



# MAHISHADAL RAJ COLLEGE

(Govt. Sponsored)

NAAC Accredited 'A' Grade College

DST (FIST) Govt. Of India approved College, NSDC Training Partner

Estd. : 1946

Mahishadal : Purba Medinipur

Phone STD 03224 No. 240220

Ref. No.....

Date:

## **ADD ON COURSE 2019-20**

**Organised by Department Zoology & Geography**

**Topic: Water and soil analysis**

Add on course summary:

### REPORT:

**Name of the course-** Water and soil analysis

**Course coordinator:** *Dr. Shubhamoy Das*, (Associate Professor, HOD, Department of Zoology , Mahishadal Raj College)

**Date of commencement:** 19.08.2019

**Date of completion:** - 06.09.2019

**Number of participant enrolled:** 30

**Total duration day:** 15

**Total duration hour:** 30

**Evaluation method:-** Paper pen MCQ and practical work

### RESULT DETAILS:-

**Number of student participate in this program:** 30

**Number of student completes this program:** 28

**Number of student got certificate in this program:** 28

**Name of the course:** Water and soil analysis

**Course coordinator:** *Dr. Shubhamoy Das*, (Associate Professor, HOD, Department of Zoology , Mahishadal Raj College)



## Water and soil analysis

### ✚ About the course:

Water and soil are essential for the sustenance of life. No living being on the planet Earth can survive without it. It is a prerequisite for human health and well-being as well as for the preservation of the environment. This course will discuss analytical methods and theories to determine the water and soil quality of different water and soil resources and factors and processes affecting the quality of water and soil. The course will also cover water and soil remediation and safeguard techniques for the improvement of water and soil quality for sustainable development. Completing such a course can open up various job opportunities in sectors related to environmental monitoring, agriculture, water resource management, and regulatory compliance.

### ✚ Learning outcomes:

Completing a water and soil analyst course prepares individuals for roles where they can contribute to environmental conservation, sustainable agriculture, and the responsible management of natural resources. Job opportunities in water and soil analysis are diverse and can span across government agencies, environmental organizations, research institutions, consulting firms, and industries related to agriculture, water treatment, and natural resource management.

### ✚ Target audience:

Students of science background (UG & PG), Researcher, and faculty members. Environmental Studies student may also participate.

### ✚ Course content overview:

A soil test can determine fertility, or the expected growth potential of the soil which indicates nutrient deficiencies, potential toxicities from excessive fertility and inhibitions from the presence of non-essential trace minerals. The test is used to mimic the function of roots to assimilate minerals.

It involves the estimation and evaluation of the available nutrient status and acidic reaction of a sample of soil. After testing, a fertility map is prepared where the available nitrogen, phosphorous and potassium is marked as low, medium or high.



✚ **Schedule:** Total 30 hours

<b>DAY</b>	<b>SCHEDULE</b>
<b>Day 1</b>	Introduction to water and soil sampling and analysis using titrimetric and spectrophotometric method. (2 hours)
<b>Day 2</b>	Estimation of pH, turbidity, TDS, and TSS (T + P) (2 hours)
<b>Day 3</b>	Estimation of dissolved oxygen and free CO <sub>2</sub> of water. (T + P) (2 hours)
<b>Day 4</b>	Estimation of salinity, hardness, and alkalinity of water. (T + P) (2 hours)
<b>Day 5</b>	Estimation of BOD and COD of effluent water. (T + P) (2 hours)
<b>Day 6</b>	Estimation of phosphate in water and soil. (T + P) (2 hours)
<b>Day 7</b>	Estimation of Nitrite and nitrate in soil and water. (T + P) (2 hours)
<b>Day 8</b>	Estimation of available potassium in soil sample. (T + P) (2 hours)
<b>Day 9</b>	Estimation of organic carbon of soil. (T + P) (2 hours)
<b>Day 10</b>	Estimation of iron of water sample. (T + P) (2 hours)
<b>Day 11</b>	Bacteriological test (MPN) for drinking water. (T + P) (2 hours)
<b>Day 12</b>	Estimation of moisture content and water holding capacity of soil. (T + P) (2 hours)
<b>Day 13</b>	Role of soil and water quality in agriculture and fishery. (T) (2 hours)
<b>Day 14</b>	A field visit with mobile laboratory. (2 hours)
<b>Day 15</b>	Overall discussion. Doubts clear and revision



