

॥ सा विद्या या विमुक्तये ॥



स्वामी रामानंद तीर्थ मराठवाडा विद्यापीठ, नांदेड

“ज्ञानतीर्थ” परिसर, विष्णुपुरी, नांदेड - ४३१६०६ (महाराष्ट्र)

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY NANDED

“Dnyanteerth”, Vishnupuri, Nanded - 431606 Maharashtra State (INDIA)

Established on 17th September 1994 – Recognized by the UGC U/s 2(f) and 12(B), NAAC Re-accredited with 'A' Grade



ACADEMIC (1-BOARD OF STUDIES) SECTION

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संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील प्रथम वर्षाचे CBCS Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०१९-२० पासून लागू करण्याबाबत.

प रि प त्र क

या परिपत्रकान्वये सर्व संबंधितांना कळविण्यात येते की, दिनांक ०८ जून २०१९ रोजी संपन्न झालेल्या ४४व्या मा. विद्या परिषद बैठकीतील ऐनवेळचा विषय क्र.११/४४-२०१९ च्या ठरावानुसार प्रस्तुत विद्यापीठाच्या संलग्नित महाविद्यालयांतील विज्ञान व तंत्रज्ञान विद्याशाखेतील पदवी स्तरावरील प्रथम वर्षाचे खालील विषयांचे C.B.C.S. (Choice Based Credit System) Pattern नुसारचे अभ्यासक्रम शैक्षणिक वर्ष २०१९-२० पासून लागू करण्यात येत आहेत.

- | | |
|---|---------------------------------------|
| 1. Agricultural Microbiology | 18. Dyes and Drugs |
| 2. Agrochemicals & Fertilizers | 19. Electronics |
| 3. Analytical Chemistry | 20. Environmental Science |
| 4. B.C.A. | 21. Fishery Science |
| 5. B.Voc. (Food Processing, Preservation and Storage) | 22. Food Science |
| 6. B.Voc. (Web Printing Technology) | 23. Geology |
| 7. Biochemistry | 24. Horticulture |
| 8. Bioinformatics | 25. Industrial Chemistry |
| 9. Biophysics | 26. Information Technology (Optional) |
| 10. Biotechnology (Vocational) | 27. Mathematics |
| 11. Biotechnonology | 28. Microbiology |
| 12. Botany | 29. Network Technology |
| 13. Chemistry | 30. Physics |
| 14. Computer Application (Optional) | 31. Software Engineering |
| 15. Computer Science (Optional) | 32. Statistics |
| 16. Computer Science | 33. Zoology |
| 17. Dairy Science | |

सदरील परिपत्रक व अभ्यासक्रम प्रस्तुत विद्यापीठाच्या www.srtmun.ac.in या संकेतस्थळावर उपलब्ध आहेत. तरी सदरील बाब ही सर्व संबंधितांच्या निदर्शनास आणून द्यावी.

‘ज्ञानतीर्थ’ परिसर,

विष्णुपुरी, नांदेड - ४३१ ६०६.

जा.क्र.: शैक्षणिक-०१/परिपत्रक/पदवी-सीबीसीएस अभ्यासक्रम/
२०१९-२०/२९२

दिनांक : ०३.०७.२०१९.

प्रत माहिती व पुढील कार्यवाहीस्तव :

- १) मा. कुलसचिव यांचे कार्यालय, प्रस्तुत विद्यापीठ.
- २) मा. संचालक, परीक्षा व मूल्यमापन मंडळ यांचे कार्यालय, प्रस्तुत विद्यापीठ.
- ३) प्राचार्य, सर्व संबंधित संलग्नित महाविद्यालये, प्रस्तुत विद्यापीठ.
- ४) साहाय्यक कुलसचिव, पदव्युत्तर विभाग, प्रस्तुत विद्यापीठ.
- ५) उपकुलसचिव, पात्रता विभाग, प्रस्तुत विद्यापीठ.
- ६) सिस्टम एक्सपर्ट, शैक्षणिक विभाग, प्रस्तुत विद्यापीठ.

