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

ACADEMIC COURSE STRUCTURED

AND

DETAILED SYLLABUS

B.Tech.

Computer Engineering (CE)

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,
Email: principal.dypcoei@dypatilef.com

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 produce global standard professionals, innovators and entrepreneurs with strong fundamental concepts and desire to learn latest trends and technologies in the field of Computer Engineering.

Mission of Department:

M1: Adapt changes in recent trends and technologies by effective Teaching-Learning process to train the students.

M2: Prepare competent Computer Engineers to sustain in the competitive global corporate world with a spirit of good work ethics.

M3: Inculcate self and continuous learning and the ability to work in a team to share innovation and research.

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 – B. Tech. (Computer Engineering)

(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 Computer Engineering (CE) 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 B.Tech Degree in CE:

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
MDM	Multidisciplinary Minor	14
OEC	Open Elective Courses	08
VSE	Vocational and Skill Enhancement Course	06
AEC	Ability Enhancement Course	04
EMC	Entrepreneurship and Management Courses	04
IKS	Indian Knowledge System	02
VAC	Value Added Courses	04
REM	Research Methodology	04
CEP	Community Engagement Project	02
IAP	Internship and Project	14
CCC	Co-curricular Courses	04
		160

Credit Distribution of Various Courses across Eight Semesters:

SEM	Total Marks	BSC	ESC	PCC	PEC	MDM	OEC	VSE	AEC	EMC	IKS	VAC	REM	CEP	IAP	CCC	Total Credit
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**
	5600	**18**	**12**	**44**	**20**	**14**	**8**	**6**	**4**	**4**	**2**	**4**	**4**	**2**	**14**	**4**	**160**

2.0 Course Structure – Computer Engineering

2.1 Course Structure – SY (Computer Engineering)

Computer Engineering - Second Year (Semester –III)												
Sr. No.	**Code**	**Course Title**	**Teaching Scheme (Hours/week)**			**Credits**	**Examination scheme**					
			L	**T**	**P**		**CCE**	**SEE**	**TW**	**PR**	**OR**	**Total**
1	CEPCC301T	Discrete Structures and Graph Theory	3	0	0	3	50	50	0	0	0	**100**
2	CEPCC302T	Computer Architecture and Organization	2	0	0	2	50	50	0	0	0	**100**
3	CEPCC303T	Data Structures and Algorithms	2	0	0	2	50	50	0	0	0	**100**
4	CEMDM304T	Multidisciplinary Minor I	2	0	0	2	50	50	0	0	0	**100**
5	CEPCC305W & CEPCC305P	Data Structures and Algorithms - Lab	0	0	2	1	0	0	50	25	0	**75**
6	CEOEC306W	Open Elective I	0	0	4	2	0	0	50	0	0	**50**
7	CEOEC307W	Open Elective II	0	0	4	2	0	0	50	0	0	**50**
8	CEEMC308W	Entrepreneurship and Management Courses I	1	0	2	2	0	0	50	0	0	**50**
9	CEVAC309W	Value Added Courses I	2	0	0	2	0	0	25	0	0	**25**
10	CECEP310W	Community Engagement Project	0	0	4	2	0	0	50	0	0	**50**
Total			**11**	**1**	**16**	**20**	**200***	**200#**	**275$**	**25$**	**0**	**700**

MDM-I (CEMDM304T)	
CEMDM304TA	Smart cities and intelligent infrastructure
CEMDM304TB	Fundamentals of autonomy and intelligent behaviour
CEMDM304TC	Introduction to smart and precision agriculture
CEMDM304TD	Fundamentals of electric vehicles and comparison with ICE vehicles
CEMDM304TE	Fundamentals of additive manufacturing
CEMDM304TF	Fundamentals of healthcare systems and digital health

Open Elective -I (CEOEC306T)		Open Elective -II (CEOEC307W)	
CEOEC306TA	Engineering Economics	CEOEC307WA	Environmental Engineering
CEOEC306TB	AI in Finance Management	CEOEC307WB	Foreign Language

