| No. | Information of the subject | |
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| 1. | Unit name: | Genetic Engineering I |
| 2. | Code: | BioT31042 |
| 3. | Classification: | Core subject |
| 4. | Credit value: | 3.5 |
| 5. | Semester/Year Offered: | 1/2 |
| 6. | Pre-requisite: | BioT 21041 and BioT 22041 |
| 7. | Mode of delivery: | Presentations, Lectures |
| 8. | Assessment system and breakdown of marks: | Practical, Classwork |
| | Practical | 15% |
| | Active participation in Classwork and discussion | 15% |
| | Mid-term exam | 35% |
| | Final exam | 35% |
| 9. | Academic staff teaching unit: | Department of Biotechnology |
| 10. | Course outcome of unit:<br>After completion of this course, students will be able to<br>1. Describe the general principles Gene cloningand recombinantDNA identification.<br>2. Understand the cloning vectors for *E.coli* that involve the use of recombinant DNA technology<br>3. Explain the essential enzymes that involve the use of recombinant DNA technology<br>4. Exhibit advanced knowledge in a specialized field of molecular and cell biology<br>5. Recognize safe laboratory practices and perform basic molecular biology techniques<br>6. Understand and apply the principles and techniques of molecular biology which prepares students for further education and/or employment in teaching, basic research, or the health professions. | |
| 11. | Synopsis of unit:<br>Genetic engineering – the process of purposefully altering an organism's DNA – has been used to create powerful research tools and model organisms, and has also seen many agricultural applications. However, in order to engineer traits to tackle complex agricultural problems such as stress tolerance, or to realize the promise of gene therapy for treating human diseases, further advances in the field are still needed. Important considerations include the safe and efficient delivery of genetic constructs into cells or organisms, and the establishment of the desired modification in an organism's genome with the least "off-target" effects. | |
| 12. | Topics<br>1. Introduction | |

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| | 2. Introducing molecular biology<br>3. Working with nucleic acids<br>4. The tools of the trade<br>5. Host cells and vectors<br>6. Cloning strategies<br>7. The polymerase chain reaction<br>8. Selection, screening, and analysis of recombinants<br>9. Bioinformatics |
| 13. | Main reference:<br>• Desmond S.T. Nicholl, "An Introduction to Genetic Engineering", 3rd edition, Cambridge |
| 14. | Additional references:<br>• Watson. Baker. Bell. Gann. Levine. Losick" Molecular Biology of the Gene", 7th Edition<br>• William S. Klug, Michael R. Cummings, Charlotte A. Spencer, Michael A. Palladino. "Concepts of Genetics", 10th Edition, Pearson<br>• T.A. Brown, "Gene Cloning and DNA Analysis, An Introduction", 6th Edition, Wiley-Blackwell |