

**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 <i>L-Lecture; T-Tutorial;P-Practicals</i>			Total Credits <i>C- Credits</i>
					L <i>(Periods/week)</i>	T <i>(Periods/week)</i>	P <i>(Periods/week)</i>	C
<b>GRAND TOTAL FOR FIRST YEAR</b>								<b>43.5</b>
THIRD Monsoon		<b>THEORY</b>						
	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	MA303	Discrete Mathematics	3	1	0	4
	SECOND		EC203	Digital System Design	3	0	0	3
			CS201	Data Structures	3	1	0	4
		<b>LABORATORIES</b>						
	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
<b>TOTAL</b>								<b>21.5</b>
FOURTH Spring		<b>THEORY</b>						
	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
			IT220	Shell & Kernel Programming	0	0	3	1.5
			CS208	Formal language and Automata Theory	3	0	0	3
		<b>LABORATORIES</b>						
	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		
<b>TOTAL</b>								<b>24.5</b>
FIFTH Monsoon	THIRD	PC	IT301	Data Comm. computer Network	3	1	0	4
			CS301	Database Management System	3	0	0	3
			CS303	Operating System	3	0	0	3
			CS305	Compiler Design	3	0	0	3
		PE	**	PROGRAM ELCTIVE-I	3	0	0	3

		OE	*	OPEN ELCTIVE-I	3	0	0	3	
		<b>LABORATORIES</b>							
	THIRD	PC	IT302	DCCN Lab	0	0	3	1.5	
			CS302	DBMS Lab	0	0	3	1.5	
			CS304	OS Lab	0	0	3	1.5	
			CS306	Compiler Design Lab	0	0	3	1.5	
<b>TOTAL</b>								<b>25</b>	
SIXTH Spring		PC	<b>THEORY</b>						
			THIRD	IT305	Software Engineering	3	0	0	3
				CS307	Graph Theory	3	0	0	3
			PE	**	PROGRAM ELCTIVE-II	3	0	0	3
		OE	*	OPEN ELCTIVE-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
			<b>LABORATORIES</b>						
		THIRD	PC	IT306	Software Engineering Lab	0	0	3	1.5
				CS308	Mobile Interface Lab	0	0	3	1.5
	PE	**		PROGRAM ELCTIVE LAB-I	0	0	3	1.5	
<b>TOTAL</b>								<b>22.5</b>	
SEVENTH Monsoon		PC	<b>THEORY</b>						
				IT404	Professional Practice Law & Ethics	2	0	0	2
			OE	*	OPEN ELCTIVE-III/MOOC-I	3	0	0	3
				*	OPEN ELCTIVE-IV / MOOC-II	3	0	0	3
			PE	**	PROGRAM ELCTIVE-III	3	0	0	3
		**		PROGRAM ELCTIVE-IV	3	1	0	4	
			<b>LABORATORIES</b>						
			PE	**	PROGRAM ELCTIVE LAB-II	0	0	3	1.5
		**		PROGRAM ELCTIVE LAB-III	0	0	3	1.5	
<b>TOTAL</b>								<b>18</b>	
EIGHT Spring	FOURTH	PC	CS400	Research project / Industry Internship	<i>NOT APPLICABLE</i>			12	
<b>GRAND TOTAL</b> <i>Minimum requirement for Degree award</i>								<b>167</b>	

**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		PE 2	IT326	Wireless Sensor Network	Data communication and Computer networks IT301	3	0	0
3	IT327		Wireless Sensor Lab	Wireless Sensor Network IT326	0	0	3	1.5
3	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	PE 3	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		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	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

**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
	OE2	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
		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
3	OE3	IT271	Introduction to Python NIL	3	0	0	3
		CS271	Cyber Law and Security NIL	3	0	0	3
		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
4	OE4	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
		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**

<b>LEVEL</b>	<b>Code no.</b>	<b>Name of the Courses</b>	<b>Prerequisites courses with code</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
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	<b>Computational Intelligence</b>	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		<b>Internet of things</b>	IT326	Wireless Sensor Networks	Data communication and Computer networks IT301	3	1	0
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	<b>Image Processing &amp; Computer Vision</b>		CS327	Computer Graphics	Design and Analysis of Algorithm CS206	3	0	0
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		<b>High Performance Computing</b>	CS436	High Performance Computing	Parallel Computing CS421	3	0	0
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