

Thadomal Shahani Engineering College

(A Constituent College of HSNC University, Mumbai)

Bachelor of Engineering (B.E.)

in

Computer Engineering

Programme Scheme

R-2026

(As per NEP 2020)

Undergraduate Programme

Applicable from Academic Year 2027–28

(Subject to revision after every two academic years)

Thadomal Shahani Engineering College

(A Constituent College of HSNC University, Mumbai)

Institute Vision:

Perpetuating and transcending the processes of:

1. Contributing to evolving supply chain of human capital for National Economy
2. Creating entrepreneurs and ‘game changers’ to support heightened level of economic activities underpinning ever increasing human aspiration
3. Helping the Nation evolve as a total solution provider
4. Value and wealth creation for the mankind

Institute Mission:

Focusing and practicing:

1. Product and processes innovation
2. Leveraging human cognitive and behavioral science for creating instructional content
3. Pervasive and ubiquitous Information Communication Technologies for customized content for learning
4. Acknowledge and facilitate various learning styles and learning abilities
5. Migrating from teaching paradigm to learning paradigm
6. Every day discourse shall inculcate research culture and further the cause of societal advancement
7. Understand various markets and cultures
8. Collaborative learning and emotional integrity
9. Sensitizing about opportunities in Energy, Education, Environment and Health care sectors
10. Extensively promoting computer aided design, analysis and manufacturing procedures
11. Theoretical rigor to develop conceptual clarity
12. Modeling and design of experiments to inculcate culture of investigation
13. Helping foot print on Project management and collaborative human endeavor
14. Interdisciplinary studies and exposure to functional areas

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Department Vision

Metamorphosis into a centre of excellence in higher education and enterprise computing to nurture and facilitate the learners who ought to be the creams of society in terms of their irresistible ambition to be part of entities inventing breakthrough technologies to further the cause of mankind through emerging technologies.

Department Mission

1. Building state of art laboratories with the help of internal accruals / government funding / industry funding
2. Collaborative research initiative with premier research organizations in the country
3. Subjecting and initiating learners to entrepreneurship training program and nascent technologies which shall be beyond curriculum
4. Developing instructional content leveraging new findings of cognitive load theories and visual learning
5. Initiating public private partnership to setup startup ventures to help learners evolve as entrepreneurs in ICT
6. Extensively promote participation in application building competition getting organized externally and internally to
7. enable learner to apply theoretical understanding in real time functional area

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Program Specific Outcomes (PSOs)

PSO1: To exhibit competency in emerging technologies like Block chain, Artificial Intelligence and Data Science, Data analytics and Cloud services driven computational procedures.

PSO2: To acquire the ability to work in multidisciplinary environment while demonstrating leadership skills with effective communication and adapt to nascent technologies for self and lifelong learning.

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Program Outcome (POs)

1. PO1: Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.
2. PO2: Problem Analysis: Identify, formulate, review research literature and analyse complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
3. PO3: Design / Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)
4. PO4: Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).
5. PO5: Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6).
6. PO6: The Engineer and the World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).
7. PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
8. PO8: Individual and Collaborative Team Work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
9. PO9: Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences.
10. PO10: Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

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11. PO11: Life-Long Learning: Recognize the need for, and have the preparation and ability for
- i) independent and life-long learning ii) adaptability to new and emerging technologies and
 - iii) critical thinking in the broadest context of technological change. (WK8)



Thadomal Shahani Engineering College

Program Structure for Second Year of Computer Engineering

Semester III



Course Code	Course Name	Teaching Scheme Contact Hours		Evaluation Scheme								
		L	P	Credits	IA-1	IA-2	IA-1 + IA-2	End Sem Exam	Exam Duration in Hrs.	Term Work	Practical/ Oral Exam	Total
PC301	Probability and Statistics	2	-	2	20	20	40	60	2	-	-	100
PC302	Data Structures	3	-	3	20	20	40	60	2	-	-	100
PC303	Computer Organization and Architecture	3	-	3	20	20	40	60	2	-	-	100
PC304	Computational Theory and Compiler Construction	3	-	3	20	20	40	60	2	-	-	100
OE301	Evolution of Science and Technology	2	-	2	10	10	20	30	1	-	-	50
PCL301	Data Structures Lab	-	2	1	-	-	-	-	-	25	25	50
PCL302	Computer Organization and Architecture Lab	-	2	1	-	-	-	-	-	25	25	50
VSE301	Object-Oriented Programming with Python	-	2*+2	2	-	-	-	-	-	50	25	75
CEP301	Mini Project- 1A	--	4 ^s	2	--	--	--	--	--	25	25	50
VECL301	Environmental Science for Engineers (Syllabus common to all Branches).	-	2*+2	2	-	-	-	-	-	50	-	50
Total		13	16	21	90	90	180	270	09	175	100	725

*Two hours of practical class to be conducted for full class as demo/discussion.