CEOEC306TC	Digital Finance	CEOEC307WC	Sustainability and Climate Change

Computer Engineering - Second Year (Semester –IV)												
Sr. No.	**Code**	**Course Title**	**Teaching Scheme (Hours/week)**			**Credits**	**Examination scheme**					
			L	**T**	**P**		**CCE**	**SEE**	**TW**	**PR**	**OR**	**Total**
1	CEPCC401T	Operating Systems	2	0	0	2	50	50	0	0	0	**100**
2	CEPCC402T	Fundamentals of Computer Network	2	0	0	2	50	50	0	0	0	**100**
3	CEPCC403T	Computer Graphics Design	2	0	0	2	50	50	0	0	0	**100**
4	CEMDM404T	Multidisciplinary Minor II	2	0	0	2	50	50	0	0	0	**100**
5	CEPCC405W & CEPCC405P	Operating Systems and Computer Graphics Design - Lab	0	0	2	1	0	0	25	25	0	**50**
6	CEOEC406W	Open Elective III	0	0	4	2	0	0	50	0	0	**50**
7	CEVSE407W & CEVSE407O	Vocational and Skill Enhancement Course I	0	0	4	2	0	0	25	0	25	**50**
8	CEAEC408W	Ability Enhancement Course	0	0	4	2	0	0	25	0	0	**25**
9	CEEMC409W	Entrepreneurship and Management Courses II	1	0	2	2	0	0	50	0	0	**50**
10	CEVAC410W	Value Added Courses II	2	0	0	2	0	0	25	0	0	**25**
11	CEIAP411W	Intrenship	0	0	4	2	0	0	25	0	0	**25**
12	CECCC412W	Co-Curriculum Course II	0	0	2	1	0	0	25	0	0	**25**
Total			**08**	**0**	**28**	**22**	**200***	**200#**	**250$**	**25$**	**25$**	**700**

MDM-II (CEMDM404T)	
CEMDM404TA	Sustainable energy and environment
CEMDM404TB	Perception, sensing, and sensor fusion
CEMDM404TC	Robotics and automation in farming operations
CEMDM404TD	Electric powertrain architecture and motor technologies
CEMDM404TE	3D printing processes: FDM, SLA, SLS, DMLS, Binder Jetting, etc.
CEMDM404TF	AI techniques (ML, DL, NLP, CV) in diagnostics and prognosis

Open Elective -III (CEOEC406W)	
CEOEC406WA	Digital Marketing
CEOEC406WB	Critical Thinking and Problem Solving
CEOEC406WC	Ethics in Artificial Intelligence

Co-Curriculum Course II (CECCC412W)
• Technical Events/Quiz/Paper Contest/Project Contest / Model Making etc.
• MOOC/ NPTEL/ SWAYAM/ Coursera etc. related to Professional Development and Social Activity
• Competitions/ Events Conducted by Professional Societies (ISTE, IEI, CSI, IEEE, IETE, SAE, ISRO-IIRS, SWE, ISHRAE, ASM, ISNT etc.)
• Attending Full time Conference/ Seminars/ Exhibitions/ Workshop/ STTP Conducted at IITs/ NITs/ Reputed Institutes/ Universities
• Attending Full time Conference/ Seminars/ Exhibitions/ Workshop/ STTP Conducted at DYPCOEI
• Paper Presentation in National/ International Conference of High Repute
• Poster Presentation in National/ International Conference of High Repute
• Paper Publication in National/ International Journal of High Repute
• Industrial Training/ Internship (at least for 04 Weeks)
• Participation in Institute Level Student Clubs
• Elected Student Representative of Student Council (University Representative, General Secretary, Cultural, Sports, NSS Secretary, Ladies Representative, Academic Toppers, Invitee Members)
• Office Bearer of Professional Society Chapter (ISTE, IEI, CSI, IEEE, IETE, SAE, ISRO-IIRS, SWE, ISHRAE, ASM, ISNT etc.)
• Office Bearer of Institute Level Student Club
• Office Bearer of Departmental Student Association
• Office Bearer of ECell, Digital Content Lab etc.
• Student Ambassador for Mayura AICTE IDEA Lab/ NIDHI iTBI etc.
• Editorial Board Member of Annual Magazine
• Editorial Board Member of E-Newsletter
• Member of Governance Committee/ Statutory Committee

2.2 Course Structure – TY (Computer Engineering)

Computer Engineering - Third Year (Semester –V)												
Sr. No.	**Code**	**Course Title**	**Teaching Scheme (Hours/week)**			**Credits**	**Examination scheme**					
			L	**T**	**P**		**CCE**	**SEE**	**TW**	**PR**	**OR**	**Total**
1	CEPCC501T	Database Management Systems	2	0	0	2	50	50	0	0	0	**100**
2	CEPCC502T	Theory of Computation	2	0	0	2	50	50	0	0	0	**100**
3	CEPEC503T	Program Elective I	3	0	0	3	50	50	0	0	0	**100**