## ✚ Detail Work Schedule

Date	Day	Contents	Time	Duration	Experts	Designation
19.08.19	1	Introduction to water and soil sampling and analysis using titrimetric and spectrophotometric method.	12 to 2pm	2	Dr. Rajkumar Guchhait	SACT Mahishadal Raj College
20.08.19	2	Estimation of pH, turbidity, TDS, and TSS (T + P)	1 to 3 pm	2	Prof.Moumit a Jana	SACT Mahishadal Raj College
21.08.19	3	Estimation of dissolved oxygen and free CO <sub>2</sub> of water. (T + P)	3 to 5pm	2	Prof.Manik Das	SACT Mahishadal Raj College
22.08.19	4	Estimation of salinity, hardness, and alkalinity of water. (T + P)	03 to 05pm	2	Prof. Sagnik Mandal	SACT Mahishadal Raj College
23.08.19	5	Estimation of BOD and COD of effluent water. (T + P)	02 to 04pm	2	Dr. Rajkumar Guchhait	SACT Mahishadal Raj College
26.08.19	6	Estimation of phosphate in water and soil. (T + P)	01 to 03pm	2	Dr Rajkumar Guchhait	SACT Mahishadal Raj College
27.08.19	7	Estimation of Nitrite and nitrate in soil and water. (T + P)	03 to 05pm	2	Dr Rajkumar Guchhait	SACT Mahishadal Raj College
28.08.19	8	Estimation of available potassium in soil sample. (T + P)	02 to 04pm	2	Dr.Rajkumar Guchhait	SACT Mahishadal Raj College
29.08.19	9	Estimation of organic carbon of soil. (T + P)	02 to 04pm	2	Dr.Subhamoy Das	HOD, Zoology, MRC
30.08.19	10	Estimation of iron of water sample. (T + P)	01 to 03pm	2	Prof.Saheli Maiti	SACT Mahishadal Raj College
02.09.19	11	Bacteriological test (MPN) for drinking water. (T + P)	02 to 04pm	2	Prof.Moumit a Jana	SACT Mahishadal Raj College
03.09.19	12	Estimation of moisture content and water holding capacity of soil. (T + P)	02 to 04pm	2	Dr.Subhamoy Das	HOD, Zoology, MRC
04.09.19	13	Role of soil and water quality in agriculture and fishery. (T)	01 to 03pm	2	Dr.Subhamoy Das	HOD, Zoology, MRC
05.09.19	14	A field visit with mobile	01 to 03pm	2	Dr.Subhamoy	HOD,



		laboratory.			Das, Prof.Moumit a Jana, Prof.SaheliM aiti, Prof.Manik Das	Zoology, MRC, SACT Mahishadal Raj College
06.09.19	15	Evaluation, valediction, feedback Overall discussion.	12 to 2 pm	2	Dr. Subhamoy Day, Dr. Rajkumar Guchhait, Prof. Sagnik Manadal, Prof. Manik Das and Prof. Moumita Jana. DR.Asim Kr Bera	HOD & SACT., Zoology; Principal, MRC
				30 hours		

**✚ Course structure and examination scheme:**

Course name	Theory classes (hr.)	Practical classes (hr.)	Internal marks	External marks		Total marks
				Theory	Practical	
Water and soil analysts	10	20	20	30	50	100



✚ Participant's Details and attendance:

**Enrolment Details of Students**

<b>Sl no.</b>	<b>Class</b>	<b>Roll no.</b>	<b>Name</b>	<b>Signature</b>
1.	B. Sc., 3 <sup>rd</sup> Year	1510086	MANAS KUMAR BHUNIA	
2.	PG 3 <sup>rd</sup> Sem	170061	Soumitra Chatterjee	
3.	Pg 1 <sup>st</sup> Sem	5180029	Baishali pal	
4.	B. Sc., 3 <sup>rd</sup> Year	2150546	SWARNENDU MAITY	
5.	PG 3 <sup>rd</sup> Sem	170073	Surekha Chowdhury	
6.	Pg 1 <sup>st</sup> Sem	5180030	Susmita Bhowmik	
7.	B. Sc., 3 <sup>rd</sup> Year	2160481	BIJAN DOLUI	
8.	PG 3 <sup>rd</sup> Sem	170065	Bidya Kabasi	
9.	Pg 1 <sup>st</sup> Sem	5180031	Suman Ghosh	
10.	B.Sc 4 <sup>th</sup> sem Generic	2170335	Mahamaya Das	
11.	PG 3 <sup>rd</sup> Sem	170069	Payel Jana	
12.	B. Sc., 3 <sup>rd</sup> Year	2160012	RUPALI BARMAN	
13.	Pg 1 <sup>st</sup> Sem	5180036	Ipsita Maji	
14.	PG 3 <sup>rd</sup> Sem	170070	Pramita Panda	
15.	B.Sc 4 <sup>th</sup> sem Generic	2170354	Julekha Khatun	
16.	B. Sc., 3 <sup>rd</sup> Year	2160018	SASWATI PRADHAN	
17.	Pg 1 <sup>st</sup> Sem	5180037	Moumita Pramanik	



