



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 <i>L-Lecture; T-Tutorial; P-Practical</i>			Total Credits <i>C- Credits</i>
				<b>L</b> <i>(Periods/ week)</i>	<b>T</b> <i>(Periods/ week)</i>	<b>P</b> <i>(Periods/ week)</i>	<b>C</b>
<b>FIRST</b>	<b>FS</b>	MA 103	Mathematics - I	3	1	0	4
		CH101	Chemistry	3	1	0	4
	<b>GE</b>	EC101	Basic of Electronics and Communication Engineering	3	1	0	4
		ME101	Basic of Mechanical Engineering	3	1	0	4
	<b>FS</b>	CE101	Environmental Sciences	2	0	0	2
	<b>LABORATORIES</b>						
	<b>FS</b>	CH102	Chemistry Lab	0	0	3	1.5
	<b>GE</b>	EC102	Electronics and Communication Lab	0	0	3	1.5
		ME102	Engineering Graphics	0	0	4	2
	<b>MC</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>

SECO ND	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 TH	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(L EX, 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	AI323	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	AI324	Data Comm. & Computer Networks Lab	0	0	3

		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							
SEVENTH							
	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 Retrieval	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
	<b>PE5 (NO Lab)</b>	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