

**SCHOOL OF COMPUTER SCIENCE AND
ENGINEERING**

**M.Tech Computer Science with
Specialization in Cyber Physical
Systems**

M.Tech CSE (CPS)

Curriculum
(2020-2021 admitted students)



VIT[®]

Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

VISION STATEMENT OF VELLORE INSTITUTE OF TECHNOLOGY

Transforming life through excellence in education and research.

MISSION STATEMENT OF VELLORE INSTITUTE OF TECHNOLOGY

World class Education: Excellence in education, grounded in ethics and critical thinking, for improvement of life.

Cutting edge Research: An innovation ecosystem to extend knowledge and solve critical problems.

Impactful People: Happy, accountable, caring and effective workforce and students.

Rewarding Co-creations: Active collaboration with national & international industries & universities for productivity and economic development.

Service to Society: Service to the region and world through knowledge and compassion.

VISION STATEMENT OF THE SCHOOL OF COMPUTER SCIENCE & ENGINEERING

To create and maintain an environment for Excellence in Instruction, Learning and Applied Research in the area of Computing Science and Engineering and allied disciplines so as to equip our students with necessary knowledge and skills for higher education/employment and to meet the societal demands.

MISSION STATEMENT OF THE SCHOOL OF COMPUTER SCIENCE & ENGINEERING

- Produce graduates thoroughly acquainted with the principles of modern Computing Science who are able to apply the principles in the design and construction of reliable systems.
- To equip students with the fundamental understanding and practical skills needed by the potential organizers of a demanding profession.
- Provide cost-effective Information and Communication Technology (ICT)-based solutions and value-added services to a variety of organizations and to meet the expectations of stakeholders



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- Foster a learning and creative community that strives to continuously advance the frontiers of knowledge and promote the deployment and usage of ICT-based applications for betterment of society.

M.Tech Computer Science with Specialization in Cyber Physical Systems

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

1. Graduates will be engineering practitioners and leaders, who would help solve industry's technological problems.
2. Graduates will be engineering professionals, innovators or entrepreneurs engaged in technology development, technology deployment, or engineering system implementation in industry.
3. Graduates will function in their profession with social awareness and responsibility.
4. Graduates will interact with their peers in other disciplines in industry and society and contribute to the economic growth of the country.
5. Graduates will be successful in pursuing higher studies in engineering or management.
6. Graduates will pursue career paths in teaching or research.



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PROGRAMME OUTCOMES (POs)

PO_01: Having an ability to apply mathematics and science in engineering applications.

PO_02: Having a clear understanding of the subject related concepts and of contemporary issues and apply them to identify, formulate and analyse complex engineering problems.

PO_03: Having an ability to design a component or a product applying all the relevant standards and with realistic constraints, including public health, safety, culture, society and environment

PO_04: Having an ability to design and conduct experiments, as well as to analyse and interpret data, and synthesis of information

PO_05: Having an ability to use techniques, skills, resources and modern engineering and IT tools necessary for engineering practice

PO_06: Having problem solving ability- to assess social issues (societal, health, safety, legal and cultural) and engineering problems

PO_07: Having adaptive thinking and adaptability in relation to environmental context and sustainable development

PO_08: Having a clear understanding of professional and ethical responsibility

PO_09: Having cross cultural competency exhibited by working as a member or in teams

PO_10: Having a good working knowledge of communicating in English – communication with engineering community and society

PO_11: Having a good cognitive load management skills related to project management and finance

PO_12: Having interest and recognise the need for independent and lifelong learning



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ADDITIONAL PROGRAMME OUTCOMES (APOs)

APO_01: Having an ability to be socially intelligent with good SIQ (Social Intelligence Quotient) and EQ (Emotional Quotient)

APO_02: Having Sense-Making Skills of creating unique insights in what is being seen or observed (Higher level thinking skills which cannot be codified)

APO_03: Having design thinking capability

APO_04: Having computational thinking (Ability to translate vast data in to abstract concepts and to understand database reasoning)

APO_05: Having Virtual Collaborating ability

APO_06: Having an ability to use the social media effectively for productive use

APO_07: Having critical thinking and innovative skills

APO_08: Having a good digital footprint

PROGRAMME SPECIFIC OUTCOMES (PSOs)

On completion of M. Tech. CSE with (CPS) programme, graduates will be able to

- PSO1: Acquire the ability to identify, investigate, understand and analyse complex problems pertaining to Cyber Physical Systems in industries and identify solution strategies for implementation.