18.	PG 3 <sup>rd</sup> Sem	170067	Barnali Maity	
19.	B. Sc., 3 <sup>rd</sup> Year	2160509	POULAMI HAZRA	
20.	B.Sc 4 <sup>th</sup> sem Generic	2170354	Nibedita Singha	
21.	Pg 1 <sup>st</sup> Sem	5180088	Indrani Halder	
22.	B. Sc., 3 <sup>rd</sup> Year	2160440	MADHUSHREE KARAN	
23.	PG 3 <sup>rd</sup> Sem	170084	Suman Das	
24.	B.Sc 4 <sup>th</sup> sem Generic	2170368	Amrita Jana	
25.	Pg 1 <sup>st</sup> Sem	5180089	Susmita Jana	
26.	B. Sc., 3 <sup>rd</sup> Year	2160389	SANGITA JANA	
27.	B. Sc., 3 <sup>rd</sup> Year	2160445	DEBAYAN MAITY	
28.	PG 3 <sup>rd</sup> Sem	170086	Aparna Guchhait	
29.	Pg 1 <sup>st</sup> Sem	5180090	Subhada Shankar Mondal	
30.	B. Sc., 3 <sup>rd</sup> Year	2160044	SANGITA PATRA	







18.	Barnali Maity								
19.	POULAMI HAZRA								
20.	Nibedita Singha								
21.	Indrani Halder								
22.	MADHUSHREE KARAN								
23.	Suman Das								
24.	Amrita Jana								
25.	Susmita Jana								
26.	SANGITA JANA								
27.	DEBAYAN MAITY								
28.	Aparna Guchhait								
29.	Subhada Shankar Mondal								
30.	SANGITA PATRA								





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20.	Nibedita Singha								
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27.	DEBAYAN MAITY								
28.	Aparna Guchhait								
29.	Subhada Shankar Mondal								
30.	SANGITA PATRA								



## Sample Question of Examination

2019/Add On Course/ Examination

**ADD ON COURSE**  
**Department of Zoology & Computer Science, Mahishadal Raj College**  
**Water and Soil Analysis**

**Full Marks: 50**

**Time: 2 hrs**

*The figures in the right-hand margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable.*

*Illustrate the answers wherever necessary.*

**A. Answer the following MCQ : 10x1=30**

- The salinity of ocean waters is calculated as the amount of salt (in gm) dissolved in \_\_\_\_\_ gm of seawater  
a) 10000 b) 100 c) 1000 d) None of the above
- \_\_\_\_\_ is the amount of oxygen required to oxidize only organic matter in sewage.  
a) Turbidity b) BOD c) COD d) DO
- The biochemical oxygen demand is computed by \_\_\_\_\_  
a) Dissolved oxygen / Dilution factor  
b) Dissolved oxygen + Dilution factor  
c) Dissolved oxygen – Dilution factor  
d) Dissolved oxygen \* Dilution factor
- How does solubility of oxygen in water change with respect to temperature?  
a) It decreases with increase in temperature  
b) It increases with increase in temperature  
c) It decreases with decrease in temperature  
d) It does not depend on temperature
- Oxygen content can be controlled by adding which of the following materials with water?  
a) Acidic solution b) Basic solution c) Iodine d) Hydrazine
- When carbon dioxide dissolves in water, it gives \_\_\_\_\_ ?  
a) Citric Acid b) Carbonic Acid c) Sulphuric Acid d) Acetic Acid
- Which of the following statement is correct regarding the pH Scale?  
a) It is the negative logarithm of the H<sup>+</sup> ion concentration of a given solution.  
b) It is the positive logarithm of the H<sup>+</sup> ion concentration of a given solution.  
c) It is a 14-point scale.  
d) pH is an example of an extrinsic property.  
Correct options can be:  
a) 1 and 3  
b) 2 and 3  
c) 1, 3 and 4  
d) Only 2
- Who invented the pH Scale?  
a) S.P.L Sorenson b) Benjamin Franklin c) Henry Moseley d) Wilhelm Rontgen
- Which source of water is free from hardness and surface impurities?  
a) Surface water b) Underground water c) Rain water d) Sea water
- Which of the following indicator is pink in basic medium?  
a) Methyl orange b) Phenolphthalein c) Starch d) Litmus paper



2019/Add On Course/ Examination

**B. Answer the following questions:**

**2x10=20**

1. What is soil texture & soil structure?
2. What is the problem of dryland agriculture?
3. Write down the principle of analysis of dissolve oxygen in water.
4. Define BOD & COD.
5. Add a note on soil profile.
6. What is the best way to improve organic matter?
7. Define alkalinity & hardness of water sample.
8. What are the objectives of irrigation ?
9. Add a note on vermicomposting.
10. Define soil water potential.

**C. Answer the following questions:**

**2x5=10**

1. Explain soil sampling procedure.
2. Explain the concept of watershed management and list the principles of watershed management.



# CERTIFICATE OF COURSE COMPLETION

THIS IS TO CERTIFY THAT

*Subhada Shankar Mondal*

has successfully completed the **Add-on Course** on *Water and soil analysis*  
held during 2018-19 academic year at Mahishadal Raj College.

Course Co-ordinator

IQAC Co-ordinator

Principal

DATE: 06.09.2019



# CERTIFICATE OF COURSE COMPLETION

THIS IS TO CERTIFY THAT

*Soumitra Chatterjee*

has successfully completed the **Add-on Course** on *Water and soil analysis*  
held during 2018-19 academic year at Mahishadal Raj College.

Course Co-ordinator

IQAC Co-ordinator

Principal

DATE: 06.09.2019