4	CEPEC504T	Program Elective II	3	0	0	3	50	50	0	0	0	**100**
5	CEMDM505T	Multidisciplinary Minor III	2	0	0	2	50	50	0	0	0	**100**
6	CEMDM506T	Multidisciplinary Minor IV	2	0	0	2	50	50	0	0	0	**100**
7	CEPCC507P	Database Management Systems - Lab	0	0	4	2	0	0	0	25	0	**25**
8	CEPEC508P	Elective I & II - Lab	0	0	4	2	0	0	0	25	0	**25**
9	CEOEC509W	Open Elective IV	0	0	4	2	0	0	50	0	0	**50**
Total			**14**	**0**	**12**	**20**	**300***	**300#**	**50$**	**50$**	**0**	**700**

Program Elective -I (CEPEC503T)		**Program Elective -II (CEPEC504T)**	
CEPEC503TA	Fundamentals of Web Technology	CEPEC504TA	Blockchain Technology
CEPEC503TB	Cloud Computing Technology and Fundamentals	CEPEC504TB	Cyber Security and Digital Forensic
CEPEC503TC	Big data & data Modelling	CEPEC504TC	Modelling and Analysis Network
CEPEC503TD	Multimedia Technology	CEPEC504TD	Foundations of AI Agent Frameworks

MDM-III (CEMDM505T)	
CEMDM505TA	Role of IoT, AI, and data analytics in sustainability
CEMDM505TB	AI and machine learning for autonomous decision-making
CEMDM505TC	IoT and wireless sensor networks for field monitoring
CEMDM505TD	Battery systems and energy storage technologies
CEMDM505TE	CAD modelling and slicing software
CEMDM505TF	Medical imaging analysis using AI

MDM-IV (CEMDM506T)	
CEMDM506TA	Waste, water, and resource management
CEMDM506TB	Robotics and embedded systems
CEMDM506TC	AI and data analytics for crop prediction and decision-making
CEMDM506TD	Power electronics and charging systems
CEMDM506TE	Materials for 3D printing: plastics, metals, ceramics, composites, bio-materials
CEMDM506TF	Predictive analytics for patient monitoring and disease outbreaks

Open Elective -IV (CEOEC509W)	
CEOEC509WA	Intellectual Property Rights
CEOEC509WB	Cyber Law
CEOEC509WC	Bio-medical Instrumentation

Computer Engineering - Third Year (Semester –VI)					
Sr.	**Code**	**Course Title**	**Teaching Scheme**	**Credits**	**Examination scheme**

No.			(Hours/week)									
			L	T	P		CCE	SEE	TW	PR	OR	Total
1	CEPCC601T	Machine Learning	3	0	0	3	50	50	0	0	0	**100**
2	CEPEC602T	Program Elective III	3	0	0	3	50	50	0	0	0	**100**
3	CEMDM603T	Multidisciplinary Minor V	2	0	0	2	50	50	0	0	0	**100**
4	CEPCC604W & CEPCC604P	Machine Learning - Lab	0	0	2	1	0	0	50	50	0	**100**
5	CEPEC605W & CEPEC605P	Program Elective III - Lab	0	0	2	1	0	0	50	50	0	**100**
6	CEVSE606W & CEVSE606O	Vocational and Skill Enhancement Course II	0	0	4	2	0	0	50	0	25	**75**
7	CEIAP607W & CEIAP607O	Internship / On Job Training	0	0	8	4	0	0	50	0	50	**100**
8	CECCC608W	Co-Curriculum Course III	0	0	4	2	0	0	50	0	0	**50**
Total			**8**	**0**	**20**	**18**	**150***	**150#**	**225$**	**100$**	**75$**	**700**

Program Elective -III (CEPEC602T)	
CEPEC602TA	Web Technology & its applications
CEPEC602TB	Cloud Computing Technique
CEPEC602TC	Business Intelligence
CEPEC602TD	Artificial Intelligence for Multimedia

MDM-V (CEMDM603T)	
CEMDM603TA	Life-cycle thinking and system optimization
CEMDM603TB	Real-time systems and control
CEMDM603TC	Drone technologies in agriculture (e.g., for spraying, mapping)
CEMDM603TD	Vehicle dynamics and control systems
CEMDM603TE	Design for Additive Manufacturing (DfAM)
CEMDM603TF	AI in drug discovery and personalized medicine

