ODISHA UNIVERSITY OF TECHNOLOGY AND RESEARCH

Techno Campus, Mahalaxmi Vihar, Ghatikia, Bhubaneswar-751029.

Syllabus Structure (Effective from 2023-24)

School/ Department: School of Mechanical Sciences
Course: M. Tech., Programme: Mechatronics and Machine Learning (MML),
Duration: 2 years (Four Semesters)

Abbreviation used:

AC	Audit course	LC	Lab Course	PA	Practical Assessment
PC	Professional Core	PR	Project/ Practical/ Internship	L	Lecture
PE	Professional Elective	SE	Seminar/ Expert Lecture/ Etc.	T	Tutorial
OE	Open Elective	IA*	Internal Assessment	P	Practical
MC	Mandatory/ Common Course	EA	End-Semester Assessment		
*Internal Assessment Mark (30 marks) consists of (i) Mid Semester (20 marks), (ii) Quiz/ Assignment (10 marks)					

Subject Code Format:

A1	A2	B3	C4	C5	C6
School/ Dept. (Offering) **BH:** Basic Sciences and Humanities **CS:** Computer Sciences **EE:** Electrical Sciences **EI:** Electronic Sciences **IP:** Infrastructure and Planning **MS:** Mechanical Sciences **BT:** Biotechnology **TE:** Textile Engineering		**Level** **1:** UG/ Int. Msc. (1st Year) **2:** UG/ Int. Msc. (2nd Year) **3:** UG/ Int. Msc. (3rd Year) **4:** UG/ Int. Msc. (4th Year) **5:** UG/ Int. Msc. (5th Year) **6:** PG (1st Year) **7:** PG (2nd Year) **8:** Ph.D.	**0:** AC **1:** PC **2:** PE **3:** OE **4:** MC **5:** LC **6:** PR **7:** SE **8:** **9:**	**Serial Number (01 to 99)** 01/ 03/…/ 19: Odd Sem. (IEM) 21/ 23/…/ 39: Odd Sem. (MML) 41/ 43/…/ 59: Odd Sem. (MSD) 61/ 63/…/ 79: Odd Sem. (THE) 81/ 83/…/ 99: Odd Sem. (MBA) 02/ 04/…/ 20: Even Sem. (IEM) 22/ 24/…/ 40: Even Sem. (MML) 42/ 44/…/ 60: Even Sem. (MSD) 62/ 64/…/ 80: Even Sem. (THE) 82/ 84/…/ 98: Even Sem. (MBA)	

1st Semester

Sl. No.	Subject Type	Subject Code	Subject Name	Teaching Hours			Credit	Maximum Marks			
				L	T	P		IA	EA	PA	Total
1	PC 1	MS6121	Fundamentals of Mechatronics	3	0	0	3	30	70	-	100
2	PC 2	MS6123	Artificial Intelligence	3	0	0	3	30	70	-	100
3	PE 1 (Any One)	MS6221	Sensors and Actuators in Industries	3	0	0	3	30	70	-	100
		MS6223	Introduction to Internet of Things								
		MS6225	Design and Control of Mechatronic Systems								
4	MC 1	BS6401	Mathematical Methods in Engineering	3	0	0	3	30	70	-	100
5	MC 2	MS6403	Research Methodology and IPR	2	0	0	2	30	70	-	100
6	LC 1	MS6521	Data Modeling Lab	0	0	4	2	-	-	100	100
7	LC 2	MS6523	Mechatronics Laboratory	0	0	4	2	-	-	100	100
8	AC 1	BH6001	English for Research Paper Writing	2	0	0	0	30	70	-	100
			Total	**16**	**0**	**10**	**18**	**180**	**420**	**200**	**800**

ODISHA UNIVERSITY OF TECHNOLOGY AND RESEARCH

Techno Campus, Mahalaxmi Vihar, Ghatikia, Bhubaneswar-751029.

Syllabus Structure (Effective from 2023-24)

2nd Semester

Sl. No.	Subject Type	Subject Code	Subject Name	Teaching Hours			Credit	Maximum Marks			
				L	T	P		IA	EA	PA	Total
1	PC 3	MS6122	Foundations of Machine Learning	3	0	0	3	30	70	-	100
2	PC 4	MS6124	Robot Mechanics and Control	3	0	0	3	30	70	-	100
3	PE 2 (Any One)	MS6222	Mechatronics System Design	3	0	0	3	30	70	-	100
		MS6224	Microprocessor and Embedded Systems								
		MS6226	Autonomous Robotics								
4	PE 3 (Any One)	MS6228	Advanced Machine Learning	3	0	0	3	30	70	-	100
		MS6230	Big Data Analytics								
		MS6232	Deep Learning								
5	OE 1	Any One from the List of *OE 1 (Appendix-I)		3	0	0	3	30	70	-	100
6	PR 1	MS6622	Project (Specialization Related)	0	0	4	2	-	-	100	100
7	LC 3	MS6522	Advanced Data Modeling Lab	0	0	4	2	-	-	100	100
8	AC 2	IP6002	Disaster Management	2	0	0	0	30	70	-	100
			Total	**17**	**0**	**8**	**19**	**180**	**420**	**200**	**800**