स्वाक्षरित / -

उपकुलसचिव

शैक्षणिक (१-अभ्यासमंडळ) विभाग



**SWAMI RAMANAND TEERTH
MARATHWADA UNIVERSITY, NANDED**

*Revised Structure of curriculum
B. Sc. I, II, and III year
Environmental Science*

w.e.f. June 2019

Distribution of credits for B.Sc. Environmental Science (Optional)
Under Faculty of Science
B. Sc. Syllabus Structure
Semester Pattern Effective From June, 2019
Subject: Environmental Science

B. Sc. I Year								
Sem.	Paper No.	Name of the Course	Instruction Hrs./Week	Total Period	Internal Evaluation Marks	Marks of Semester Examination	Total Marks	Credits
I	CCENV I (Section A)	Earth and Earth Surface Process	03	45	10	40	50	02
	CCENV I (Section B)	Basic Science of Environment	03	45	10	40	50	02
II	CCENV II (Section A)	Developments in Environment	03	45	10	40	50	02
	CCENV II (Section B)	Issues in Environment	03	45	10	40	50	02
	CCENV P I [CCENV I & II (Section A & B)]	Practical's based on Section A & Section B of CCENV I & CCENV II (P-V)	04	20 Practical's	20	80	100	04
Total Credits								12

B. Sc. II Year								
Semester	Paper No.	Name of the Course	Instruction Hrs./Week	Total Period	Internal Evaluation	Marks of Semester Examination	Total Marks	Credits
III	CCENV III (Section A)	Atmosphere & Global Climate Change	03	45	10	40	50	02
	CCENV III (Section B)	Natural Resource Management	03	45	10	40	50	02
	CCENV P II [CCENV III & IV (Section B)]	Practical's based on P-VI & P-VIII (P-X)	04	20 Practical's	20	80	100	02
	CCENV P II [CCENV III & IV (Section A)]	SEC I (1 Skill / optional)	03	45	---	---	---	(02)*
IV	CCENV IV (Section A)	Environmental Pollution and Human Health	03	45	10	40	50	02
	CCENV IV (Section B)	Land and Soil Conservation and Management	03	45	10	40	50	02
	CCENV P III [CCENV III & IV (Section B)]	Practical's based on P-VIII & P-IX (P-X)	04	20 Practical's	20	80	100	02
	CCENV P III [CCENV III & IV (Section B)]	SEC II (1 Skill / Optional) PXI	03	45	---	---	---	(02)*
Total Credits								16

B. Sc. III Year								
Sem	Paper No.	Name of the Course	Instruction Hrs./Week	Total Period	Internal Evaluation	Marks of Semester Examination	Total Marks	Credits
V	DECENV I (Section A)	Water Pollution and Waste Water Analysis	03	45	10	40	50	02
	DECENV I [(Section B) Elective-1]	Wild Life Management	03	45	10	40	50	02
	DECENV I (Section B) Elective-II	Environmental Legislation & Policy	03	45	10	40	50	02
	DECENV II [DECMB I & IV]	Practical's based on P-XII, XIII & PXIV (P-XVI)	04	20 Practical's	20	80	100	02
	DECCEN VP I [DECMB I & II]	SEC III (1 Skill / optional)	03	45	---	---	---	(02)*
VI	DECENV II (Section A)	Environmental Education and Biodiversity	03	45	10	40	50	02
	DECENV II [(Section B) Elective I]	Environmental Instrumentation	03	45	10	40	50	02
	DECENV II [(Section B) Elective II]	Environmental Impact & Risk Assessment	03	45	10	40	50	02
	DECENV II [DECENV I & II (Section B)]	Practical's based on P-XIII & P-XIV (P-XVII)	04	20 Practical's	20	80	100	02
	DECENV II [DECENV I & II (Section B)]	SEC IV (Project))	03	45	---	---	---	(02)*
Total Credits								16



**SWAMI RAMANAND TEERTH
MARATHWADA UNIVERSITY, NANDED**

*Revised curriculum B. Sc. I year
(Semester I and Semester II)
Environmental Science*

B. Sc. I Year								
Semester	Paper No.	Name of the Course	Instruction Hrs./Week	Total Period	Internal Evaluation Marks	Marks of Semester Examination	Total Marks	Credits
I	CCENV I (Section A)	Earth and Earth Surface Process	03	45	10	40	50	02
	CCENV I (Section B)	Basic Science of Environment	03	45	10	40	50	02
II	CCENV II (Section A)	Developments in Environment	03	45	10	40	50	02
	CCENV II (Section B)	Issues in Environment	03	45	10	40	50	02
	CCENV P I [CCENV I & II (Section A & B)]	Practical's based on Section A & Section B of CCENV I & CCENV II (P-V)	04	20 Practical's	20	80	100	04
Total Credits								12

Introduction

Environmental Science is an interdisciplinary area of study that includes both applied and theoretical aspects of human impact on the world. It also includes many areas that are not usually considered to be scientific. Environmental Science is a field of study that is still in the process of evolving, but its beginnings are rooted in the early of civilization.

