the standard value now to 40 NTU. so that the calibration process is completed.

(7) Now take the sample in the cuvette which is to be tested. And note down the value of turbidity.

DETERMINATION OF CHLORIDES :-

Aim:- To determine the presence of chlorides in the water.

Apparatus:

Burette, standard 0.01N AgNO_3 , NaCl solution, potassium chromate (K_2CrO_4), beaker, pipette, conical flask, measuring jar.

Procedure:-

- (1) Prepare the solution of AgNO_3 of standard 0.01N which is taken in the burette.
- (2) Take 25 ml to 30 ml of NaCl solution to the conical flask by measuring through the measuring jar.
- (3) Add 2 to 3 drops of potassium chromate (K_2CrO_4) indicator to the NaCl solution:
- (4) Now start doing titration so that the colour from yellow turns into brick red colour. $\frac{N \times 1000 \times 25}{\text{ml of sample}}$
- (5) In place of NaCl we can also take distilled water for blank titration.
- (6) Now take the sample that we are testing of 25 ml to 30 ml. in the conical flask.
- (7) Add potassium chromate indicator of 2 to 3 drops to the sample and start titration, here end point is brick red colour.
- (8) Note down the initial readings and final readings

from the formula we get $N_1 V_1 = N_2 V_2$

$$N_2 = \frac{N_1 V_1}{V_2}$$

Observations:-

$$\text{Chlorine (mg/l)} = \frac{(A-B) \times N \times 1000 \times 35.5}{\text{ml of sample.}}$$

From this we can get the amount of chlorides present in water.

Calculations:-

Sl.No	Sample in ml	Initial reading (B)	Final reading (A)	Volume of AgNO ₃ Consumed.
1.	25 ml	0 ml	11.6 ml	11.6 ml

$$\begin{aligned} \therefore \text{Chlorine (mg/l)} &= \frac{(11.6) \times 0.01 \times 1000 \times 35.5}{25} \\ &= 164.72 \text{ mg/l} \end{aligned}$$

Result:-

Therefore the amount of chlorides present in the tap water was 164.72 mg/l.

As per WHO the chlorides range should be less than 250 mg/l.



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Bachupally, Kukatpally, Hyderabad - 500090

PRACTICAL EXAMINATION ANSWER BOOK INTERNAL

No. **29586**

H.T. No.	2	0	2	4	5	A	0	1	2	9
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Name of the Examination Internal exam

Course 8.tech Branch civil Date 3/12/21

Signature of the Invigilator

START WRITING FROM HERE

11a) determination of phosphates

Aim TO determination of phosphate in the water sample.

Apparatus

- 1) u-v spectrometer.
- 2) burette
- 3) pipette.
- 4) water
- 5) conical flask
- 6) glass rod.

chemicals

- 1) standard solution
- 2) phosphates.

combined reagent

- 1) 10ml of dichloroacetic acid.
- 2) Aluminium.
- 3) Ascorbic Acid.
- 4) 15ml of potassium dichromate.
- 5) starch

procedure:

- 1) 100ml of standard phosphate solution is taken in burette.
- 2) 25 or 50ml of potassium dichromate is taken.
- 3) 15ml of taken in Aluminium sulphate.
- 4) 10ml of Ascorbic Acid is taken.
- 5) To the mix thoroughly in the solution.
- 6) Another beaker taken in 10ml of Ascorbic acid is taken in the beaker and mix in the solution. titrate in the solution.
- 7) Beaker taken in to the 50ml of the potassium dichromate and 15 Aluminium taken in mix thoroughly.
- 8) mix the solution in burette in taken. 100ml of standard phosphate solution taken in conical flask. titrate the solution. colour will be change in real yellow colour. In the spectrometer in the sample.
- 9) The colour will be changes in real yellow to colour less on the phosphates.

116) optimum coagulant dose

Aim: To determine the optimum coagulant dose on the sample.

