

DAYANANDA SAGAR UNIVERSITY

SCHOOL OF ENGINEERING



**SCHEME FOR
BACHELOR OF TECHNOLOGY (B. Tech)**

**COMPUTER SCIENCE & ENGINEERING
(Artificial Intelligence & Machine Learning)
(1st to 8th Semester)**

Graduation Year: 2022-2026

(With effect from 2022-23)



Dayananda Sagar University
School of Engineering



Devarakagalahalli, Harohalli, Kanakapura Road, Ramanagara Dt., Bengaluru- 562112

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
(Artificial Intelligence & Machine Learning)

Total Credits

Sl. No	Semester	Credits
1	1 st semester	21
2	2 nd semester	21
3	3 rd semester	20
4	4 th semester	22
5	5 th semester	25
6	6 th semester	24
7	7 th semester	14
8	8 th semester	14
Total		161

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(Artificial Intelligence & Machine Learning)

I SEM - CHEMISTRY CYCLE



SL	PROGRAM CODE	COURSE CODE	COURSE TITLE	CR / AU	SCHEME OF TEACHING					PREREQUISITE	
					L	T	P	S/P	C	SEM	COURSE CODE
1	101-105 & 121-123	22EN1101	LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS	CR	3	-	-	-	3	*	***
2	101-105 & 121-123	22EN1102	C PROGRAMMING FOR PROBLEM SOLVING	CR	2	-	2	-	3	*	***
3	101-105 & 121-123	22EN1103	ENGINEERING CHEMISTRY	CR	3	-	2	-	4	*	***
4	101-105 & 121-123	22EN1104	ELEMENTS OF MECHANICAL ENGINEERING	CR	2	-	2	-	3	*	***
5	101-105 & 121-123	22EN1105	INTRODUCTION TO ELECTRICAL ENGINEERING	CR	3	-	-	-	3	*	***
6	101-105 & 121-123	22EN1106	BIOLOGY FOR ENGINEERS	CR	3	-	-	-	3	*	***
7	101-105 & 121-123	22EN1107	CONSTITUTION OF INDIA AND PROFESSIONAL ETHICS	CR	1	-	-	-	1	*	***
8	101-105 & 121-123	22EN1108	KANNADA KALI / MANASU	CR	1	-	-	-	1	*	***
			Total		18	-	06	-	21		

CR – Credit, AU – Audit, L – Lecture, T – Tutorial, P – Practical, S/P – Seminar/Project, C – No. of Credits

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

(Artificial Intelligence & Machine Learning)

I-SEM - PHYSICS CYCLE



SL	PROGRAM CODE	COURSE CODE	COURSE TITLE	CR / AU	SCHEME OF TEACHING					PREREQUISITE	
					L	T	P	S/P	C	SEM	COURSE CODE
1	101-105 & 121-123	22EN1101	LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS	CR	3	-	-	-	3	*	***
2	101-105 & 121-123	22EN1102	C PROGRAMMING FOR PROBLEM SOLVING	CR	2	-	2	-	3	*	***
3	101-105 & 121-123	22EN1109	ENGINEERING PHYSICS	CR	3	-	2	-	4	*	***
4	101-105 & 121-123	22EN1110	ENGINEERING MECHANICS	CR	3	-	-	-	3	*	***
5	101-105 & 121-123	22EN1111	INTRODUCTION TO ELECTRONICS	CR	3	-	-	-	3	*	***
6	101-105 & 121-123	22EN1112	ENGINEERING GRAPHICS AND DESIGN THINKING	CR	2	-	2	-	3	*	***
7	101-105 & 121-123	22EN1113	ENVIRONMENTAL SCIENCE	CR	1	-	-	-	1	*	***
8	101-105 & 121-123	22EN1114	TECHNICAL ENGLISH	CR	1	-	-	-	1	*	***
Total					18	-	06	-	21		

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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II SEM - CHEMISTRY CYCLE



