Birla Institute of Technology, Mesra, Ranchi

BTECH IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

NEW COURSE STRUCTURE - To be effective from academic session 2022 - 23
BTECH IN ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
Based on CBCS system & OBE model Recommended scheme of study
(For Circuit Branches)

Course Level	Semester of Study	Course Code	Course Name	**Mode of delivery & credits** *L-Lecture; T-Tutorial; P-Practical*			**Total Credits** *C- Credits*
				L (*Periods/ week*)	**T *(Periods/ week)***	**P *(Periods/ week)***	**C**
FIRST	**FS**	MA 103	Mathematics - I	3	1	0	4
		CH101	Chemistry	3	1	0	4
	GE	EC101	Basic of Electronics and Communication Engineering	3	1	0	4
		ME101	Basic of Mechanical Engineering	3	1	0	4
	FS	CE101	Environmental Sciences	2	0	0	2
	LABORATORIES						
	FS	CH102	Chemistry Lab	0	0	3	1.5
	GE	EC102	Electronics and Communication Lab	0	0	3	1.5
		ME102	Engineering Graphics	0	0	4	2
	MC	MC101/102/103 /104	Choice of: NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1
TOTAL (Theory + Labs)							**24**

SECOND	**THEORY**						
	FS	MA107	Mathematics - II	3	1	0	4
		PH113	Physics	3	1	0	4
		BE101	Biological Science for Engineers	2	0	0	2
	GE	CS101	Programming for problem Solving	3	1	0	4
		EE101	Basics of Electrical Engineering	3	1	0	4
	LABORATORIES						
	HSS	MT132	Communication Skills - I	0	0	3	1.5
	FS	PH114	Physics Lab	0	0	3	1.5
	GE	CS102	Programming for Problem Solving Lab	0	0	3	1.5
		PE101	Workshop Practice	0	0	3	1.5
	MC	MC105/106/107 /108	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1
TOTAL (Theory + Labs)							**25**
THIRD	**THEORY**						
	PC						
		MA205	Discrete Mathematics	3	1	0	4
		EC203	Digital System Design	3	0	0	3
		CS231	Data Structures	3	1	0	4

		CS233	Object Oriented Programming and Design Pattern	3	0	0	3
		CS235	Computer Organization and Architecture	3	0	0	3
	LABORATORIES						
	PC	EC204	Digital System Design Lab	0	0	3	1.5
		CS232	Data Structures Lab	0	0	3	1.5
		CS234	OOPDP Lab	0	0	3	1.5
	GE	EE102	Electrical Engineering Lab	0	0	3	1.5
	MC	MC201/ 202/203/204	Choice of: NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1
TOTAL (Theory + Labs)							**24**
THEORY							
FOUR T H	**PC**	AI201	Probability and Statistics	3	0	0	3
	HSS	MT131	UHV2: Understanding Harmony	3	0	0	3
	PC	AI203	Mathematics for Data Science	3	0	0	3
		CS241	Design and Analysis of Algorithms	3	0	0	3
		AI205	Introduction to Artificial	3	0	0	3

			Intelligence				
	OE		Open Elective-I	3	0	0	3
	LABORATORIES						
	PC	AI202	IT Systems Workshop(LEX, YACC)	0	0	2	1
		CS242	Design and Analysis of Algorithms Lab	0	0	2	1
		CS240	Shell and Kernel Lab	0	0	3	1.5
		AI204	Mathematic s for Data Science Lab	0	0	3	1.5
	MC	MC205/ 206/207/208	Choice of : NCC/NSS/ PT & Games/ Creative Arts (CA)	0	0	2	1
TOTAL (Theory + Labs)							**24**
FIFTH	**PC/PE**						
	PC	IT333	Data Comm. & Computer Networks	3	0	0	3
		CS361	Database System Concepts	3	0	0	3
		AI301	Supervised Learning	3	0	0	3
	PE		PROGRAM ELECTIVE-I	3	0	0	3
			PROGRAM ELECTIVE-II	3	0	0	3
	OE		Open Elective-II	3	0	0	3
	LABORATORIES						
	PC	IT334	Data Comm. & Computer Networks Lab	0	0	3	1.5

