

2023-24



Vel Tech
Rangarajan Dr. Sagunthala
R&D Institute of Science and Technology
(Deemed to be University Estd. u/s 3 of UGC Act, 1956)
Chennai, Tamil Nadu
India



4th BoS Meeting

with effect from
27.05.2023

B.Tech - Artificial Intelligence & Machine Learning

B.Tech (VTR UGE-21) - Curriculum

CBCS - Choice Based Credit System

School of Computing



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Avadi, Chennai-600062, Tamil Nadu, India

B.TECH - ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

CURRICULUM

(CBCS)

Honors / Specialization / Minor

(With effect from 2021-2022)

Credits required for regular students in various course categories for B.Tech Artificial Intelligence and Machine Learning

Preamble:

Artificial Intelligence refers to machines that replicate human abilities, whereas Machine Learning refers to machines that are trained to learn how to process and use data; which is termed 'Machine Intelligence'. Machine intelligence enables complex and larger data to be processed and analyzed along with the desired results.

The students shall earn 164 credits in various course categories given below for the award of degree of B.Tech (AI and ML).

Course Category	Minimum Credits Required
Foundation Courses (FC)	56
Program Core (PC)	58
Program Elective (PE)	18
Open Elective (OE)	12
Independent Learning(IL)	14
Industry / Higher Institute Learning Interaction(IHL)	2
Professional Proficiency Courses (PPC)	4
TOTAL	164

Minimum credits required for regular students in various course categories for B.Tech Artificial Intelligence and Machine with minor

The students shall earn 164 credits in various course categories and additional 18 to 20 credits in the specialized tracks / areas from other branches/Schools by satisfying the prerequisite courses for the award of degree of B.Tech Artificial Intelligence and Machine Learning with minor subject to the regulations.



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Minimum credits required for regular students in various course categories for B.Tech Artificial Intelligence and Machine Learning with Honor

The students shall earn 164 credits in various course categories and additional 18 to 20 credits in the specialized tracks / areas courses by satisfying the prerequisite courses for the award of degree of B.Tech Artificial Intelligence and Machine Learning with Honors subject to the regulations.



Foundation Core (56 Credits)

Foundation courses enhance the knowledge, skills and attitude of UG engineering graduates of all programmes to the expected level. The foundation courses shall have the courses related to basic sciences and mathematics, basic engineering sciences and humanities and social sciences.

(L-Lecture, T-Tutorial, P-Practical, C-Credit)

S.No	Course Code	Subject Title	Category	L	T	P	C
Lecture Courses							
1	10210MA101	Linear Algebra for Computing	BSC	3	1	0	4
2	10210MA102	Calculus & Ordinary differential Equations	BSC	3	1	0	4
3	10210MA103	Probability, Statistics and Queuing theory	BSC	3	1	0	4
4	10210MA110	Discrete Mathematical Structures	BSC	3	1	0	4
5	10210PH101	Semiconductor Physics	BSC	3	0	0	3
6	10210CH103 (2021-2022) admitted batch only	Environmental Science	BSC	3	0	0	3
	10210CH104 (2022-2023) admitted batch onwards	Environmental Science and Sustainability	BSC	3	0	0	3
7	10210CS101	Problem Solving using C	ESC	3	0	0	3
8	10210CS103 (2021-2022) admitted batch only	Object Oriented Programming using C++	ESC	3	0	0	3
	10210CS104 (2022-2023) admitted batch onwards	Programming Using Python	ESC	3	0	0	3
9	10210ME101	Design thinking	ESC	2	0	0	2
10	10210BM101	Biology for Engineers	ESC	2	0	0	2
11	10210ME103	Innovation & Entrepreneurship	ESC	2	0	0	2
12	10210ME102	Universal Human Values	HSC	3	0	0	3
13	10210ME104	Project Management & Finance	HSC	2	0	0	2
14	10210ME105	Engineers and Society	HSC	1	0	0	M



