

Semester wise Titles of Papers in B.Sc. Biotechnology

| Certificate in Basic Biotechnology | | | | | | | | | | | | |
|---|-------------|------------|---------------------------|-----------------------|---|------------------------|---------------------------------------|--------------------------------|----------------------------|--------------|--|--|
| SEMESTER-I | | | | | | | | | | | | |
| | Year | Sem | | Course Code | Paper Title | L-T-P/ Week | Credits | Internal Assessment | University Exam | Total | | |
| | I | I | Major Core 1 | BIOT-111 | Cell Biology | 4-0-0 | 4 | 50 | 50 | 100 | | |
| | | | Major Core 1 Practical | BIOT-111P | Cell Biology Lab | 0-0-2 | 2 | 50 | 50 | 100 | | |
| | | | Major Core 2 | BIOT-112 | Genetics | 4-0-0 | 4 | 50 | 50 | 100 | | |
| | | | Major Core 3 | BIOT-113 | Introduction to Microbiology | 4-0-0 | 4 | 50 | 50 | 100 | | |
| | | | Major Core 3 Practical | BIOT-113P | Introduction to Microbiology Lab | 0-0-2 | 2 | 50 | 50 | 100 | | |
| Elective | | | Minor 1 | *CHEM-112 | Molecules Of Life (Chemical Science I) | 4-0-0 | 4 | 50 | 50 | 100 | | |
| | | | Minor 1 Practical | *CHEM-112P | Molecules Of Life (Chemical Science I) Lab | 0-0-2 | 2 | 50 | 50 | 100 | | |
| Vocational/ Skill Enhancement | | | Minor 2 | BIOT-114 | Industrial Fermentation | 3-0-0 | 3 | 50 | 50 | 100 | | |
| Co-Curricular/ Value Additional Course | | | Minor 3 | VAC-1 # Qualifying | Basic Communication Skills | 3-0-0 | 3 | 50 | 50 | 100 | | |
| | | | | | | | Total Credits (Semester I) | | 25 | | | |
| <p># Students have to pass Co-Curricular course with 40% marks.</p> <p>* CHEM-112 & CHEM-112P BOS was conducted by Chemistry Department on date 25.11.2022.</p> | | | | | | | | | | | | |

| | | SEMESTER-II | | | | | | | |
|---|------------|---------------------------|---|---|------------------------|----------------|--------------------------------|----------------------------|--------------|
| | Sem | | Course Code | Paper Title | L-T-P/ Week | Credits | Internal Assessment | University Exam | Total |
| | I | Major Core 1 | BIOT-121 | Molecular Biology | 4-0-0 | 4 | 50 | 50 | 100 |
| | | Major Core 1 Practical | BIOT-121P | Molecular Biology Lab | 0-0-2 | 2 | 50 | 50 | 100 |
| | | Major Core 2 | BIOT-122 | Animal Physiology | 4-0-0 | 4 | 50 | 50 | 100 |
| | | Major Core 2 Practical | BIOT-122P | Animal Physiology Lab | 0-0-2 | 2 | 50 | 50 | 100 |
| | | Major Core 3 | BIOT-123 | Plant Physiology | 4-0-0 | 4 | 50 | 50 | 100 |
| | | Major Core 3 Practical | BIOT-123P | Plant Physiology Lab | 0-0-2 | 2 | 50 | 50 | 100 |
| Vocational/ Skill Enhancement | | Minor 1 | BIOT-124B | Choose one from the list of Annexure III | 3-0-0 | 3 | 50 | 50 | 100 |
| Co-Curricular/ Value Additional Course | | Minor 2 | VAC-2 # Qualifying | Environmental Sciences | 3-0-0 | 3 | 50 | 50 | 100 |
| | | | | Total Credits (Semester II) | | | 21 | | |
| | | | Certificate in Basic Biotechnology Total Credits (Semester I+II) | | | 46 | | | |

Students have to pass Co-Curricular course with 40% marks.

