



Dr. Vishwanath Karad

**MIT WORLD PEACE  
UNIVERSITY** | PUNE

TECHNOLOGY, RESEARCH, SOCIAL INNOVATION & PARTNERSHIPS

## SYLLABUS

DR VISHWANATH KARAD

MIT - WORLD PEACE UNIVERSITY

**FACULTY OF ENGINEERING AND TECHNOLOGY  
SCHOOL OF COMPUTER ENGINEERING AND TECHNOLOGY**

**M. Tech (Computer Science & Engineering (CSE))**

**Data Science and Analytics**

**BATCH 2024 – 2026**

## **PROGRAMME STRUCTURE**

### **Preamble:**

The Computer Engineering and Technology is the most sought-after branch of Engineering in today's world. With the advancements in hardware and software technologies, there is huge scope for development of a wide range of applications. The Internet and allied technologies have connected the world cohesively offering immense opportunities at national and international levels. The students of MITWPU will be tomorrow's global leaders, researchers, entrepreneurs and change-makers. MITWPU has the objective to make them competent for global scenarios.

The M. Tech, CSE, Data Science and Analytics (DSA) curriculum offers a varied range of subjects that fall into the core, specialization and basic sciences categories. The programme also has provisions for pursuing Industry projects, Internships, Foreign and National study tours, Interdisciplinary Projects as a prudential aspect of the course curriculum. The value-based education is ensured by offering Peace related subjects and Yoga practice.

The curriculum is based on the theme of Continuous Evaluation. Theory and Laboratory components are given appropriate importance. The communication skills are enhanced through the component of Seminars. Industry exposure is given through Internships / Projects, and development of latest Technologies is achieved and enhanced through usage of latest Tools.

The curriculum will transform the students into winning personalities.

### **Dr. Vrushali Kulkarni**

Head, School of Computer Engineering and  
Faculty of Engineering and Technology  
Technology

Vice Chairman  
BoS for School of Computer Engineering  
Technology

### **Dr. Dinesh Seth**

Dean, School of Computer Science and

Chairman,  
BoS for School of Computer  
Engineering and Technology

## *Vision and Mission of the Programme*

### **VISION**

To be an academic centre of excellence in Computer Science and Engineering to cater to societal needs.

### **MISSION**

- To create conducive environment for nurturing integrity, discipline and technical knowledge in emerging areas of computer science and engineering.
- To encourage students to work in trans-disciplinary domain in collaboration with industry and to inculcate research mindset.
- To develop globally competent graduates to provide solutions for societal problems.

### *Programme Educational Objectives*

The program is designed with the objectives to nurture competent, multifaceted and ethical Professionals. After completion of program the post-graduates will be able to –

**PEO I Competent Professionals** - To mould the students with the technical knowledge and skills needed to identify and apply appropriate data science principles.

**PEO II Data Science and Analytics Professionals** - To develop students' skills so that they are able to demonstrate and apply data science and analytics techniques and enhance the performance of information technology systems in various application domains.

**PEO III Ethical Professionals** - To select suitable ethical principles and commit to professional responsibilities and human values for the benefit of the society.

### **Programme Outcomes (POs)**

Computer Engineering and Technology Post-Graduates will be able to:

- PO1 Understanding:** Understand data science and analytics concepts and contemporary issues.
- PO2 Capabilities:** Analyse and assess data so as to design suitable problem solving strategies.
- PO3 Development:** Develop a clear understanding of AI models so as to identify and develop appropriate AI models.
- PO4 Research skills:** Plan, experiment, analyse and evaluate the performance of techniques in data science at the theoretical as well as well as the practical level.
- PO5 Innovation:** Identify, analyse and develop innovative ways of applying data science and analytics techniques.
- PO6 Real World Problems:** Apply suitable data science techniques to solve real world problems while considering relevant performance parameters.
- PO7 Employability:** Use data science techniques and related tools so as to apply at the workplace or research areas.
- PO8 Scholarship:** Conduct independent and innovative research and/or apply an interdisciplinary approach.
- PO9 Communication skills:** Excel in delivering oral, written & presentation skills to various audiences.
- PO10 Teaching skills:** Gain knowledge, skills and ample opportunities to utilize their innate teaching skills.
- PO11 Professional skills:** Use collaborative skills, ability to write grants & articles for journals and qualify for various competitive and professional certifications in the field of data analytics and data science.
- PO12 Ethical standards:** Ensure ethical behaviour as a person, professional and as a researcher.

