Dr. D. Y. Patil Educational Federation's
Dr. D. Y. Patil College of Engineering and Innovation
APPROVED BY AICTE, RECOGNIZED BY GOVT. OF MAHARASHTRA,
AUTONOMOUS INSTITUTE AFFILIATED TO SAVITRIBAI PHULE PUNE UNIVERSITY
Accredited by NAAC with "A" Grade

ACADEMIC COURSE STRUCTURE

SY, TY, B. Tech.

Artificial Intelligence and Machine Learning (AI-ML),

B. Tech. 4 YEAR UG COURSE

(Applicable for the batches admitted from AY 2025-2026 at FY)

Dr. D. Y. Patil College of Engineering & Innovation

Survey No. 27/A/1/2C, Varale Campus,
Near Talegaon Railway Station,
Tal. Maval, Dist. Pune 410 507,
Ph: 020 48522561, 565,566
Web Site: https://www.dypcoei.edu.in,
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Vision and Mission of the Institute

Vision of DYPCOEI

To achieve excellence in quality education through value based rapidly changing technologies and create technical Human-Resource with proficiencies of accepting new challenges.

Mission of DYPCOEI

M1: Continuously strive to impart value-based education to elevate the satisfaction level of all stakeholders.

M2: Take dedicated efforts to create competent professionals by effective teaching learning process with passion of lifelong learning attitude.

M3: Our endeavour is to promote and support innovative research, entrepreneurship and development activities through Industry Interaction.

Vision and Mission of the Department

Vision of Department:

To cultivate innovative professionals who can apply Artificial Intelligence and Machine learning concepts to real-world problems and contribute to the society and industry through interdisciplinary knowledge and skills.

Mission of Department:

M1: To impart skill-based (Artificial Intelligence and Machine Learning) education through a effective teaching-learning process.

M2: To establish Innovation and Entrepreneur ecosystem which provides solutions for the technological challenges of industry, society and the nation.

M3: To set-up an industry-institute interface and research environment for the development of students through research and team work activities.

Program Educational Objectives (PEOs)

PEO1: Prepare graduates who will be able to apply the concepts of Machine Learning while deriving solutions for real-life problems.

PEO2: Inculcate ability of communication, soft skills, ethics and work in a team while demonstrating the professionalism in the corporate world.

PEO3: Impart life-long learning towards Artificial Intelligence while using new trends and technologies.

PEO4: Develop research ability among students while understanding, analysing the problems and designing solutions innovatively.

Program Outcomes (POs)

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex Engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature and analyze complex Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and Engineering sciences.

PO3: Design / Development of Solutions: Design solutions for complex Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and Environmental considerations.

PO4: Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern Engineering and IT tools including prediction and modelling to complex Engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the professional Engineering solutions in societal and Environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of Engineering practice.

PO9: Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in Multidisciplinary settings.

PO10: Communication Skills: Communicate effectively on complex Engineering activities with the Engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of Engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary Environments.

PO12: Life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

PSO1: Inculcate ability to apply and analyse key concepts of Artificial Intelligence and Machine Learning to find solutions to real world problems.

PSO2: Rigorous hand-on training to enhance the skills in emerging trends and technologies while implementing Machine Learning.

PSO3: Train the students for their understanding towards their responsibility, working in a team and contributing while developing of model, product or application as part of student's projects.

Program – B. Tech. (Artificial Intelligence and Machine Learning)

(Autonomous Curriculum Structure for students admitted from AY 2025-26 at FY)

A. Definition of Credit:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
2 Hours Practical (Lab) per week	1 credit

B. Range of Credits:

Student will become eligible to get Under Graduate (UG) **BTech degree in Artificial Intelligence and Machine Learning** after earning **160 credits.** A student will be eligible to get Under **Graduate degree with Honors** or additional **Minor Engineering**, if he/she completes an additional **20 credits from SEM-V to SEM-VIII.**

C. Credit for BTech Degree in Artificial Intelligence and Machine Learning

Sr. No.	Year	Semester	Credits
1	First Year	I	22
2		II	22
3	Second Year	III	20
4		IV	22
5	Third Year	V	20
6		VI	18
7	Final Year	VII	18
8		VII	18
Total Credits			**160**

