

Maulana Azad

NATIONAL INSTITUTE OF TECHNOLOGY, Bhopal-462003

DEPARTMENT OF MATHEMATICS, BIOINFORMATICS & COMPUTER APPLICATIONS

M. Tech. in *Computational & Systems Biology*

SCHEME OF STUDY (Revised April 2020)



**First Semester**

Course No.	Subject	Scheme of Studies Periods per week			Total Credits
		L	T	P	
MTH101 CSB	Numerical Methods	3	1	-	4
CSB102	Foundations of Computational & Systems Biology	3	1	-	4
CSB 103	Applied Bioinformatics	3	1	-	4
CSB 104	Mathematical & Computational Biology	3	1	-	4
	Elective 1(A)	3	1	-	4
	Elective 2(B)	3	1	-	4
CSB 104	Lab Practice-I	-	-	2	1
CSB 105	Seminar-I	-	-	2	1
CSB 106	Computational skills NPTEL/MOOC	2	-	-	2
<b>Total Hours 30</b>		<b>Total Credits</b>			<b>28</b>
<b>Total Credits (Cumulative) 28</b>					

**Second Semester**

Course No.	Subject	Scheme of Studies Periods per week			Total Credits
		L	T	P	
CSB 201	Mathematical Modeling & Simulation of Biological Systems	3	1	-	4
CSB 202	Optimization methods	3	1	-	4
CSB 203	Data Warehousing & Data Mining	3	1	-	4
	ELECTIVE 3(A)	3	1	-	4
	ELECTIVE 4(A)	3	1	-	4
	ELECTIVE 5(C)	3	1	-	4
CSB 204	Lab –II	-	-	2	1
CSB 205	Seminar-II	-	-	2	1
CSB 206	Research Methodology, Technical Report and Paper Writing	2	-	-	2
<b>Total Hours 30</b>		<b>Total Credits</b>			<b>28</b>
<b>Total Credits (Cumulative) 56</b>					

**Third Semester**

Course No.	Subject	Scheme of Studies Periods per week			Total Credits
		L	T	P	
CSB301	Dissertation Phase-I	-	-	24	12
<b>Total Hours 24</b>		<b>Total Credits</b>			<b>12</b>
<b>Total Credits (Cumulative) 68</b>					

**Fourth Semester**

Course No.	Subject	Scheme of Studies Periods per week			Total Credits
		L	T	P	
CSB401	Dissertation Phase-II	-	-	24	12
<b>Total Hours 24</b>		<b>Total Credits</b>			<b>12</b>
<b>Total Credits (Cumulative) 80</b>					

## **List of Electives**

### **Group A Program Electives**

- CSB 501 Statistical Methods
- CSB 502 Dynamic Systems with Application to Biology & Medicine.
- CSB 503 Omic Data & Quantitative Systems Biology
- CSB 504 Bio Python
- CSB 505 Biological Data Analytics and Data Science
- CSB 506 Computational Cell Biology
- CSB 507 Pattern Recognition & Machine Learning
- CSB 508 Petri Net Models in Biology
- CSB 509 Computational Models in Agriculture
- CSB 510 Computational Thermal Biology
- CSB 511 Computational Epidemiology
- CSB 512 Computational Exposomics
- CSB 513 Computational Metagenomics
- CSB 514 Computational Ecology
- CSB 515 Cognitive Science

### **Group B Department Electives (for other programs of same department only)**

- CSB 601 Chemoinformatics& Drug Design
- CSB 602 Machine Learning Techniques in Bioinformatics
- CSB 603 Network Biology
- CSB 604 Reactome and Interactome informatics
- CSB 605 Biological Data Science

### **Group C Institute Electives (for other departments only)**

- CSB 701 Statistical Methods
- CSB 702 Dynamic Systems with Application to Biology & Medicine.
- CSB 703 Omic Data & Quantitative Systems Biology
- CSB 704 Bio Python
- CSB 705 Biological Data Analytics and Data Science
- CSB 706 Computational Cell Biology
- CSB 707 Pattern Recognition & Machine Learning
- CSB 708 Petri Net Models in Biology
- CSB 709 Computational Models in Agriculture
- CSB 710 Computational Thermal Biology
- CSB 711 Computational Epidemiology
- CSB 712 Computational Exposomics
- CSB 713 Computational Metagenomics
- CSB 714 Computational Ecology
- CSB 715 Cognitive Science
- CSB 716 Chemoinformatics& Drug Design
- CSB 717 Machine Learning Techniques in Bioinformatics
- CSB 718 Network Biology
- CSB 719 Reactome and Interactome informatics
- CSB 719 Biological Data Science