BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
NEWCOURSE STRUCTURE - Effective from academic session 2018- 19
Based on CBCS & OBE model
Recommended scheme of study
B.Tech. in Computer Science & Engineering

Semester/ Session of Study (Recomended)	Course Level	Category of course	Course Code	Courses	Mode of delivery & credits *L-Lecture; T-Tutorial;P-Practicals*			Total Credits *C- Credits*
					L *(Periods/week)*	**T** *(Periods/week)*	**P** *(Periods/week)*	**C**
				Theory				
FIRST	FIRST	FS Foundation Sciences	MA 103	Mathematics - I	3	1	0	4
			CH101	Chemistry	3	1	0	4
		GE General Engineering	EC101	Basics of Electronics & Communication Engineering	3	1	0	4
			ME101	Basic of Mechanical Engineering	3	1	0	4
				Labs				
	FIRST	FS	CH102	Chemistry Lab	0	0	3	1.5
		GE	EC102	Electronics & Communication Lab	0	0	3	1.5
		GE	ME102	Engineering Graphics	0	0	4	2
		MC Mandatory Course	MC101/ 102/103/104	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1
				TOTAL				22
SECOND				THEORY				

FIRST	FS	MA107	Mathematics - II	3	1	0	4
		PH113	Physics	3	1	0	4
	GE	CS101	Programming for problem Solving	3	1	0	4
		EE101	Basics of Electrical Engineering	3	1	0	4
Labs							
FIRST	FS	PH114	Physics Lab	0	0	3	1.5
	GE	CS102	Programming for problem Solving lab	0	0	3	1.5
		PE101	Workshop Practice	0	0	3	1.5
	MC	MC105/106/107/108	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1
Total							21.5
GRAND TOTAL FOR FIRST YEAR							**43.5**

			THEORY				
FIRST	FS	BE101	Biological Science for Engineers	2	0	0	2
SECOND	GE	IT 201	Basics of Intelligent Computing	3	0	0	3
THIRD	PC	MA205	Discrete Mathematics	3	1	0	4
SECOND		EC203	Digital System Design	3	0	0	3
		CS201	Data Structures	3	1	0	4
			LABORATORIES				
FIRST	GE	EE102	Electrical Engineering lab	0	0	3	1.5
SECOND	MC	MC201/202/203/204	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1
	PC	EC204	Digital System Design Lab	0	0	3	1.5
		CS202	Data Structures Lab	0	0	3	1.5

THIRD Monsoon (row label spanning the THEORY and LABORATORIES section)

					TOTAL					21.5
					THEORY					
FOURTH Spring	SECOND	FS	MA203		Numerical Methods	2	0	0	2	
	FIRST	FS	CE101		Environmental Science	2	0	0	2	
	SECOND	PC	CS203		Computer Organization and Architecture	3	1	0	4	
			CS204		Object Oriented Programming and Design Pattern	3	0	0	3	
			CS206		Design and Analysis of Algorithm	3	0	0	3	
			CS211		Operating System	3	0	0	3	
					LABORATORIES					
	SECOND	FS	MA204		Numerical Methods Lab	0	0	2	1	
		GE	IT202		Basic IT Workshop (Common Subject)	0	0	2	1	
		MC	MC205/206/207/208		Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1	
		PC	CS205		OOPDP Lab	0	0	3	1.5	
			CS207		Design of Algorithm Lab	0	0	3	1.5	
			CS212		Operating System Lab	0	0	3	1.5	
					TOTAL					24.5
					THEORY					
FIFTH Monsoon	THIRD	PC	IT301		Data Comm. computer Network	3	1	0	4	
			CS301		Database Management System	3	0	0	3	
			CS310		Formal Language and Automata theory	3	0	0	3	
			IT305		Software Engineering	3	0	0	3	
		PE	**		PROGRAM ELECTIVE-I	3	0	0	3	
		OE	*		OPEN ELECTIVE-I	3	0	0	3	
			LABORATORIES							
	THIRD	PC	IT302		DCCN Lab	0	0	3	1.5	
			CS302		DBMS Lab	0	0	3	1.5	
			IT310		Shell and Kernel Prog. Lab	0	0	3	1.5	

			IT306	Software Engg. Lab	0	0	3	1.5
TOTAL								25
SIXTH Spring			PC	THEORY				
	THIRD	PC	CS305	Compiler Design	3	0	0	3
			CS307	Graph Theory	3	0	0	3
		PE	**	PROGRAM ELECTIVE-II	3	0	0	3
		OE	*	OPEN ELECTIVE-II	3	0	0	3
	FIRST	HSS	MT123	Business Communications	3	0	0	3
	THIRD	MC	MC300	Summer training - Mandatory				3
	SECOND	HSS	MT204	Constitution of India	2	0	0	Non-credit
		LABORATORIES						
	THIRD	PC	CS306	Compiler Design Lab	0	0	3	1.5
			CS308	Mobile Interface Lab	0	0	3	1.5
		PE	**	PROGRAM ELECTIVE LAB-II	0	0	3	1.5
TOTAL								22.5
SEVENTH Monsoon		PC		THEORY				
	FOURTH		IT404	Professional Practice Law & Ethics	2	0	0	2
		OE	*	OPEN ELECTIVE-III/MOOC-I	3	0	0	3
			*	OPEN ELECTIVE-IV / MOOC-II	3	0	0	3
		PE	**	PROGRAM ELECTIVE-III	3	0	0	3
			**	PROGRAM ELECTIVE-IV	3	1	0	4
		LABORATORIES						
		PE	**	PROGRAM ELECTIVE LAB-III	0	0	3	1.5
			**	PROGRAM ELECTIVE LAB-IV	0	0	3	1.5
TOTAL								18

