

Thadomal Shahani Engineering College

(A Constituent College of HSNC University, Mumbai)

Bachelor of Engineering (B.E.)

in

Information Technology

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:

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

Institute Mission:

Focusing and practicing:

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

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Department Vision:

- The department should be known globally for its core competence in terms of intuitive and intelligent architectural solutions on “conversion of problem to logic.”

Department Mission:

Focusing and Practicing:

- Theoretical rigour to develop conceptual clarity
- Modelling and design of experiments to inculcate culture of investigation
- Making project-based learning a pervasive pedagogy
- Transcending learning in the emerging areas of Artificial Intelligence, Deep Learning, Block-chain technology and Quantum Computing
- Short term training program in evolving fields of Information Technology
- Collaborative learning, interdisciplinary studies and exposure to functional areas
- Sensitising all concerned about automation in IT services, software product and software process innovation
- Introducing risk management, risk mitigation and the process of hedging
- Inculcating and enhancing the culture of entrepreneurship, start-up ventures and incubation process
- Metamorphosis from teaching paradigm to learning paradigm
- Every day discourse shall inculcate research culture and create IPR in terms of process and product patents, by understanding various markets and cultures

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Program Specific Outcomes (PSOs)

- **PSO1:** Learners and graduates shall develop competency in digital technology integration in use cases underpinning their insight into functional areas and technology market place.
- **PSO2:** Learners and graduates are expected to develop mental models which help them to align with emerging technologies and technology driven practices in realm of Artificial Intelligence and Quantum Computing.
- **PSO3:** Learners and graduates shall exhibit a heightened understanding of sustainability concerns, enabling them to establish structurally sound enterprises and ultimately render ESG practices pervasive and Ubiquitous.

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Program Outcome (POs)

- 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.
- PO2: Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)
- 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)
- 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).
- 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).
- 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).
- PO7: Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)
- PO8: Individual and Collaborative Team Work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.
- 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.
- 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.
- 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)

Program Structure for Information Technology

HSNC University, Mumbai

Second Year (with effect from A.Y 2027-28)

SEMESTER III

Course Code	Course Title	Teaching Scheme (Contact Hours)			Credit	EVALUATION SCHEME							
		L	T	P		IA-I	IA-II	IA-I + IA II	End Sem Exam	Exam duration in hrs.	Term Work	Practical & Oral Exam	Total
PC301	Probability and Statistics for Data Science	2	--	--	2	20	20	40	60	2	--	--	100
PC302	Data Structure & Algorithms with Java	3	--	--	3	20	20	40	60	2	--	--	100
PC303	Database Management Systems & NoSQL	3	--	--	3	20	20	40	60	2	--	--	100
PC304	Discrete Maths & Graph Theory	3	--	--	3	20	20	40	60	2	--	--	100
OE301	Open Elective: Evolution of science and technology	2	--	--	2	10	10	20	30	1	--	--	50
PCL301	Data Structure & Algorithms with Java Lab	--	--	2	1	--	--	--	--	--	25	25	50
PCL302	Database Management Systems Lab	--	--	2	1	--	--	--	--	--	25	25	50
VSE301	Object-Oriented Programming with Python	--	--	2+2*	2	--	--	--	--	--	50	25	75
CEP301	Mini Project- 1A	--	--	4 ^{\$}	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	9	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

Program Structure for Information Technology

HSNC University, Mumbai

Second Year (with effect from A.Y 2027-28)

SEMESTER IV

Course Code	Course Title	Teaching Scheme (Contact Hours)			Credit	EVALUATION SCHEME							
		L	T	P		IA-I	IA-II	IA-I + IA II	End Sem Exam	Exam duration in hrs.	Term Work	Practical & Oral Exam	Total
PC401	Operating Systems	3	--	--	3	20	20	40	60	2	--	--	100
PC402	Cybersecurity and Cryptography	3	--	--	3	20	20	40	60	2	--	--	100
PC403	Machine Learning & Deep Learning	3	--	--	3	20	20	40	60	2	--	--	100
MD401	Multi-disciplinary Minor: Behavioural Economics	3	--	--	3	20	20	40	60	2	--	--	100
OE401	Open Elective: Global Supply Chain	2	--	--	2	10	10	20	30	1	--	--	50
PCL401	Operating Systems Lab	--	--	2	1	--	--	--	--	--	25	25	50
PCL402	Cybersecurity and Cryptography Lab	--	--	2	1	--	--	--	--	--	25	25	50
PCL403	Machine Learning & Deep Learning Lab	--	--	2	1	--	--	--	--	--	25	25	50
MDL401	Multi-disciplinary Minor Lab	--	--	2	1	--	--	--	--	--	25	25	50
CEP401	Mini Project-1B	--	--	4 ^{\$}	2	--	--	--	--	--	25	25	50
EEM402	Business Model Development (Syllabus common to all Branches)	--	--	2*+2	2	--	--	--	--	--	50	--	50
TOTAL		14	--	16	22	90	90	180	270	9	175	125	750

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Program Structure for Information Technology

HSNC University, Mumbai

Third Year (with effect from A.Y 2028-29)