		CS238	Database Management System Lab	0	0	3	1.5
		AI302	Supervised Learning Lab	0	0	3	1.5
			PROGRAM ELECTIVE LAB-II	0	0	3	1.5
TOTAL (Theory + Labs)							**24**
THEORY							
SIXTH	**PC/PE**						
	PC	AI303	Unsupervised Learning	3	0	0	3
		AI305	Deep Learning	3	0	0	3
		AI307	Modern Artificial Intelligence	3	0	0	3
	PE		PROGRAM ELECTIVE-III	3	0	0	3
	OE		Open Elective-III	3	0	0	3
	HSS	MT204	Constitution of India	2	0	0	NC
	PROJ	MC300	Summer training				2
	LABORATORIES						
		AI304	Unsupervised Learning Lab	0	0	3	1.5
		AI306	Deep Learning Lab	0	0	3	1.5
	HSS	MT133	Communication Skills - II	0	0	3	1.5
TOTAL (Theory + Labs)							**21.5**
THEORY							
SEVEN TH							
	PC	AI401	Reinforcement Learning	2	0	0	2
	PE		PROGRAM ELECTIVE-IV	3	0	0	3
			PROGRAM ELECTIVE-V	3	0	0	3

	OE		Open Elective-IV	3	0	0	3
	PROJ	AI400M	Minor Project				3
	LABORATORIES						
	PE		PROGRAM ELECTIVE LAB-IV	0	0	3	1.5
TOTAL (Theory + Labs)							**15.5**
EIGHT H	**PROJ**	AI400	Research Project / Industry Internship				**10**
GRAND TOTAL							**168**

*Requirement of Programme Elective Courses (Theory/ Lab) : 18 credit or above								
List of Program Electives (PE)								
PE / LEVEL		**Code no.**	**Name of the PE Courses**	**Prerequisites/ Corequisites**	**L**	**T**	**P**	**C**
		CS331	Formal Language and Automata Theory	MA205: Discrete Maths	3	0	0	3
3	**PE 1**	CS362	Operating system concepts	CS231: Data Structures	3	0	0	3
3		IT337	Software Engineering	CS233: OOPDP	3	0	0	3
3		IT331	Image Processing	AI305, CS231	3	0	0	3
	PE2	AI309	Evolutionary Computing	CS241: Design and Analysis of Algorithms	3	0	0	3
		AI310	Evolutionary Computing Lab	AI309: Evolutionary Computing	0	0	3	1.5
		AI311	Network Analysis	MA 205, CS241	3	0	0	3
		AI312	Network Analysis Lab	AI311: Network Analysis	0	0	3	1.5
		IT353	Blockchain Technology	CS241	3	0	0	3
		IT354	Blockchain Technology lab	IT353	0	0	3	1.5
		AI313	Classical Optimization Techniques	CS241	3	0	0	3
		AI314	Optimization Techniques Lab	AI313	0	0	3	1.5
	PE3	AI315	Advanced Algorithms	CS241	3	0	0	3
		AI317	Information Retrival	CS241	3	0	0	3
4		AI319	Introduction to Compiler Design	CS331	3	0	0	3
		AI321	Data Mining	CS237: DBMS	3	0	0	3
4	**PE4**	IT347	Introduction to Distributed Systems	CS235, IT333	3	0	0	3
		IT348	Distributed Computing using SPARK Lab	IT347	0	0	3	1.5
4		IT445	Internet of Things (IoT)	IT333: DCCN	3	0	0	3
		IT446	Internet of Things Lab	IT445	0	0	3	1.5
		AI425	Computer Vision	IT331, AI305: Deep Learning	3	0	0	3

		AI426	Computer Vision lab	AI306: Deep Learning Lab, AI425	0	0	3	1.5
		IT451	Cloud Computing	IT333: DCCN	3	0	0	3
4		IT452	Cloud Computing Lab	IT451	0	0	3	1.5
	PE5 (NO Lab)	AI427	Robotics	AI205, AI307: Modern AI	3	0	0	3
		IT351	Natural Language Processing	CS241	3	0	0	3
		AI429	Speech Processing	CS331: FLAT	3	0	0	3
		IT349	Cryptography & Network Security	CS241	3	0	0	3