**Curricular Structure of the Programme**

**MASTER OF SCIENCE (BIOTECHNOLOGY)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Paper Code** | **Paper Name** | **Credit** |  |
| **Semester – 1** | **MBT-101** | Microbiology | 04 | **Total Credits 25** |
| **MBT-102** | Molecular biology | 04 |
| **MBT-103** | Biochemistry | 04 |
| **MBT-104** | Cell biology | 04 |
| **MBT-105** | Laboratory course-I(based on MBT-101, 102, 103 & 104)(based on mbt-101, 102, 103 & 104) | 08 |
| **MBT-106** | Seminar | 01 |
| **Semester – 2**  | **MBT-201** | Recombinant DNA technology | 04 | **Total Credits 25** |
| **MBT-202** | Enzyme technology | 04 |
| **MBT-203** | Immunology | 04 |
| **MBT-204** | Bioinformatics, biostatistics and genomics | 04 |
| **MBT-205** | Laboratory course-II(based on MBT-201, 202, 203 & 204) | 08 |
| **MBT-206** | Seminar | 01 |
| **Semester-3**  | **MBT-301** | Plant biotechnology | 04 | **Total Credits 25** |
| **MBT-302** | Animal biotechnology | 04 |
| **MBT-303** | Bioprocess technology | 04 |
| **MBT-304** | Environmental biotechnology | 04 |
| **MBT-305**  | Introductory Biotechnology(Elective for other department) | 04 |
| **MBT-306** | Laboratory Course-III(Based on MBT-301, 302, 303 & 304) | 08 |
| **MBT-306** | Seminar | 01 |
| **Semester-4 \*** | **MBT-401** | Genomics for crop improvement | 04 | **Total Credits 25** |
| **MBT-402** | Proteomics andNanobiotechnology | 04 |
| **MBT-403** | Biosafety, IPR and bioethics | 04 |
| **MBT-404** | Animal cell and tissue culture | 04 |
| **MBT-405** | Seminar | 01 |
| **MBT-406** | Dissertation | 12 |
| *\*Student will select three papers (courses) out of four papers from MBT- 401, MBT- 402, MBT- 403 and MBT-404* |

**Curricular Structure of the Programme**

**MASTER OF SCIENCE (PLANT BIOTECHNOLOGY)**

|  |  |  |  |
| --- | --- | --- | --- |
| Course Code | Course Name | Credit |  |
| Semester – 1 | Core Course | Total Credits 18 |
| PBT-501 | Plant Microbial Diversity | 2+1 |
| PBT-502 | Molecular Biology | 2+1 |
| PBT-503 | Plant Biochemistry | 2+1 |
| Optional Course (Only One) |
| PBT-510 | Microbiology | 2+1 |
| PBT-511 | Cell Biology | 2+1 |
| Minor Course (Only one) |
| PBT-520 | Computational Biology | 2+1 |
| PBT-521 | Basic Bioinformatics | 2+1 |
| Ability Enhancement Compulsory Courses (AECC)AECC1 |
| PBT-530 | Environmental Sustainability/ Swachh Bharat Abhiyan activities/ Biodiversity and its conservation | 3 |
| Semester – 2  | Core Course | Total Credits 15 |
| PBT-504 | Fundamental Genetics | 2+1 |
| PBT-505 | Plant Physiology and Metabolism | 2+1 |
| Optional Course (only one) |
| PBT-512 | Molecular Modeling and Drug Design | 2+1 |
| PBT-513 | Recombinant DNA technology | 3+1 |
| Minor Course (only one) |
| PBT-522 | Enzyme Technology | 2+1 |
| PBT-523 | Immunology | 2+1 |
| Ability Enhancement Courses (AEC): Skill enhancement course |
| PBT-540 | Mushroom Culture/ Bio-fertilizer production/ Environmental Law/ Tourism and Hospitality management/ Life Skills and skill development/ Yoga studies | 3 |
| Semester-3  | Core Course | Total Credits 18 |
| PBT-506 | Bioprocess Technology | 2+1 |
| PBT-507 | Plant Biotechnology | 2+1 |
| PBT-508 | Molecular Plant breeding | 2+1 |
| Optional Course (only one) |
| PBT-514 | Plant Stress Biology | 2+1 |
| PBT-515 | Photochemistry and Pharmacognosy | 3 |
| Minor Course (only one) |
| PBT-524 | Biosafety and Scientific Communications | 3 |
| PBT-525 | Molecular Plant Pathology | 3 |
| Ability Enhancement Compulsory Courses (AECC)AECC2 |
| PBT-531 | Human Values and professional Ethics/Gender Sensitization | 3 |
| Semester-4  | Core Course |  |
| PBT-509 | Genomics for crop improvement | 2+1 | Total Credits 22 |
| Minor Course (only one) |
| PBT-526 | Proteomics and Metabolomics | 3 |
| PBT-527 | Plant Developmental Biology | 3 |
| Compulsory Course (Non-Credit) |
| PBT-550 | Course Seminar | 1 |
| PBT-560 | Thesis/Dissertation | 15 |
|  |  |