Apparatus

- 1) sand water
- 2) coagulant dose
- 3) Burette
- 4) pipette
- 5) conical flask
- 6) stirrers
- 7) Beakers
- 8) test machine

Reagents

- 1) concentrated solution
- 2) 100ml of H_2SO_4 solution
- 3) sand water
- 4) flocc
- 5) HCl solution
- 6) Alum

Procedure

- 1) To protect from the chlorides on the protected from the solution on the preserve from the solution in 10ml of HCl solution in the sample.
- 2) To take the 100ml of sand water is taken to taken in the 6 beakers
- 3) To measure the 100ml solution taken in the six beakers.
- 4) To protected six beakers in add the 100ml of solution.
- 5) The 10ml of Alum is add in the beakers.
- 6) The add the in 0.4, 0.5, 0.6, 0.7, 0.8 & 0.9 in add the H_2SO_4 solution in the beakers.

- 3) coagulant does in a process in taken in the sample.
- 5) First a process in rapid mix process and slow mix process.
- 6) rapid mix process in 1000rpm in 2 minutes.
- 7) slow mix process is 400rpm in 20 minutes.
- 1) First we take the rapid mix process in the sample start the machine and taken in readings. stopups was mix in the alum does floc will be represent. will we set the 1000rpm in 2 minutes. in floc will be represent.
- 2) slow mix process in 400rpm in 20 minutes sample is taken in the Alum does. to set the instrument will be 400rpm in 20 minutes.
- 3) After the few minutes waiting. machine will be stop and few minutes in wait in the machine floc will be represented.
- 4) Note down the floc form in noted down the reading.

Tabular Column

S.NO	Initial reading in the beaker (mg/L)	Final reading in the beaker (mg/L)



formula $\frac{(A-B) \times 8000}{\text{mg/L}}$

result : To determine the coagulant dose to be done.



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PRACTICAL EXAMINATION ANSWER BOOK INTERNAL

No. ... **29539**

H.T. No.

1 9 2 4 1 A 0 1 7 2

Name of the Examination EE Lab - Internal Examination sem - I

Course B-tech - IIIrd year Branch Civil - B Date 04/12/21

Signature of the Invigilator

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Procedure for determination of Iron

→ prepare a standard dichromate solution by dissolving an accurately weighed sample of about 0.9 gm. in water and make - upto 100 ml in a volumetric flask. In flask weigh out accurately duplicate portions of about 0.7 g of the iron provided. Add 30 ml of dil sulphuric acid to 100 ml of water. 7 ml of 85% phosphoric acid and 5 drops of indicator. Titrate with dichromate to a purple colour.

3b

Determination of Nitrogen

AIM :- TO determine the Nitrogen ^{/Nitrate} present in the given sample of water.

Apparatus :- UV visible spectrophotometer with 1cm cells (quartz) acts as ~~absorbance~~ absorbance measurements.

Reagents :-

- > analytical reagent grade
- > distilled water
- > Nitrate solution (1000gm/l)
- > Dissolved potassium nitrate (0.7220) → (100ml)
- > ~~sulfur~~ sulfanilic acid (0.5g in 100ml)

Procedure

- Pipette out 10 ml of nitrate solution into a beaker.
- add 5 ml of HCl and 2 ml of NaCl
- wait for 30 min. by stirring occasionally
- this will form nitrate.
- The solution was filtered through to 100 ml.
- add 1 ml of ~~methyle~~ ~~indicator~~ methyle indicator
- 2 ml of sodium hydroxide is added to form azo dye.
- Diluted with 10 ml water.
- after dilution, the absorbance of the red colour dye is measured at 493 nm.

Observation :-





Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering

GUIDELINES TO STUDY THE COURSE SUBJECT

Academic Year : 2021-2022
Semester : I
Name of the Program: B. Tech **Year:** III Year **Section:** A
Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011
Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep
Designation: Associate/Assistant Professor

Guide line to study the course/subject: Environmental Engineering Lab

This course helps the students to learn and understand, with the concept of water and waste water parameters to characterize ground water/lake water/industrial effluent for social responsibility.

So the students should have the following prerequisites:

- Basic knowledge of science, engineering and fluid mechanics
- Ability to perform exercise as well as analyze and interpret data.