### **Programme Specific Outcomes (PSOs)**

Computer Engineering and Technology Post Graduates will be able to:

- PSO1** Design, develop and test application software by using state-of-art analytical techniques of data science to address contemporary issues,
- PSO2** Acquire and apply new knowledge to implement intelligent computing systems using hardware and software modules in Machine Learning, Artificial Intelligence, Data Analytics and allied domains
- PSO3** Select appropriate platforms to architect innovative and optimized IT solutions with data scientists' perspective and apply this acumen for entrepreneurship and for higher studies in addition to professional career.

**Assessment Scheme :**

<b>Abbreviation</b>	<b>L-T-P-J-C : L-Lecture, T-Tutorial, P-Practical, J-Project, C-Total Credits.</b> <b>CCA1 - Class Continuous Assessment 1,</b> <b>MT - Mid Term Test,</b> <b>CCA2 - Class Continuous Assessment 2,</b> <b>LCA1 - Laboratory Continuous Assessment 1,</b> <b>LCA2 - Laboratory Continuous Assessment 2,</b> <b>LCA3 - Laboratory Continuous Assessment 3,</b> <b>TE - Term End Exam</b>
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Type of Course	Assessment Scheme Code	Description L-T-P-J-C	CCA1	MT	CCA2	LCA1	LCA2	LCA3	TE	Total
Theory Courses	TT1	All Theory (L, T) Only courses <b>with</b> TE exams	15	30	15	-	-	-	40	100
Theory Courses with Continuous Evaluation	TT2	All Theory (L, T) only courses <b>without</b> TE exams	35	30	35	-	-	-	-	100
Lab /Projects/ Internship/ Dissertation	PJ	All courses having P and J components Only	-	-	-	33.33	33.33	33.33	-	100
Theory and Lab Course 1	TL1	2-0-2-0-4	7.5	15	7.5	10	10	10	40*	100
Theory and Lab Course 2	TL2	1-0-3-0-4	2.5	10	2.5	15	15	15	40*	100
Theory and Lab Course 3	TL3	3-0-1-0-4	10	25	10	5	5	5	40	100
Theory and Lab Course 4	TL4	2-0-1-0-3	10	20	10	6.67	6.67	6.67	40	100
Theory and Lab Course 5	TL5	1-0-2-0-3	5	10	5	13.33	13.33	13.33	40*	100
Theory and Lab Course 6	TL6	2-1-1-0-4	10	25	10	5	5	5	40	100
Theory and Lab Course 7	TL7	1-1-1-0-3	10	20	10	6.67	6.67	6.67	40	100

\* Term End Exams to be conducted anywhere within the MITWPU Campus subject to the following conditions:

1. All eligible students will be taking this exam in the same space and at the same time slot.
2. The time for Term End Exams will be a maximum of 3 hrs.
3. QP will be sent along with Invigilators by DoE.

**PLEASE NOTE: IF ANY OF THE ASSESSMENT CODE COMBINATION AS APPLICABLE TO YOUR PARTICULAR PROGRAM IS NOT AVAILABLE IN THE ABOVE GIVEN CODES, PLEASE CONTACT WITH YOUR ASSOCIATE DEAN ACADEMICS TO HAVE IT INCLUDED FROM DEAN ACADEMICS INCORDINATION WITH THE CONTROLLER OF EXAMINATION.**

***M. Tech. (First Year) (Data Science and Analytics) (2023-25)***  
**Semester – I**

Sr. No.	Course Code	Name of Course	Type	Weekly Workload, Hrs.				Credits	Assessment Scheme Code
				L	T	P	J		
1	CSD40010	Research Methodology	PC	3	1	0	0	4	TT1
2	CSD40020	Computational Statistics for Data Science	PC	3	0	2	0	4	TL3
3	CSD40030	Advances in Machine Learning	PC	3	0	2	0	4	TL3
4	CSD40040	Advances in AI	PC	3	0	2	0	4	TL3
5	CSD40050	Deep Generative Models	PC	3	0	2	0	4	TL3
6	PCE10040	Scientific Studies of Mind, Matter, Spirit and Consciousness	UC	2	0	0	0	2	TT1
7	YOG10030	Yoga	UC	0	0	2	0	1	PJ
Total:				17	1	10	0	23	