The Environment essentially comprises our living ambience, which gives us the zest and verve in all our activities. The turn of the twentieth century saw the gradual onset of its degradation by often callous deeds without any concern for the well being of our surroundings. This sustainable development goals. Such actions are pronouncedly necessitated, particularly in developing countries like India, in view of the rapid developmental activities that are taking place in the last two decades after liberal opening up of the economy on a global scale.

The environmental movements reached enormous proportions and environment became a house hold word following Earth Day, April 22nd, 1970. Courses in the high school and colleges with the title "Environmental science" were began around Earth Day. Most of the concepts become covered by Environmental Science courses had been taught previously in Ecology classes or Conservation classes. There was also some input from the social science such as Economics, Sociology, and Political Science. So Environmental Science has evolved as an interdisciplinary field that draws information related to environmental concern from the social sciences as well as the biological and physical sciences.

Environmental Science from a verity of subject areas, which also influence decisions, related to the environment. The areas are Biology, Laws, Sociology, Economics, Physics, Chemistry, Agriculture, Philosophy, Earth Science, Computers and Engineering.

Man is a part of this earth than careless exploiter of it. If we exploit the nature in unwise it will be difficult to support even a small population. But if we protect the nature it will continue to meet the needs of all living things not only for man.

The consideration of Environment as natural heritage may be the integral part of Environmental Education. Only when our life is guided by respect for the earth and all living things, we will be able to live In harmony with our Environment.

Scope

The students passing B. Sc. Degree in the subject Environmental science have the opportunity of job in the field of Effluent treatment plant of various industries, Maharashtra Pollution Control Board, NGO's, Forest department, Water purification plants, and various sectors of Environmental field.

*Revised curriculum B. Sc. I year
(Semester I)
Environmental Science*

Swami Ramanand Teerth Marathwada University Nanded
Choice Based Credit System (CBCS) Course Structure (New scheme)

B. Sc. First Year (Semester - I)
Semester Pattern Effective From -2019

ENVIRONMENTAL SCIENCE

CCENV I (Section A)

CORE COURSE I: EARTH AND EARTH SURFACE PROCESSES (P-I)

Credits: 02

(Marks: 50)

Periods: 45

Preamble: The content of the paper will acquainted to students about the basic structure and composition of the Earth and will explore various surface processes and their impact on and role in living systems. It will also deal with the interactive processes in the inner as well as outer Earth's surface.

Unit I: Earth system processes

(15 lectures)

Movement of lithosphere plates; mantle convection and plate tectonics, major plates and hot spots, plate boundaries; sea floor spread; earthquakes; volcanic activities; gravitational and magnetic fields of the earth; origin of the main geomagnetic field; continental drift, paleontological evidences of plate tectonics; continental collision an mountain formation with specific example of the Himalaya

Unit II: Earth surface processes

(15 lectures)

Atmosphere: evolution of earth's atmosphere, composition of atmosphere, physical and optical properties, circulation; interfaces: atmosphere-ocean interface, atmosphere-land interface, ocean-land interface; land surface processes: fluvial and glacial processes, rivers and geomorphology; types of glaciers, glacier dynamics, erosional and depositional processes and glaciated landscapes; coastal processes.

Unit III: Soil properties and its erosion & conservation:

(15 lectures)

Density, Porosity, Permeability, Temperature, Soil water, Soil Atmosphere; Chemical properties of soil: Hydrogen ion concentration, Organic matter, Inorganic elements; Soil fauna and Soil flora Soil erosion: Agents of soil erosion: Running water, Glaciers, Wind, Sea water, Deforestation and Overgrazing; Types of erosion: Sheet, Rill Gully, Slip erosion (land slide), Wind erosion; Soil conservation

