**UG Program (B.Sc. Biotechnology) : Course Outline**

**Year 1**

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| **Semester – I** | **Semester -II** |
| Introductory Biology | Basics of Physics |
| Experimental Techniques in Science | Introduction to biological data and databases  Bioinformatics |
| Foundational Chemistry | Computer operating systems and programming |
| Essential mathematics and statistics | Principles of Ecology and Evolution |
| University core | University core |

**Year 2**

|  |  |
| --- | --- |
| **Semester -III** | **Semester – IV** |
| Biochemistry & Structural Biology | Molecular Biology and Genetic Engineering |
| Techniques in Biochemistry | Techniques in Molecular Biology and Genetic Engineering |
| Programming for Biologists | Minor Cores – 3 and 4 |
| Minor Cores – 1 and 2 |  |
| University core |  |

**Year 3**

|  |  |
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| **Semester -V** | **Semester – VI** |
| Cell Biology and Signalling | Microbiology and Immunology |
| Techniques in Cell Biology | Techniques in Microbiology |
| Genetics | Fermentation and Downstream Processing |
| Open Elective-1 or Minor Research Project-1 | Open Elective-2 or Minor Research Project-2 or University core |
| Minor Cores – 5, 6 and 7 | Minor Cores – 8, 9 and 10 |

**Year 4**

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| **Semester -VII** | **Semester – VIII** |
| Genomic and Transcriptomic data analysis | Computational drug design |
| Introduction to cell and tissue engineering | Introduction to AI/ML and their applications in biology |
| Bio-Entrepreneurship | Basics of synthetic biology |
| University core | Minor Research project - 3  OR  Major Research Project (BSc. Hons. Res) |
| Minor Core2 – 11, 12 and 13 |

**Putative Open Elective Choices**

1. Medical biotechnology
2. Plant biotechnology
3. Environmental biotechnology
4. Nanobiotechnology
5. Bioprospecting
6. Biosafety, Bioethics and IPR
7. Biophysics & Biomechanics
8. Forensic Law and Science
9. Systems biology
10. Research methodologies, scientific writing and presentation