\*\*Assessment Marks are valid only if Attendance criteria are met

**Weekly Teaching Hours: 28**

**L-Lecture, T-Tutorial, P-Practical, J-Project.**

**Total Credits: 23**

Academic  
Coordinator

Program  
Director/HoS

Associate Dean  
Academics

Dean

Dean Academics  
MITWPU

Registrar  
MITWPU



***M. Tech. (First Year) (Data Science and Analytics) (2023-25)***  
**Semester – II**

Sr. No.	Course Code	Name of Course	Type	Weekly Workload, Hrs.				Credits	Assessment Scheme Code
				L	T	P	J		
1	CSD40060	Natural Language Processing	PC	3	0	2	0	4	TL3
2	CSD40070	Data Analytics for Data Science	PC	3	0	2	0	4	TL3
3	CSD40080 CSD40090	Program Elective I A. Soft Computing Techniques B. Reinforcement Learning	PE	3	1	0	0	4	TT1
4	CSD40100	Software Lab I Data Science and Analytics	PC	0	0	4	0	2	PJ
5	CSD40110	Seminar	PC	0	0	0	6	2	PJ
6	PCE10050	Peace Building: Global Initiatives	UC	2	0	2	0	2	TT1
Total:				11	1	10	6	<b>18</b>	

\*\*Assessment Marks are valid only if Attendance criteria are met

**Weekly Teaching Hours: 28**

**L-Lecture, T-Tutorial, P-Practical, J-Project.**

**Total Credits: 18**

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Director/HoS

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Academics

Dean

Dean Academics  
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**M. Tech. (Second Year) (Data Science and Analytics) (2023-25)**  
**Semester – III**

Sr. No.	Course Code	Name of Course	Type	Weekly Workload, Hrs.				Credits	Assessment Scheme Code
				L	T	P	J		
1	CSD50010	Image and Video Analytics	PC	3	0	2	0	4	TL3
2	CSD50020 CSD50030	Program Elective II A. Data Privacy for Data Science B. Cloud and Block chain for data Analytics	PE	3	1	0	0	4	TT1
3	CSD50040 CSD50050	Program Elective III A. Health-care Data Analytics B. Social Media Analytics	PE	3	1	0	0	4	TT1
4	CSD50060	Software Lab II Data Science and Analytics	PC	0	0	2	0	1	PJ
5	CSD50070	Research Project I	PC	0	0	0	24	8	PJ
Total:				9	2	4	24	21	

\*\*Assessment Marks are valid only if Attendance criteria are met

**Weekly Teaching Hours: 39**

**L-Lecture, T-Tutorial, P-Practical, J-Project.**

**Total Credits: 21**

Academic  
Coordinator

Program  
Director/HoS

Associate Dean  
Academics

Dean

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MITWPU

Registrar  
MITWPU

***M. Tech. (Second Year) (Data Science and Analytics) (2023-25)***  
**Semester – IV**

Sr. No.	Course Code	Name of Course	Type	Weekly Workload, Hrs.				Credits	Assessment Scheme Code
				L	T	P	J		
1	CSD50080 CSD50090	Program Elective IV A. Business Data Analytics and Applications B. Quantum Computing and Machine Learning	PE	3	1	0	0	4	TT1
2	CSD50100	Internship	PC	0	0	0	12	4	PJ
3	CSD50110	Research Project II	PC	0	0	0	36	12	PJ
Total:				3	0	2	48	20	

\*\*Assessment Marks are valid only if Attendance criteria are met

**Weekly Teaching Hours: 52**

**L-Lecture, T-Tutorial, P-Practical, J-Project.**

**Total Credits: 20**

Academic  
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Program  
Director/HoS

Associate Dean  
Academics

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***M. Tech. (Data Science and Analytics) (2023-25)***  
**Professional Elective Tracks**

<b>Semester</b>	<b>Course Code</b>	<b>Name of the Course</b>	<b>Type</b>
II	CSD40080	Soft Computing Techniques	Program Elective I
II	CSD40090	Reinforcement Learning	Program Elective I
III	CSD50020	Data Privacy for Data Science	Program Elective II
III	CSD50030	Cloud and Block chain for data Analytics	Program Elective II
III	CSD50040	Healthcare Data Analytics	Program Elective III
III	CSD50050	Social Media Analytics	Program Elective III
IV	CSD50080	Business Data Analytics and Applications	Program Elective IV
IV	CSD50090	Quantum Computing and Machine Learning	Program Elective IV

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