Suggested Readings

1. Bridge, J., & Demicco, R. 2008. *Earth Surface Processes, Landforms and Sediment deposits*. Cambridge University Press.
2. Duff, P. M. D., & Duff, D. (Eds.). 1993. *Holmes' Principles of Physical Geology*. Taylor & Francis.
3. Gupta, A. K., Anderson, D. M., & Overpeck, J. T. 2003. Abrupt changes in the Asian southwest monsoon during the Holocene and their links to the North Atlantic Ocean. *Nature* **421**: 354-357.
4. Gupta, A. K., Anderson, D. M., Pandey, D. N., & Singhvi, A. K. 2006. Adaptation and human migration, and evidence of agriculture coincident with changes in the Indian summer monsoon during the Holocene. *Current Science* **90**: 1082-1090.
5. Keller, E.A. 2011. *Introduction to Environmental Geology* (5th edition). Pearson Prentice Hall.
6. Krishnan, M. S. 1982. *Geology of India and Burma*. CBS Publishers & Distributors.
7. Leeder, M., Arlucea, M.P. 2005. *Physical Processes in Earth and Environmental Sciences*. Blackwell Publishing.
8. Pelletier, J. D. 2008. *Quantitative Modeling of Earth Surface Processes* (Vol. 304). Cambridge: Cambridge University Press. Chicago.
9. *Fundamentals of Ecology* : Eugene P. Odum, Natraj Publishers, Dehradun..
10. *Principles of Ecology* : P. S. Verma, V. K. Agarwal S. Chand and Co. New Delhi .
11. *Environmental Biology* : P. D. sharma Rastogi Publications, Meerut .
- 12 *Ecology and Environment* : P. D. sharma Rastogi Publications, Meerut .
- 13 *Principles of Environmental Biology* : P. K. G. Nair Himalaya Publishing House, New Delhi .
- 14 *Environmental Biology* : M. P. Arora Himalaya Publishing House, New Delhi

Swami Ramanand Teerth Marathwada University Nanded
Choice Based Credit System (CBCS) Course Structure (New scheme)
B. Sc. First year (Semester- I)
Semester Pattern effective from June -2019

Environmental Science
CCENV I (Section B)

CORE COURSE II: BASIC SCIENCE OF ENVIRONMENT (P-II)

Credits: 02

(Marks: 50)

Periods: 45

Preamble: The aim of this paper is to build the conceptual understanding of students by exposing them to the basic science behind various environmental processes. The content of the paper has been divided into two sections, with the view to introduce students to the fundamental concepts of physics and chemistry of environment.

Unit I: Fundamentals of Environmental Physics

(15 lectures)

Basic concepts of pressure, force, work and energy; types of forces and their relation (pressure gradient, viscous, Coriolis, gravitational, centripetal, and centrifugal force) Concept of heat transfer, conduction, convection; concept of temperature, lapse rate (dry and moist adiabatic) laws of thermodynamics; concept of heat and work, transmission of electrical power, efficiency of turbines, wind mills and hydroelectric power plants.

Unit II: Fundamentals of Environmental Chemistry

(15 lectures)

Atomic structure, electronic configuration, periodic properties of elements (ionization potential, electron affinity and electronegativity), types of chemical bonds (ionic, covalent, coordinate and hydrogen bonds); mole concept, molarity and normality, Thermodynamic system; types of chemical reactions; acids, bases and salts, solubility products; solutes and solvents; redox reactions, concepts of pH and pE, electrochemistry, Basic concepts of organic chemistry, hydrocarbons, aliphatic and aromatic compounds, organic functional groups, polarity of the functional groups.

Unit III: Atmosphere & Meteorology:

(15 lectures)

Structure of Atmosphere, Wind speed, direction and their vertical profiles, turbulence (mechanical and thermal), atmospheric stability Characteristics and classes, Plume behavior, effects of micrometeorology on point source emission, wind-valley effects, land/sea breeze-effects, heat island effect, mixing height-boundary layer definition, temperature inversions, factors affecting on dispersion of air pollutants, micro meteorological instruments

Suggested Readings

1. Beard, J.M. 2013. *Environmental Chemistry in Society* (2nd edition). CRC Press.
2. Boeker, E. & Grondelle, R. 2011. *Environmental Physics: Sustainable Energy and Climate Change*. Wiley.
3. Connell, D.W. 2005. *Basic Concepts of Environmental Chemistry* (2nd edition). CRC Press.
4. Forinash, K. 2010. *Foundation of Environmental Physics*. Island Press.
5. Girard, J. 2013. *Principles of Environmental Chemistry* (3rd edition). Jones & Bartlett.
6. Hamung, S.E. & Johnson, M.S. 2012. *Chemistry and the Environment*. Cambridge University Press.
7. Hites, R.A. 2012. *Elements of Environmental Chemistry* (2nd edition). Wiley & Sons.
8. Manhan, S. E. 2000. *Fundamentals of Environmental Chemistry*. CRC Press.
9. Pani, B. 2007. *Textbook of Environmental Chemistry*. IK international Publishing House.
10. Air Pollution and its control: Sumit Malhotra (Pointer Publishers, Jaipur)
11. Air Pollution: M. N. Rao (Tata McGraw – Hill publishing company, New Delhi)
12. Air Pollution: B. K. Sharma, H. Kaur (Krishna Prakashan media, Meerut)
13. Pollution of our Atmosphere: B. Henderson, (Sellers Adam Hilger Limited, Bristol)
14. Fundamentals of Air Pollution: Richard W. Bowel, Donald L. Fox, D. Bruce Tunner and Arthur C. Stern (Academic Press, California)