Exit Option with “Undergraduate Certificate” (Certificate in Basic Biotechnology) after the first year or two Semesters with the completion of course equivalent to minimum 40 credits. Along with entry option to third semester after exit

Diploma in Biotechnology

SEMESTER-III

| | Year | Sem. | | Course Code | Paper Title | L-T-P/ Week | Credits | Internal Assessment | University Exam | Total | |
|--|------|------|--|------------------------------|--|----------------|---|------------------------|--------------------|-------|--|
| | II | III | Major Core 1 | BIOT-231 | Bioprocess Technology | 4-0-0 | 4 | 50 | 50 | 100 | |
| | | | Major Core 1 Practical | BIOT-231P | Bioprocess Technology Lab | 0-0-2 | 2 | 50 | 50 | 100 | |
| | | | Major Core 2 | BIOT-232 | Biochemistry | 4-0-0 | 4 | 50 | 50 | 100 | |
| | | | Major Core 2 Practical | BIOT-232P | Biochemistry Lab | 0-0-2 | 2 | 50 | 50 | 100 | |
| | | | Major Core 3 | CHEM-232 | General Analytical Techniques | 4-0-0 | 4 | 50 | 50 | 100 | |
| | | | Major Core 3 Practical | CHEM-232P | General Analytical Techniques Lab | 0-0-2 | 2 | 50 | 50 | 100 | |
| Vocational/ Skill Enhancement | | | Minor 1 | BIOT-233B | Public Health & Hygiene | 3-0-0 | 3 | 50 | 50 | 100 | |
| Co-Curricular/ Value Additional Course | | | Minor 2 | VAC-3A/VAC-3B *Qualifying | Management Paradigm From Bhagwat Gita/ Disaster Management | 3-0-0 | 3 | 50 | 50 | 100 | |
| | | | | | | | Total Credits (Semester III) | 21 | | | |
| | | | <p>*Students have to pass Co-Curricular course with 40% marks.</p> <p>* CHEM-232 & CHEM-232P BOS was conducted by Chemistry Department on date 25.11.2022.</p> | | | | | | | | |

| SEMESTER-IV | | | | | | | | | | | |
|---|----|-------------|--|--|---|----------------|--------------------------------|----------------------------|--------------|-----|--|
| | | Sem. | Course Code | Paper Title | L-T-P/ Week | Credits | Internal Assessment | University Exam | Total | | |
| | II | IV | Major Core 1 | BIOT-241 | Recombinant DNA Technology | 4-0-0 | 4 | 50 | 50 | 100 | |
| | | | Major Core 1 Practical | BIOT-241P | Recombinant DNA Technology Lab | 0-0-2 | 2 | 50 | 50 | 100 | |
| | | | Major Core 2 | BIOT-242 | Industrial Microbiology | 6-0-0 | 6 | 50 | 50 | 100 | |
| | | | Major Core 3 | BIOT-243 | Biostats & Bioinformatics | 4-0-0 | 4 | 50 | 50 | 100 | |
| | | | Major Core 3 Practical | BIOT-243P | Biostats & Bioinformatics Lab | 0-0-2 | 2 | 50 | 50 | 100 | |
| Elective | | | Minor 1 | | (Choose One from list of Elective for IV Semester Annexure II) | 4-0-0 | 4 | 50 | 50 | 100 | |
| Vocational/ Skill Enhancement | | | Minor 2 | BIOT-245A | Molecular Diagnostics | 3-0-0 | 3 | 50 | 50 | 100 | |
| Co-Curricular/ Value Additional Course | | | Minor 3 | VAC 4A/VAC-4B/ VAC-4C # Qualifying | Vedic Studies/ Vedic Mathematics/ Bioentrpreneurship | 3-0-0 | 3 | 50 | 50 | 100 | |
| | | | | | Total Credits (Semester IV) | | | 25 | | | |
| | | | | | Total Credits (Semester III + IV) | | | 46 | | | |
| | | | Total Credits (I , II , III and IV Semester) | | | 92 | | | | | |
| Diploma in Biotechnology | | | | | | | | | | | |

Students have to pass Co-Curricular course with 40% marks.

