

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
NEWCOURSE STRUCTURE - To be effective from academic session 2018- 19
Based on CBCS system & OBE model
Recommended scheme of study
(For Integrated MSc. in Mathematics and Computing)

UG Program (1st - 6th Semester)									
Semester/ Session of Study (Recommended)	Level	Category of course	Course Code	Subjects	Mode of delivery & credits <i>L-Lecture; T-Tutorial;P-Practicals</i>			Total Credits <i>C- Credits</i>	
					L <i>(Period s/week)</i>	T <i>(Period s/week)</i>	P <i>(Periods /week)</i>	C	
THEORY									
FIRST Monsoon	1	PC Program Core	MA101	Calculus-I	3	1	0	4	
			MA102	Real Analysis	3	1	0	4	
			MA109	Matrix Theory	3	1	0	4	
		HSS Humanities & Social Sciences	MT123	Business Communications	2	0	2	3	
	FS Foundation Sciences	CH111	Chemistry –I	3	1	0	4		
LABORATORIES									
1	FS	CH112	Chemistry –I Lab	0	0	3	1.5		
	MC Mandatory Course	MC 101/102/103/104	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1		
TOTAL								21.5	
THEORY									
SECOND Spring	1	PC	MA105	Calculus-II	3	1	0	4	
			MA106	Ordinary Differential Equations	3	1	0	4	
			MA110	Complex Analysis	3	1	0	4	
		FS	CE101	Environmental Science	2	0	0	2	
	PH109		Physics I	3	1	0	4		
GE General Engineering	CS101	Programming for problem solving	3	1	0	4			
LABORATORIES									
1	FS	PH110	Physics I Lab	0	0	3	1.5		
	GE	CS102	Programming for problem solving	0	0	3	1.5		
	MC	MC 105/106/107/108	Choice of : NCC/NSS/ PT & Games / Creative Arts (CA)	0	0	2	1		
TOTAL								26	
GRAND TOTAL FOR FIRST YEAR								47.5	
THEORY									
THIRD Monsoon	2	PC	MA201	Partial Differential Equations	3	1	0	4	
			MA202	Modern Algebra	3	1	0	4	
			MA208	Integral Transforms and its Applications	3	1	0	4	
			CS201	Data Structure	3	1	0	4	
	1	FS	PH111	Physics –II	3	1	0	4	
	LABORATORIES								
	2	PC	CS202	Data Structure Lab	0	0	3	1.5	
1	FS	PH112	Physics –II Lab	0	0	3	1.5		
2	MC	MC 201/202/203/204	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1		
TOTAL								24	

FOURTH Spring	THEORY							
	2	PC	MA205	Discrete Mathematics	3	1	0	4
			MA206	Linear Algebra	3	1	0	4
			MA209	Integral Equations and Green's Function	3	1	0	4
			CS204	Object Oriented Programming and Design Pattern	3	0	0	3
		FS	CH213	Chemistry II	3	1	0	4
	LABORATORIES							
	2	PC	CS205	Object Oriented Programming and Design Pattern Lab	0	0	3	1.5
		FS	CH214	Chemistry II Lab	0	0	3	1.5
		MC	MC 205/206/207/208	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1
TOTAL							23	
FIFTH Monsoon	THEORY							
	3	PC	MA301	Probability and Statistics	3	1	0	4
			MA303	Fuzzy Logic	3	1	0	4
	2		CS 206	Design and Analysis of Algorithm	3	0	0	3
			CS 203	Computer System Architecture	3	1	0	4
	3	PE* Program Electives	Dept Codes	PE I ^A (Maths)	3	1	0	4
			Dept Codes	PE II ^B (Maths/CSE)	3	0	0	3
	LABORATORIES							
	3	PC	MA 302	Probability and Statistics Lab	0	0	3	1.5
	2		CS 207	Design and Analysis of Algorithm Lab	0	0	3	1.5
TOTAL							25	
SIXTH Spring	THEORY							
	3	PC	MA309	Optimization Techniques	3	1	0	4
			MA311	Numerical Techniques	3	1	0	4
			CS 301	Database Management System	3	0	0	3
			CS 303	Operating Systems	3	0	0	3
		PE*	Dept Codes	PE III ^C (Maths)	3	1	0	4
			Dept Codes	PE IV ^D (Maths/CSE)	3	0	0	3
	LABORATORIES							
	3	PC	MA 310	Optimization Techniques Lab	0	0	3	1.5
			MA 312	Numerical Techniques Lab	0	0	3	1.5
CS 302			Database Management System Lab.	0	0	3	1.5	
TOTAL							25.5	

*Course Code and Course Name of Program Electives will depend on the choice of the subjects from that group.

