

**BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI**  
**NEW COURSE STRUCTURE - To be effective for B.Tech**  
**(Information Technology), 2021-22**  
**Based on CBCS system & OBE model**  
**Recommended scheme of study**  
**(For Circuit Branches)**

S. No	Semester of Study (Recommended)	Category of course	Course Code (TBD) XX100x	Subjects	Mode of delivery & credits <i>L-Lecture; T-Tutorial; P-Practicals</i>			Total Credits <i>C-Credits</i>	
					L (Periods/week)	T (Periods/week)	P (Periods/week)		
<b>THEORY</b>								<b>C</b>	
<b>THEORY</b>									
I.1	<b>FIRST</b>	<b>FS</b> <i>Founda tion Science s</i>	MA 107	Mathemat ics - I	3	1	0	4	
I.2			CH101	Chemistry	3	1	0	4	
I.3		<b>GE</b> <i>Genera l Engine ering</i>	EC101	Basic of Electronic s and Communi cation Engineerin g	3	1	0	4	
			ME101	Basic of Mechanic al Engineerin g	3	1	0	4	
I.4		<b>FS</b>	<b>CE101</b>	<b>Environm ental Sciences</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>	
		<b>LABORATORIES</b>							
I.6		<b>FS</b>	CH102	Chemistry Lab	0	0	3	1.5	

I.7		<b>GE</b>	EC102	Electronic s and Communi cation Lab	0	0	3	1.5	
I.8			ME102	Engineerin g Graphics	0	0	4	2	
		<b>MC Manda tory Course</b>	MC101/102/ 103/104	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1	
<b>TOTAL (Theory + Labs)</b>								<b>24</b>	
<b>THEORY</b>									
II.1	<b>SECOND</b>	<b>FS</b>	MA117	Mathemat ics - II	3	1	0	4	
			PH100	Physics	3	1	0	4	
II.2			<b>BE101</b>	<b>Biological Sciences</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>	
II.3		<b>GE</b>	CS101	Programm ing for problem Solving	3	1	0	4	
II.4			EE101	Basics of Electrical Engineerin g	3	1	0	4	
			<b>LABORATORIES</b>						
II.6			<b>FS</b>	PH102	Physics Lab	0	0	3	1.5
II.7			<b>GE</b>	CS102	Programm ing for problem Solving laboratori es	0	0	3	1.5
II.8				PE101	Workshop Practice	0	0	3	1.5
			<b>MC</b>	MC105/106/ 107/108	Choice of : NCC/NSS/ PT & Games/	0	0	2	1

				Creative Arts (CA)				
<b>TOTAL (Theory + Labs)</b>								<b>23.5</b>
<b>GRAND TOTAL FOR FIRST YEAR</b>								<b>47.5</b>
<b>THEORY</b>								
III. 1		<b>GE</b>	IT 201	Basis of Intelligent Computing	3	0	0	3
III. 2		<b>PC</b>	MA205	Discrete Mathematics	3	1	0	4
III. 3			EC203	Digital System Design	3	0	0	3
III. 4			CS201	<b>Data Structures</b>	3	1	0	4
III. 5			CS204	Object Oriented Programming and Design Pattern	3	0	0	<b>3</b>
			<b>LABORATORIES</b>					
III. 6		<b>GE</b>	EE102	Electrical Engineering lab	0	0	3	1.5
III. 7		<b>MC</b>	MC201/202/203/204	Choice of : NCC/NSS/PT & Games/ Creative Arts (CA)	0	0	2	1
III. 8		<b>PC</b>	EC204	Digital System Design Lab	0	0	3	1.5
III. 9			CS202	Data Structures Lab	0	0	3	1.5
			CS205	OOPDP Lab	0	0	3	<b>1.5</b>

	<b>TOTAL</b>							<b>24</b>
	<b>FOURTH</b>			<b>THEORY</b>				
IV. 1		<b>FS</b>	MA203	Numerical Methods	2	0	0	<b>2</b>
IV. 2		<b>HSS</b>		<b>UHV2: Understanding Harmony</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>
IV. 3		<b>PC</b>	CS203	Computer Organization and Architecture	3	1	0	<b>4</b>
IV. 4			CS206	Design and Analysis of Algorithm	3	0	0	<b>3</b>
IV. 5			CS211	Operating System	3	0	0	<b>3</b>
IV. 6		<b>OE</b>		OE1/MOOC	3	0	0	<b>3</b>
		<b>LABORATORIES</b>						
IV. 7		<b>FS</b>	MA2004	Numerical Methods lab	0	0	2	<b>1</b>
IV. 8		<b>GE</b>	IT202	Basic IT Workshop	0	0	2	<b>1</b>
IV. 9		<b>PC</b>	CS207	Design of Algorithm Lab	0	0	3	<b>1.5</b>
IV. 10	CS212		Operating System Lab	0	0	3	<b>1.5</b>	
IV. 11	<b>MC</b>	MC205/206/207/208	Choice of : NCC/NSS/PT & Games/ Creative Arts (CA)	0	0	2	<b>1</b>	
	<b>TOTAL</b>							<b>24</b>
	<b>GRAND TOTAL FOR SECOND YEAR</b>							<b>48</b>
	<b>FIFTH</b>			<b>THEORY</b>				
<b>V. 1</b>		<b>PC</b>	IT301	Data Comm. computer Network	3	1	0	<b>4</b>