Exit Option with “Undergraduate Diploma” (Diploma in Biotechnology) after the Two years or four Semesters with the completion of course equivalent to minimum 80 credits. Along with entry option to fifth semester after exit.

Degree in Bachelor of Science (Biotechnology)

SEMESTER-V

| | Year | Sem. | | Course Code | Paper Title | L-T-P/ Week | Credits | Internal Assessment | University Exam | Total | | |
|---|------------|----------|---|--|---|-----------------------------------|---------|------------------------|--------------------|-------|--|--|
| | III | V | Major Core 1 | BIOT-351 | Immunology | 4-0-0 | 4 | 50 | 50 | 100 | | |
| | | | Major Core 1 Practical | BIOT-351P | Immunology Lab | 0-0-2 | 2 | 50 | 50 | 100 | | |
| | | | Major Core 2 | BIOT-352 | Animal Biotechnology | 5-0-0 | 5 | 50 | 50 | 100 | | |
| | | | Major Core 3 | BIOT-353 | Environmental Biotechnology | 4-0-0 | 4 | 50 | 50 | 100 | | |
| | | | Major Core 3 Practical | BIOT-353P | Environmental Biotechnology Lab | 0-0-2 | 2 | 50 | 50 | 100 | | |
| | | | Major Core 4 | BIOT-354 | Molecular Cancer Biology | 5-0-0 | 5 | 50 | 50 | 100 | | |
| Co-Curricular/ Value Additional Course | | | Minor 1 | VAC-5A/ VAC5B/ VAC-5C # Qualifying | Meditation/ Personality Development through Applied Philosophy of Ramcharitra Manas/ Ecology | 3-0-0 | 3 | 50 | 50 | 100 | | |
| | | | Minor 2 | BIOT-355 (Qualifying) | Seminar Presentation | 0-0-2 | 2 | 50 | | 50 | | |
| Inter/Intra related to main faculty | | | Major Core 5 | BIOT-356 (Qualifying) | Industrial Training/ Survey/Research /Project | 0-0-3 | 3 | 50 | 50 | 100 | | |
| | | | | | | Total Credits (Semester V) | | | 22 | | | |
| | | | # Students have to pass Co-Curricular course with 40% marks. | | | | | | | | | |

| | | SEMESTER-VI | | | | | | | | |
|---|------------|---|----------------------------|------------------------------------|--|------------------------|----------------|--------------------------------|----------------------------|--------------|
| | III | VI | Sem. | Course Code | Paper Title | L-T-P/ Week | Credits | Internal Assessment | University Exam | Total |
| | | | Major Core 1 | BIOT-361 | Plant Biotechnology | 4-0-0 | 4 | 50 | 50 | 100 |
| | | | Major Core 2 | BIOT-362 | Bio Analytical Tools | 4-0-0 | 4 | 50 | 50 | 100 |
| | | | Major Core 3 | BIOT-363 | Microbial Genetics | 5-0-0 | 5 | 50 | 50 | 100 |
| | | | Major Core 4 | BIOT-364 | Biotechnology and Human Welfare | 5-0-0 | 5 | 50 | 50 | 100 |
| | | | Major Core Practical | BIOT-365 | Lab Course based on (BIOT-361+BIOT-362) | 0-0-4 | 4 | 50 | 50 | 100 |
| Co-Curricular/ Value Additional Course | | | Minor 1 | VAC-6 # Qualifying | Essence of Indian traditional knowledge/ Vivekanand Studies | 3-0-0 | 3 | 50 | 50 | 100 |
| Inter/Intra related to main faculty | | | Major Core 5 | BIOT-365 (Qualifying) | Industrial Training/ Survey/ Research/Project | 0-0-3 | 3 | 50 | 50 | 100 |
| | | | | Total Credits (Semester VI) | | | | | 22 | |
| | | Total Credits (Semester V +VI) | | | | | 44 | | | |
| | | Bachelor of science in Biotechnology Total Credits | | | | | 136 | | | |

Students have to pass Co-Curricular course with 40% marks.

Exit Option with “Bachelor degree” (Bachelor of science) after the three years or Six Semesters with the completion of course equivalent to minimum 120 credits. Along with entry option to fourth year or seventh semester for those students meeting a minimum CGPA of 7.5 in Bachelor’s Degree Examination (BDE).

