

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
NEWCOURSE STRUCTURE - To be 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 (Recommended)	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
GRAND TOTAL FOR FIRST YEAR								43.5
THIRD Monsoon		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
TOTAL								21.5
FOURTH Spring		THEORY						
	SECOND	FS	MA203	Numerical Methods	2	0	0	2
	FIRST	FS	CE101	Environmental Science	2	0	0	2
	SECOND	PC	CS203	Computer Organization 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
			CS303	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
			CS304	OS Lab	0	0	3	1.5
			CS207	Design of Algorithm Lab	0	0	3	1.5
TOTAL								24.5
FIFTH Monsoon		THEORY						
	THIRD	PC	IT301	Data Comm. computer Network	3	1	0	4
			CS301	Database Management System	3	0	0	3
			CS208	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
			IT220	Shell & Kernel Programming	0	0	3	1.5
			IT306	Software Engineering Lab	0	0	3	1.5
TOTAL								25
SIXTH Spring		PC	THEORY					
	THIRD		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-I	0	0	3	1.5
TOTAL								22.5
SEVENTH Monsoon		THEORY						
	FOURTH	PC	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 ELCTIVE LAB-II	0	0	3	1.5
	**		PROGRAM ELCTIVE LAB-III	0	0	3	1.5	
TOTAL								18
EIGHT 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)

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	PE 1	IT320	UI Design	OOPDP CS204	3	0	0	3
3		IT321	Bio Inspired Computing	Data Structure CS201	3	0	0	3
3		CS320	Optimization Technique	Design and Analysis of Algorithm CS206	3	0	0	3
3		IT321	Soft Computing	Discrete Mathematics MA303	3	0	0	3
3		CS322	Simulation and Modelling	Data Structure CS201, Mathematics-II MA 107	3	1	0	4
3		CS323	Simulation Modelling Lab	Simulation Modelling CS322	0	0	3	1.5
3		IT322	Cloud Computing	Basics of Intelligent Computing IT 201	3	0	0	3
3		IT323	Software Project Management	Software Engineering IT305	3	0	0	3
3		CS324	System Programming	NIL	3	0	0	3
3		CS325	Database Modelling	Database Management System CS301	3	0	0	3
3		CS326	Database Modelling Lab	Database Modelling CS325	0	0	3	1.5
3		IT324	Software Testing	Software Engineering IT305	3	1	0	4
3		IT325	Software Testing Lab	Software Testing IT324	0	0	3	1.5
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	PE 2	IT328	Pattern Recognition	Image Processing IT307	3	1	0	4
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		IT330	Cryptography & Network Security	Mathematics-I MA 103/Mathematics-II MA 107	3	0	0	3
3		CS391	Introduction to Distributed System	NIL	3	0	0	3
4		IT401	Data Analysis and Interpretation	NIL	3	0	0	3
4		IT420	Artificial Intelligence	Basics of Intelligent Computing IT 201	3	0	0	3
4	PE 3	IT421	Artificial Intelligence Lab	Artificial Intelligence IT420	0	0	3	1.5
4		IT422	Principles of Multimedia	NIL	3	0	0	3
4		IT423	Internet of Things(IoT)	Basics Of intelligent Computing IT 201	3	1	0	4
4		IT424	Internet of Things(IoT) Lab	Internet of Things(IoT) IT423	0	0	3	1.5
4		CS420	Advanced Data Structure	Data Structure CS201	3	0	0	3
4		CS421	Parallel Computing	Design and Analysis of Algorithm CS206	3	0	0	3
4		CS422	Parallel Computing Lab	Parallel Computing CS421	0	0	3	1.5
4		IT425	Image Analysis	Image Processing IT307	3	0	0	3
4		CS423	Advanced Algorithm	Design and Analysis of Algorithm CS206	3	0	0	3
4		CS424	Advanced Algorithm Lab	Advanced Algorithm CS423	0	0	3	1.5

4		IT426	Data Mining Concepts and Techniques	Database Modelling CS325	3	1	0	4
4		IT427	Data Mining Concepts and Techniques Lab	Data Mining Concepts and Techniques IT426	0	0	3	1.5
4		CS425	Advanced Operating System	Operating System CS303	3	0	0	3
4		CS426	Advanced Operating system Lab	Advanced Operating System CS425	0	0	3	1.5
4		IT428	Information Retrieval	Data Structure CS201	3	1	0	4
		IT403	Web App Development	NIL	3	0	0	3
4		CS429	Information and Coding Theory	Discrete Mathematics MA303	3	0	0	3
4		CS430	Information and Coding Theory Lab	Information and Coding Theory CS429	0	0	3	1.5
4		CS431	Computational Network Analysis	Data Communication and Computer Network IT301	3	1	0	4
4		CS432	Computational Network Analysis Lab	Computational Network Analysis CS431	0	0	3	1.5
4		IT431	Emerging Storage Technologies	Database Management System CS301	3	1	0	4
4		IT432	Emerging Storage Technologies Lab	Emerging Storage Technologies	0	0	3	1.5
4		IT433	Computer Vision	Computer Graphics CS327	3	0	0	3
4	PE 4	CS436	High Performance Computing	Parallel Computing CS421	3	1	0	4
4		CS437	High Performance Computing Lab	High Performance Computing CS430	0	0	3	1.5
4		IT402	.NET Programming	NIL	3	0	0	3
4		IT434	Mobile Computing	NIL	3	0	0	3
4		IT429	Machine Learning	Design and Analysis of Algorithm CS206	3	1	0	4
4		IT430	Machine Learning Lab	Machine Learning IT429	0	0	3	1.5
4		IT490	Natural Language Processing	Compiler Design CS305	3	0	0	3
4		CS494	Big Data Analytics	Database Management System CS301	3	0	0	3
4		CS490	3D Simulation	Computer Graphics CS327	3	0	0	3
4		CS493	GP-GPU Programming	Operating System CS303	3	0	0	3
4		CS494	Big Data Analytics	Database Management System CS301	3	0	0	3