					L	T	P	C
EIGTH Spring	FOURTH	PC	CS400	Research project / Industry Internship	NOT APPLICABLE			12
GRAND TOTAL Minimum requirement for Degree award								167

Programme Elective and Open Elective may include one or two Massive Open Online Course (MOOC)

** indicates program elective (PE)
* indicates Open Elective (OE)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
OPEN ELECTIVES (OE)*
OFFERED FOR LEVEL 1-4

OE / LEVEL		Code no.	Name of the courses	Prerequisites/ Corequisites courses with code	L	T	P	C
2	**OE1**	CS270	Fundamentals of Computer Science	NIL	3	0	0	3
		CS271	Fundamentals of Computer Science Lab	NIL	0	0	3	1.5
		CS201	Data Structures	Programming for Problem Solving CS101	3	1	0	4
		CS202	Data Structures Lab	Data Structures CS201	0	0	3	1.5
		CA201	Object Oriented Programming using JAVA	NIL	3	0	0	3
		CA202	Object Oriented Programming using JAVA Lab	NIL	0	0	3	1.5
		CS204	Object Oriented Programming and Design Patterns	Programming for Problem Solving CS101	3	0	0	3
	OE2	CS206	Design and Analysis of Algorithm	Data Structures CS201	3	0	0	3
		CS275	Bio Informatics	Programming for Problem Solving CS101	3	0	0	3
		IT270	Introduction to R	NIL	0	1	4	3

		IT271	Introduction to Python	NIL	0	1	4	3
		CS276	Cyber Law and Security	NIL	3	0	0	3
3	**OE3**	CS301	Database Management System	NIL	3	0	0	3
		CS302	Database Management System Lab	Database Management System CS301	0	0	3	1.5
		IT305	Software Engineering	NIL	3	0	0	3
		CS325	Database Modelling	Database Management System CS301	3	0	0	3
		IT330	Cryptography & Network Security	Mathematics-I MA 103/Mathematics-II MA 107	3	0	0	3
		CS371	Genetic Algorithm	Design and Analysis of Algorithm CS206,Mathematics-II MA 107	3	0	0	3
		IT340	Machine Learning	Design and Analysis of Algorithm CS206	3	0	0	3

4	**OE4**	IT490	Natural Language Processing	Compiler design CS305	3	0	0	3
		IT423	Internet of Things(IoT)	Basics of Intelligent Computing IT 201	3	0	0	3
		IT420	Artificial Intelligence	Basics of Intelligent Computing IT 201	3	0	0	3
		IT426	Data Mining Concepts and Techniques	Database Management System CS301	3	0	0	3
		IT427	Data Mining Concepts and Techniques Lab	Data Mining Concepts and Techniques	0	0	3	1.5

* OPEN ELECTIVES TO BE OPTED ONLY BY OTHER DEPARTMENT STUDENTS

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
PROGRAMME ELECTIVES (PE)*
OFFERED FOR LEVEL 1-4

PE / LEVEL		Code no.	Name of the PE Courses	Prerequisites/ Corequisites Courses with code	L	T	P	C
3		IT320	UI Design	OOPDP CS204	3	0	0	3
3		IT322	Cloud Computing	Basics of Intelligent Computing IT 201	3	0	0	3
3		CS320	Optimization Technique	Design and Analysis of Algorithm CS206	3	0	0	3
3	PE 1	CS321	Soft Computing	Discrete Mathematics MA205	3	0	0	3
3		CS391	Introduction to Distributed System	NIL	3	0	0	3
3		IT330	Cryptography & Network Security	Mathematics-I MA 103/Mathematics-II MA 107	3	0	0	3
3		IT326	Wireless Sensor Network	Data communication and Computer networks IT301	3	0	0	3
3		IT327	Wireless Sensor Lab	Wireless Sensor Network IT326	0	0	3	1.5
3		CS322	Simulation and Modelling	Data Structure CS201, Mathematics-II MA 107	3	0	0	3
3		CS323	Simulation Modelling Lab	Simulation Modelling CS322	0	0	3	1.5
3	PE 2	IT328	Pattern Recognition		3	0	0	3
3		IT329	Pattern Recognition Lab	Pattern Recognition IT328	0	0	3	1.5
3		CS327	Computer Graphics	Design and Analysis of Algorithm CS206	3	0	0	3
3		CS328	Computer Graphics Lab	Computer Graphics CS327	3	0	0	3
3		IT340	Machine Learning	Design and Analysis of Algorithm CS206	3	0	0	3
3		IT341	Machine Learning Lab	Machine Learning IT429	0	0	3	1.5
4		IT420	Artificial Intelligence	Basics of Intelligent Computing IT 201	3	0	0	3
4		IT421	Artificial Intelligence Lab	Artificial Intelligence IT420	0	0	3	1.5
4		IT423	Internet of Things(IoT)	Basics Of intelligent Computing IT 201	3	0	0	3

