

SHIVAJI UNIVERSITY, KOLHAPUR CENTRE FOR COMMUNITY DEVELOPMENT

LABORATORY MANAGEMENT AND WATER ANALYSIS

Objectives

- 1.To acquire skills for Laboratory Management and routine analysis of water
- 2.To improve working ability in analytical laboratory.

Course Duration: 3 Months

Eligibility for Admission: 12th Science pass or equivalent

Medium of Instruction: English

Job Opportunities

1. Can avail the services to general analytical industries.
2. Can start own analytical laboratory.

Course Fees per Student: Rs.1500/- + Rs.150 Evaluation Fee

Objectives

The students after H.S.C. has one of the more exciting and rewarding turning time of life Course is designed as a new non-conventional alternative for the future. The course can be completed as part along with the graduation. The certificate obtained will be helpful for obtaining jobs in various fields. The student can start his own business/laboratory or can associate with any kind of laboratory or associated jobs with confidence. There are opportunities in the field of analysis, analytical research, fundamental research, quality control departments, governmental and non-governmental organizations etc. for the technical laboratory personnel. In addition to this the college conducting this course can avail the services to general public and industries and raise funds for development.

- 1.To acquire skills for Laboratory Management and routine analysis of soil, water and food.
- 2.To improve working ability in analytical laboratory.

Staff Qualifications:

1. B.Sc. with 3 year's experience in analytical laboratory.
2. M. Sc. or higher qualification in Microbiology, Chemistry, Zoology, Botany, Biochemistry, Environmental Science, Nutrition, Pollution, Management.
3. Laboratory attendant with H. S. C. Science Pass or Fail.

Infrastructure and other Requirement

1. Standard laboratory with required equipments with basic facilities of light, Ventilation, Water, gas connection, sinks, firefighting equipments etc.
2. The following equipments are required in working condition: PH meter, Conductivity meter, Oven, Bacteriological incubator, Water still, Vutyro refractometer, Muffle furnace, reflux apparatus, photo colorimeter or spectrophotometer, flame photometer, Soxhlet apparatus, Kjeldahl's apparatus, Microscope with oil immersion lens. The apparatus not available in parent institute can be hired from other competent laboratory/ college. The consent letters from the institute must be produced during inspection.

- Some of the particles can be conducted in other institutes with previous written M.O.A. between two institutes.

3. The minimum books included as reference books in syllabus must be available. Other books and journals, audio visuals etc. in the subject will be additional preference point for affiliation.
4. Preference will be given to the colleges having microbiology department along with chemistry department.

SYLLABUS

LABORATORY QUALITY MANAGEMENT

1. Basic fundamentals in Analysis (4)
 - A) Analytical Chemistry, Titrimetric, gravimetric, instrumental analysis.
 - B) Analytical Physics, Physical tests.
 - C) Analytical Biology.
2. Instrumentation – Types, Principles, Maintenance, Operation, Working G.C., H.P.L.C., G.L.C., A.A.S., Organic C analyzer (4)
3. Fundamentals in sampling methods, Preparation of reagents & culture media (Simple, Differential & Special) sterilization, inoculation, microbial staining methods (Wet mounting, Gram’s staining, Monochrome staining.) (4)
4. Mathematical calculations in analysis- Concentration calculations, PPM, PPb, mg/l, Kg/ha, % normal, Molar Ug/100 gm calculations. (2)
5. Analytical work in various laboratories like Soil, Water, Food, Industry, Pathological, Environmental, Industrial, Fertilizer Industry. (3)
6. Quality control management in laboratory. Standardization of reagents, solutions, cross analysis. (2)
7. Safety and precautions in laboratory. General safety, ventilation, equipment arrangement, safety wares , first aid, handling and disposal of hazardous samples. (3)
8. Accuracy and precision maintenance in laboratory. (2)
9. Report presentation and interpretation of results. (2)
10. Laboratory management and Personality development. (2)

Reference Books

1. Basic concepts of analytical chemistry By S. M. Khopkar.
2. Vogel’s textbook of quantitative chemical analysis. (Longman) ELBS) Edn.
3. Handbook of organic qualitative analysis, By Clarke.
4. Vigel’s text book of qualitative chemical analysis. (Longman) ELBS) Edn.
5. Basic laboratory studies in college chemistry By herd & Nebergali.
6. Instrumental methods of analysis By Dr. B. K. Sharma.

WATER AND WASTE WATER ANALYSIS

1. Chemistry of water development, hydrology, precipitation, rain, snowfall, water availability requirement (2)
2. Quality of surface water, ground water: (2)
3. Impurities in water, standards of water quality for various requirements like potable, domestic use, industrial purpose, agricultural purpose. (3)
4. Water treatment technologies – House hold water treatment, Municipal water treatment, Industrial treatment, softening of water, Dis-infection of water (4)
5. Water Chemistry. (1)
6. Water Microbiology – types and sources of contamination, prevention of water borne diseases. (3)
7. Water management, water harvesting, water recycling (3)
8. Characteristics of waste water from industries- Sugar factory, Pulp and Paper mill, Distillery, Textile, Engineering, Food industry, Domestic waste. (5)
9. Waste water treatment plant types and quality control. (2)
10. Water pollution causes and remedies. (3)

Practicals :

1. Collection and preservation of samples from open well, tap, bore well, river, water treatment plants, waste water treatment plants.
2. Determination of PH and Electrical Conductivity of water.
3. Determination of Alkalinity.
4. Determination of Hardness (Total, Permanent & Temporary)
5. Determination of calcium.
6. Determination of Magnesium.
7. Determination of Carbonates & Bi-carbonates.
8. Determination of Chemical Oxygen demand (C.O.D.)
9. Determination of Biochemical Oxygen Demand (B.O.D.)
10. Determination of M.P.N. of water.
11. Identification of fresh water algae & Protozoa by Microscopy.

Reference Books

1. Standard Methods for Examination of water & waste water APHA- AWWA- WPCE
2. Manual of water & waste water analysis, NEERI, Nagpur.
3. Text book of water and waste water engineering by H. K. Hussen.
4. Water supply & sanitary engineering by Birdie.
5. Practical methods in ecology & Environmental science by R. K. Trivedi, P. K. Goel, C. L. Trisal.