

<b>Course title:</b> Plant biotechnology laboratory – Part 1				
<b>Course code:</b> BBP 101		<b>No. of credits:</b> 7	<b>L-T-P:</b> (0-0-196	<b>Learning hours:</b> 196
<b>Pre-requisite course code and title (if any):</b> None				
<b>Department:</b> Department of Biotechnology				
<b>Course coordinator:</b> Dr. Ramakrishnan Sitaraman			<b>Course instructor:</b> Dr. Ramakrishnan Sitaraman /Dr. Udit Soni/ Dr. Shashi Bhushan Tripathi	
<b>Contact details:</b> rkraman@teriuniversity.ac.in / udit.soni@teriuniversity.ac.in /Dr. Shashi Bhushan Tripathi				
<b>Course type:</b> Core			<b>Course offered in:</b> Semester I	
<b>Course description:</b>				
<ol style="list-style-type: none"> <li>1. Lab safety</li> <li>2. Types of hazards</li> <li>3. Levels of containment.</li> <li>4. Standard bio-analytical techniques.</li> <li>5. Good laboratory practices and quality control.</li> </ol>				
<b>Course objectives:</b>				
<ol style="list-style-type: none"> <li>1. To introduce the students to standard techniques of molecular biology and GLPs (good laboratory practices).</li> <li>2. To impart intensive hands-on-training using molecular tools in a research project mode.</li> <li>3. To train the students in designing experiments with appropriate controls.</li> </ol>				
<b>Course contents</b>				
<b>Module</b>	<b>Topic</b>	<b>L</b>	<b>T</b>	<b>P</b>
<b>Suggested practicals</b>				
1	Buffer Preparation 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. Gel electrophoresis Chromatography			
9	Genetic Engineering techniques PCR, restriction enzymes, ligation, vectors			
10	Introduction of DNA into model organisms, screening and selection. Bacterial transformation Eukaryotic cell transfection			
<b>Evaluation criteria:</b>				
<ol style="list-style-type: none"> <li>1. Attendance : 5%</li> <li>2. Preparation of report(s)/lab record(s). :65%</li> <li>3. Answers to written questions/viva voce. :30%</li> </ol>				
<b>Learning outcomes:</b>				
<ol style="list-style-type: none"> <li>1. Ability to conduct experiments with adequate safety precautions.</li> <li>2. Capacity to compare and evaluate various approaches in solving a given experimental problem.</li> <li>3. Ability to design and interpret molecular biology experiments.</li> <li>4. Proficiency in defining a research problem, drawing logical inferences from results and documenting outcomes in systematic manner.</li> </ol>				

**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:**

1. Class attendance.
2. Study of course materials as specified by the instructor.
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