BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI

COURSE STRUCTURE

M.Sc. Bioinformatics & Computational Biology

Based on CBCS & OBE model (NEP2020)

Semester / Session	Course Level	Course Category	Course Code	Course Name	Mode of Delivery and Credits (Period/Week)			
					Lecture	Tutorial	Practical	Credits
Semester - I								
FIRST / Monsoon	FOURTH LEVEL	**THEORY**						
		Program Core	BI101	Cell and Molecular Biology	3	0	0	3
			BI102	Biological Databases and MySQL	3	0	0	3
			BI103	Mathematics and Statistics for Biologist	3	0	0	3
			CA405	Data Structures and Algorithms	3	0	0	3
		Program Elective		PE Subject 1	3	0	0	3
		LABORATORY - I						
		Laboratory	BI104	Cell & Molecular Biology Lab	0	0	3	1.5
			BI105	Biocomputing with Python, PERL & MySQL Lab	0	0	3	1.5
			CA406	Data Structures and Algorithms Lab	0	0	3	1.5
				PE Lab 1	0	0	3	1.5
		NEP Course	MT132	Communication Skills -1	0	0	3	1.5
					Total Semester Credits			**22.5**
Semester - II								
SECOND/ Spring	FOURTH LEVEL	**THEORY**						
			BI201	Biological Sequence Analysis & Algorithms	3	0	0	3
		Program Core	BI202	Computational Structural Biology	3	0	0	3
			BI203	Artificial Intelligence & Machine Learning	3	0	0	3
			BI204	Data Analytics using R	3	1	0	4
		Program Elective		PE Subject 2	3	0	0	3
		Open Elective		OE Subject 1	3	0	0	3
		LABORATORY - II						
		Laboratory	BI205	BioSequence & Structure Analysis Lab	0	0	3	1.5
			BI206	Data Science Lab	0	0	3	1.5
				PE Lab 2	0	0	3	1.5
		NEP Course	MT133	Communication Skills - 2	0	0	3	1.5
		NEP Course	NP202	Community Engagement	0	0	4	2
					Total Semester Credits			**27**
Semester - III								
THIRD/ Monsoon	FIFTH LEVEL	**THEORY**						
		Program Core	BI301	Proteomics, Metabolomics & Biomarker Design	3	0	0	3
			BI302	Cheminformatics and Drug Design	3	0	0	3
			BI303	NGS Data Analysis	3	0	0	3
			CA439	Image Processing	3	0	0	3
		Program Elective		PE Subject 3	3	0	0	3
		Open Elective		OE Subject 2	3	0	0	3
		LABORATORY - III						
		Laboratory	BI304	Cheminformatics and Drug Design Lab	0	0	3	1.5
			BI305	NGS data Analysis Lab	0	0	3	1.5
			BI306	Image Processing Lab	0	0	3	1.5
				PE Lab 3	0	0	3	1.5
			BI307	Mini Project - Dissertation Part-I	0	0	0	1.5
					Total Semester Credits			**25.5**
Semester - IV								
FOURTH/ Spring	FIFTH LEVEL	Research Project	BI401	Dissertation Part-II / Major Project	**Total Credits**			**8**
Grand Total Credits for M.Sc. Bioinformatics Course								**83**

PROGRAM ELECTIVES (PE) FOR M.Sc. LEVEL OFFERED FOR LEVEL 4 - 5

PE / LEVEL	Code no.	Name of the PE courses	Prerequisites/ Corequisites	L	T	P	C
Programme Elective -I							
PE/4 (MO)	BT415	Molecular Biology and rDNA Technology		3	0	0	3
PE/4 (MO)	BT420	Genomics & rDNA Technology Lab		0	0	3	1.5
PE/4 (MO)	BT403	Applied Microbiology		3	0	0	3
PE/4 (MO)	BT406	Microbiology Lab		0	0	3	1.5
PE/4 (MO)	CA409	Object Oriented Design using JAVA		3	0	0	3
PE/4 (MO)	CA410	Object Oriented Design using JAVA Lab		0	0	3	1.5
PE/4 (MO)	IT303	Internet and Web Technology		3	0	0	3
PE/4 (MO)	IT340	Internet and Web Technology Lab		0	0	3	1.5
Programme Elective -II							
PE/4 (SP)	BT407	Genomics		3	0	0	3
PE/4 (SP)	BT408	Genomics Lab		0	0	3	1.5
PE/4 (SP)	CA407	Database Design Concepts		3	0	0	3
PE/4 (SP)	CA408	Database Design Concepts Lab		0	0	3	1.5
PE/4 (SP)	BI207	Systems Biology & Biological Networks		3	0	0	3
PE/4 (SP)	BI208	Systems Biology & Biological Networks Lab		0	0	3	1.5
Programme Elective -III							
PE/5 (MO)	BI308	Medical Genomics		3	0	0	3
PE/5 (MO)	BI309	Medical Genomics Lab		0	0	3	1.5
PE/5 (MO)	BI310	Biocomputing with Perl & BioPerl		3	0	0	3
PE/5 (MO)	BI311	Biocomputing with Perl & BioPerl Lab		0	0	3	1.5
PE/5 (MO)	BI312	Immuno-Informatics and Vaccine Design		3	0	0	3
PE/5 (MO)	BI313	Immuno-Informatics and Vaccine Design Lab		0	0	3	1.5

OPEN ELECTIVES (OE)* FOR M.Sc. LEVEL OFFERED FOR LEVEL 4 - 5

OE / LEVEL	Code no.	Name of the OE courses	Prerequisites/ Corequisites	L	T	P	C
Open Electives - I (MO Session)							
OE/4 (MO)	BI102	Biological Database & MySQL	NIL	3	0	0	3
OE/4 (MO)	BT503	Biosafety, Bioethics and IPR	NIL	3	0	0	3
Open Electives - II (SP Session)							
OE/5 (SP)	BI310	Biocomputing with Perl & BioPerl	NIL	3	0	0	3
OE/5 (SP)	BT418	Analytical Techniques	NIL	3	0	0	3

*** OPEN ELECTIVES TO BE OPTED ONLY BY OTHER DEPARTMENT STUDENT**

NEP 2020 Exit Policy

Students who leave the course after one year, earning 49.5 credits will be awarded with **Post Graduate Diploma in Bioinformatics and Computational Biology**.