V. 2			CS301	Database Management System	3	0	0	3
V. 3			CS310	Formal Language and Automata theory	3	0	0	3
V. 4			IT303	Internet and Web Technology	3	0	0	3
V.5		OE		OE2/MOOC	3	0	0	3
V.6		PE		PROGRAM ELECTIVE-I	3	0	0	3
	<b>LABORATORIES</b>							
V.7		PC	IT302	DCCN Lab	0	0	3	1.5
V.8			CS302	DBMS Lab	0	0	3	1.5
V.9			IT310	Shell and Kernel Programming Lab	0	0	3	1.5
V.10			IT308	Internet and Web Technology Lab	0	0	3	1.5
<b>TOTAL</b>								<b>25</b>
	<b>SIXTH</b>			<b>THEORY</b>				
VI. 1		PC	IT305	Software Engineering	3	0	0	3
VI. 2			IT307	Image Processing	3	0	0	3
VI. 3		OE		OE3/MOOC	3	0	0	3
VI. 4		PE	**	PROGRAM ELECTIVE-II	3	0	0	3
VI. 5		HSS		Business Communications	3	0	0	3
VI. 6		MC		Summer training - compulsory				3

		<b>LABORATORIES</b>						
VI. 7		<b>PC</b>	IT306	Software Engg. Lab	0	0	3	1.5
VI. 9			IT509	Image Processing Lab	0	0	3	1.5
VI. 10		<b>PE</b>	**	PROGRAM ELECTIVE LAB-I	0	0	3	1.5
<b>TOTAL</b>								<b>22.5</b>
<b>GRAND TOTAL FOR THIRD YEAR</b>								<b>47.5</b>
				<b>THEORY</b>				
VII. 1	<b>SEVENTH</b>	<b>OE</b>	*	OE IV / MOOC	3	0	0	3
VII. 2		<b>PE</b>	**	PROGRAM ELECTIVE- III	3	0	0	3
VII. 3			**	PROGRAM ELECTIVE- IV	3	1	0	4
		<b>LABORATORIES</b>						
VII. 4			<b>PE</b>	**	PROGRAM ELECTIVE LAB-II	0	0	3
VII. 5		**		PROGRAM ELECTIVE LAB-III	0	0	3	1.5
<b>TOTAL</b>								<b>13</b>
VIII .1	<b>EIGHTH</b>			<b>Research project / Industry Internship</b>	<i>NOT APPLICABLE</i>			<b>12</b>
<b>GRAND TOTAL FOR FOURTH YEAR</b>								<b>25</b>
				<b>GRAND TOTAL</b>				<b>168</b>

List of Program electives

**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	<b>PE 1</b>	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		CS321	Soft Computing	Discrete Mathematics MA205	3	0	0	3
		CS324	System Programming	NIL	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	<b>PE 2</b>	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		IT328	Pattern Recognition	Image Processing IT307	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
4	IT421		Artificial Intelligence Lab	Artificial Intelligence IT420	0	0	3	1.5

4	<b>PE3</b>	IT423	Internet of Things(IoT)	Basics Of intelligent Computing IT 201	3	0	0	3
4		IT424	Internet of Things(IoT) Lab	Internet of Things(IoT) IT423	0	0	3	1.5
3		IT307	Image Processing		3	0	0	3
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
4		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
4		<b>PE4</b>	IT438	Block Chain Technology	NIL	3	1	0
4	IT428		Information Retrieval	Data Structure CS201	3	1	0	4
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	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
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 AND ENGINEERING**  
**OPEN ELECTIVES (OE)\***  
**OFFERED FOR LEVEL 1-4**

<b>OE / LEVEL</b>		<b>Code no.</b>	<b>Name of the courses</b>	<b>Prerequisites/ Corequisites courses with code</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>1</b>	<b>OE I</b>	CS275	Fundamentals of Data Structures	<b>NIL</b>	3	0	0	3
		CA201	Object Oriented Programming using JAVA	<b>NIL</b>	3	0	0	3
<b>2</b>	<b>OE II</b>	IT271	Introduction to Python	<b>NIL</b>	0	1	4	3
		CS276	Cyber Law and Security	<b>NIL</b>	3	0	0	3
<b>3</b>	<b>OE III</b>	IT305	Software Engineering	<b>NIL</b>	3	0	0	3
		IT340	Machine Learning	<b>NIL</b>	3	0	0	3
<b>4</b>	<b>OE IV</b>	IT420	Artificial Intelligence	<b>NIL</b>	3	0	0	3
		IT426	Data mining concepts and techniques	<b>NIL</b>	3	0	0	3

**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	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**

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**

<b>LEVEL</b>	<b>Specialization area</b>	<b>Code No</b>	<b>Name of the courses</b>	<b>Pre requisites / Co requisites</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
3	<b>Computational Intelligence</b>	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
4		CS460	Specialization Lab II: Deep Learning Lab		0	0	4	2
3	<b>Internet of things</b>	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		<b>Image Processing &amp; Computer Vision</b>	CS380	Modern Computer Graphics		3	1	0
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: <b>Modern Computer Graphics LAB</b>		0	0	4	2
4	IT481		Specialization Lab II: <b>Visualization and Perception LAB</b>		0	0	4	2
4	<b>High Performance Computing</b>		CS387	High Performance Computer Architecture	CS203 Computer Organization and Architecture	3	1	0
4		CS493	GPU Programming	Operating System CS303	3	1	0	4
3		CS421	Parallel Computing	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