SL	PROGRAM CODE	COURSE CODE	COURSE TITLE	CR / AU	SCHEME OF TEACHING					PREREQUISITE	
					L	T	P	S/P	C	SEM	COURSE CODE
1	101-105 & 121-123	22EN1201	SINGLE AND MULTIVARIATE CALCULUS	CR	3	-	-	-	3	*	***
2	101-105 & 121-123	22EN1202	PYTHON PROGRAMMING FOR PROBLEM SOLVING	CR	2	-	2	-	3	*	***
3	101-105 & 121-123	22EN1103	ENGINEERING CHEMISTRY	CR	3	-	2	-	4	*	***
4	101-105 & 121-123	22EN1104	ELEMENTS OF MECHANICAL ENGINEERING	CR	2	-	2	-	3	*	***
5	101-105 & 121-123	22EN1105	INTRODUCTION TO ELECTRICAL ENGINEERING	CR	3	-	-	-	3	*	***
6	101-105 & 121-123	22EN1106	BIOLOGY FOR ENGINEERS	CR	3	-	-	-	3	*	***
7	101-105 & 121-123	22EN1107	CONSTITUTION OF INDIA AND PROFESSIONAL ETHICS	CR	1	-	-	-	1	*	***
8	101-105 & 121-123	22EN1108	KANNADA KALI / MANASU	CR	1	-	-	-	1	*	***
			Total		18	-	06	-	21		

SL	PROGRAM CODE	COURSE CODE	COURSE TITLE	CR / AU	SCHEME OF TEACHING					PREREQUISITE	
					L	T	P	S/P	C	SEM	COURSE CODE
1	101-105 & 121-123	22EN1201	SINGLE AND MULTIVARIATE CALCULUS	CR	3	-	-	-	3	*	***
2	101-105 & 121-123	22EN1202	PYTHON PROGRAMMING FOR PROBLEM SOLVING	CR	2	-	2	-	3	*	***
3	101-105 & 121-123	22EN1109	ENGINEERING PHYSICS	CR	3	-	2	-	4	*	***
4	101-105 & 121-123	22EN1110	ENGINEERING MECHANICS	CR	3	-	-	-	3	*	***
5	101-105 & 121-123	22EN1111	INTRODUCTION TO ELECTRONICS	CR	3	-	-	-	3	*	***
6	101-105 & 121-123	22EN1112	ENGINEERING GRAPHICS AND DESIGN THINKING	CR	2	-	2	-	3	*	***
7	101-105 & 121-123	22EN1113	ENVIRONMENTAL SCIENCE	CR	1	-	-	-	1	*	***
8	101-105 & 121-123	22EN1114	TECHNICAL ENGLISH	CR	1	-	-	-	1	*	***
			Total		18	-	06	-	21		

III SEMESTER													
SL	Course Type	Course Code	Course Name	Teaching Department	Teaching Hours / Week				Examination				
					Lecture	Tutorial	Practical	Project	Duration in Hours	CIE Marks	SEE Marks	Total Marks	Credits
					L	T	P	J					
1	IPCC / PCC	22AM2301	Transform and Numerical Techniques	MA T	3	0	0	0	03	60	40	100	03
2	IPCC / PCC	22AM2302	Data Structures	CSE	3	0	2	0	03	60	40	100	04
3	IPCC / PCC	22AM2303	Digital Logic Design	ECE	3	0	2	0	03	60	40	100	04
4	IPCC / PCC	22AM2304	Discrete Mathematics and Graph Theory	CSE	3	0	0	0	03	60	40	100	03
5	OEC	22AM2305	Artificial Intelligence	AI& ML	3	0	0	0	03	60	40	100	03
6	PEC	22LS23XX	Liberal Studies	Not Specific	1	0	0	0	01	100	--	100	01
7	SEC	22AM2306	Skill Enhancement – I	AI& ML	1	0	2	0	01	100	--	100	02
			Total		17	0	6	0					20

BSC-Basic Science Courses, IPCC-Integrated Professional Core Course, PCC-Professional Core Courses, SEC-Skill Enhancement Courses, PEC-Professional Elective Courses, CR – Credit, AU – Audit, L – Lecture, T – Tutorial, P – Practical, S/P – Seminar/Project, C – No. Of Credits

LIBERAL STUDIES LIST - B.TECH PROGRAMME – 2022-23 Batch

Sl. No.	Course Code	Course Title	Offering dept
1	22LS0001	INTRODUCTION TO DRAMA	Any department
2	22LS0002	INTRODUCTION TO DANCE	
3	22LS0003	INTRODUCTION TO MUSIC	
4	22LS0004	INTRODUCTION TO PHOTOGRAPHY	
5	22LS0005	INTRODUCTION TO JAPANESE LANGUAGE	
6	22LS0006	LAW FOR ENGINEERS	
7	22LS0007	INTRODUCTION TO PAINTING	
8	22LS0008	COMMUNICATION THROUGH SANSKRIT	
9	22LS0009	VEDIC MATHEMATICS	
10	22LS0010	FUNDAMENTALS OF CRITICAL THINKING	
11	22LS0011	INTRODUCTION TO FILM STUDIES	
12	22LS0012	PRACTICING YOGA & MEDITATION	
13	22LS0013	CYBER CRIMES, POLICIES & LAWS	
14	22LS0014	INTRODUCTION TO GERMAN LANGUAGE	