Internship (In-house/External) of at least 2 months should be done by the students (Non-credit) during 5th/6th semester.

Minimum requirement for Degree award of B. Sc. Honours in Mathematics and Computing (1st - 6th Semester)

145

PG Program (7th - 10th Semester)								
Semester/ Session of Study (Recommended)	Level	Category of course	Course Code	Subjects	Mode of delivery & credits L-Lecture; T-Tutorial;P-Practicals			Total Credits C- Credits
					L (Periods /week)	T (Periods /week)	P (Periods /week)	C
SEVENTH Monsoon	THEORY							
	4	PC	MA 401	Real Analysis and Measure Theory	3	1	0	4
			MA 402	Advanced Complex Analysis	3	1	0	4
	5		CA504	Automata Theory	3	1	0	4
			CA505	Software Engineering	3	1	0	4
	5	PE*	Dept Codes	PE V ^E (Maths)	3	0	0	3
			Dept Codes	PE VI ^F (Maths / CSE)	3	0	0	3
	5	OE* Open Electives		OE-I	3	0	0	3
			LABORATORIES					
	5	PC	CA506	Software Engineering Lab	0	0	3	1.5
TOTAL							26.5	
EIGHTH Spring	THEORY							
	4	PC	MA412	Topology	3	1	0	4
			MA413	Stochastic Processes and Simulation	3	0	0	3
			MA414	Advanced Operation Research	3	1	0	4
	4		MA417	Numerical Solutions of Boundary Value Problems	3	0	0	3
	4	PE*	Dept Codes	PE VII ^G (Maths / CSE)	3	0	0	3
		OE*		OE-II	3	0	0	3
	LABORATORIES							
4	PC	MA415	Advanced Operation Research Lab.	0	0	3	1.5	
TOTAL							21.5	
NINTH Monsoon	THEORY							
	5	PC	MA501	Functional Analysis	3	1	0	4
			MA502	Number Theory	3	1	0	4
	6		CA601	Computer Graphics	3	0	0	3
	5	PE*	Dept Codes	PE VIII ^H (Maths / CSE)	3	0	0	3
			Dept Codes	PE IX ^I (Maths / CSE)	3	0	0	3
	LABORATORIES							
	5		MA513	Computing Lab (MAT Lab)	0	0	3	1.5
	6		CA602	Computer Graphics Lab	0	0	3	1.5
2	MC	MT204	Constitution of India	2	0	0	0	
TOTAL							20	
TENTH Spring	5	RP Research Project / Industry Internship	MA509	Research Project / Industry Internship	0	0	0	12
Total							12	
Total credits of Integrated M.Sc. in Mathematics and Computing (7th - 10th Semester)							80	
Minimum requirement for Degree award of Integrated M. Sc. in Mathematics and Computing (1st - 10th Semester)							225	