Degree in Bachelor of Science (Biotechnology) with Research

SEMESTER-VII

| | Year | Sem | | Course Code | Paper Title | L-T-P/Week | Credits | Internal Assessment | University Exam | Total |
|-------------------------------------|------|-----|-------------------------------------|-------------|---|------------|---------|---------------------|-----------------|-------|
| | IV | VII | Major Core 1 | BIOT-471 | Genomics & Proteomics | 4-0-0 | 4 | 50 | 50 | 100 |
| | | | Major Core 2 | BIOT-472 | Advances in Genetic Engineering | 4-0-0 | 4 | 50 | 50 | 100 |
| | | | Major Core 2 Practical | BIOT-473 | Lab Course Based on (BIOT-471+BIOT-472) | 0-0-4 | 4 | 50 | 50 | 100 |
| | | | Major Core 3 | BIOT-474 | Research Design and Methodology | 5-0-0 | 5 | 50 | 50 | 100 |
| | | | Major Core 4 | BIOT-475 | Intellectual Property Rights (IPR) | 5-0-0 | 5 | 50 | 50 | 100 |
| Inter/Intra related to main faculty | | | Major Core 5 | BIOT-476 | Project-1 | 0-0-4 | 4 | 50 | 50 | 100 |
| | | | Total Credits (Semester VII) | | | | | | 26 | |

| SEMESTER-VIII | | | | | | | | | | | | |
|--|-------------|-----------|--|-------------|--------------------|--------------------|---|----------------|--------------------------------|-----------------------------|--------------|-----|
| | Dddd | IV | Sem | VIII | Course Code | Paper Title | L-T-P/ Week | Credits | Internal Assessment | Universit y Exam | Total | |
| | | | | | Major Core 1 | BIOT-481 | Enzymology | 5-0-0 | 5 | 50 | 50 | 100 |
| | | | | | Major Core 2 | BIOT-482 | Nanotechnology & Drug Designing | 5-0-0 | 5 | 50 | 50 | 100 |
| | | | | | Major Core 3 | BIOT-483 | Research Publication & Ethics | 5-0-0 | 5 | 50 | 50 | 100 |
| | | | | | Major Core 4 | BIOT-484 | Virology | 5-0-0 | 5 | 50 | 50 | 100 |
| Elective | | | | | Minor 1 | | (Choose One from list of Elective for VIII Semester) | 4-0-0 | 4 | 50 | 50 | 100 |
| Inter/Intra related to main faculty | | | | | Major Core 5 | BIOT-486 | Project-2 | | 4 | 50 | 50 | 100 |
| | | | | | | | Total Credits (Semester VIII) | | | 28 | | |
| | | | Total Credits (Semester VII +VIII) | | | 54 | | | | | | |
| | | | Bachelor of Science Biotechnology With Research | | | 190 | | | | | | |

*Award of **Bachelor's Degree (Honor/Research)** or **Bachelor of Science with Research** after the four years or eight semesters with the completion of the course equivalent to minimum 160 credits*

Annexure I

List of Major Core Courses

| S. No. | Semester | Course Name | Course Code |
|--------|--------------|---------------------------------|-------------|
| 1 | Semester I | Cell Biology | BIOT-111 |
| | | Genetics | BIOT-112 |
| 2 | | Introduction to Microbiology | BIOT-113 |
| 4 | Semester II | Molecular Biology | BIOT-121 |
| 5 | | Animal Physiology | BIOT-122 |
| 6 | | Plant Physiology | BIOT-123 |
| 7 | Semester III | Bioprocess Technology | BIOT-231 |
| 8 | | Biochemistry | BIOT-232 |
| 9 | | General Analytical Techniques | CHEM-232 |
| 10 | Semester IV | Recombinant DNA Technology | BIOT-241 |
| 11 | | Industrial Microbiology | BIOT-242 |
| | | Biostats & Bioinformatics | BIOT-243 |
| 12 | Semester V | Immunology | BIOT-351 |
| 13 | | Animal Biotechnology | BIOT-352 |
| 14 | | Environmental Biotechnology | BIOT-353 |
| 15 | | Molecular Cancer Biology | BIOT-354 |
| 16 | Semester VI | Plant Biotechnology | BIOT-361 |
| 17 | | Bio-Analytical Tools | BIOT-362 |
| 18 | | Microbial Genetics | BIOT-363 |
| 19 | | Biotechnology and Human Welfare | BIOT-364 |