IV SEM - CSE(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

IV SEMESTER													
SL	Course Type	Course Code	Course Name	Teaching Department	Teaching Hours / Week				Examination				
					Lecture	Tutorial	Practical	Project	Duration in Hours	CIE Marks	SEE Marks	Total Marks	Credits
					L	T	P	J					
1	BSC	22AM2401	Probability & Statistics	MA T	3	0	0	0	03	60	40	100	03
2	IPCC	22AM2402	Design and Analysis of Algorithms	CSE	3	0	2	0	03	60	40	100	04
3	PCC	22AM2403	Database Management System	CSE	3	0	2	0	03	60	40	100	04
4	PCC	22AM2404	Embedded Systems Design	ECE	3	0	2	0	03	60	40	100	04
5	IPCC	22AM2405	Computer Organization and Architecture	CSE	3	0	0	0	03	60	40	100	03
6	AEC	22AM2406	Special Topic	AI& ML	0	0	0	4	02	100	--	100	02
7	SEC	22AM2407	Skill Enhancement Course -II	AI& ML	1	0	2	0	01	100	--	100	02
			Total		16	0	8	4					22

BSC-Basic Science Courses, IPCC-Integrated Professional Core Course, PCC-Professional Core Courses, SEC-Skill Enhancement Courses, PEC-Professional Elective Courses, CR – Credit, AU – Audit, L – Lecture, T – Tutorial, P – Practical, S/P – Seminar/Project, C – No. Of Credits

SL	Course Type	Course Code	Course Name	Teaching Hours / Week				Examination			
				Lecture	Tutorial	Practical	Project	CIE Marks	SEE Marks	Total Marks	Credits
				L	T	P	J				
1	IPCC / PCC	22AM3501	Machine Learning	3	0	2	0	60	40	100	04
2	IPCC / PCC	22AM3502	Operating Systems	3	0	2	0	60	40	100	04
3	IPCC / PCC	22AM3503	Theory of Computation	3	1	0	0	60	40	100	04
4	IPCC / PCC	22AM3504	Computer Networks	3	0	2	0	60	40	100	04
5	SEC	22AM3505	Skill Enhancement Course - III	1	0	2	0	100	--	100	02
6	PEC	22AM35XX	Professional Elective Course -I	3	0	0	0	60	40	100	03
7	PROJ	22AM3506	Minor Project	0	0	0	4	100	--	100	02
8	AEC	22AM3507	Cognitive and Technical Skills - I	0	0	4	0	100	--	100	02
			Total	16	1	12	4				25

BSC-Basic Science Courses, IPCC-Integrated Professional Core Course, AEC-Ability Enhancement Course, PCC-Professional Core Courses, SEC-Skill Enhancement Courses, PEC-Professional Elective Courses, CR – Credit, AU – Audit, L – Lecture, T – Tutorial, P – Practical, S/P – Seminar/Project, C – No. Of Credits

SL	Course Type	Course Code	Course Name	Teaching Hours / Week				Examination			
				Lecture	Tutorial	Practical	Project	CIE Marks	SEE Marks	Total Marks	Credits
				L	T	P	J				
1	HSMC	22AM3601	Innovation and Entrepreneurship	2	0	0	0	60	40	100	02
2	IPCC / PCC	22AM3602	Deep Learning	3	0	0	0	60	40	100	03
3	IPCC / PCC	22AM3603	Compiler Design and System Software	3	0	2	0	60	40	100	04
4	IPCC / PCC	22AM3604	Image Processing and Computer Vision	3	0	2	0	60	40	100	04
5	PEC	22AM36XX	Professional Elective Course – II	3	0	0	0	60	40	100	03
6	PEC	22AM36XX	Professional Elective Course – III	3	0	0	0	60	40	100	03
7	OEC	22OEXXX	Open Elective – I	3	0	0	0	60	40	100	03
8	AEC	22AM3605	Cognitive and Technical Skills - II	0	0	4	0	100	--	100	02
			Total	20	0	8	0				24