**Curricular Structure of the Programme**

**MASTER OF SCIENCE (Bioinformatics)**

|  |  |  |  |
| --- | --- | --- | --- |
| Course Code | Course Name | Credit |  |
| Semester – 1 | Core Course | Total Credits 18 |
| BI-501 | Molecular Biology | 2+1 |
| BI-502 | IT tools and applications | 2+1 |
| BI-503 | Basic Bioinformatics | 2+1 |
| Optional Course (Only One) |
| BI-510 | Problem Solving Through C | 2+1 |
| BI-511 | Structural Biology | 3 |
| Minor Course (Only one) |
| BI-520 | Cell Biology | 2+1 |
| BI-521 | Biochemistry | 2+1 |
| Ability Enhancement Compulsory Courses (AECC)AECC1 |
| BI-530 | Environmental Sustainability/ Swachh Bharat Abhiyan activities/ Biodiversity and its conservation | 3 |
| Semester – 2 | Core Course | Total Credits 15 |
| BI-504 | Introduction JAVA Programming | 2+1 |
| BI-505 | Introduction to Genomics and Proteomics | 2+1 |
| Optional Course (only one) |
| BI-512 | Probability and Information theory | 3 |
| BI-513 | Data structure and algorithms | 3 |
| Minor Course (only one)  |
| BI-522 | Biomathematics and Biostatistics  | 2+1 |
| BI-523 | Introduction R Programming | 3 |
| Ability Enhancement Courses (AEC): Skill enhancement course |
| BI-540 | Mushroom Culture/ Bio-fertilizer production/ Environmental Law/ Tourism and Hospitality management/ Life Skills and skill development/ Yoga studies | 3 |
| Semester-3 | Core Course | Total Credits 18 |
| BI-506 | Database Management | 2+1 |
| BI-507 | Perl programming for bioinformatics | 2+1 |
| BI-508 | Optimization, machine learning and artificial intelligence | 2+1 |
| Optional Course (only one) |
| BI-514 | Complex Algorithms in Bioinformatics | 2+1 |
| BI-515 | PYTHON programming for Bioinformatics  | 3 |
| Minor Course (only one) |
| BI-524 | Statistical Methods in Bioinformatics | 3 |  |
| BI-525 | Bio-safety and Scientific Communications | 3 |
| Ability Enhancement Compulsory Courses (AECC)AECC2 |
| BI-531 | Human Values and professional Ethics/Gender Sensitization  | 3 |
| Semester-4 | Core Course | Total Credits 06 |
| BI-509 | Molecular modeling and drug discovery | 2+1 |
| Minor Course (Only one) |
| BI-526 | Human Genetics and Genome Project | 3 |
| BI-527 | NGS data Analysis | 2+1 |
| Compulsory Course (Non-Credit) |
| BI-550 | Course Seminar | 0+1 |
| BI-560 | Thesis/Dissertation | 15 |

**Curricular Structure for Ph.D. programme**

|  |  |  |  |
| --- | --- | --- | --- |
| **Course Nature** | **Course Code** | **Core Courses** | **Credit** |
| ***(Compulsory Course)*** |
| **Compulsory Course** | BT 601 | Research Methodology | 4+0 |
| BT 602 | Research and Publication Ethics | 1+1 |
| BT 603 | Computer Fundamentals and IT | 1+1 |
| BT 604 | Seminar | 0+1 |
|  | **09 Credits** |
|  |
| **Elective Course (*Any two of the followings*)** |
| **Discipline-Specific Courses** | BT 605 | Omics for Crop improvement  | 3+0 |
| BT 606 | Medical Biotechnology | 3+0 |
| BT 607 | Microbial Biotechnology | 3+0 |
| BT 608 | Environmental Engineering | 3+0 |
| BT 609 | Bio-analytical Techniques | 3+0 |
| BT 610 | Computational Biology  | 3+0 |
|  | **06 Credits** |
|  |
| **Open Elective Course (*Any two of the followings*)** |
| **Research Theme- Specific Courses** | BT 611 | Stress Biology | 3+0 |
| BT 612 | Cancer Biology | 3+0 |
| BT 613 | Molecular Virology | 3+0 |
| BT 614 | Enzyme Engineering  | 3+0 |
| BT 615 | Structural Biology | 3+0 |
| BT 616 | Environmental Management  | 3+0 |
|  | **06 Credits** |
|  |  | Thesis | Non Credit |
|  |  | **Total** | **21 Credits** |