| | | | |
|----|---------------|------------------------------------|----------|
| | | | |
| 20 | Semester VII | Genomics & Proteomics | BIOT-471 |
| 21 | | Advances in Genetic Engineering | BIOT-472 |
| 22 | | Research Design and Methodology | BIOT-474 |
| 23 | | Intellectual Property rights (IPR) | BIOT-475 |
| | | Project-I | BIOT-476 |
| 24 | Semester VIII | Enzymology | BIOT-481 |
| 25 | | Nanotechnology & Drug Designing | BIOT-482 |
| 26 | | Research Publication & Ethics | BIOT-483 |
| 27 | | Virology | BIOT-484 |
| 28 | | Project-II | BIOT-486 |

Annexure II

| List of Elective (Minor) | | | |
|---------------------------------|-----------------|---|---------------------------------------|
| S. No. | Semester | Course Name | Course Code |
| 1 | Semester I | Molecules of life | Chem-112 |
| | | Food Microbiology | BIOT-115 |
| 2 | Semester IV | Food Biotechnology | BIOT-244A |
| | | Industrial Biotechnology | BIOT-244B |
| | | Food Microbiology | BIOT-244C |
| | | Economic Botany | BIOT-244D |
| | | Mycology and Phytopathology | BIOT-244E |
| | | * Electromagnetic Spectrum: UV, IR and NMR | CHEM-07 |
| | | Developmental Biology | BIOT-244E |
| 3 | Semester VIII | Medicinal Botany/ Online/SWAYAM/MOOC Course/ Basics of Forensic Science | BIOT-485A/ BIOT-485B/ BIOT-485C |

* CHEM-07 & CHEM-07P BOS was conducted by Chemistry Department on date 25.11.2022.

Annexure III

| List of Vocational/Skill Enhancement Course (Minor) | | | |
|--|-----------------|---|--------------------|
| S. No. | Semester | Course Name | Course Code |
| 1 | Semester I | Industrial Fermentation | BIOT-114 |
| | | Mushroom Cultivation | BOTN-05 |
| 2 | Semester II | Biochemical Engineering | BIOT-124A |
| | | Biofertilizers | BIOT-124B |
| | | Food Nutrition & Health | BIOT-124C |
| | | Cytology, Genetics and Infectious Diseases | BIOT-124D |
| 3 | Semester III | Herbal Medicine | BIOT-233A |
| | | Public Health & Hygiene | BIOT-233B |
| | | Food Process Technology and Food Microbiology | BIOT-233C |
| 4 | Semester IV | Molecular Diagnostic | BIOT-245A |
| | | Computer Application and Bioinformatics | BIOT-245B |

Annexure IV

| List of Co-Curricular Course/Value additional Courses (Minor) | | | |
|--|-----------------|---|--------------------|
| S. No. | Semester | Course Name | Course Code |
| 1 | Semester I | Basic Communication Skills | VAC -1 |
| 2 | Semester II | Environmental Sciences | VAC-2 |
| 3 | Semester III | Management Paradigm from Bhagvat Geeta | VAC-3A |
| | | Disaster Management | VAC-3B |
| 4 | Semester IV | Vedic Studies | VAC-4A |
| | | Vedic Mathematics | VAC-4B |
| | | Bioentrpneurship | VAC-4C |
| 5 | Semester V | Meditation | VAC-5A |
| | | Personality Development through Applied Philosophy of Ramcharitra Manas | VAC-5B |
| | | Ecology | VAC-5C |
| 6 | Semester VI | Essence of Indian Traditional Knowledge | VAC-6A |
| | | Vivekanand Studies | VAC-6B |