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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 Structure	Programming for Problem Solving CS101	3	1	0	4
		CS202	Data Structure Lab	Data Structure 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
	OE2	CS204	Object Oriented Programming and Design Patterns	Programming for Problem Solving CS101	3	0	0	3
		CS206	Design and Analysis of Algorithm	Data Structure CS201	3	0	0	3
		CS270	Bio Informatics	Programming for Problem Solving CS101	3	0	0	3
		IT270	Introduction to R	NIL	3	0	0	3
		IT271	Introduction to Python	NIL	3	0	0	3
		CS271	Cyber Law and Security	NIL	3	0	0	3
3	OE3	CS301	Database Management System	NIL	3	0	0	3
		CS301	Database Management System Lab	Database Management System CS301	3	0	0	3
		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
		IT331	Bio Metric Security	Data Structure CS201,Design and Analysis of Algorithm CS206	3	0	0	3
		CS370	Cyber Crime and Investigation	Design and Analysis of Algorithm CS206	3	0	0	3
		CS371	Genetic Algorithm	Design and Analysis of Algorithm CS206,Mathematics-II MA 107	3	0	0	3
4	OE4	IT402	.NET Programming	NIL	0	0	3	1.5
		IT429	Machine Learning	Design and Analysis of Algorithm CS206	3	0	0	3
		IT490	Natural Language Processing	Compiler design CS305	0	0	3	1.5
		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
		CS422	High Performance Computing	NIL	3	0	0	3
		CS470	Wireless communication	Data communication and computer networks IT301	3	0	0	3
		CS471	Medical Image Processing	NIL	3	0	0	3
		CS472	Programming for Bio Informatics	NIL	3	0	0	3
		IT470	Genomic Data Science	Design and Analysis of Algorithm CS206	3	0	0	3
		CS473	Deep Learning	Machine Learning IT429	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 IT426	0	0	3	1.5

* OPEN ELECTIVES TO BE OPTED ONLY BY OTHER DEPARTMENT STUDENTS

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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	CS207	Design and Analysis of Algorithm	NIL	3	1	0	4
3	CS303	Operating System	NIL	3	0	0	3
2	CS205	Computer Organisation Architecture	NIL	3	1	0	4

LABORATORIES

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 /s	Code No	Name of the courses	Pre requisites / Co requisites	L	T	P	C
4	Computational Intelligence	IT420	Artificial Intelligence	Basics of Intelligent Computing IT 201	3	0	0	3
4		IT429	Machine Learning	Design and Analysis of Algorithm CS206	3	1	0	4
4		IT426	Data Mining Concepts and Techniques	Database Modelling CS325	3	0	0	3
4		IT490	Natural Language Processing	Compiler Design CS305	3	1	0	4
3		IT322	Cloud Computing	Basics of Intelligent Computing IT 201	3	0	0	3
4		IT427	Data Mining Concepts and Techniques Lab	Data Mining Concepts and Techniques IT426	0	0	3	1.5
4		IT421	Artificial Intelligence Lab	Artificial Intelligence IT420	0	0	3	1.5
3	Internet of things	IT326	Wireless Sensor Networks	Data communication and Computer networks IT301	3	1	0	4
3		IT322	Cloud Computing	Basics of Intelligent Computing IT 201	3	0	0	3
4		IT423	Internet of Things(IoT)	Basics Of intelligent Computing IT 201	3	0	0	3
4		IT426	Data Mining Concepts and Techniques	Database Modelling CS325	3	1	0	4
3		CS391	Introduction to Distributed System	NIL	3	0	0	3
4		IT424	Internet of Things(IoT) Lab	Internet of Things(IoT) IT423	0	0	3	1.5
4		IT427	Data Mining Concepts and Techniques Lab	Data Mining Concepts and Techniques IT426	0	0	3	1.5
3	Image Processing & Computer Vision	CS327	Computer Graphics	Design and Analysis of Algorithm CS206	3	0	0	3
3		IT307	Image Processing	NIL	3	0	0	3
4		CS447	Machine Learning	Design and Analysis of Algorithm CS206	3	1	0	4
4		IT433	Computer Vision	Computer Graphics CS327	3	0	0	3
4		CS490	3D Simulation		3	1	0	4
3		IT308	Image Processing Lab	Image Processing IT307	0	0	3	1.5
4		CS491	3D Simulation Lab	NIL	0	0	3	1.5
4	High Performance Computing	CS436	High Performance Computing	Parallel Computing CS421	3	0	0	3
4		CS421	Parallel Computing	Design and Analysis of Algorithm CS206	3	0	0	3
3		CS391	Introduction to Distributed System	Operating System CS303	3	0	0	3
4		CS493	GP-GPU Programming	Operating System CS303	3	1	0	4
4		CS494	Big Data Analytics	Database Management System CS301	3	1	0	4
4		CS422	Parallel Computing Lab	Parallel Computing CS421	0	0	3	1.5
4		CS495	Big Data Analytics Lab	Big Data Analytics CS494	0	0	3	1.5