School of Computer Science Engineering and Information Systems

CURRICULUM AND SYLLABI

(2024-2025)

B.TECH CSE (ARTIFICIAL INTELLIGENCE AND DATA ENGINEERING)

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School of Computer Science Engineering and Information Systems

B. Tech. Computer Science and Engineering

(Artificial Intelligence and Data Engineering)

VISION STATEMENT OF VELLORE INSTITUTE OF TECHNOLOGY

- Transforming life through excellence in education and research.

MISSION STATEMENT OF VELLORE INSTITUTE OF TECHNOLOGY

- **World class Education**: Excellence in education, grounded in ethics and critical thinking, for improvement of life.

- **Cutting edge Research**: An innovation ecosystem to extend knowledge and solve critical problems.

- **Impactful People**: Happy, accountable, caring and effective workforce and students.

- **Rewarding Co-creations**: Active collaboration with national & international industries & universities for productivity and economic development.

- **Service to Society**: Service to the region and world through knowledge and compassion.

School of Computer Science Engineering and Information Systems

B. Tech. Computer Science and Engineering

(Artificial Intelligence and Data Engineering)

VISION STATEMENT OF THE SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS

- To provide transformative education through innovative teaching, extensive research and services in computer science and information systems.

MISSION STATEMENT OF THE SCHOOL OF COMPUTER SCIENCE ENGINEERING AND INFORMATION SYSTEMS

- Strengthen the core competency to solve real world problems and instill the notion of lifelong learning in the field of computer science and information systems.

- Sustain an ecosystem for impactful research and innovation through collaborations and extension activities.

- Create ethically strong leaders and entrepreneurs for the advancement of the society.

School of Computer Science Engineering and Information Systems

B. Tech. Computer Science and Engineering

(Artificial Intelligence and Data Engineering)

PROGRAMME OUTCOMES (PEOs)

1) Graduates will be engineering practitioners and leaders, who would help solve industry's technological problems.

2) Graduates will be engineering professionals, innovators or entrepreneurs engaged in technology development, technology deployment, or engineering system implementation in industry.

3) Graduates will function in their profession with social awareness and responsibility.

4) Graduates will interact with their peers in other disciplines in industry and society and contribute to the economic growth of the country.

5) Graduates will be successful in pursuing higher studies in engineering or management.

6) Graduates will pursue career paths in teaching or research.

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PROGRAMME OUTCOMES (POs)

PO_01: Having an ability to apply mathematics and science in engineering applications.

PO_02: Having a clear understanding of the subject related concepts and of contemporary issues and apply them to identify, formulate and analyse complex engineering problems

PO_03: Having an ability to design a component or a product applying all the relevant standards and with realistic constraints.

PO_04: Having an ability to design and conduct experiments, as well as to analyse and interpret data

PO_05: Having an ability to use techniques, skills, resources and modern engineering tools necessary for engineering practice

PO_06: Having problem solving ability- solving social issues and engineering problems

PO_07: Having adaptive thinking and adaptability

PO_08: Having a clear understanding of professional and ethical responsibility

PO_09: Having cross cultural competency exhibited by working in teams

PO_10: Having a good working knowledge of communicating in English

PO_11: Having a good cognitive load management [discriminate and filter the available data] skills

PO_12: Having interest in lifelong learning

School of Computer Science Engineering and Information Systems

B. Tech. Computer Science and Engineering

(Artificial Intelligence and Data Engineering)

PROGRAMME OUTCOMES (PSOs)

➢ Apply the implication of artificial intelligence and data engineering techniques to provide solutions for real world problems

➢ Explore the practical aspects of artificial intelligence for leveraging pattern driven decision making capabilities

➢ Develop AI powered intelligent analytical solutions for a sustainable smart society

B.Tech Computer Science Engineering

(Artificial Intelligence and Data Engineering)