Where will this subject help?

1. To develop skills in low cost water treatment methods.
2. To describe the knowledge of physical, chemical and biological parameters of water and their importance.
3. To develop the social responsibility to eradicate water borne diseases.
4. Recognize the methods to control environmental pollution.



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Department of Civil Engineering

BOOKS AND MATERIALS

TEXT BOOKS

- | |
|---|
| 1. Standard Methods for Analysis of water and Wastewater – APHA. |
| 2. Chemistry for Environmental Engineering by Sawyer and Mc. Carty. |

Suggested / Reference Books

- | | |
|----|---|
| 1. | Environmental Science : Laboratory manual , Maurice A Strobbe, The C V Mosby ... Engineering , Chair N. Sawyer and Perry L McCarty, McGraw Hill Book ... Vogel's Textbook of Quantitative Inorganic Analysis (Revised Fourth Edition), ... |
| 2. | Environmental and Hydraulic Engineering Laboratory Manual [Gang Chen, ... as a textbook for an Environmental and hydraulics engineering laboratory course. |

Web Sites

- | | |
|----|---|
| 1. | http://www.nptel.ac.in/syllabus/105104032/ |
| 2. | Lab_CVL212v1.pdf |



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering

COURSE DESIGN AND DELIVERY SYSTEM (CDD)

- The Course syllabus is written into number of learning objectives and outcomes.
- These learning objectives and outcomes will be achieved through lectures, assessments, assignments, experiments in the laboratory, projects, seminars, presentations, etc.
- Every student will be given an assessment plan, criteria for assessment, scheme of evaluation and grading method.
- The Learning Process will be carried out through assessments of Knowledge, Skills and Attitude by various methods and the students will be given guidance to refer to the text books, reference books, journals, etc.

The faculty be able to –

- Understand the principles of Learning
- Understand the psychology of students
- Develop instructional objectives for a given topic
- Prepare course, unit and lesson plans
- Understand different methods of teaching and learning
- Use appropriate teaching and learning aids
- Plan and deliver lectures effectively
- Provide feedback to students using various methods of Assessments and tools of Evaluation
- Act as a guide, advisor, counselor, facilitator, motivator and not just as a teacher alone

Signature of HOD

Signature of faculty

Date:

Date:



Gokaraju Rangaraju Institute of Engineering and Technology
Department of Civil Engineering
EVALUATION STRATEGY

Academic Year : 2021-2022

Semester : I

Name of the Program: B. Tech **Year:** III Year **Section:** A / B

Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011

Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep

Designation: Associate/Assistant Professor

1. TARGET:

- a) Percentage for pass: 100 %
- b) Percentage of class:

First class with distinction	
First class	
Pass class	
Total strength	

2. COURSE PLAN & CONTENT DELIVERY

- 75 practice classes held for detailed demonstration of experiments and for analyzing real time experiments in the lab.

3. METHOD OF EVALUATION

3.1 Continuous Assessment Examinations (CAE-I, CAE-II)

3.2 Assignments/Seminars

3.3 Mini Projects

3.4 Quiz

3.5 Semester/End Examination

3.6 Others

4. List out any new topic(s) or any innovation you would like to introduce in teaching the subjects in this Semester.

Signature of HOD
Date:

Signature of faculty
Date:



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Bachupally, Kukatpally, Hyderabad – 500 090. (040) 6686 4440

Assessment in relation to CO's and COB's

Assessment:

1. Assignment
2. Internal Examination
3. External Examination
4. Practical Projects
5. Viva

Assessments \ Course Outcomes	Course Outcomes				
	1	2	3	4	5
1	X	X	X	X	X
2	X	X	X	X	X
3	X	X	X	X	X
4					
5	X	X	X	X	X

Assessments \ Course Objectives	Course Objectives				
	1	2	3	4	5
1	X	X	X		
2	X	X	X	X	X
3	X	X	X	X	X
4					
5	X	X	X	X	X



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Mappings of CO's, COB's Vs PO's, POB's