D. Structure of B. Tech. program

Abbreviation	Course Type	Credit
BSC	Basic Science Courses	18
ESC	Engineering Science Courses	12
PCC	Program Core Courses	44
PEC	Program Elective Courses	20
CEP	Community Engagement Project	02
VAC	Value Added Courses	04
IAP	Internship and Project	14
MDM	Multidisciplinary Minor	14
OEC	Open Elective Courses	08
VSE	Vocational and Skill Enhancement Course	06
REM	Research Methodology	04
EMC	Entrepreneurship and Management Courses	04
AEC	Ability Enhancement Course	04
CCC	Co-curricular Courses	04
IKS	Indian Knowledge System	02
	Total	**160**

E. Minor Structure: B.Tech (Computer Engineering)

Sr. No.	Courses Name	SEM	Credits
1	Database Management Systems	V	3
2	Database Management Systems Laboratory		2
3	Fundamental of Web Technology	VI	3
4	Fundamental of Web Technology Laboratory		2
5	Cryptography and System Security	VII	3
6	Cryptography and System Security Laboratory		2
7	Software Testing and Quality Assurance	VIII	3
8	Software Testing and Quality Assurance Laboratory		2
		Total	**20**

F. Honors Courses: Cyber Security

Sr. No.	Courses Name	SEM	Credits
1	Network Security and Cryptography	V	5
2	Ethical Hacking	VI	5
3	Secure Software Development	VII	5
4	Cyber risk management and Compliance	VIII	5
		Total	**20**

Honors Courses: Internet of Things

Sr. No.	Courses Name	SEM	Credits
1	Introduction to Internet of Things	V	5
2	Embedded IoT	VI	5
3	Cloud Integrated IoT Systems	VII	5
4	Security in Industrial IoT	VIII	5
		Total	**20**

Honors Courses: Generative AI

Sr. No.	Courses Name	SEM	Credits
1	Generative Ai Introduction and Applications	V	5
2	Prompt Engineering basics	VI	5
3	Explainable AI	VII	5
4	Natural Language Processing	VIII	5
		Total	**20**

Credit Distribution of Various Courses across Eight Semesters:

SEM	Total Marks	No. of Credits for Course Category															Total Credit
		BSC	ESC	PCC	PEC	MDM	OEC	VSE	AEC	EMC	IKS	VAC	REM	CEP	IAP	CCC	
I	700	9	6	4				1	2								**22**
II	700	9	6	3				1			2					1	**22**
III	700			8		2	4			2		2		2			**20**
IV	700			7		2	2	2	2	2		2			2	1	**22**
V	700			6	8	4	2										**20**
VI	700			4	4	2		2							4	2	**18**
VII	700			6	2	2							4		4		**18**
VIII	700			6	6	2									4		**18**
Total	**5600**	**18**	**12**	**44**	**20**	**14**	**8**	**6**	**4**	**4**	**2**	**4**	**4**	**2**	**14**	**4**	**160**

S. Y. BTech (AI-ML)

Artificial Intelligence and Machine Learning - Second Year (Semester –III)												
Sr. No.	Code	Course Title	Hours/week			Credits	Examination scheme					
			L	T	P		CCE	SEE	TW	PR	OR	Total
1	AMPCC301	Operating systems	2	--	--	2	50	50	--	--	--	100
2	AMPCC302	Data Structures	2	--	--	2	50	50	---	--	--	100
3	AMPCC303	Data Structures Laboratory	--	--	2	1	--	--	25	25	--	50
4	AMPCC304	Artificial Intelligence	2	--	--	2	50	50	--	--	--	100
5	AMPCC305	Artificial Intelligence Laboratory	--	--	2	1	--	--	--	25	--	25
6	AMMDM306	MDM-I	2	--	--	2	50	50	--	--	--	100
7	AMOEC307	Open Elective Courses I	2	--	--	2	--	50	25	--	--	75
8	AMOEC308	Open Elective Courses II	--	--	4	2	--	--	50	--	--	50
9	AMEMC309	Entrepreneurship and Start-up Ecosystem	2	--	--	2	--	--	25	--	--	25
10	AMVAC310	VAC-I (Social Well-being)	1	--	2	2	--	--	25	--	--	25
11	AMCEP311	Community Engagement/Field Project	--	--	4	2	--	--	25	--	25	50
Total			**13**	**--**	**14**	**20**	**200***	**250#**	**175$**	**50$**	**25$**	**700**

Open Elective -I (AMOEC307)		Open Elective -II (AMOEC308)	
AMOEC307A	Engineering Economics	AMOEC308A	MOOC- I
AMOEC307B	Finance Management	AMOEC308B	Foreign Language- I
AMOEC307C	Digital Finance	AMOEC308C	UHV

#	**Semester End Examination (SEE)** based on subjective questions.
$	**LAB /Practical or Hands-on/ Activity based Evaluation.**
*	**Comprehensive Continuous Evaluation (CCE)** based on Unit Tests, Home Assignment/Comprehensive, Presentation/Group Discussion/Laboratory Work/Course Project/Viva Voce/Blog Writing/Case Study/Survey/Multiple-Choice Question (MCQ) examination.
@	**For MOOCs:** Assignments marks will be converted on the scale of 50 marks.
%	**For MOOCs:** Score of examination conducted by the respective authority of MOOC or Score of SEE Conducted by Institute will be converted on the scale of 50 marks.