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- PSO2: Develop professional skills that prepare them for immediate employment and for life-long learning in advanced areas of Cyber Physical Systems and related domains.
- PSO3: Impart an eagerness to conduct investigation and research in the field of Cyber Physical Systems.



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M.Tech Computer Science with Specialization in Cyber Physical Systems

CREDIT STRUCTURE

Category-wise Credit distribution

Credits Breakup	
	CREDITS
University Core	27
University Elective	6
Program Core (CSE - 9, CPS – 9)	18
Program Elective	19
Total	70



M.Tech Computer Science with Specialization in Cyber Physical Systems

DETAILED CURRICULUM

University Core

S. No.	Course Code	Course Title	L	T	P	J	C
1.	MAT6001	Advanced Statistical Methods	1	0	2	0	2
2.	ENG5001	Fundamentals of Communications of Skills	0	0	2	0	1
3.	STS5001	Soft skills	3	-	-	-	1
4.	STS5002	Soft skills	3	-	-	-	1
5.	SET5001	SET Projects	-	-	-	8	2
6.	SET5002	SET Projects	-	-	-	8	2
7.	EEE 6099	Master's Thesis	-	-	-	64	16
8.	GER5001	Deutsch Fuer Anfaenger	2	0	0	0	2
9.	FRE5001	Francais Fonctionnel	2	0	0	0	2



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Programme Core

S. No.	Course Code	Course Title	L	T	P	J	C
1.	CSE5001	Algorithms: Design and Implementation	2	0	2	0	3
2.	CSE5003	Database Systems: Design and Implementation	2	0	2	4	4
3.	CSE5006	Multi-Core Architecture	2	0	2	0	3
4.	XXXXXX	CPS Essentials	2	0	0	0	2
5.	SET5001	Control Engineering	3	0	2	0	4
6.	SET5002	Sensors and Actuators	2	0	2	0	3



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Programme Elective

S. No.	Course Code	Course Title	L	T	P	J	C
1	XXXXXXXX	Industrial Robotics	2	0	2	4	4
2	XXXXXXXX	Machine Learning for CPS	2	0	2	0	3
3	XXXXXXXX	Cyber Security	3	0	0	4	4
4	XXXXXXXX	Adaptive and Robust Control Systems	3	0	0	0	3
5	XXXXXXXX	Cloud Computing	3	0	2	0	4
6	ECE5044	Hardware Software Co-design	3	0	0	0	3
7	XXXXXXXX	Design of CPS Prototype	0	0	0	4	1
8	XXXXXXXX	Programming for CPS	0	0	4	0	2
9	XXXXXXXX	Data Acquisition of Hardware	2	0	2	4	4
10	XXXXXXXX	Heterogeneous Networks	3	0	2	0	4
11	XXXXXXXX	Network-on-Chip	3	0	2	0	4
12	XXXXXXXX	Software Defined Networks	3	0	2	0	4
13	XXXXXXXX	Real Time Systems	2	0	0	4	3
14	XXXXXXXX	Fault-Tolerant Systems	3	0	0	0	3
15	XXXXXXXX	Advanced Digital Control Systems	2	0	2	0	3
16	XXXXXXXX	High Performance Communication Networks	3	0	2	0	4
17	XXXXXXXX	Digital Manufacturing and Factory Automation	3	0	2	0	4
18	XXXXXXXX	Smart Health Technology	2	0	0	4	3
19	XXXXXXXX	Smart Transportation Systems	2	0	0	4	3
20	XXXXXXXX	Smart Grid	2	0	0	4	3
21	XXXXXXXX	Smart Sensors and IoT Systems	2	0	2	0	3