Course Objectives - Course Outcomes Relationship Matrix

Course Objectives \ Course Outcomes	Course Outcomes				
	1	2	3	4	5
1	X	X			X
2		X		X	
3	X		X	X	
4	X				X
5		X		X	

Course Outcomes - Program Outcomes relations (Contributions: High, Medium and Low)

Environmental Engineering Lab (GR18A3011) CO's	a	B	c	d	e	f	g	h	i	j	k	l
1. Summarize the knowledge of physical, chemical and biological parameters of water and their importance	H	H		M			M					H
2. Develop the social responsibility to eradicate water borne diseases	M	H		H								M
3. Identify the methods to control environmental pollution	M			M			H					H
4. Classify the water quality parameters in written reports.	H	M					M			H		
5. Improve the various quality control aspects of industrial effluents by performing the different lab tests.	H	M							M	M		M

Course Objectives - Program Outcomes (PO's) Relationship Matrix

Course Objectives \ Program Outcomes	a	b	c	d	e	f	g	h	i	j	k	l
	1	x			x						x	
2	x											
3	x								x			
4		x		x					x			
5	x			x						x		x

Course Outcomes - Program Outcomes relations (PO's) Relationship Matrix

Course Outcomes \ Program Outcomes	a	b	c	d	e	f	g	h	i	j	k	l
	1	x	x		x			x				
2	x	x		x								x
3	x			x			x					x
4	x	x					x			x		
5	x	x							x	x		x

Courses (with title & code)-Program Outcomes (PO's) Relationship Matrix

Course: Environmental Engineering Lab

Program Outcomes \ Courses	a	B	c	d	e	f	g	h	I	j	k	l
	1	x	x		x			x	x	x	x	

Program Educational Objectives (PEOs)- Course Outcomes Relationship Matrix

Program Educational Objectives \ Course Outcomes	1	2	3
	1	X	
2		X	
3	X		X
4			X
5	X		

Program Specific Objectives (PSOs)- Course Outcomes Relationship Matrix

Program Specific Objectives \ Course Outcomes	1	2
	1	X
2		X
3	X	
4		
5	X	



Rubric Template – Environmental Engineering Lab

Academic Year : 2021-2022 **Date:**
Semester : I
Name of the Program: B. Tech **Year:** III Year **Section:** B
Course/Subject : Environmental Engineering Lab **Course Code** : GR18A3011
Name of the Faculty : Dr. K. Srikanth / Mr. A. Prakash / Mr. C Vanadeep
Designation: Associate/Assistant Professor

		Beginning	Developing	Reflecting Development	Accomplished	Exemplary	Score
Name of the Student	Performance Criteria	1	2	3	4	5	
		Inability to perform fundamental laboratory tests or collect, analyze, or synthesize appropriate data	Able to collect, analyze, and synthesize data related to the properties of water in the environmental laboratory	Ability to observe collection of samples, perform fundamental laboratory tests, and collect, analyze, and synthesize appropriate data.	Knowledge on collection of Samples & independently perform fundamental laboratory tests, and collect, analyze, and synthesize appropriate data with few procedural errors	Full knowledge on collection of soilsamples, independently perform fundamental laboratory tests, and collect, analyze, and synthesize appropriate data with no procedural errors	3
	Level of knowledge on properties of water and assessment using appropriate laboratory analysis.	Low level of knowledge on water properties and the respective laboratory analyses.	Able to understand the importance of vital water parameters and effecting factors.	Ability to apply the knowledge of water properties in choosing appropriate laboratory analysis	Full Knowledge on properties of water and assessment of vital parameters using laboratory analyses.	Analyzing all practical aspects of water properties and their key role in Protecting environment	4
X	Level of knowledge on biological parameters	Low level of knowledge on biological parameters of water and their	Able to understand the biological Parameters of soil under	Ability to apply the knowledge in the determination of biological	Full knowledge on biological parameters of water and the	Analyzing the importance of biological parameters of water under	4

