



FACULTY OF  
SCIENCE AND  
HEALTH SCIENCE



## ***Integrated M.Sc. Biotechnology***

Division	Faculty of Science & Health Science
School Name	School of Science & Environmental Studies
Department Name	Department of Biosciences and Technology
Programme Name	Integrated M. Sc. Biotechnology

+ + + + + + + + + + + + + + **COURSE BASKET** + + + + + + + + + + + + + + + +

| Course Type               | Description   |
|---------------------------|---|
| Programme Core (PC)       | Courses dealing with the foundations, depth and breadth of the major in which the student is admitted at MIT-WPU  |
| Programme Electives (PE)  | Open electives under the Programme allow students to specialise in a particular area connected to their major.  |
| Programme Major (PM)      | This encompasses the specialised, in-depth coursework within a specific major. It focuses on the core concepts and skills relevant to that particular field of study. |
| Programme Foundation (PF) | These courses provide the essential background knowledge and skills needed to succeed in the chosen Programme.  |
| University Core (UC)      | Courses that reflect the core MIT-WPU values and the mission of Life Transformation of students.  |
| University Electives (UE) | Multidisciplinary courses across the faculties at MIT-WPU and outside the Programme core.   |

| Semester    | Odd(I) | Even(II) | Total Credits |
|-------------|--------|----------|---------------|
| First Year  | 20     | 22       | 42            |
| Second Year | 22     | 21       | 43            |
| Third Year  | 22     | 21       | 43            |
| Fourth Year | 19     | 18       | 37            |
| Fifth Year  | 22     | 15       | 37            |

## SEMESTER – I

| Semester | Course Type | Course Name / Course Title               | Total Credits |
|----------|-------------|--|---------------|
| I        | UC          | Indian Constitution                      | 1             |
| I        | UC          | Environment and Sustainability           | 1             |
| I        | UC          | Yoga – I                                 | 1             |
| I        | UC          | Social Leadership Development Programme  | 1             |
| I        | UC          | Financial Literacy                       | 1             |
| I        | PF          | Biochemistry and Metabolism              | 3             |
| I        | PF          | Fundamentals of Cell & Molecular Biology | 2             |
| I        | PF          | Biostatistics                            | 3             |
| I        | PF          | Microbiology                             | 3             |
| I        | PF          | Genetics                                 | 2             |
| I        | PF          | Integrated Laboratory – 01               | 2             |
|          |             | <b>Total Credits:</b>                    | <b>20</b>     |

## SEMESTER – II

| Semester | Course Type | Course Name / Course Title        | Total Credits |
|----------|-------------|-----------------------------------|---------------|
| II       | UC          | Yoga – II                         | 1             |
| II       | UC          | Co-creation                       | 1             |
| II       | UC          | AI for Everyone                   | 2             |
| II       | UC          | Foundation of Peace               | 2             |
| II       | UC          | Indian Knowledge System (General) | 2             |
| II       | UC          | Sports                            | 1             |
| II       | PF          | Bioinformatics                    | 2             |
| II       | PF          | Recombinant DNA Technology        | 2             |
| II       | PF          | Immunology                        | 4             |
| II       | PF          | Bioanalytical Techniques          | 3             |
| II       | PF          | Integrated Laboratory – 02        | 2             |
|          |             | <b>Total Credits:</b>             | <b>22</b>     |

### SEMESTER – III

| Semester | Course Type | Course Name / Course Title                         | Total Credits |
|----------|-------------|--|---------------|
| III      | UC          | Spiritual and Cultural Heritage: Indian Experience | 2             |
| III      | UC          | Research Innovation Design Entrepreneurship (RIDE) | 1             |
| III      | UE          | University Electives – I                           | 3             |
| III      | PF          | (IKS) Indian Health Sciences                       | 2             |
| III      | PF          | Computational Biology                              | 3             |
| III      | PF          | Plant and Animal Biotechnology                     | 3             |
| III      | PF          | Bioprocess Technology                              | 3             |
| III      | PF          | Integrated Laboratory – 03                         | 2             |
| III      | PC          | Bioethics, Biosafety and IPR                       | 3             |
|          |             | <b>Total Credits:</b>                              | <b>22</b>     |

### SEMESTER – IV

| Semester | Course Type | Course Name / Course Title                    | Total Credits |
|----------|-------------|---|---------------|
| IV       | UC          | Rural Immersion                               | 1             |
| IV       | UC          | Life Transformation Skills                    | 1             |
| IV       | UE          | University Electives – II                     | 3             |
| IV       | PM          | Fundamentals of Metabolic Engineering         | 3             |
| IV       | PM          | Genomics and Proteomics                       | 3             |
| IV       | PM          | Environmental Biotechnology                   | 4             |
| IV       | PC          | Integrated Laboratory – 04                    | 2             |
| IV       | PM          | Genomic Data Science                          | 2             |
| IV       | PM          | Introduction to Biosensors and Bioelectronics | 2             |
|          |             | <b>Total Credits:</b>                         | <b>21</b>     |

## SEMESTER – V

| Semester | Course Type | Course Name / Course Title                          | Total Credits |
|----------|-------------|---|---------------|
| V        | UC          | Managing Conflicts Peacefully: Tools and Techniques | 2             |
| V        | UE          | University Electives – III                          | 3             |
| V        | PE          | Programme Elective – I                              | 4             |
| V        | PM          | Introduction to Stem Cell Biology                   | 2             |
| V        | PM          | Food Chemistry and Microbiology                     | 3             |
| V        | PM          | Pharmaceutical Technology                           | 2             |
| V        | PM          | Research Methodology                                | 4             |
| V        | PC          | Integrated Laboratory – 05                          | 2             |
|          |             | <b>Total Credits:</b>                               | <b>22</b>     |

