Shiksha Mandal's
Bajaj College of Science, Wardha (Autonomous)
Department of Biotechnology
B.Sc. Part I- Semester I
VSEC (VSC-I)

Laboratory Safety and Instrument Handling

This course will emphasize on increasing understanding of Biotechnology laboratory component and laboratory setup. To replicate the understanding of basic Biotechnology training and laboratory management skills among students. This course is focus on Biotechnology laboratory setup, safety and security in laboratory, documentation, basic and advance instruments and maintenances of instruments.

Learning Objectives:
The student will be able to learn:

1. Critical thinking skills in the students
2. Accuracy in calculations and in scientific writing.
3. Learn the responsibilities associated with working in a laboratory.

Learning Outcomes:
Upon successful completion, students will have the knowledge and skills to:

1. Understand basic working differences between various laboratories.
2. Basic instruments used in biotechnology laboratories
3. Students behave more professionally in laboratory

List of Practical	**Laboratory Safety and Instrument Handling [4 hrs/week 15 weeks* 4 Practical= 60P] [2 credits]**
1	Introduction to Biotechnology laboratory
2	Biotechnology Laboratory Security, Safety(Biohazard) and first Aid
3	Sterilization and decontamination of laboratory
4	Basic Lab Equipment handling and maintenances
5	Advance Lab equipment handling and maintenance
6	Preparation of laboratory solution

References:

1. Sambrook, J., & Green, R. M. (2012). Molecular cloning a laboratory Manual. (4th ed.). New York: Cold Springer Harbor Laboratory Press.
2. Brown, T. A. (2010). Gene cloning and DNA analysis: An introduction. (6th ed.). Wiley Blackwell, John Wiley & Sons, Ltd., Publication.
3. Chanyen J.(1999) Cell biology: A laboratory handbook. J. E. Celis (Ed.). Academic Press: New York, London, Sydney, Tokyo, Toronto.
4. Surajit Das , Hirak Ranjan Dash (2015) Microbial Biotechnology- A Laboratory Manual for Bacterial Systems, Nature Protocol

Shiksha Mandal's
Bajaj College of Science, Wardha (Autonomous)
Department of Biotechnology
B.Sc. Part I- Semester II
VSEC (Skill Enhancement Course II (SEC-I))
Microbial Commercial Products

Microorganisms are the major components of biological systems on the planet earth, which are present everywhere. These microbes play a crucial role in the fermentation process to obtain a number of commercial products. This course is focus on increasing understanding students regarding production of important microbial commercial products by performing hand on experiment to replicate exact procedures. This course also provide opportunity to student for start- up as they have practical knowledge of subjects.

Learning Objectives:
The student will be able to learn:

1. How microbes are valuable for betterment of mankind.
2. Various commercial products produced by microbes.
3. Learn the responsibilities associated with working in a microbial laboratory.

Learning Outcomes:
Upon successful completion, students will have the knowledge and skills to:

1. Understand the production process of microbial commercial products.
2. Understand and calibrated basic instruments used in microbiology laboratories/ industries.
3. Students behave more professionally in laboratory.

Sr. No	**Microbial Commercial Products** **[4 hrs/week 15 weeks* 4 Practical= 60P]** **[2 credits]**
1	Production of Bio fertilizer (PSB/ Nitrogen fixing Bacteria)
2	Production of alcohol from jiggery/ Fruit Waste by using Yeast and preparation of sanitizer
3	Production of fermented food (Idali/ Dosa/ Bread)
4	Isolation and characterization of antibiotic producing microorganism.
5	Isolation and characterization of probiotic bacteria from Soli
6	Production of fermented dairy products (Yogurt and Cheese)

References:-

1) Ratledge C. and Kristiansen, B (2001); Basic Biotechnology 2nd Ed. Cambridge University Press.
2) Villadsen J., Nielsen J., Gunnar Lide´n (2011) ,Bioreaction Engineering Principles 3rd Ed. Pringer
3) Casida. LE, (1996) Industrial Microbiology by New age International (P) Limited, Publishers.
4) Prescott and Dunns (2004) Industrial Microbiology , AVI Publishing Company Inc.
5) Stanbury, P.F., Whitaker,A., Hall,Sj., B. Heineman (2003) Principles of Fermentation Technology , Principles of Fermentation Technology , Aditya Books (P) Ltd.