\$ indicates workload of Learner (Not Faculty), Students can form groups with minimum 2 (Two) and not more than 4 (Four), Faculty Load: 1 hour per week per four groups

#Institute shall offer an Open Elective course from the Science/Commerce/Management stream basket provided by HSNC University.



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Program Structure for Second Year of Computer Engineering

Semester IV



Course Code	Course Name	Teaching Scheme Contact Hours		Credits	Evaluation Scheme							
		L	P		IA-1	IA-2	IA-1 + IA-2	End Sem Exam	Exam Duration in Hrs.	Term Work	Practical/ Oral Exam	Total
PC401	Analysis of Algorithms	3	-	3	20	20	40	60	2	-	-	100
PC402	Operating System	3	-	3	20	20	40	60	2	-	-	100
PC403	Database Management Systems	3	-	3	20	20	40	60	2	-	-	100
MD401	Multi-disciplinary Minor : Behavioural Economics	3	-	3	20	20	40	60	2	-	-	100
OE401	Global Supply Chain	2	-	2	10	10	20	30	1	-	-	50
PCL401	Analysis of Algorithms Lab	-	2	1	-	-	-	-	-	25	25	50
PCL402	Operating System Lab	-	2	1	-	-	-	-	-	25	25	50
PCL403	Database Management Systems Lab	-	2	1	-	-	-	-	-	25	25	50
MDL401	Multi-disciplinary Minor Lab	-	2	1	-	-	-	-	-	25	25	50
CEP 401	Mini Project -1B	-	4 ^{\$}	2	-	-	-	-	-	25	25	50
EEM401	Business Model Development (Syllabus common to all Branches)	-	2*+2	2	-	-	-	-	-	50	-	50
Total		14	16	22	90	90	180	270	09	175	125	750

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Program Structure for Third Year of Computer Engineering

Semester V



Course Code	Course Name	Teaching Scheme Contact Hours		Credits	Evaluation Scheme							
		L	P		IA-1	IA-2	IA-1 + IA-2	End Sem Exam	Exam Duration in Hrs.	Term Work	Practical/ Oral Exam	Total
PC501	Distributed Computing and Computer Networks	3	-	3	20	20	40	60	2		-	100
PC502	Expert Systems and Machine Learning	3	-	3	20	20	40	60	2	-	-	100
PC503	Natural Language Processing	3	-	3	20	20	40	60	2	-	-	100
PE501	Program Electives –I	3	-	3	20	20	40	60	2	-	-	100
MD501	Multi-disciplinary Minor: Financial accounting	3		3	20	20	40	60	2	-	-	100
PCL501	Distributed Computing and Computer Networks Lab	-	2	1	-	-	-	-	-	25	25	50
PCL502	Expert Systems and Machine Learning Lab	-	2	1	-	-	-	-	-	25	25	50
PCL503	Natural Language Processing Lab	-	2	1	-	-	-	-	-	25	25	50
PEL501	Program Electives -I Lab	-	2	1	-	-	-	-	-	25	25	50
MDL502	Multi-disciplinary Minor Lab	-	2	1	-	-	-	-	-	25	25	50
OE501	International Treaties and Agreements	2	-	2	10	10	20	30	1	-	-	50
CEP501	Mini Project	-	4 ^{\$}	2	-	-	-	-	-	25	25	50
Total		17	14	24	110	110	220	330	11	150	150	850
PEC501	Program Electives –I	PEC5011	Data Warehousing and Mining				PEC5011	Data Warehousing and Mining Lab				
		PEC5012	Evolutionary Algorithms				PEC5012	Evolutionary Algorithms Lab				
		PEC5013	Computer Graphics & Virtual Reality Techniques				PEC5013	Computer Graphics & Virtual Reality Techniques Lab				