CURRICULUM

CREDIT STRUCTURE

CREDIT INFO		
S.No	**Category**	**Credits**
1	Foundation Core	53
2	Discipline linked Engineering Sciences	12
3	Discipline Core	47
4	Specialization Elective	21
5	Projects and Internship	9
6	Open Elective	9
7	Bridge Course	0
8	Non-graded Core Requirement	11
	Total Credits	**162**

		Foundation Core						
S.No	**Course Code**	**Course Title**	**Course Type**	**Version**	**L**	**T**	**P**	**C**
1	BCHY101L	Engineering Chemistry	Theory Only	1.0	3	0	0	3
2	BCHY101P	Engineering Chemistry Lab	Lab Only	1.0	0	0	2	1
3	BCSE101E	Computer Programming: Python	Embedded Theory and Lab	1.0	1	0	4	3
4	BCSE102L	Structured and Object-Oriented Programming	Theory Only	1.0	2	0	0	2
5	BCSE102P	Structured and Object-Oriented Programming Lab	Lab Only	1.0	0	0	4	2
6	BCSE103E	Computer Programming: Java	Embedded Theory and Lab	1.0	1	0	4	3
7	BEEE102L	Basic Electrical and Electronics Engineering	Theory Only	1.0	3	0	0	3
8	BEEE102P	Basic Electrical and Electronics Engineering Lab	Lab Only	1.0	0	0	2	1
9	BENG101L	Technical English Communication	Theory Only	1.0	2	0	0	2
10	BENG101P	Technical English Communication Lab	Lab Only	1.0	0	0	2	1
11	BENG102P	Technical Report Writing	Lab Only	1.0	0	0	2	1
12	BFLE200L	B.Tech. Foreign Language - 2021onwards	Basket	1.0	2	0	0	2
13	BHSM200L	B.Tech. HSM Elective - 2021 onwards	Basket	1.0	3	0	0	3
14	BMAT101L	Calculus	Theory Only	1.0	3	0	0	3
15	BMAT101P	Calculus Lab	Lab Only	1.0	0	0	2	1
16	BMAT102L	Differential Equations and Transforms	Theory Only	1.0	3	1	0	4
17	BMAT201L	Complex Variables and Linear Algebra	Theory Only	1.0	3	1	0	4
18	BMAT202L	Probability and Statistics	Theory Only	1.0	3	0	0	3
19	BMAT202P	Probability and Statistics Lab	Lab Only	1.0	0	0	2	1
20	BPHY101L	Engineering Physics	Theory Only	1.0	3	0	0	3
21	BPHY101P	Engineering Physics Lab	Lab Only	1.0	0	0	2	1
22	BSTS101P	Quantitative Skills Practice I	Soft Skill	1.0	0	0	3	1.5
23	BSTS102P	Quantitative Skills Practice II	Soft Skill	1.0	0	0	3	1.5
24	BSTS201P	Qualitative Skills Practice I	Soft Skill	1.0	0	0	3	1.5
25	BSTS202P	Qualitative Skills Practice II	Soft Skill	1.0	0	0	3	1.5

Discipline linked Engineering Sciences

S.No	Course Code	Course Title	Course Type	Version	L	T	P	C
1	BECE102L	Digital Systems Design	Theory Only	1.0	3	0	0	3
2	BECE102P	Digital Systems Design Lab	Lab Only	1.0	0	0	2	1
3	BECE204L	Microprocessors and Microcontrollers	Theory Only	1.0	3	0	0	3
4	BECE204P	Microprocessors and Microcontrollers Lab	Lab Only	1.0	0	0	2	1
5	BMAT205L	Discrete Mathematics and Graph Theory	Theory Only	1.0	3	1	0	4

