

**BHARATI VIDYAPEETH DEEMED TO BE UNIVERSITY**

**PUNE**

**REVISED SYLLABUS FOR**

**MASTER OF SCIENCE**

**M.Sc. IN BIOINFORMATICS**

**UNDER**

**FACULTY OF INTERDISCIPLINARY STUDIES**



**SYLLABUS OF SEM I – SEM IV**

**AS PER NEP 2020**

**(CHOICE BASED CREDIT SYSTEM)**

**From Academic Year**

**2023-24**

## SEMESTER I

Course No. & Description	Title	Credits	IA	Univ. Exam	Total Credits
<b>MBI-23-101</b> Core Course-Theory	Fundamentals of Bioinformatics and Computational Biology	2	50	50	<b>22</b>
<b>MBI-23-102</b> Core Course –Theory	Biomathematics	2	50	50	
<b>MBI-23-103</b> Core Course –Theory	Statistical Analysis System (SAS)	2	50	50	
<b>MBI-23-104</b> Core Course –Theory	DBMS	2	50	50	
<b>MBI-23-105</b> Core Course –Theory	C Programming	2	50	50	
<b>MBI-23-106</b> Core Course –Theory	Research Methodology 1	2	50	50	
<b>MBI-23-107</b> Core Course –Theory	Research Methodology 2	2	50	50	
<b>MBI-23-108</b> Core Course –Practical	Fundamentals of Bioinformatics and Computational Biology Lab	1	25	25	
<b>MBI-23-109</b> Core Course –Practical	Statistical Analysis System (SAS) Lab	1	25	25	
<b>MBI-23-110</b> Core Course –Practical	DBMS Lab	1	25	25	
<b>MBI-23-111</b> Core Course –Practical	C Programming Lab	1	25	25	
<b>MBI-23-112</b> <b>EC I</b>	Elective (Select any1)	2	100	Continuous Assessment	
<b>MBI-23-113</b> <b>EC II</b>	Elective (Select any1)	2	100		

### Elective Course

EC I	EC II
Structural Biology and Biophysics	Data Structure and Algorithms
MongoDb	PERL Programming
NanoBiotechnology	Concepts in Molecular Biology

**\*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>MBI-23- 201</b> Core Course –Theory	Fundamentals of Omics	2	50	50	<b>22</b>
<b>MBI-23- 202</b> Core Course –Theory	R Programming	2	50	50	
<b>MBI-23- 203</b> Core Course –Theory	Basic JAVA Programming	2	50	50	
<b>MBI-23- 204</b> Core Course –Theory	Omics data Visualization and analysis	2	50	50	
<b>MBI-23- 205</b> Core Course – Theory	Molecular Modeling	2	50	50	
<b>MBI-23- 206</b> Core Course –Practical	R Programming Lab	1	25	25	
<b>MBI-23- 207</b> Core Course –Practical	Basic JAVA Programming Lab	1	25	25	
<b>MBI-23- 208</b> Core Course –Practical	Omics Lab	1	25	25	
<b>MBI-23-209</b> Core Course – Practical	Molecular Modeling Lab	1	25	25	
<b>MBI-23- 210</b> <b>EC III</b>	Elective Course (Select any1)	2	100	Continuous Assessment	
<b>MBI-23- 211</b> <b>EC IV</b>	Elective Course (Select any1)	2	100		
<b>MBI-23- 212</b>	<b>On-the-job training/ internship</b>	4	100		

**Elective Course:**

EC III	EC IV
Advanced JAVA	JAVA script and Angular Programming
Web Designing	IPR and Bioethics
Molecular Diagnostics	Regenerative Biology

**\*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>MBI-23- 301</b> Core Course–Theory	Python Programming	2	50	50	22
<b>MBI-23- 302</b> Core Course –Theory	Chemoinformatics	2	50	50	
<b>MBI-23- 303</b> Core Course –Theory	Machine Learning Techniques	2	50	50	
<b>MBI-23- 304</b> Core Course –Theory	Sequencing Data Analysis	2	50	50	
<b>MBI-23- 305</b> Core Course –Theory	Computer Aided Drug Design	2	50	50	
<b>MBI-23-306</b> Core Course –Practical	Python Programming Lab	1	25	25	
<b>MBI-23- 307</b> Core Course –Practical	Chemoinformatics and CADLab	1	25	25	
<b>MBI-23-308</b> Core Course –Practical	Machine Learning TechniquesLab	1	25	25	
<b>MBI-23-309</b> Core Course –Practical	Sequencing Data Analysis Lab	1	25	25	
<b>MBI-23- 310</b> <b>EC-V</b>	Elective (Select any1)	2	100	Continuous assessment	
<b>MBI-23- 311</b> <b>EC-VI</b>	Elective (Select any1)	2	100		
<b>MBI-23- 312</b>	<b>Research Project I</b>	4	100		

#### Elective Course

EC-V	EC-VI
Enzyme Technology	Introduction to Artificial Intelligence
Environmental Biotechnology	Cloud Computing & AWS

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### SEMESTER IV

Course No. & Description	Title	Credits	IA	Univ. Exam	Total Credits
<b>MBI-23- 401</b> Core Course –Theory	Digital Image processing	2	100	<b>Continuous assessment</b>	<b>20</b>
<b>MBI-23- 402</b> Core Course –Theory	Health Informatics	2	100		
<b>MBI-23- 403</b> Core Course –Theory	Cancer Genomics	2	100		
<b>MBI-23- 404</b> Core Course –Theory	Introduction to Clinical Trials and Pharmacovigilance	2	100		
<b>MBI-23- 405</b> <b>Elective-VII</b>	Select Any One	2	100		
<b>MBI-23- 406</b>	<b>Research Project II</b>	<b>10</b>	<b>50</b>	<b>50</b>	

#### Elective Course

<b>EC-VII</b>
Microbiome Data Analysis
Power BI
Herbal Biotechnology