LABORATORY TECHNIQUES IN LIFE SCIENCES VOC110

FACULTY : SCIENCE

DEPARTMENT : ZOOLOGY

COURSE LEARNING OUTCOMES

This vocational course is intended for students aspiring for employment as laboratory technician in schools or colleges or private laboratories. At present no academic programme is available in our university to train students the laboratory through the regular Botany/Zoology curriculum. The vocational programme has been designed to train laboratory supporting staff in appropriate procedures for organizing and maintaining school/college/private laboratories.

The board objective of this programme is to impart knowledge of the basics of organization and management of laboratories; train the learners in the operation and maintenance of simple instruments used in laboratories; enable them to develop skill in common laboratory techniques. Therefore, after studying the course as per the following syllabus, learners will be able to identify the tools/ apparatus/ equipments/instruments used in a typical life science laboratory; understand the basic working principles (without going into detail) learn how to use them, setting up experiments, carry out for minor repairs and ensure them proper maintenance and up keeping.

Credits : 3	Programme : Vocational
Max. Marks : 100	Min. Passing Marks : 33
Department Name : Zoology	Course Code :
Duration of Programme : 2 Semester	
Total no. of Lectures - Tutorials – Practical (in hours per week) : L-T-P:1-0-2	

	Unit	Topics	No. of Lectures
Sem. I	Theory	Basic Practice : Salient aspects of Life science laboratories and industry Environment, Health and Safety (EHS) norms at work in the life science laboratory. Maintain lab area, equipment and lab glassware/plastic ware clean calibrated as per Good Laboratory Practices (GLP) and Standard Operating Procedures (SOP). Introduction of different chemicals used in laboratory practices Humidity and Temperature Measurement – Dry wet thermometer, mercury thermometer, atmospheric pressure – Barometer. Advance Practice – Specific Handling and Maintenance of equipments as incubators, autoclaves, glasswares etc. Handle, label and store materials/chemicals. Introduction to different type of Microscopes.	15

	Practical II	**Experiment 1 :** Measurement of room temperature, humidity, atmospheric pressure. **Experiment 2 :** Knowing about different glasswares. **Experiment 3 :** Handling and Labelling of chemicals. **Experiment 4 :** Maintenance of Calibration of Microscopes. **Experiment 5 :** Handling and calibration of different measurements as autoclave, incubators etc. **Experiment 6 :** Washing and cleaning of the glasswares with different solutions and types of water to ensure complete cleaning.	**30**

	Unit	**Topics**	**No. of Lectures**
Sem. 2	**Theory**	**Basic Techniques :** Preparation of solutions and reagents commonly used in laboratory. Stains, alcohol grades etc. Preservation techniques of materials used in laboratory operations and use of laboratory equipments as hot case, incubator, colorimeter etc. **Advance Technique :** Perform waste disposal as per Good Laboratory Practices (GLP), maintain record, deviation/incident reports and logs in lab. Developing professional skills at work, such as decision making, planning and organizing, problem solving, analytical thinking and critical thinking.	**15**
	II Practical	**Experiment 1 :** Preparation of grades of alcohol. **Experiment 2 :** Preservation of materials. **Experiment 3 :** Sterilization of glassware. **Experiment 4 :** Moc-drill in case of accident in laboratory. **Experiment 5 :** Preparation of different stains. **Experiment 6 :** Reprocess the glasswares for experimentation.	**30**

SUGGESTED READINGS :

1. Experimental Procedures in Life Sciences – S. Rajan, R. Selvi Christy. (Amazon.in)
2. Experimental Design for the Life Sciences – Graeme D. Ruxton & Nick Colegrave. (Amazon.in)
3. Introduction to Instrumentation of Life Science– Dr. Suchitra Sharma and Dr. Agosh Verma. (Amazon.in)
4. The Science of Everyday Life – Marty Jopson (Amazon.in)
5. How to be good at Science, Technology and Engineering – D.K. (Amazon.in)
6. Biological Science – Freman, Quillin, Allicon, Black, Podgorski, Taylor Publication – Pearson.
7. Advanced Lab Practices in Biochemistry and Molecular Biology – Swati Agarwal, Suphiya Khan, (I.K. International Publishing House Pvt. Ltd.)
8. Laboratory Techniques in Biological Science – Dr. Manish Pratim Sarma, Dr. Minakshi Bhattacharjee, Publisher – 24 by 7 Publishing.
9. Life Science in Tools and Techniques – P.S. Bisen / Shruti Mathur (Publisher CBS Publishers and Distributors).
10. NCERT Biology Lab Manual Class 11 and 12.

SUGGESTED CONTINUOUS EVALUATION METHODS :

Theory : 20 marks for test/quiz, 05 marks for class interaction.

Practical : 15 marks for record file/assignment, 05 marks for Viva-voce. 05 marks for class interaction.

Eligibility (Subject Specific) : A student must have had the subject Biology in Class 12^{th}.

SUGGESTED EQUIVALENT ONLINE COURSES :

1. Uttar Pradesh Higher Education Digital Library, http://heecontent.upsdc.gov.in/searchcontent.aspx
2. Swayam Prabha – DTH Channel, http://www.swayamprabha.gov.in/index.php/program/current_he/8