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15	10210BL101	Constitution of India	HSC	1	0	0	M
Integrated Courses							
16	10210EN201	Professional Communication – I	HSC	1	0	2	2
17	10210EN202	Professional Communication – II	HSC	1	0	2	2
18	10210EC201	Basic Electronics & Digital Logic Design	ESC	2	0	2	3
19	10210EE204	Introduction to Engineering	ESC	1	0	4	3
20	10210ME201	Engineering Graphics	ESC	1	0	4	3
Laboratory Courses							
21	10210PH301	Modern Physics Laboratory	BSC	0	0	2	1
22	10210EE301	Engineering Products Lab	ESC	0	0	2	1
23	10210CS301	Problem Solving using C Lab	ESC	0	0	2	1
24	10210CS303 (2021-2022) admitted batch only	IT workshop	ESC	0	0	2	1
25	10210CS304 (2021-2022) admitted batch only	Object Oriented Programming using C++ Lab	ESC	0	0	2	1
	10210CS305 (2022-2023) admitted batch onwards	Programming Using Python Lab	ESC	0	0	2	1
Total Credits							56

*BSC – Basic Science Courses, ESC – Engineering Science Courses, HSC – Humanities & Social Science Courses, M – Mandatory course



Program Core (58 Credits)
(L-Lecture, T-Tutorial, P-Practical, C-Credit)

S.No	Course Code	Course Name	L	T	P	C
Theory Courses						
1	10211AM101	Data Structures	3	1	0	3
2	10211AM103	Operating Systems	3	0	0	3
3	10211AM104 (2021-2022) admitted batch only	Computer Architecture and Organization	3	0	0	3
	10211AM129 (2022-2023) admitted batch onwards	Modern Computer Architecture	3	0	0	3
4	10211AM108 (2021-2022) admitted batch only	Image Processing	2	0	0	2
	10211AM118 (2022-2023) admitted batch only	Image Processing Techniques	3	0	0	3
5	10211AM110	Optimization Techniques	3	1	0	3
6	10211AM113	Reinforcement Learning	3	0	0	3
Integrated Courses						
7	10211AM202	Design and Analysis of Algorithms	3	1	2	4
8	10211AM203	Programming using Java	2	1	2	3
9	10211AM205 (2021-2022) admitted batch only	Artificial Intelligence	2	0	2	3
	10211AM211 (2022-2023) admitted batch only	Artificial Intelligence Techniques	3	0	2	4
10	10211AM207	Database Management Systems	3	1	2	4
11	10211AM210	Big Data Analytics	3	0	2	4
12	10211AM213 (2021-2022) admitted batch only	Programming Using Python	1	1	2	2
13	10211AM223	Machine Learning Techniques	3	0	2	4
14	10211AM214	Data Visualization	3	0	2	4
15	10211AM215	Deep Learning	3	1	2	4
16	10211AM216	Natural Language Processing	3	0	2	4
Laboratory Courses						
17	10211AM301	Data Structures Laboratory	0	0	2	1
18	10211AM304	Operating Systems Laboratory	0	0	2	1
19	10211AM306	Competitive Coding-I	0	0	2	1
20	10211AM307	Competitive Coding-II	0	0	2	1
21	10211AM309	Robotic Process Automation Laboratory	0	0	2	1
Total Credits						58



Program Electives (18 Credits)

Program Electives are the courses offered in the programme which covers depth and breadth. The students may register for appropriate electives offered in the programme based on their area of interest. One course under this category shall be taken from the list of approved MOOCs.

(L-Lecture, T-Tutorial, P-Practical, C-Credit)

S. No	Course Code	Course Name	L	T	P	C
General Electives						
1	10212AM106	Formal Languages and Automata Theory	3	1	0	3
2	10212AM107	Compiler Design	3	1	0	3
3	10212AM208	Software Engineering	2	1	2	3
4	10212AM130	Fundamentals of Computer Networks	3	0	0	3
5	10212AM212	Web and Mobile Application Development	3	0	2	4
6	10212AM228	Blockchain Technology	2	0	2	3
7	10212AM229	IoT and Cloud Computing	3	0	2	4
Core Electives						
8	10212AM122	Cognitive Computing *	3	0	0	3
9	10212AM121	High Performance Computing	3	0	0	3
10	10212AM224	Computer vision	3	0	2	4
11	10212AM234	Time series and Forecasting*	3	0	2	4
12	10212AM124	Artificial Intelligence for Cyber Security*	3	0	0	3
13	10212AM233	Social Media Analytics*	3	0	2	4
*The proposed Course and the Course content are subject to approval/ratification in the upcoming BoS meetings						