Discipline Core

S.No	Course Code	Course Title	Course Type	Version	L	T	P	C
1	BCSE202L	Data Structures and Algorithms	Theory Only	1.0	3	0	0	3
2	BCSE202P	Data Structures and Algorithms Lab	Lab Only	1.0	0	0	2	1
3	BCSE203E	Web Programming	Embedded Theory and Lab	1.0	1	0	4	3
4	BCSE204L	Design and Analysis of Algorithms	Theory Only	1.0	3	0	0	3
5	BCSE204P	Design and Analysis of Algorithms Lab	Lab Only	1.0	0	0	2	1
6	BCSE205L	Computer Architecture and Organization	Theory Only	1.0	3	0	0	3
7	BCSE301L	Software Engineering	Theory Only	1.0	3	0	0	3
8	BCSE301P	Software Engineering Lab	Lab Only	1.0	0	0	2	1
9	BCSE302L	Database Systems	Theory Only	1.0	3	0	0	3
10	BCSE302P	Database Systems Lab	Lab Only	1.0	0	0	2	1
11	BCSE303L	Operating Systems	Theory Only	1.0	3	0	0	3
12	BCSE303P	Operating Systems Lab	Lab Only	1.0	0	0	2	1
13	BCSE304L	Theory of Computation	Theory Only	1.0	3	0	0	3
14	BCSE305L	Embedded Systems	Theory Only	1.0	3	0	0	3
15	BCSE306L	Artificial Intelligence	Theory Only	1.0	3	0	0	3
16	BCSE308L	Computer Networks	Theory Only	1.0	3	0	0	3
17	BCSE308P	Computer Networks Lab	Lab Only	1.0	0	0	2	1
18	BCSE309L	Cryptography and Network Security	Theory Only	1.0	3	0	0	3
19	BCSE309P	Cryptography and Network Security Lab	Lab Only	1.0	0	0	2	1
20	BCSE339L	Data Engineering Fundamentals	Theory Only	1.0	3	0	0	3
21	BCSE339P	Data Engineering Fundamentals Lab	Lab Only	1.0	0	0	2	1

Specialization Elective

S.No	Course Code	Course Title	Course Type	Version	L	T	P	C
1	BCSE209L	Machine Learning	Theory Only	1.0	3	0	0	3
2	BCSE209P	Machine Learning Lab	Lab Only	1.0	0	0	2	1
3	BCSE307L	Compiler Design	Theory Only	1.0	3	0	0	3
4	BCSE307P	Compiler Design Lab	Lab Only	1.0	0	0	2	1
5	BCSE332L	Deep Learning	Theory Only	1.0	3	0	0	3
6	BCSE332P	Deep Learning Lab	Lab Only	1.0	0	0	2	1
7	BCSE407L	Computer Vision	Theory Only	1.0	3	0	0	3
8	BCSE409L	Natural Language Processing	Theory Only	1.0	3	0	0	3
9	BCSE418L	Explainable Artificial Intelligence	Theory Only	1.0	2	0	0	2
10	BCSE433L	Cloud Platforms and Services	Theory Only	1.0	2	0	0	2
11	BCSE433P	Cloud Platforms and Services Lab	Lab Only	1.0	0	0	2	1
12	BCSE434L	Generative Artificial Intelligence and Large Language Models	Theory Only	1.0	2	0	0	2
13	BCSE434P	Generative Artificial Intelligence and Large Language Models Lab	Lab Only	1.0	0	0	2	1
14	BCSE435L	Time Series Analysis and Forecasting Techniques	Theory Only	1.0	2	0	0	2
15	BCSE435P	Time Series Analysis and Forecasting Techniques Lab	Lab Only	1.0	0	0	2	1
16	BCSE436L	Data Visualization and Analytics	Theory Only	1.0	3	0	0	3
17	BCSE436P	Data Visualization and Analytics Lab	Lab Only	1.0	0	0	2	1

Projects and Internship

S.No	Course Code	Course Title	Course Type	Version	L	T	P	C
1	BCSE399J	Summer Industrial Internship	Project	1.0	0	0	0	1
2	BCSE497J	Project – I	Project	1.0	0	0	0	3
3	BCSE498J	Project - II / Internship	Project	1.0	0	0	0	5
4	BCSE499J	One Semester Internship	Project	1.0	0	0	0	14

