

# **CERTIFICATE COURSE IN SAFETY IN RESEARCH AND CLINICAL LABORATORY**

**(Non-Semester)**

**(With effect from the academic year 2013-14)**

## **Eligibility for the Course**

Candidates for admission to Certificate course in Safety in Research and Clinical Laboratory could possess a Higher Secondary school Education in Science subjects with Biology

## **Duration of the Course**

One year Certificate course in Safety in Research and Clinical Laboratory course non-semester for One Year duration

## **Examination**

All the theory paper are of 3 hours duration each for maximum of 100 marks with passing minimum of 35 marks Practical examinations are also for 3 hours duration for a maximum of 100 marks and passing minimum of 35 marks.

Question Paper Pattern

Maximum marks: 100

Time: 3 hours

Part A (5 x 3 = 15)

Five short answer questions (One question from each unit)

Part B (5 x 8 = 40)

Paragraph questions (Total questions 8, out of which answers are to be given for any five questions;

Part C (3x 15 = 45)

Total questions 5, out of which answers are to be given for any Three questions;

S.No	Theory & Practicals	Maximum Marks	Minimum Marks
1.	Biosafety and Bioethics	100	35
2.	Environment Health and Radiation Safety	100	35

## Paper-I: Biosafety and Bioethics

### Unit-I

Micro-organisms: Classification, Structure and Growth, Factors influencing growth, Pathogenic and non-pathogenic organisms, Normal flora of the body, Common microbes used in laboratories.

### Unit II

Common diseases caused by different types of microorganisms, Bloodborne Pathogens - universal precautions, causes of bloodborne diseases, proper personal protective equipments.

### Unit III

Infection and its transmission: Sources of infection, Growth of microbes, Portals of entry and exit of microbes, Transmission of infection, Collection, handling and transportation of specimens.

### Unit IV

General Biosafety: Biosafety-guidelines, Biosafety levels, regulations - Biosafety and Bioethics committees for the Institutions.

### Unit V

Safety and containment equipments – Shipment and containment procedures for GMOs, DNA, vectors, etc. – Handling guidelines for the usage of antibiotics in research labs - Facility design considerations, Protective Equipments – Types and purpose, Documentation and work culture in Research labs - Ethics in Research and Medical labs – Data Audit - Good lab practices – Things to do and avoid in the research and clinical labs – Social and Legal aspects in clinical labs.

### References:

1. Bioethics and Biosafety in Biotechnology by Sree Krishna. 2007. New Age International Publishers, India.
2. Bioethics and Biosafety by M. K. Sateesh. 2008. I. K International Pvt Limited, Publishers, India.
3. Good Clinical, Laboratory and Manufacturing Practices: Techniques for the QA Professional, 2007. Philip A. Carson, Nigel J. Dent, Royal Society of Chemistry.
4. Safety Sense: A Laboratory Guide, 1999, CSHL Press.
5. Infection Control Manual for Hospitals, 2006, Gail Bennett, Gloria Morrell, HCPro Incorporated Publishers.
6. Teaching Science Lab Safety: A Guide for K-12 Science Educators, 2011, Erin Colfax, Laboratory Safety Institute Publishers

## **Paper-II: Environment Health and Radiation Safety**

### **Unit-I**

Chemical Safety: Chemical hazards-classification and definition, Material safety data analysis, safe handling, storage and segregation, hazard recognition and control, Types of chemicals – storage and safety - waste management and emergency response.

### **Unit II**

Common occupational diseases. Occupations involving risks of contracting these diseases. Mode of causation of the diseases and its effects. Diagnostic methods, Physiological tests in occupational health assessment.

### **Unit III**

Methods of prevention. Compensation for occupational diseases. Evaluation of injuries. Industrial medical services in an industrial establishment and its functions.

### **Unit IV**

Radiation Safety: Scientific background, Biological effects of radiation and ionizing radiation in the environment, Principles of radiation protection, Radiation Monitoring Instruments & Measurements , Radiation safety in the laboratories, safety practices for handling radioactive materials, Accidents and emergency planning scenarios.

### **Unit V**

Behavior in the research and clinical lab, Laboratory code and conduct. Visit to relevant Labs/Field Visits

### **References:**

1. Radiation Protection Manual. A publication of Institute of Nuclear Medicine and Allied Science. DRDO, 2010, India.
2. Laboratory Safety for Chemistry Students by Robert H. Hill and David Finster. 2010, John Willey & Sons, Inc., USA.
3. Patient Safety: Essentials for Health Care, 2009. Joint Commission Resources.
4. Complete Guide to Lab Safety, 2010, Terry Jo Gile, Hcpro Incorporated Publishers.
5. Safety Sense: A Laboratory Guide, 1999, CSHL Press.