

BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
NEW COURSE STRUCTURE - To be effective for B.Tech
(Computer Science), 2020-21
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)		
THEORY								C	
THEORY									
I.1	FIRST	FS Founda tion Science s	MA 103	Mathema tics - I	3	1	0	4	
I.2			CH101	Chemistry	3	1	0	4	
I.3		GE Genera l Engine ering	EC101	Basic of Electronic s and Communi cation Engineeri ng	3	1	0	4	
I.4			ME101	Basic of Mechanic al Engineeri ng	3	1	0	4	
LABORATORIES									
I.5			FS & GE	CH102	Chemistry Lab	0	0	3	1.5
I.6		EC102		Electronic s and Communi	0	0	3	1.5	

				cation Lab				
I.7			ME102	Engineeri ng Graphics	0	0	4	2
I.8		MC Manda tory Course	MC101/102/ 103/104	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1
TOTAL (Theory + Labs)								22
THEORY								
II.1	SECOND	FS	MA107	Mathema tics - II	3	1	0	4
II.2			PH113	Physics	3	1	0	4
II.3		GE	CS101	Program ming for problem Solving	3	1	0	4
II.4			EE101	Basics of Electrical Engineeri ng	3	1	0	4
		LABORATORIES						
II.5		FS	PH114	Physics Lab	0	0	3	1.5
II.6		GE	CS102	Program ming for problem Solving laboratori es	0	0	3	1.5
II.7			PE101	Worksho p Practice	0	0	3	1.5
II.8		MC	MC105/106/ 107/108	Choice of : NCC/NSS/ PT & Games/	0	0	2	1

				Creative Arts (CA)					
TOTAL (Theory + Labs)								21.5	
GRAND TOTAL FOR FIRST YEAR								43.5	
THEORY									
III. 1	THIRD	FS	BE101	Biological Sciences for Engineering	2	0	0	2	
III. 2		GE	IT 201	Basis of Intelligent Computing	3	0	0	3	
III. 3		PC	MA205	Discrete Mathematics	3	1	0	4	
III. 4			EC203	Digital System Design	3	0	0	3	
III. 5			CS201	Data Structures	3	1	0	4	
			CS204	Object Oriented Programming and Design Pattern	3	0	0	3	
		LABORATORIES							
III. 6		GE	EE102	Electrical Engineering lab	0	0	3	1.5	
III. 7		MC	MC201/202/203/204	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1	

III. 8		PC	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	1.5
TOTAL								26
FOURTH		THEORY						
IV. 1		FS	MA203	Numerical Methods	2	0	0	2
IV. 2			CE101	Environmental Science	2	0	0	2
IV. 3		HSS		UHV2: Understanding Harmony	2	1	0	3
IV. 4		PC	CS203	Computer Organization and Architecture	3	1	0	4
IV. 5			CS206	Design and Analysis of Algorithm	3	0	0	3
			CS211	Operating System	3	0	0	3
IV. 6		OE		OE1/MOOC	3	0	0	3
		LABORATORIES						
IV. 7		FS	MA2004	Numerical Methods lab	0	0	2	1
IV. 8		GE	IT202	Basic IT Workshop	0	0	2	1

IV. 9			CS207	Design of Algorithm Lab	0	0	3	1.5
IV. 10			CS212	Operating System Lab	0	0	3	1.5
IV. 11		MC	MC205/206/207/208	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1
TOTAL								26
GRAND TOTAL FOR SECOND YEAR								52

	FIFTH			THEORY					
V.1		PC	IT301	Data Comm. computer Network	3	1	0	4	
V.2			CS301	Database Management System	3	0	0	3	
V.3			CS310	Formal Language and Automata theory	3	0	0	3	
V.4			IT305	Software Engineering	3	0	0	3	
V.5		OE		OE2/MOOC	3	0	0	3	
V.6		PE		PROGRAM ELECTIVE-I	3	0	0	3	
		LABORATORIES							
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 Lab	0	0	3	1.5		

V.10			IT306	Software Engg. Lab	0	0	3	1.5	
TOTAL								25	
	SIXTH			THEORY					
VI.1		PC	CS305	Compiler Design	3	0	0	3	
VI.2			CS307	Graph Theory	3	0	0	3	
VI.3		OE		OE3/MOOC	3	0	0	3	
VI.4			**	PROGRAM ELECTIVE-II	3	0	0	3	
VI.5		HSS	MT123	Business Communications	3	0	0	3	
VI.6		MC	MC300	Summer training - compulsory				3	
		LABORATORIES							
VI.7				CS306	Compiler Design Lab	0	0	3	1.5
VI.8				CS308	Mobile Interface Lab	0	0	3	1.5
VI.9			**	PROGRAM ELECTIVE LAB-II	0	0	3	1.5	
TOTAL								22.5	
GRAND TOTAL FOR THIRD YEAR								47.5	
	SEVENTH			THEORY					
VII.5		OE	*	OE4/MOOC	3	0	0	3	
			**	PROGRAM ELECTIVE-III	3	0	0	3	
			**	PROGRAM ELECTIVE-IV	3	1	0	4	

		LABORATORIES						
			**	PROGRAM ELECTIVE LAB-III	0	0	3	1.5
			**	PROGRAM ELECTIVE LAB-IV	0	0	3	1.5
TOTAL								13
VIII. 1	EIGHTH		CS400	Research project / Industry Internship	<i>NOT APPLICABLE</i>			12
GRAND TOTAL FOR FOURTH YEAR								25
				GRAND TOTAL				168
<i>UHV2: Understanding Harmony can be offered either in 3rd or 4th semester depending upon the convenience of the Department.</i>								

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	PE 1	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	PE 2	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	PE3	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		PE4	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

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

**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

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
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	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: Modern Computer Graphics LAB		0	0	4	2
4	IT481		Specialization Lab II: Visualization and Perception LAB		0	0	4	2
4	High Performance Computing		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