Open Elective

S.No	Course Code	Course Title	Course Type	Version	L	T	P	C
1	BECE320E	Embedded C Programming	Embedded Theory and Lab	1.0	2	0	2	3
2	BHUM201L	Mass Communication	Theory Only	1.0	3	0	0	3
3	BHUM202L	Rural Development	Theory Only	1.0	3	0	0	3
4	BHUM203L	Introduction to Psychology	Theory Only	1.0	3	0	0	3
5	BHUM204L	Industrial Psychology	Theory Only	1.0	3	0	0	3
6	BHUM205L	Development Economics	Theory Only	1.0	3	0	0	3
7	BHUM206L	International Economics	Theory Only	1.0	3	0	0	3
8	BHUM207L	Engineering Economics	Theory Only	1.0	3	0	0	3
9	BHUM208L	Economics of Strategy	Theory Only	1.0	3	0	0	3
10	BHUM209L	Game Theory	Theory Only	1.0	3	0	0	3
11	BHUM210E	Econometrics	Embedded Theory and Lab	1.0	2	0	2	3
12	BHUM211L	Behavioral Economics	Theory Only	1.0	3	0	0	3
13	BHUM212L	Mathematics for Economic Analysis	Theory Only	1.0	3	0	0	3
14	BHUM213L	Corporate Social Responsibility	Theory Only	1.0	3	0	0	3
15	BHUM214L	Political Science	Theory Only	1.0	3	0	0	3
16	BHUM215L	International Relations	Theory Only	1.0	3	0	0	3
17	BHUM216L	Indian Culture and Heritage	Theory Only	1.0	3	0	0	3
18	BHUM217L	Contemporary India	Theory Only	1.0	3	0	0	3
19	BHUM218L	Financial Management	Theory Only	1.0	3	0	0	3
20	BHUM219L	Principles of Accounting	Theory Only	1.0	3	0	0	3
21	BHUM220L	Financial Markets and Institutions	Theory Only	1.0	3	0	0	3
22	BHUM221L	Economics of Money, Banking and Financial Markets	Theory Only	1.0	3	0	0	3
23	BHUM222L	Security Analysis and Portfolio Management	Theory Only	1.0	3	0	0	3
24	BHUM223L	Options , Futures and other Derivatives	Theory Only	1.0	3	0	0	3
25	BHUM224L	Fixed Income Securities	Theory Only	1.0	3	0	0	3
26	BHUM225L	Personal Finance	Theory Only	1.0	3	0	0	3
27	BHUM226L	Corporate Finance	Theory Only	1.0	3	0	0	3
28	BHUM227L	Financial Statement Analysis	Theory Only	1.0	3	0	0	3
29	BHUM228L	Cost and Management Accounting	Theory Only	1.0	3	0	0	3
30	BHUM229L	Mind, Embodiment and Technology	Theory Only	1.0	3	0	0	3
31	BHUM230L	Health Humanities in Biotechnological Era	Theory Only	1.0	3	0	0	3
32	BSTS301P	Advanced Competitive Coding - I	Soft Skill	1.0	0	0	3	2
33	BSTS302P	Advanced Competitive Coding - II	Soft Skill	1.0	0	0	3	2

Bridge Course

S.No	Course Code	Course Title	Course Type	Version	L	T	P	C
1	BENG101N	Effective English Communication	Lab Only	1.0	0	0	4	2

Non-graded Core Requirement

S.No	Course Code	Course Title	Course Type	Version	L	T	P	C
1	BCHY102N	Environmental Sciences	Online Course	1.0	0	0	0	2
2	BCSE101N	Introduction to Engineering	Project	1.0	0	0	0	1
3	BEXC100N	Extracurricular Activities / Co-Curricular Activities - B.Tech. Programmes	Basket	1.0	0	0	0	2
4	BHUM101N	Ethics and Values	Online Course	1.0	0	0	0	2
5	BSSC101N	Essence of Traditional Knowledge	Online Course	1.0	0	0	0	2
6	BSSC102N	Indian Constitution	Online Course	1.0	0	0	0	2