**Course title:** Plant biotechnology laboratory – Part 1

| **Course code:** BBP 101 | **No. of credits:** 7 | **L-T-P:** (0-0-196 | **Learning hours:** 196 |
|---|---|---|---|

**Pre-requisite course code and title (if any):** None

**Department:** Department of Biotechnology

| **Course coordinator:** Dr. Ramakrishnan Sitaraman | **Course instructor:** Dr. Ramakrishnan Sitaraman /Dr. Udit Soni/ Dr. Shashi Bhushan Tripathi |
|---|---|

**Contact details:** rkraman@teriuniversity.ac.in / udit.soni@teriuniversity.ac.in /Dr. Shashi Bhushan Tripathi

| **Course type: Core** | **Course offered in:** Semester1 |
|---|---|

**Course description:**

1. Lab safety
2. Types of hazards
3. Levels of containment.
4. Standard bio-analytical techniques.
5. Good laboratory practices and quality control.

**Course objectives:**

1. To introduce the students to standard techniques of molecular biology and GLPs (good laboratory practices).
2. To impart intensive hands-on-training using molecular tools in a research project mode.
3. To train the students in designing experiments with appropriate controls.

**Course contents**

| Module | Topic | L | T | P |
|---|---|---|---|---|
| **Suggested practicals** | | | | |
| **1** | Buffer Preparation<br>Solution chemistry and buffers | | | |
| **2** | Media preparation | | | |
| **3** | Autoclaving | | | |
| **4** | Principles of Instrumentation and bioanalytical techniques | | | |
| **5** | Microscopy, types of stains – Gram, Haematoxylin, Eosin | | | |
| **6** | Isolation of microbes from environmental samples | | | |
| **7** | Nucleic acid extraction and analysis Qualitative and quantitative analyses | | | |
| **8** | Fractionation techniques, e.g.<br>Gel electrophoresis<br>Chromatography | | | |
| **9** | Genetic Engineering techniques<br>PCR, restriction enzymes, ligation, vectors | | | |
| **10** | Introduction of DNA into model organisms, screening and selection.<br>Bacterial transformation<br>Eukaryotic cell transfection | | | |

**Evaluation criteria:**

1. Attendance : 5%
2. Preparation of report(s)/lab record(s). :65%
3. Answers to written questions/viva voce. :30%

**Learning outcomes:**

1. Ability to conduct experiments with adequate safety precautions.
2. Capacity to compare and evaluate various approaches in solving a given experimental problem.
3. Ability to design and interpret molecular biology experiments.
4. Proficiency in defining a research problem, drawing logical inferences from results and documenting outcomes in systematic manner.

| **Materials:** |
| --- |
| **Additional information (if any)**: Coordinator may choose experiments from this list, which should be considered merely representative, not exhaustive. The objective is to give students sufficient exposure to several aspects of experimental modern biology. |
| **Student responsibilities:**<br>1. Class attendance.<br>2. Study of course materials as specified by the instructor.<br>3. Performance of experiments and their timely documentation. |

**Course reviewers:**
Reviewed and commented on by the following experts.

1. Dr. Prem P. Jauhar, Research Geneticist, USDA
2. Dr. J.S. Virdi, University of Delhi