Swami Ramanand Teerth Marathwada University Nanded
Choice Based Credit System (CBCS) Course Structure (New scheme)

B. Sc. First year (Semester - II)

Semester Pattern effective from June -2019

Environmental Science

CCENV II (Section A)

CORE COURSE III: DEVELOPMENTS IN ENVIRONMENT (P-III)

Credits:

02 (Marks: 50)

Periods: 45

Preamble: The contents of this paper will covers the conceptual understanding of students by exposing them to the natural processes and developments in environment . The paper has been divided into Three sections, with the view to introduce students to the concepts of universe, earth and atmospheric movements.

.UNIT I: Evolution and life forms: (15 lectures)

Evolution of Universe. Evolution of Elements, Origin of life and Evolution of life forms: Fossils
Origin of life Chemical basis. Evolution of life forms through ages

Biogeochemical Cycles : Concept and Scope of environment,. Global environmental problems.
Need of Environmental awareness, Nitrogen, Carbon, Oxygen, Phosphorus and Sulphur

Unit II: Minerals and Rocks (15 lectures)

Minerals and important rock forming minerals; rock cycle: lithification and metamorphism;
Three rock laws; rock structure, igneous, sedimentary and metamorphic rocks; weathering:
physical, biogeochemical processes, Rivers and streams, glacial and aeolian transportation and
deposition of sediments by running water, wind and glaciers. Properties of Rocks

Minerals , types of minerals, Properties of minerals , extractions of minerals

Unit III: Atmospheric Chemistry (15 lectures)

Composition of atmosphere; photochemical reactions in atmosphere; smog formation,
types of smog (sulphur smog and photochemical smog); chemistry of acid rain, case studies;
reactions of NO₂ and SO₂; free radicals and ozone layer depletion, role of CFCs in ozone
depletion Movement of pollutants in environment ;Diffusion and dispersion, point and area
source pollutants, pollutant dispersal; Gaussian plume model, mixing heights, types of flow,
turbulence. Natural contaminants: Aerosols, Dust, Smoke,
Mist, Fog, Fumes, Particulate matter (PM), Suspended particulate matter (SPM), Respirable
suspended particulate matter (RSPM), Fly ash, Photochemical smog

Suggested Readings

1. Bridge, J., & Demicco, R. 2008. *Earth Surface Processes, Landforms and Sediment deposits*. Cambridge University Press.
2. Duff, P. M. D., & Duff, D. (Eds.). 1993. *Holmes' Principles of Physical Geology*. Taylor & Francis.
3. Gupta, A. K., Anderson, D. M., & Overpeck, J. T. 2003. Abrupt changes in the Asian southwest monsoon during the Holocene and their links to the North Atlantic Ocean. *Nature* **421**: 354-357.
4. Gupta, A. K., Anderson, D. M., Pandey, D. N., & Singhvi, A. K. 2006. Adaptation and human migration, and evidence of agriculture coincident with changes in the Indian summer monsoon during the Holocene. *Current Science* **90**: 1082-1090.
5. Keller, E.A. 2011. *Introduction to Environmental Geology* (5th edition). Pearson Prentice Hall.
6. Beard, J.M. 2013. *Environmental Chemistry in Society* (2nd edition). CRC Press.
7. Boeker, E. & Grondelle, R. 2011. *Environmental Physics: Sustainable Energy and Climate Change*. Wiley.
8. Connell, D.W. 2005. *Basic Concepts of Environmental Chemistry* (2nd edition). CRC Press.
9. Forinash, K. 2010. *Foundation of Environmental Physics*. Island Press.
10. Girard, J. 2013. *Principles of Environmental Chemistry* (3rd edition). Jones & Bartlett.
11. Air Pollution and its control: Sumit Malhotra (Pointer Publishers, Jaipur)
12. Air Pollution: M. N. Rao (Tata McGraw – Hill publishing company, New Delhi)
13. Air Pollution: B. K. Sharma, H. Kaur (Krishna Prakashan media, Meerut)
14. Pollution of our Atmosphere: B. Henderson, (Sellers Adam Hilger Limited, Bristol)