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Semester VI



Course Code	Course Name	Teaching Scheme Contact Hours		Credits	Evaluation Scheme							
		L	P		IA-1	IA-2	IA-1 + IA-2	End Sem Exam	Exam Duration in Hrs.	Term Work	Practical/ Oral Exam	Total
PC601	Neural Networks & Deep Learning	3	-	3	20	20	40	60	2	-	-	100
PC602	Gen AI and Agentic AI	3	-	3	20	20	40	60	2	-	-	100
PE601	Program Electives -II	3	-	3	20	20	40	60	2	-	-	100
PE602	Program Electives -III	3	-	3	20	20	40	60	2	-	-	100
MD601	Multi-disciplinary Minor : UPI and Fintech	3		3	20	20	40	60	2	-	-	100
PCL601	Neural Network & Deep Learning Lab	-	2	1	-	-	-	-	-	25	25	50
PCL602	Gen AI and Agentic AI Lab	-	2	1	-	-	-	-	-	25	25	50
PEL601	Program Electives -II Lab	-	2	1	-	-	-	-	-	25	25	50
PEL602	Program Electives -III Lab	-	2	1	-	-	-	-	-	25	25	50
MDL601	Multi-disciplinary Minor Lab	-	2	1	-	-	-	-	-	25	25	50
CEP601	Mini Project	-	4 ^s	2	-	-	-	-	-	25	25	50
VSE601	Graph Database	-	2*+2	2	-	-	-	-	-	50	-	50
Total		15	18	24	100	100	200	300	10	200	150	850

PE601	Program Electives –II	PEC6011	NoSQL	PEL6011	NoSQL Lab
		PEC6012	Digital Signal Processing and Image Processing	PEL6012	Digital Signal Processing and Image Processing Lab
		PEC6013	Software Engineering	PEL6013	Software Engineering Lab
PE602	Program Electives –III	PEC6021	Internet of Things	PEL6021	Internet of Things Lab
		PEC6022	Applied Data Science	PEL6022	Applied Data Science Lab
		PEC6023	User Experience Design	PEL6023	User Experience Design Lab

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Program Structure for Fourth Year of Computer Engineering

Semester VII



Course Code	Course Name	Teaching Scheme Contact Hours		Credits	Evaluation Scheme							
		L	P		IA-1	IA-2	IA-1 + IA-2	End Sem Exam	Exam Duration in Hrs.	Term Work	Practical/ Oral Exam	Total
PC701	Cyber Security and Forensic	3	-	3	20	20	40	60	2	-	-	100
PE701	Program Electives -IV	3	-	3	20	20	40	60	2	-	-	100
PCL701	Cyber Security and Forensic Lab	-	2	1	-	-	-	-	-	25	25	50
PEL701	Program Electives -IV Lab	-	2	1	-	-	-	-	-	25	25	50
MDL701	Multi-disciplinary Minor Lab : Banking and Insurance	-	2*+2	2	-	-	-	-	-	50	25	75
PC701	Major Project- I	-	4	2	-	-	-	-	-	50	50	100
EL702	Internship (Entire Semester)	-	-	6	-	-	-	-	-	100	100	200
Total		06	12	18	40	40	80	120	04	250	225	675

PE701	Program Electives –IV	PEC7011	Game Theory	PEL7011	Game Theory Lab
		PEC7012	Management Information System	PEL7012	Management Information System Lab
		PEC7013	BlockChain Technology	PEL7013	BlockChain Technology Lab

* Two hours of practical class to be conducted for full class as demo/discussion.



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Program Structure for Fourth Year of Computer Engineering

Semester VIII



Course Code	Course Name	Teaching Scheme Contact Hours		Credits	Evaluation Scheme							
		L	P		IA-1	IA-2	IA-1 + IA-2	End Sem Exam	Exam Duration in Hrs.	Term Work	Practical/ Oral Exam	Total
PC801	Quantum Computing	3	-	3	20	20	40	60	2	-	-	100
PE801	Program Electives-V	3	-	3	20	20	40	60	2	-	-	100
PCL801	Quantum Computing Lab	-	2	1	-	-	-	-	-	25	25	50
PEL801	Program Electives -V Lab	-	2	1	-	-	-	-	-	25	25	50
PC801	Major Project- II	-	4	2	-	-	-	-	-	50	50	100
EL802	Internship (Entire Semester)	-	-	6	-	-	-	-	-	100	100	200
Total		06	08	16	40	40	80	120	04	200	200	600

PE801	Program Electives –V	PEC8011	Big Data Analytics	PEL8011	Big Data Analytics Lab
		PEC8012	Social Network Analysis	PEL8012	Social Network Analysis Lab
		PEC8013	Robotics and Drone Technology	PEL8013	Robotics and Drone Technology Lab