X

of water and their real time applications.	real time applications.	various loading conditions.	parameters of water	respective laboratory analyses.	various existing conditions and their respective applications.	
	Inability to perform fundamental laboratory tests or collect, analyze, or synthesize appropriate data	Able to collect, analyze, and synthesize data related to the properties of water in the environmental laboratory	Ability to observe collection of samples, perform fundamental laboratory tests, and collect, analyze, and synthesize appropriate data.	Knowledge on collection of Samples & independently perform fundamental laboratory tests, and collect, analyze, and synthesize appropriate data with few procedural errors	Full knowledge on collection of soilsamples, independently perform fundamental laboratory tests, and collect, analyze, and synthesize appropriate data with no procedural errors	3
Level of knowledge on properties of water and assessment using appropriate laboratory analysis.	Low level of knowledge on water properties and the respective laboratory analyses.	Able to understand the importance of vital water parameters and effecting factors.	Ability to apply the knowledge of water properties in choosing appropriate laboratory analysis	Full Knowledge on properties of water and assessment of vital parameters using laboratory analyses.	Analyzing all practical aspects ofwaterl properties and their key role in Protecting environment	3
Level of knowledge on biological parameters of water and their real time applications.	Low level of knowledge on biological parameters of water and their real time applications.	Able to understand the biological Parameters of soil under various loading conditions.	Ability to apply the knowledge in the determination of biological parameters of water	Full knowledge on biological parameters of water and the respective laboratory analyses.	Analyzing the importance of biological parameters of water under various existing conditions and their respective applications.	4
Level of knowledge on fundamental laboratory tests and collect, analyze or synthesize appropriate data.	Inability to perform fundamental laboratory tests or collect, analyze, or synthesize appropriate data	Able to collect, analyze, and synthesize data related to the properties of water in the environmental laboratory	Ability to observe collection of samples, perform fundamental laboratory tests, and collect, analyze, and synthesize appropriate data.	Knowledge on collection of Samples & independently perform fundamental laboratory tests, and collect, analyze, and synthesize appropriate data with few procedural errors	Full knowledge on collection of soilsamples, independently perform fundamental laboratory tests, and collect, analyze, and synthesize appropriate data with no procedural errors	4

X	Level of knowledge on biological parameters of water and their real time applications.	Low level of knowledge on biological parameters of water and their real time applications.	Able to understand the biological parameters of soil under various loading conditions.	Ability to apply the knowledge in the determination of biological parameters of water	Full knowledge on biological parameters of water and the respective laboratory analyses.	Analyzing the importance of biological parameters of water under various existing conditions and their respective applications.	4 3
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Objectives: To learn theory and practical aspects of Environmental engineering lab

Students Outcomes: Learn applications of different Environmental Engineering lab and Hands on experience in research

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(Autonomous)

**Department of Civil Engineering
Environmental Engineering Lab**

Internal Lab Exam questions

Marks: 10 marks

1. a. Write about Presumptive coli form test [CO 3]
 b. Determine pH and Turbidity of given sample
2. a. Write about Determination of B.O.D. [CO2]
 b. Determine conductivity and total dissolved salts
3. a. Write about determination of nitrogen [CO 5]
 b. Determine Acidity of given sample
4. a. Write about determination and Estimation of total solids, organic solids and inorganic solids
 b. Determine Chlorides of given sample [CO 4]
5. a. Write about Determination of total phosphorous [CO 1]
 b. Determine Alkalinity of given sample
6. a. Write about Determination of iron [CO 6]
 b. Determine Dissolved oxygen of given sample.
7. a. Write about Determination of Dissolved oxygen [CO 7]
 b. Determine Iron of given sample
8. a. Write about Presumptive coli form test [CO 2]
 b. Determine Nitrogen of given sample
9. a. Write about Determination of B.O.D. [CO 5]
 b. Determine total phosphorous of given sample
10. a. Write about Determination of C.O.D. [CO 4]
 b. Determine chlorine demand of given sample.
11. a. Write about determination of nitrogen [CO 3]
 b. Determination of C.O.D.
12. a. Write about determination of phosphates [CO 6]
 b. Determine optimum coagulant dose of given sample