Swami Ramanand Teerth Marathwada University Nanded

Choice Based Credit System (CBCS) Course Structure (New scheme)

B. Sc. First year (Semester – II)

Semester Pattern effective from June -2019

ENVIRONMENTAL SCIENCE

CCENV II (Section B)

CORE COURSE IV: ISSUES IN ENVIRONMENT (P-IV)

Credits: 02

(Marks: 50)

Periods: 45

Preamble: The course examines the relationship between the environment and societal Issues enabling the students to understand and appreciate the role played by environment, society, and, their interface in shaping environmental decisions. The students will be enabled to think critically on environmental issues.

Unit I: Environment and Issues in Environmentalism (15 Lectures)

Social and cultural construction of 'environment'; environmental thought from historical and contemporary perspective in light of the concepts of Gross Net Happiness and Aldo Leopold's Land Ethic. Significant global environmental issues such as acid rain, climate change, and resource depletion; historical developments in cultural, social and economic issues related to land, forest, and water management in a global context; interface between environment and society.

Unit II: Development-Environment Conflict (15 lectures)

Developmental issues and related impacts such as ecological degradation; environmental pollution; development-induced displacement, resettlement, and rehabilitation: problems, concerns, and compensative mechanisms; discussion on Project Affected People (PAPs).

Unit III: Urbanization and Environment (15 lectures)

Production and consumption oriented approaches to environmental issues in Indian as well as global context; impact of industry and technology on environment; urban sprawl, traffic congestion and social-economic problems; conflict between economic and environmental interests.

Suggested Readings

1. Chokkan, K.B., Pandya, H. & Raghunathan, H. (eds). 2004. *Understanding Environment*. Sagar Publication India Pvt. Ltd., New Delhi.
2. Elliot, D. 2003. *Energy, Society and Environment, Technology for a Sustainable Future*. Routledge Press.
3. Guha, R. 1989. *Ecological change and peasant resistance in the Himalaya*. Unquiet Woods, Oxford University Press, Delhi.
4. Leopold, A. 1949. *The Land Ethic*. pp. 201-214. Chicago, USA.
5. National Research Council (NRC). 1996. *Linking Science and Technology to Society's Environmental Goals*. National Academy Press.
6. Pandit, M.K. 2013. Chipko: Failure of a Successful Conservation Movement. In: Sodhi, N.S., Gibson, L. & Raven, P.H. *Conservation Biology: Voices from the Tropics*. pp. 126-127. Wiley-Blackwell, Oxford, UK.

Swami Ramanand Teerth Marathwada University Nanded
Choice Based Credit System (CBCS) Course Structure (New scheme)
B. Sc. First year

Semester Pattern effective from June -2019

ENVIRONMENTAL SCIENCE

Practical Paper: CCENVP-I (P-V)

(Annual practical Based on [CCENV I & II (Section A & B)])

Credits: 04

(Marks: 100)

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01. Measurement of Atmospheric Humidity by Psychrometer.
 02. Measurement of Light intensity by Lux meter.
 03. Estimation of Dust particle by Tiles method
 04. Determination of Carbon monoxide by CO- detector
 05. Determination of Atmospheric pressure by Barometer.
 06. Determination of Soil Temperature by Soil Thermometer
 07. Determination of Total Organic Matter by Ignition method
 08. Determination of Soil pH
 09. Determination of Water Holding Capacity of soil.
 10. Determination of N. P. K. from soil.
 11. Determination of Bulk Density of soil.
 12. Determination of Plant Population Density.
 13. Estimation of Dissolved Oxygen from water by Winkler's method
 14. Estimation of Alkalinity of provided water sample
 15. Estimation of Acidity from provided water sample.
 - 16 Determination of Residual Chlorine from provided water sample
 17. Estimation of Total Hardness from water sample by E. D. T. A. method.
 18. Estimation of Permanent Hardness from water sample by E.D.T.A. method
 19. Estimation of Chlorides from water sample by Argentometric method.
 20. Estimation of Carbon dioxide from the provided water sample.