Artificial Intelligence and Machine Learning - Second Year (Semester –IV)												
Sr. No.	**Code**	**Course Title**	**Hours/week**			**Credits**	**Examination scheme**					
			L	**T**	**P**		**CCE**	**SEE**	**TW**	**PR**	**OR**	**Total**
1	AMPCC401	Transforms and Numerical Methods	2	--	--	2	50	50	--	--	--	100
2	AMPCC402	Data Structures and Algorithms	2	--	--	2	50	50	--	--	--	100
3	AMPCC403	Data Structures and Algorithms Laboratory	--	--	2	1	--	--	--	25	--	25
4	AMPCC404	Machine Learning Algorithms	2	--	--	2	50	50	25	--	--	125
5	AMMDM405	MDM-II	2	--	--	2	50	50	--	--	--	100
6	AMOEC406	Open Elective Courses III	2	--	--	2	--	50	25	--	--	75
7	AMVSE407	Power BI for Beginners Laboratory	--	--	4	2	--	--	--	25	--	25
8	AMAEC408	Reasoning and Aptitude Development	2	--	--	2	--	--	25	--	--	25
9	AMEMC409	Technology Commercialization and start-up Dev elopment	2	--	--	2	--	--	25	--	--	25
10	AMIAP410	Project Based Learning	--	--	4	2	--	--	50	--	--	50
11	AMVAC411	VAC-II(Campus To Corporate)	1	--	2	2	--	--	25	--	--	25
12	AMCCC412	Professional Self Initiatives and Social Activities	1	--	--	1	--	--	25	--	--	25
Total			**16**	**--**	**12**	**22**	**200***	**250#**	**200$**	**50$**	--	**700**

Open Elective -III (AMOEC406**)**	
AMOEC406A	Digital Marketing
AMOEC406B	Critical Thinking and Problem Solving
AMOEC406C	Ethics in Artificial Intelligence

T. Y. BTech (AI-ML)

Artificial Intelligence and Machine Learning - Third Year (Semester –V)												
Sr. No.	Code	Course Title	Hours/week			Credits	Examination scheme					
			L	T	P		CCE	SEE	TW	PR	OR	Total
1	AMPCC501	Theory of Computation	3	--	--	3	50	50	--	--	--	100
2	AMPCC502	Deep Learning and Neural Network	2	--	--	2	50	50	--	--	--	100
3	AMPCC503	Deep Learning and Neural Network Laboratory	--	--	2	1	0	0	25	50	--	75
4	AMPEC504	Program Elective Courses I	3	--	--	3	50	50	--	--	--	100
5	AMPEC505	Program Elective Courses I Laboratory	--	--	2	1	--	--	--	25	--	25
6	AMPEC506	Program Elective Courses II	4	--	--	4	50	50	--	--	--	100
7	AMMDM507	MDM-III	2	--	--	2	--	50	25	--	--	75
8	AMMDM508	Mini Project & Seminar	--	--	4	2	--	--	25	--	50	75
9	AMOEC509	Open Elective Courses IV	--	--	4	2	--	--	50	--	--	50
Total			**14**	**--**	**12**	**20**	**200***	**250#**	**125$**	**75$**	**50$**	**700**

Program Elective-I (AMPEC504)		Program Elective-II (AMPEC506)	
AMPEC504(A)	Responsible AI	AMPEC506(A)	Information Retrieval in AI
AMPEC504(B)	Python for Data Science	AMPEC506(B)	Web Development – Frontend
AMPEC504(C)	Machine Learning Operations	AMPEC506(C)	Human Computer Interface
AMPEC504(D)	Data Warehousing & Mining	AMPEC506(D)	Data Visualization

Open Elective -IV (AMOEC509)	
AMOEC509A	Intellectual Property Rights
AMOEC509B	MOOC- 2
AMOEC509C	Foreign Language-2