HSMC- Humanities and Social Sciences including Management Courses, IPCC-Integrated Professional Core Course, PCC-Professional Core Courses, AEC-Ability Enhancement Course, SEC-Skill Enhancement Courses, PEC-Professional Elective Courses, OEC-Open Elective Courses, PROJ-Project Work, INT-Internship, CR – Credit, AU – Audit, L – Lecture, T – Tutorial, P – Practical, S/P – Seminar/Project, C – No. Of Credits

SL	Course Type	Course Code	Course Name	Teaching Hours / Week				Examination			
				Lecture	Tutorial	Practical	Project	CIE Marks	SEE Marks	Total Marks	Credits
				L	T	P	J				
1	SEC	22AM4701	Skill Enhancement – IV	1	0	2	0	100	--	100	02
2	PROJ	22AM4702	Capstone Project Phase-I	0	0	0	6	100	--	100	03
3	PEC	22AM47XX	Professional Elective Course – IV	3	0	0	0	60	40	100	03
4	PEC	22AM47XX	Professional Elective Course – V/ MOOC course	3	0	0	0	60	40	100	03
5	OEC	22OEXXXX	Open Elective – II	3	0	0	0	60	40	100	03
			Total	12	0	0	6				14

CID* - NPTEL COURSE ID

HSMC- Humanities and Social Sciences including Management Courses, IPCC-Integrated Professional Core Course, PCC-Professional Core Courses, SEC-Skill Enhancement Courses, PEC-Professional Elective Courses, OEC-Open Elective Courses, PROJ-Project Work, INT-Internship, CR – Credit, AU – Audit, L – Lecture, T – Tutorial, P – Practical, S/P – Seminar/Project, C – No. Of Credits

SL	Course Type	Course Code	Course Name	Teaching Hours / Week				Examination			
				Lecture	Tutorial	Practical	Project	CIE Marks	SEE Marks	Total Marks	Credits
				L	T	P	J				
1	PROJ	22AM4801	Capstone Project Phase-II	0	0	0	22	100	--	100	11
2	INT	22AM4802	Research Internship/ Industry Internship	0	0	0	6	100	--	100	03
			Total	0	0	0	28				14

HSMC- Humanities and Social Sciences including Management Courses, IPCC-Integrated Professional Core Course, PCC-Professional Core Courses, SEC-Skill Enhancement Courses, PEC-Professional Elective Courses, OEC-Open Elective Courses, PROJ-Project Work,INT-Internship, CR – Credit, AU – Audit, L – Lecture, T – Tutorial, P – Practical, S/P – Seminar/Project, C – No. Of Credits

Skill Enhancement Courses (SEC)												
SL	Course Type	Year/ Semester	Course Code	Course Name	Teaching Hours / Week				Examination			
					Lecture	Tutorial	Practical	Project	CIE Marks	SEE Marks	Total Marks	Credits
					L	T	P	J				
1	SEC	II/III	22AM2306	Skill Enhancement – I (JAVA Programming)	1	0	2	0	100	--	100	02
2	SEC	II/IV	22AM2407	Skill Enhancement Course -II (Unix And Shell Programming)	1	0	2	0	100	--	100	02
3	SEC	III/V	22AM3505	Skill Enhancement Course – III (Web Development)	1	0	2	0	100	--	100	02
4	SEC	IV/VII	22AM4701	Skill Enhancement Course – IV (Designing MLOps For Enterprises)	1	0	2	0	100	--	100	02

S. No	Domain wise	Domain Clusters	PROFESSIONAL ELECTIVE COURSES									
			PEC-I		PEC-II		PEC-III		PEC-IV		PEC-V	
			5 th Semester		6 th Semester				7 th Semester			
			Course Code	Course Name	Course Code	Course Name	Course Code	Course Name	Course Code	Course Name	Course Code	Course Name
1	Domain-1	AI and Language Perceptions	22AM3508	Pattern Recognition	22AM3606	Explainable AI	22AM3610	Natural Language Models	22AM4703	AI Ethics	22AM4707	Generative AI
2	Domain-2	Robotics and Automation	22AM3509	Fundamental of Robotics	22AM3607	Reinforcement Learning	22AM3611	Robot Operating System (ROS)	22AM4704	Industry 5.0	22AM4708	Robotics and Automation Application
3	Domain-3	Architecture and Security	22AM3510	Fundamentals of IoT	22AM3608	Cryptography & Network Security	22AM3612	GPU Architecture	22AM4705	Quantum Computing	22AM4709	Blockchain Technology
4	Domain-4	Data Analytics	22AM3511	Data Science & Analytics	22AM3609	Predictive Analytics	22AM3613	Financial Technology (FinTech)	22AM4706	Big Data Analytics	22AM4710	UG Research Project