SEMESTER V

Course Code	Course Title	Teaching Scheme (Contact Hours)			Credit	EVALUATION SCHEME							
		L	T	P		IA-I	IA-II	IA-I + IA II	End Sem Exam	Exam duration in hrs.	Term Work	Practical & Oral Exam	Total
PC501	Blockchain & Cryptocurrency	3	--	--	3	20	20	40	60	2	--	--	100
PC502	Graph Databases and Intelligent Systems	3	--	--	3	20	20	40	60	2	--	--	100
PC503	Web Technologies	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
OE501	Open Elective: International treaties and Agreements	2	--	--	2	10	10	20	30	1	--	--	50
PCL501	Blockchain & Cryptocurrency Lab	--	--	2	1	--	--	--	--	--	25	25	50
PCL502	Graph Databases and Intelligent Systems Lab	--	--	2	1	--	--	--	--	--	25	25	50
PCL503	Web Technologies 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
CEP501	Mini Project- 2A	--	--	4 ^s	2	--	--	--	--	--	25	25	50
TOTAL		17	--	14	24	110	110	220	330	11	150	150	850

PE501	Program Electives -I	PEC5011 Computer Vision PEC5012 Middleware for Building Intelligence to Legacy Systems PEC5013 Computer Network	PEL5011 Computer Vision Lab PEL5012 Middleware for Building Intelligence to Legacy Systems Lab PEL5013 Computer Networks Lab
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Program Structure for Information Technology

HSNC University, Mumbai

Third Year (with effect from A.Y 2028-29)

SEMESTER VI

Course Code	Course Title	Teaching Scheme (Contact Hours)			Credit	EVALUATION SCHEME							
		L	T	P		IA-I	IA-II	IA-I + IA II	End Sem Exam	Exam duration in hrs.	Term Work	Practical & Oral Exam	Total
PC601	Language Models, Transformers and Agentic AI	3	--	--	3	20	20	40	60	2	--	--	100
PC602	Mobile Robotics and Drone Technology	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	Language Models, Transformers and Agentic AI Lab	--	--	2	1	--	--	--	--	--	25	25	50
PCL602	Mobile Robotics and Drone Technology 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
VSE601	Multimodal Gen AI for Marketing	--	--	2*+2	2	--	--	--	--	--	50	--	50
CEP601	Mini Project-2B	--	--	4 ^s	2	--	--	--	--	--	25	25	50
TOTAL		15	--	18	24	100	100	200	300	10	200	150	850

PE601	Program Electives -II	PEC6011 Game Theory PEC6012 Evolutionary Algorithms PEC6013 Web Design by Gen AI	PEL6011 Game Theory Lab PEL6012 Evolutionary Algorithms Lab PEL6013 Web Design by Gen AI Lab
PE602	Program Electives -III	PEC6021 DevOps PEC6022 Edge Devices & Computing PEC6023 Ethical Hacking & Forensics	PEL6021 DevOps Lab PEL6022 Edge Devices & Computing Lab PEL6023 Ethical Hacking & Forensics Lab

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Program Structure for Information Technology

HSNC University, Mumbai

Fourth Year (with effect from A.Y 2029-30)

SEMESTER VII

Course Code	Course Title	Teaching Scheme (Contact Hours)			Credit	EVALUATION SCHEME							
		L	T	P		IA-I	IA-II	IA-I + IA II	End Sem Exam	Exam duration in hrs.	Term Work	Practical & Oral Exam	Total
PC701	Quantum Computing	3	--	--	3	20	20	40	60	2	--	--	100
PE701	Program Electives -IV	3	--	--	3	20	20	40	60	2	--	--	100
PCL701	Quantum Computing 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/ In-house Project	(Entire Semester)			6	--	--	--	--	--	100	100	200
TOTAL		06	--	12	18	40	40	80	120	04	250	200	675

PE701	Program Electives -IV	PEC7011 Evolution of Quality Standards PEC7012 Operations Research PEC7013 AI in Sustainability	PEL7011 Evolution of Quality Standards Lab PEL7012 Operations Research Lab PEL7013 AI in Sustainability Lab
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* Two hours of practical class to be conducted for full class as demo/discussion

Program Structure for Information Technology

HSNC University, Mumbai

Fourth Year (with effect from A.Y 2029-30)

SEMESTER VIII

Course Code	Course Title	Teaching Scheme (Contact Hours)			Credit	EVALUATION SCHEME							
		L	T	P		IA-I	IA-II	IA-I + IA II	End Sem Exam	Exam duration in hrs.	Term Work	Practical & Oral Exam	Total
PC801	Software Deployment Strategies	3	--	--	3	20	20	40	60	2	--	--	100
PE801	Program Electives-V	3	--	--	3	20	20	40	60	2	--	--	100
PCL801	Software Deployment Strategies 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/In-house Project	(Entire Semester)			6	--	--	--	--	--	100	100	200
TOTAL		06	--	08	16	40	40	80	120	04	200	200	600

PE801	Program Electives -V	PEC8011 Industry 4.0/ 5.0 PEC8012 Augmented Reality/ Virtual Reality PEC8013 AI Enabled Accounting Practice	PEL8011 Industry 4.0/ 5.0 Lab PEL8012 Augmented Reality/ Virtual Reality Lab PEL8013 AI Enabled Accounting Practice Lab
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