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Artificial Intelligence and Machine Learning - Third Year (Semester –VI)												
Sr. No.	Code	Course Title	Hours/week			Credits	Examination scheme					
			L	T	P		CCE	SEE	TW	PR	OR	Total
1	AMPCC601	Design and Analysis of Algorithm	3	--	--	3	50	50	--	--	--	100
2	AMPCC602	Design and Analysis of Algorithm Laboratory	--	--	2	1	--	--	25	50	--	75
3	AMPEC603	Program Elective Courses III	3	--	--	3	50	50	--	--	--	100
4	AMPEC604	Program Elective Courses III Laboratory	--	--	2	1	--	--	50	--	50	100
5	AMMDM605	MDM-IV	2	--	--	2	50	50	--	--	--	100
6	AMVSE606	R Programming for AI	2	--	--	2	50	50	--	--	--	100
7	AMIAP607	Industrial Internship and Project	0	--	8	4	--	--	50	--	50	100
8	AMCCC608	Leadership & Management of Club/Activity	2	--	--	2	--	--	25	--	--	25
Total			**12**	**--**	**12**	**18**	**200***	**200#**	**150$**	**50$**	**100$**	**700**

Program Elective-III (AMPEC603)	
AMPEC603 (A)	GPU Programming and Architecture in AI
AMPEC603 (B)	Web Development – Backend
AMPEC603(C)	Brain Machine Interface
AMPEC603 (D)	Distributed Systems

BTech (AI-ML)

Artificial Intelligence and Machine Learning – B. Tech. (Semester –VII)												
Sr. No.	Code	Course Title	Hours/week			Credits	Examination scheme					
			L	T	P		CCE	SEE	TW	PR	OR	Total
1	AMPCC701	Generative AI	2	--	--	2	50	50	--	--	--	100
2	AMPCC702	Generative AI Laboratory	--	--	2	1	--	--	25	25	--	50
3	AMPCC703	AI for Intelligent Systems	3	--	--	3	50	50	--	--	--	100
4	AMPEC704	Program Elective Courses IV	2	--	--	2	50	50	--	--	--	100
5	AMMDM705	MDM-V	2	--	--	2	50	50	--	--	--	100
6	AMREM706	Research Methodology	2	--	4	4	50	50	25	--	25	150
7	AMIAP707	Project Stage I	--	--	8	4	--	--	50	--	50	100
Total			**11**	--	**14**	**18**	**250***	**250#**	**100$**	**25$**	**75$**	**700**

Program Elective-IV (AMPEC704)	
AMPEC704 (A)	Bioinformatics using AI
AMPEC704 (B)	API Development and Testing
AMPEC704 (C)	Generative Adversarial Networks
AMPEC704 (D)	Big Data Modelling

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Artificial Intelligence and Machine Learning – B. Tech. (Semester –VIII)												
Sr. No.	**Code**	**Course Title**	**Hours/week**			**Credits**	**Examination scheme**					
			L	**T**	**P**		**CCE**	**SEE**	**TW**	**PR**	**OR**	**Total**
1	AMPCC801	Artificial Neural Networks	2	--	--	2	50	50	--	--	--	100
2	AMPCC802	Artificial Neural Networks Laboratory	--	--	2	1	--	--	25	25	--	50
3	AMPCC803	Natural Language Processing	2	--	--	2	50	50	--	--	--	100
4	AMPCC804	Natural Language Processing Laboratory	--	--	2	1	--	--	25	25	--	50
5	AMPEC805	Program Elective Courses V	3	--	--	3	50	50	--	--	--	100
6	AMPEC806	Program Elective Courses VI	3	--	--	3	50	50	--	--	--	100
7	AMMDM807	MDM-VI	2	--	--	2	--	50	--	--	--	50
8	AMIAP808	Project Stage II	--	--	8	4	--	--	100	--	50	150
Total			**12**	**--**	**12**	**18**	**200***	**250#**	**150$**	**50$**	**50$**	**700**

Program Elective-V (AMPEC805)		**Program Elective-VI (**AMPEC806)	
AMPEC805(A)	Robotics and Autonomous Systems	AMPEC806(A)	Computational Intelligence
AMPEC805(B)	DevOps and Agile Software Development	AMPEC806(B)	AWS: Cloud Computing Services
AMPEC805(C)	Reinforcement Learning	AMPEC806(C)	Convolutional Neural Networks
AMPEC805(D)	Predictive Modelling and Analytics	AMPEC806(D)	Time Series System