

**BHARATI VIDYAPEETH DEEMED TO BE UNIVERSITY**

**PUNE**

**REVISED SYLLABUS FOR  
MASTER OF SCIENCE IN BIOTECHNOLOGY**

**UNDER  
FACULTY OF SCIENCE**



**SYLLABUS OF SEM I – SEM IV  
AS PER NEP 2020  
(CHOICE BASED CREDIT SYSTEM)  
From Academic Year  
2023-24**

**Course structure of M.Sc. Degree Course in Biotechnology**

**Under Choice Based Credit System- 2023 as Per NEP 2020**

**SEMESTER I**

<b>Course No. &amp; Description</b>	<b>Title</b>	<b>Credits</b>	<b>IA</b>	<b>Univ. Exam</b>	<b>Total Credits</b>
<b>MBT-23-101</b> Core Course-Theory	Biochemistry	2	50	50	<b>20</b>
<b>MBT-23-102</b> Core Course –Theory	Cell & Developmental Biology	2	50	50	
<b>MBT-23-103</b> Core Course –Theory	Concepts in Molecular Biology	2	50	50	
<b>MBT-23-104</b> Core Course –Theory	Microbiology	2	50	50	
<b>MBT-23-105</b> Core Course –Theory	Research Methodology I	2	50	50	
<b>MBT-23-106</b> Core Course –Theory	Research Methodology II	2	50	50	
<b>MBT-23-107</b> Core Course –Practical	Biochemistry Lab	1	25	25	
<b>MBT-23-108</b> Core Course –Practical	Cell and Developmental Biology Lab	1	25	25	
<b>MBT-23-109</b> Core Course –Practical	Microbiology Lab	1	25	25	
<b>MBT-23-110</b> Core Course –Practical	Molecular Biology Lab	1	25	25	
<b>MBT-23-111</b> Elective - I	Elective (Select any1)	2	100	Continuous Assessment	
<b>MBT-23-112</b> Elective - II	Elective (Select any1)	2	100	Continuous Assessment	

**Elective Courses**

<b>EC I</b>	<b>EC II</b>
Nano Biotechnology	Mathematics for Biologists
Structural Biology and Biophysics	Data Structure and Algorithms
MongoDB	Perl Programming

**\*Additional credit/swill be awarded to the student who will successfully complete SWAYAM NPTEL Course and receive the certificate.**

## SEMESTER II

Course No. & Description	Title	Credits	IA	Univ. Exam	Total Credits
<b>MBT-23- 201</b> Core Course –Theory	Analytical Biotechnology	2	50	50	<b>22</b>
<b>MBT-23- 202</b> Core Course –Theory	Animal Cell Culture	2	50	50	
<b>MBT-23- 203</b> Core Course –Theory	Gene Manipulation Techniques	2	50	50	
<b>MBT-23- 204</b> Core Course –Theory	Immunology	2	50	50	
<b>MBT-23- 205</b> Core Course - Theory	Cyto-Genetics	2	50	50	
<b>MBT-23- 206</b> Core Course –Practical	Analytical Biotechnology Lab	1	25	25	
<b>MBT-23- 207</b> Core Course –Practical	ATC and Cyto-Genetics Lab	1	25	25	
<b>MBT-23- 208</b> Core Course –Practical	Genetic Engineering Lab	1	25	25	
<b>MBT-23-209</b> Core Course - Practical	Immunology Lab	1	25	25	
<b>MBT-23- 210</b> Elective - III	Elective Course (Select any1)	2	100	Continuous Assessment	
<b>MBT-23- 211</b> Elective -IV	Elective Course (Select any1)	2	100	Continuous Assessment	
<b>MBT-23- 212</b>	on-job training/ internship	4	100	Continuous Assessment	

### Elective Course:

EC III	EC IV
Molecular Diagnostics	IPR and Bioethics
Basic JAVA	Regenerative Biology
Web Designing	JAVA Script and Angular Programming

**\*Additional credit/s will be awarded to the student who will successfully complete SWAYAM NPTEL Course and receive the certificate.**

**Students may exit after completion of two semesters and will be awarded PG diploma (40 – 44 Credit after 3 year UG Course)**

**Student must complete on-the-job training/ internship of 4 credit during summer break**

### SEMESTER III

Course No. & Description	Title	Credits	IA	Univ. Exam	Total Credits
<b>MBT-23- 301</b> Core Course-Theory	Agribiotechnology	2	50	50	<b>20</b>
<b>MBT-23- 302</b> Core Course –Theory	Bioprocess Technology	2	50	50	
<b>MBT-23- 303</b> Core Course –Theory	Environment Biotech	2	50	50	
<b>MBT-23- 304</b> Core Course –Theory	Genomics & Proteomics	2	50	50	
<b>MBT-23- 305</b> Core Course –Theory	Enzyme Technology	2	50	50	
<b>MBT-23-306</b> Core Course –Practical	Agribiotechnology Lab	1	25	25	
<b>MBT-23- 307</b> Core Course –Practical	Bioprocess and Enzyme Technology Lab	1	25	25	
<b>MBT-23-308</b> Core Course –Practical	Genomics & Proteomics lab	1	25	25	
<b>MBT-23-309</b> Core Course –Practical	Environment Biotechnology lab	1	25	25	
<b>MBT-23- 310</b> Elective -V	Elective (Select any1)	2	100	Continuous assessment	
<b>MBT-23- 311</b> Elective -VI	Elective (Select any1)	2	100	Continuous assessment	
<b>MBT-23- 312</b> Core Course-Project	Research Project I	4	100	Continuous assessment	

#### Elective Course

EC-V	EC-VI
Machine Learning	Immunogenetics
Sequence Data Analysis	Introduction to Artificial intelligence

**\*Additional credit/s will be awarded to the student who will successfully complete SWAYAM NPTEL Course and receive the certificate**

## SEMESTER IV

<b>Course No. &amp; Description</b>	<b>Title</b>	<b>Credits</b>	<b>IA</b>	<b>Univ. Exam</b>	<b>Total Credits</b>
<b>MBT-23- 401</b> Core Course –Theory	Vaccine Technology	2	100	Continuous Assessment	<b>20</b>
<b>MBT-23- 402</b> Core Course –Theory	Drug Designing and Development	2	100	Continuous Assessment	
<b>MBT-23- 403</b> Core Course –Theory	Clinical Trials and Data Management	2	100	Continuous Assessment	
<b>MBT-23- 404</b> Core Course –Theory	Quality assurance and Quality control in Biotechnology	2	100	Continuous Assessment	
<b>MBT-23- 405</b> Elective-VII	Selective Any One	2	100	Continuous Assessment	
<b>MBT-23- 406</b> Core Course –Project	<b>Research Project II</b>	10	50	50	

<b>Elective-VII</b>
Microbiome data analysis
Toxicology
Power BI