Co-Curriculum Course III (CECCC608W)
• Prototype Developed and Tested
• Awards for Products Developed
• Innovative Technologies Developed and Used by Industries
• Got Funding from Government/ Industry for Innovative Ideas
• Patent-Filed/ Published/ Approved/ Licensed
• Social Innovations
• Implementation of Mind Mapping

• Idea to Market: Implementation of Startup
• Development of Business Model through Technology

2.3 Course Structure – B.Tech. (Computer Engineering)

Computer Engineering - Final Year (Semester –VII)												
Sr. No.	Code	Course Title	Teaching Scheme (Hours/week)			Credits	Examination scheme					
			L	T	P		CCE	SEE	TW	PR	OR	Total
1	CEPCC701T	High Performance Computing	2	0	0	2	50	50	0	0	0	**100**
2	CEPCC702T	Design Analysis and Algorithm	2	0	0	2	50	50	0	0	0	**100**
3	CEPEC703T	Program Elective IV	2	0	0	2	50	50	0	0	0	**100**
4	CEMDM704T	Multidisciplinary Minor VI	2	0	0	2	50	50	0	0	0	**100**
5	CEREM705T	Research Methodology	4	0	0	4	50	50	0	0	0	**100**
6	CEPCC706W & CEPCC706P	High Performance Computing & Design Analysis and Algorithm - Lab	0	0	4	2	0	0	50	50	0	**100**
7	CEIAP707W & CEIAP707O	Project Phase I	0	0	8	4	0	0	50	0	50	**100**
Total			**12**	**0**	**12**	**18**	**250***	**250#**	**100$**	**50$**	**50$**	**700**

Program Elective -IV (CEPEC703T)	
CEPEC703TA	Cryptography & system Security
CEPEC703TB	Natural Language Processing
CEPEC703TC	Data centres and Network operations
CEPEC703TD	Advanced Applied AI

MDM-VI (CEMDM704T)	
CEMDM704TA	Sustainable mobility and urban planning
CEMDM704TB	Human-machine interaction and ethics
CEMDM704TC	Automated irrigation and fertigation systems
CEMDM704TD	Environmental impact and sustainability of EVs
CEMDM704TE	Post-processing techniques and quality control
CEMDM704TF	Clinical decision support systems (CDSS)

Computer Engineering - Final Year (Semester –VIII)					
Sr. No.	Code	Course Title	Teaching Scheme	Credits	Examination scheme

			(Hours/week)									
			L	T	P		CCE	SEE	TW	PR	OR	Total
1	CEPCC801T	Computer Network and Security	2	0	0	2	50	50	0	0	0	**100**
2	CEPCC802T	Software Testing and Quality Assurance	2	0	0	2	50	50	0	0	0	**100**
3	CEPEC803T	Program Elective V	3	0	0	3	50	50	0	0	0	**100**
4	CEPEC804T	Program Elective VI	3	0	0	3	50	50	0	0	0	**100**
5	CEMDM805T	Multidisciplinary Minor VII	2	0	0	2	50	50	0	0	0	**100**
6	CEPCC806W & CEPCC806P	Software Testing and Quality Assurance, & Computer Network and Security - Lab	0	0	4	2	0	0	50	50	0	**100**
7	CEIAP807W & CEIAP807O	Project Phase II	0	0	8	4	0	0	50	0	50	**100**
Total			**12**	**0**	**12**	**18**	**250***	**250#**	**100$**	**50$**	**50$**	**700**

Program Elective -V (CEPEC803T)		**Program Elective -VI (CEPEC804T)**	
CEPEC803TA	Usability Engineering	CEPEC804TA	Cognitive Computing
CEPEC803TB	Cloud Service Oriented Architecture	CEPEC804TB	Ethical Hacking and Network Defence
CEPEC803TC	Citizen Science	CEPEC804TC	System Engineering and Network Services
CEPEC803TD	Image Processing	CEPEC804TD	Applied Generative AI

MDM-VII (CEMDM805T)	
CEMDM805TA	Policy frameworks and Sustainable Development Goals
CEMDM805TB	Applications in transportation, healthcare, defence, and industry 4.0
CEMDM805TC	Sustainable practices and environmental impact
CEMDM805TD	EV infrastructure, standards, and smart grid integration
CEMDM805TE	Applications in medical, automotive, aerospace, and prototyping
CEMDM805TF	Ethical, regulatory, and legal issues in AI for healthcare

L	Lecture	**T**	Tutorial	**P**	Practical
#	**Semester End Examination (SEE)** based on subjective questions.				
$	**LAB /Practical or Handson/ 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.				