					L	T	P	C
4		IT424	Internet of Things(IoT) Lab	Internet of Things(IoT) IT423	0	0	3	1.5
4	**PE3**	IT307	Image Processing		3	0	0	3
		IT309	Image Processing lab	Image Processing IT307	0	0	3	1.5
4		CS494	Big Data Analytics	Database Management System CS301	3	0	0	3
		CS495	Big Data Analytics Lab	Big Data Analytics CS 494	0	0	3	1.5
4		IT426	Data Mining Concepts and Techniques	Database Management System CS301	3	0	0	3
4		IT427	Data Mining Concepts and Techniques Lab	Data Mining Concepts and Techniques IT426	0	0	3	1.5
		IT428	Information Retrieval	Data Structure CS201	3	1	0	4
		IT438	Information Retrieval lab	Information Retrieval IT428	0	0	3	1.5
4		CS429	Information and Coding Theory	Discrete Mathematics MA205	3	1	0	4
4	**PE4**	CS430	Information and Coding Theory Lab	Information and Coding Theory CS429	0	0	3	1.5
4		IT402	.NET Programming	NIL	3	1	0	4
		IT435	.NET Programming lab	.NET Programming IT402	0	0	3	1.5
4		IT436	Software Testing	Software Engineering IT305	3	1	0	4
4		IT437	Software Testing Lab	Software Testing IT324	0	0	3	1.5

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
MINOR* REQUIREMENT FOR OTHER BRANCHES
OFFERED FOR LEVEL 2-4

LEVEL	Code no.	Name of the Courses	Prerequisites Courses with code	L	T	P	C
2	CS201	Data Structures	NIL	3	1	0	4
3	CS301	Database Management System	NIL	3	0	0	3
2	CS206	Design and Analysis of Algorithm	NIL	3	0	0	3
3	CS303	Operating System	NIL	3	0	0	3
2	CS203	Computer Organization Architecture	NIL	3	1	0	4

LABORATORIES

LEVEL	Code no.	Name of the Courses	Prerequisites Courses with code	L	T	P	C
2	CS202	Data Structures Lab	NIL	0	0	3	1.5
3	CS302	Database Management System Lab	NIL	0	0	3	1.5

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SPECIALIZATION

LEVEL	Specialization area	Code No	Name of the courses	Pre requisites / Co requisites	L	T	P	C
3	Computational Intelligence	CS360	Nature Inspired Computing	Soft Computing CS321	3	1	0	4
4		CS473	Deep Learning		3	1	0	4
4		IT401	Data Analysis and Interpretation	NIL	3	1	0	4
4		CS465	CI-Mini Project		0	0	0	4
3		CS361	Specialization Lab I: Optimization using Nature based Algorithm		0	0	4	2

					L	T	P	C
4		CS460	Specialization Lab II: Deep Learning Lab		0	0	4	2
3	**Internet of things**	IT360	Introduction to Cyber physical systems		3	1	0	4
4		IT460	Cloud Storage and Security		3	1	0	4
4		IT462	Software Defined Networks		3	1	0	4
4		IT465	IoT-Mini Project		0	0	0	4
3		IT361	Specialization Lab I: Programming for IoT Lab		0	0	4	2
4		IT461	Specialization Lab II: Cloud Storage & Computing lab		0	0	4	2
3	**Image Processing & Computer Vision**	CS380	Modern Computer Graphics		3	1	0	4
4		IT480	Image Processing and Pattern Recognition		3	1	0	4
4		IT482	Machine Learning for Machine Vision		3	1	0	4
4		IT485	CV-Mini Project		0	0	0	4
3		CS381	Specialization Lab I: Computer Graphics LAB		0	0	4	2
4		IT481	Specialization Lab II: Image Processing LAB		0	0	4	2
4	**High Performance Computing**	CS436	Parallel Computing	CS203 Computer Organization and Architecture	3	1	0	4
4		CS493	GPU Programming	Operating System CS303	3	1	0	4
3		CS387	High Performance Computer Architecture	CS203 Computer Organization and Architecture	3	1	0	4
4		CS485	HPC-Mini Project		0	0	0	4
4		CS481	Parallel Computing Lab.	CS436 Parallel Computing	0	0	4	2
4		CS482	GPU Programming Lab.	CS493 GPU Programming	0	0	4	2