DEPARTMENT OF MATHEMATICS
PROGRAMME ELECTIVES: PE
OFFERED FOR SEMESTER 5-9/ Level 3-5

PE / LEVEL		Prerequisites Subjects with code	Code no.	Name of the PE subjects	L	T	P	C
PE I ^A V Sem.	3	MA106, MA201	MA304	Tensor Analysis	3	1	0	4
		MA205	MA305	Graph Theory	3	1	0	4
		MA101, MA105	MA306	Special Functions	3	1	0	4
PE II ^B V Sem.	3	MA106, MA201	MA307	Computational Linear Algebra	3	0	0	3
		MA102, MA106, MA	MA308	Difference Equations	3	0	0	3
			CS322	Simulation and Modelling	3	0	0	3
			IT321	Bio Inspired Computing	3	0	0	3
PE III ^C VI Sem.	3	MA205	MA313	Combinatorics	3	1	0	4
		MA303	MA314	Fuzzy Set Theory and its Applications	3	1	0	4
		MA301	MA315	Financial Mathematics	3	1	0	4
		MA301	MA316	Statistics Quality Control and Reliability	3	1	0	4
PE III ^D VI Sem.	3	MA106, MA201	MA317	Wavelet Transform	3	0	0	3
		MA102, MA105, MA	MA318	Artificial Neural Network	3	0	0	3
			IT322	Cloud Computing	3	0	0	3
			CS325	Database Modelling	3	0	0	3
PE V ^E VII Sem.	4	MA106, MA201	MA404	Mathematical Epidemiology	3	0	0	3
		MA106, MA201, MA	MA405	Mathematical Modelling	3	0	0	3
		MA205	MA406	Fuzzy Mathematical Programming	3	0	0	3
		MA301	MA407	Survey Sampling	3	0	0	3
PE VI ^F VII Sem.	4	MA106, MA201	MA408	Theory of Elasticity	3	0	0	3
		MA301, MA407	MA409	Design of Experiments	3	0	0	3
		MA105	MA410	Differential Geometry	3	0	0	3
	5		CA532	Data Mining and Warehousing	3	0	0	3
PE VII ^G VIII Sem.	4	MA301	MA416	Statistical Inference	3	0	0	3
		MA106, MA201, MA	MA417	Numerical Solutions of Boundary Value Problems	3	0	0	3
		MA106, MA201	MA418	Mechanics	3	0	0	3
		MA106, MA201	MA419	Mathematical Ecology	3	0	0	3
		MA309, MA414	MA427	Multiple-Criteria Decision Making	3	0	0	3
	5		CA584	Web Programming	3	0	0	3
PE VIII ^H IX Sem.	5	MA301	MA503	Statistical Computing	3	0	0	3
		MA106, MA201	MA504	Finite Element Methods	3	0	0	3
		MA106, MA201, MA309 MA418	MA505	Calculus of Variations and Optimal Control	3	0	0	3
		MA102, MA106, MA	MA506	Advanced Difference Equations	3	0	0	3
PE IX ^I IX Sem.	5	MA106, MA201	MA507	Computational Fluid Dynamics	3	0	0	3
		MA106, MA201	MA508	Qualitative Theory of Differential Equations	3	0	0	3
		MA106, MA201	MA523	Computational Mathematics	3	0	0	3
	6		CA630	Cryptography & Network Security	3	1	0	4
			CA638	Soft Computing	3	0	0	3

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Recommended scheme of study

Details of credits distribution for IM.Sc. in Mathematics and Computing (category wise)

UG Program (1st - 6th Semester)

S.No	Category	Credits
1	PC-Program Core (Mathematics & Computer Science)	68.5+26=94.5
2	HSS-Humanities & Social Sciences	3
3	FS-Foundation Science	24
4	GE-General Engineering	5.5
5	PE-Program Electives (Mathematics & Computer Science)	14
6	MC- Mandatory Course NCC/NSS/Creative Arts/ Pt & Games	4
TOTAL		145

PG Program (7th - 10th Semester)

S.No	Category	Credits
1	PC-Program Core (Mathematics & Computer Science)	33+14
2	PE-Program Electives (Mathematics & Computer Science)	15
3	OE-Open Electives	6
4	Research Projects	12
5	MC- Mandatory Course (Constitution of India)	0
TOTAL		80

Program total Credits for IMSc. in Mathematics and Computing:
145(UG)+80(PG) = 225 Credits

**DEPARTMENT OF MATHEMATICS
OPEN ELECTIVES (OE)*
OFFERED FOR LEVEL 3-5 (UG & PG)**

Programme	LEVEL	Prerequisites Subjects with code	Code no.	Name of the PE subjects	L	T	P	C
UG/MO	3	Differential Equations	MA306	Special Functions	3	1	0	4
		Differential Equations	MA308	Difference Equations	3	0	0	3
UG/SP		Basics Mathematics	MA314	Fuzzy Set Theory and its Applications	3	1	0	4
		Differential Equations	MA315	Financial Mathematics	3	1	0	4
		Statistics	MA316	Statistics Quality Control and Reliability	3	1	0	4
PG/MO	4	Statistics	MA407	Survey Sampling	3	0	0	3
		Basics Mathematics and Statistics	MA428	Numerical and Statistical Methods	3	0	0	3
		Basics Mathematics and Statistics	MA429	Numerical and Statistical Methods	0	0	3	1.5
		Basics Mathematics	MA430	Discrete Mathematical Structure	3	0	0	3
	5	Differential Equations	MA505	Calculus of Variations and Optimal Control	3	0	0	3
		Difference Equations	MA506	Advanced Difference Equations	3	0	0	3
		Differential Equations	MA507	Computational Fluid Dynamics	3	0	0	3
		Differential Equations	MA523	Computational Mathematics	3	0	0	3

*OPEN ELECTIVES OT BE OPTED ONLY BY OTHER DEPARTMENT STUDENTS