## PROGRAMME ELECTIVES – I

| S.No. | Course Name / Course Title                         | Total Credits |
|-------|--|---------------|
| 1     | Chemistry of Elements and Chemical Transformations | 4             |
| 2     | Introduction to Computing Languages                | 4             |
| 3     | Introduction to Quantum Mechanics                  | 4             |

## SEMESTER – VI

| Semester | Course Type | Course Name / Course Title            | Total Credits |
|----------|-------------|---------------------------------------|---------------|
| VI       | UC          | National Academic Immersion Programme | 2             |
| VI       | PE          | Programme Elective – II               | 4             |
| VI       | PC          | Research Project                      | 12            |
| VI       | PC          | AI in Biotechnology                   | 2             |
| VI       | PC          | Biologue: A Scientific Discourse      | 1             |
|          |             | <b>Total Credits:</b>                 | <b>21</b>     |

## PROGRAMME ELECTIVES – II

| S.No. | Course Name / Course Title         | Total Credits |
|-------|------------------------------------|---------------|
| 1     | Microbial Taxonomy and Diversity   | 4             |
| 2     | Molecular Diagnostics              | 4             |
| 3     | Introduction to Health Informatics | 4             |

## SEMESTER – VII

| Semester | Course Type | Course Name / Course Title                             | Total Credits |
|----------|-------------|--|---------------|
| VII      | PE          | Programme Elective – III                               | 4             |
| VII      | PM          | Principles of Regeneration and Developmental Biology   | 3             |
| VII      | PM          | ECM, Cell Signalling and Communications                | 3             |
| VII      | PM          | Systems Biology  | 3             |
| VII      | PM          | Tissue Engineering and Translational Medicine          | 3             |
| VII      | PC          | Tissue Engineering and Stem Cell Technology Laboratory | 3             |
|          |             | <b>Total Credits:</b>                                  | <b>19</b>     |

## PROGRAMME ELECTIVES – III

| S.No. | Course Name / Course Title                     | Total Credits |
|-------|--|---------------|
| 1     | Metabolomics in Health and Disease             | 4             |
| 2     | Biosensors and Bioimaging                      | 4             |
| 3     | Pharmaceutical Toxicology                      | 4             |
| 4     | Systematic Review and Meta-analysis            | 4             |
| 5     | MATLAB for Bioinformatics                      | 4             |
| 6     | Linux in Bioinformatics                        | 4             |
| 7     | Omics Technologies for Agri-Food Technology    | 4             |
| 8     | Principles of Food Preservation and Technology | 4             |

## SEMESTER – VIII

| Semester | Course Type | Course Name / Course Title  | Total Credits |
|----------|-------------|---|---------------|
| VIII     | PE          | Programme Elective – IV   | 4             |
| VIII     | PM          | Stem Cells and Translational Medicine                             | 3             |
| VIII     | PM          | Translation of Nanobiotechnology in Medicine                      | 3             |
| VIII     | PM          | Biomaterials and Mechanobiology                                   | 3             |
| VIII     | PM          | Regulatory Affairs in Tissue Engineering and Stem Cell Technology | 2             |
| VIII     | PC          | Tissue Engineering and Stem Cell Technology Laboratory – II       | 3             |
|          |             | <b>Total Credits:</b>   | <b>18</b>     |

### PROGRAMME ELECTIVES – IV

| S.No. | Course Name / Course Title                                   | Total Credits |
|-------|--|---------------|
| 1     | Experimental and Transgenic Animal Models                    | 4             |
| 2     | Drug Delivery Systems  | 4             |
| 3     | Clinical Data Science  | 4             |
| 4     | Medical Writing and Coding                                   | 4             |
| 5     | Introduction to Artificial Intelligence and Machine Learning | 4             |
| 6     | Biological Database Architecture                             | 4             |
| 7     | Precision Agriculture and Informatics                        | 4             |
| 8     | Agri-Food Management and Economics                           | 4             |

### SEMESTER – IX

| Semester | Course Type | Course Name / Course Title | Total Credits |
|----------|-------------|----------------------------|---------------|
| IX       | PC          | On-the-Job Training (OJT)  |               |
| IX       | PC          | Research Project           |               |
|          |             | <b>Total Credits:</b>      | <b>22</b>     |

### SEMESTER – X

| Semester | Course Type | Course Name / Course Title        | Total Credits |
|----------|-------------|-----------------------------------|---------------|
| X        | PM          | Nanobiotechnology and Biomimetics |               |
| X        | PC          | Research Project                  |               |
|          |             | <b>Total Credits:</b>             | <b>15</b>     |

\*Modifications to the programmes and courses are contingent upon adherence to university guidelines and procedures. Any proposed changes must undergo a thorough review process, including consultation with relevant academic departments, approval from the appropriate administrative bodies, and compliance with accreditation standards. Additionally, consideration will be given to feedback from students, faculty, and other stakeholders to ensure that modifications align with the overall educational objectives and mission of the university. The implementation of any approved changes will be communicated transparently to the university community, and appropriate measures will be taken to facilitate a smooth transition for all affected parties.