BIRLA INSTITUTE OF TECHNOLOGY- MESRA, RANCHI
NEW COURSE STRUCTURE - To be effective for B.Tech (Computer Science), 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** *L-Lecture; T-Tutorial; P-Practicals*			**Total Credits** *C-Credits*
THEORY					**L (*Periods/ week*)**	**T *(Periods/ week)***	**P *(Periods/ week)***	**C**
THEORY								
I.1	**FIRST**	**FS *Foundation Sciences***	MA 107	Mathematics - I	3	1	0	4
I.2			CH101	Chemistry	3	1	0	4
I.3		**GE *General Engineering***	EC101	Basic of Electronics and Communication Engineering	3	1	0	4
I.4			ME101	Basic of Mechanical Engineering	3	1	0	4
I.5		**FS**	**CE101**	**Environmental Sciences**	**2**	**0**	**0**	**2**
		LABORATORIES						
I.6		**FS**	CH102	Chemistry Lab	0	0	3	1.5

I.7		**GE**	EC102	Electronics and Communication Lab	0	0	3	1.5
I.8			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 (Theory + Labs)								**24**
THEORY								
II.1	**SECOND**	**FS**	MA117	Mathematics - II	3	1	0	4
			PH100	Physics	3	1	0	4
II.2			**BE101**	**Biological Sciences**	**2**	**0**	**0**	**2**
II.3		**GE**	CS101	Programming for problem Solving	3	1	0	4
II.4			EE101	Basics of Electrical Engineering	3	1	0	4
		LABORATORIES						
II.6		**FS**	PH102	Physics Lab	0	0	3	1.5
II.7		**GE**	CS102	Programming for problem Solving laboratories	0	0	3	1.5
II.8			PE101	Workshop Practice	0	0	3	1.5
		MC	MC105/106/107/108	Choice of : NCC/NSS/ PT & Games/	0	0	2	1

				Creative Arts (CA)				
TOTAL (Theory + Labs)								**23.5**
GRAND TOTAL FOR FIRST YEAR								**47.5**
	THIRD	**Theory**						
III. 1		**GE**	IT 201	Basis of Intelligent Computing	3	0	0	3
III. 2		**PC**	MA205	Discrete Mathematics	3	1	0	4
III. 3			EC203	Digital System Design	3	0	0	3
III. 4			CS201	Data Structures	3	1	0	4
iii. 5			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							**24**
	FOURTH		**THEORY**					
IV. 1		**FS**	MA203	Numerical Methods	2	0	0	**2**
IV. 2		**HSS**		**UHV2: Understanding Harmony**	**2**	**1**	**0**	**3**
IV. 3		**PC**	**CS203**	**Computer Organization and Architecture**	**3**	**1**	**0**	**4**
IV. 4			**CS206**	**Design and Analysis of Algorithm**	**3**	**0**	**0**	**3**
IV. 5			**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		**PC**	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								**24**
GRAND TOTAL FOR SECOND YEAR								**48**

	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		Business Communications	3	0	0	3
VI.6		MC		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**
				THEORY				
VII.5	**SEVENTH**	**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	**EIGTH**			**Research project / Industry Internship**	*NOT APPLICABLE*			**12**
GRAND TOTAL FOR FOURTH YEAR								**25**
				GRAND TOTAL				**168**

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	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
4		IT424	Internet of Things(IoT) Lab	Internet of Things(IoT) IT423	0	0	3	1.5
3	**PE3**	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		IT438	Block Chain Technology	NIL	3	1	0	4
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	**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
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
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
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