Open Electives (12 Credits)

Open electives are the courses offered across the schools to enhance the knowledge breadth and professional competency of the students. The students shall register for appropriate electives offered in other schools based on their area of interest. The courses offered under this category cover the interdisciplinary knowledge.

(L-Lecture, T-Tutorial, P-Practical, C-Credit)

S.No	Course Code	Course Name	L	T	P	C
1	XXX1	Course Name-1	3	0	0	3
2	XXX2	Course Name-2	3	0	0	3
3	XXX3	Course Name-3	3	0	0	3
4	XXX4	Course Name-4	3	0	0	3



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*One of the courses may be completed through MOOCs platform like NPTEL as described by the department.

These courses offered to the other departments/schools by School of computing under Open Elective Category. **(L-Lecture, T-Tutorial, P-Practical, C-Credit)**

S.No	Course Code	Course Name	L	T	P	C
1	10213AM101	Object Oriented Programming using Java	3	0	0	3
2	10213AM102	Data Structures	3	0	0	3
3	10213AM103	Operating Systems	3	0	0	3
4	10213AM104	Database Management Systems	3	0	0	3
5	10213AM105	Computer Networks	3	0	0	3
6	10213AM106	Data warehousing and Data mining	3	0	0	3

The following courses are offered to the other departments/schools by School of Computing under Open Elective category. The students will solve the problems posted by Leet Code Platform, the grades will be offered based on the scores secured by the students by solving the problems posted in Leet Code Platform.

S.No	Course Code	Course Name	L	T	P	C
1	10213GE301	Programming Challenges	0	1	4	2

Independent Learning (14 Credits)

The students are expected to learn the courses offered under this category on their own. The courses offered under this category include:

(L-Lecture, T-Tutorial, P-Practical, C-Credit)

S.No	Course Code	Course Name	L	T	P	C
1	10214AM501	Community Service Project	-	-	-	1
2	10214AM601	Minor Project	0	0	4	2
3	10214AM602	Minor Project	0	0	4	2
4	10214AM701	Major Project	-	-	-	9
Total						14



Industry / Higher Institute Learning Interaction (2 Credits)

The students shall earn a minimum of two credits by undergoing internship and/or specialized courses.

1. Internship:

The students shall undergo Internship in the industry/higher learning institute approved by Industry-Institute Interaction Cell (IIC) during any time after the second academic year.

2. Specialized Courses:

The students shall undergo the courses offered either by the industrial experts whose minimum academic qualification is Bachelor of Engineering or equivalent or faculty expert from higher learning institutions approved by IIC. The students shall choose either one two credits course or one credit course or two one credit courses.

S.No	Course Code	Course Name	L	T	P	C
1	10215AM901	Internship	-	-	-	2
2	10215AM902	Industry Expert Lecture-1	-	-	-	1
3	10215AM903	Industry Expert Lecture-2	-	-	-	1
4	10215AM951	Higher Institute Learning Interaction-1	-	-	-	1
5	10215AM952	Higher Institute Learning Interaction-2	-	-	-	1

Professional Proficiency Courses (4 Credits)

The Professional Proficiency Courses which carry four credits, to be offered in four different semesters, starting from third semester. These courses offered in this category are relevant to professional proficiency.

S.No	Course Code	Course Name	L	T	P	C
1	10216GE901	Soft Skill-I	2	0	0	1
2	10216GE902	Soft Skill-II	2	0	0	1
3		Professional Proficiency Course-III	2	0	0	1
4		Professional Proficiency Course-IV	2	0	0	1