Professional Elective Courses Offering (PEC-I)											
SL	Course Type	Course Code	Course Name	Teaching Hours / Week				Examination			
				Lecture	Tutorial	Practical	Project	CIE Marks	SEE Marks	Total Marks	Credits
				L	T	P	J				
1	PEC	22AM3508	Pattern Recognition	3	0	0	0	60	40	100	03
2	PEC	22AM3509	Fundamentals of Robotics	3	0	0	0	60	40	100	03
3	PEC	22AM3510	Fundamentals of IoT	3	0	0	0	60	40	100	03
4	PEC	22AM3511	Data Science & Analytics	3	0	0	0	60	40	100	03

Professional Elective Courses Offering (PEC-II)											
SL	Course Type	Course Code	Course Name	Teaching Hours / Week				Examination			
				Lecture	Tutorial	Practical	Project	CIE Marks	SEE Marks	Total Marks	Credits
				L	T	P	J				
1	PEC	22AM3606	Explainable AI	3	0	0	0	60	40	100	03
2	PEC	22AM3607	Reinforcement Learning	3	0	0	0	60	40	100	03
3	PEC	22AM3608	Cryptography & Network Security	3	0	0	0	60	40	100	03
4	PEC	22AM3609	Predictive Analytics	3	0	0	0	60	40	100	03

Professional Elective Courses Offering (PEC-III)											
SL	Course Type	Course Code	Course Name	Teaching Hours / Week				Examination			
				Lecture	Tutorial	Practical	Project	CIE Marks	SEE Marks	Total Marks	Credits
				L	T	P	J				
1	PEC	22AM3610	Natural Language Models	3	0	0	0	60	40	100	03
2	PEC	22AM3611	Robot Operating System (ROS)	3	0	0	0	60	40	100	03
3	PEC	22AM3612	GPU Architecture	3	0	0	0	60	40	100	03
4	PEC	22AM3613	Financial Technology (FinTech)	3	0	0	0	60	40	100	03

Professional Elective Courses Offering (PEC-IV)											
SL	Course Type	Course Code	Course Name	Teaching Hours / Week				Examination			
				Lecture	Tutorial	Practical	Project	CIE Marks	SEE Marks	Total Marks	Credits
				L	T	P	J				
1	PEC	22AM4703	AI Ethics	3	0	0	0	60	40	100	03
2	PEC	22AM4704	Industry 5.0	3	0	0	0	60	40	100	03
3	PEC	22AM4705	Quantum Computing	3	0	0	0	60	40	100	03
4	PEC	22AM4706	Big Data Analytics	3	0	0	0	60	40	100	03

Professional Elective Courses Offering (PEC-V)											
SL	Course Type	Course Code	Course Name	Teaching Hours / Week				Examination			
				Lecture	Tutorial	Practical	Project	CIE Marks	SEE Marks	Total Marks	Credits
				L	T	P	J				
1	PEC	22AM4707	Generative AI	3	0	0	0	60	40	100	03
2	PEC	22AM4708	Robotics and Automation Application	3	0	0	0	60	40	100	03
3	PEC	22AM4709	Blockchain Technology	3	0	0	0	60	40	100	03
4	PEC	22AM4710	UG Research Project	3	0	0	0	60	40	100	03

OPEN ELECTIVE COURSES

Sl. No	Open Elective Courses		
	6 th Semester		7 th Semester
	OEC-I	OEC-I	OEC-II
1	Industrial Robotics 22OE0026	Machine Learning for Health Care 22OE0044	Responsible AI & Ethics 22OE0045

Open Elective Course Offering (OEC-I)											
SL	Course Type	Course Code	Course Name	Teaching Hours / Week				Examination			
				Lecture	Tutorial	Practical	Project	CIE Marks	SEE Marks	Total Marks	Credits
				L	T	P	J				
1	OEC	22OE0026	Industrial Robotics	3	0	0	0	60	40	100	03
2	OEC	22OE0044	Machine Learning for Health Care	3	0	0	0	60	40	100	03

Open Elective Course Offering (OEC-II)											
SL	Course Type	Course Code	Course Name	Teaching Hours / Week				Examination			
				Lecture	Tutorial	Practical	Project	CIE Marks	SEE Marks	Total Marks	Credits
				L	T	P	J				
1	OEC	22OE0045	Responsible AI & Ethics	3	0	0	0	60	40	100	03