3rd Semester

Sl. No.	Subject Type	Subject Code	Subject Name	Teaching Hours			Credit	Maximum Marks			
				L	T	P		IA	EA	PA	Total
1	PE 4* (Any One)	MS7221	System Modelling and Simulation	3	0	0	3	30	70	-	100
		MS7223	Hardware Integration of Mechatronics System								
		MS7225	Advanced Control System								
		MS7227	Hydraulic and Pneumatic Control System								
2	PR 2	MS7621	Dissertation (Phase-I)	0	0	24	12	-	-	100	100
			Total	**3**	**0**	**24**	**15**	**30**	**70**	**100**	**200**

* Virtual/Online Course either offered by OUTR or available in MOOCs platform (No physical class)

4th Semester

Sl. No.	Subject Type	Subject Code	Subject Name	Teaching Hours			Credit	Maximum Marks			
				L	T	P		IA	EA	PA	Total
1	PR 3	MS7622	Dissertation (Phase-II)	0	0	32	16	-	-	100	100
			Total	**0**	**0**	**32**	**16**	**-**	**-**	**100**	**100**

Credits and Maximum Marks

Sl. No.	Semester	Credits	Maximum Marks
1	1st	18	800
2	2nd	19	800
3	3rd	15	200
4	4th	16	100
	Total	68	1900

ODISHA UNIVERSITY OF TECHNOLOGY AND RESEARCH

Techno Campus, Mahalaxmi Vihar, Ghatikia, Bhubaneswar-751029.

Syllabus Structure (Effective from 2023-24)

(APPENDIX-I)

LIST OF (MC/ *OE/ AC) SUBJECTS OFFERED BY SCHOOLS/ DEPARTMENTS

School/ Department (Offering)	Subject Type	Subject Code	Subject Name
Basic Science and Humanities	MC 1	BS6401	Mathematical Methods in Engineering
	*OE 1	BH6302	Spectroscopic Techniques for Organic Compounds
		BH6304	Chemical Biology
		BH6306	Nanoscience and Technology
		BH6308	Statistical Methods
		BH6310	Operations Research
		BH6312	Advanced Numerical Methods
	AC 1	BH6001	English for Research Paper Writing
		BH6003	Sanskrit for Technical Knowledge
		BH6005	Value Education
		BH6007	Constitution of India
	AC 2	BH6002	Pedagogy Studies
		BH6004	Stress Management by Yoga
		BH6006	Personality Development through Life Enlightenment Skills
Computer Sciences	*OE 1	CS6302	Pattern Recognition
		CS6304	Distributed Systems
		CS6306	Microfluidic Biochip
		CS6308	Programming in C
		CS6310	Data Structure
		CS6312	Computer Vision
Electrical Sciences	*OE 1	EE6302	Quantitative Methods for Energy Management and Planning
		EE6304	Soft Computing application to Engineering
		EE6306	Illumination Engineering
		EE6308	AI and ML for Biomedical Sciences
Electronic Sciences	*OE 1	EI6302	Machine Learning and Artificial Intelligence
		EI6304	IoT and its Applications
		EI6306	Parallel Processing
		EI6308	Signal Processing in Mechatronics Systems
		EI6310	Micro Electro Mechanical Systems
Infrastructure and Planning	*OE 1	IP6302	Universally Accessible Built Environments
		IP6304	Environment Impact Analysis
		IP6306	Geotechnics for Waste Materials
		IP6308	Project Planning and Management
	AC 2	IP6002	Disaster Management
Mechanical Sciences	MC 2	MS6403	Research Methodology and IPR
	*OE 1	MS6302	Production Planning and Control
		MS6304	Design of Experiment
		MS6306	Total Quality Management and Six Sigma
		MS6308	Financial Institutions, Instruments and Markets
		MS6310	Renewable Energy Systems
		MS6312	Design of Thermal Systems
		MS6314	Sensors and Actuators in Industry
		MS6316	Robot Mechanics and Control
Biotechnology	*OE 1	BT6302	Nanobiotechnology
Textile Engineering	*OE 1	TE6302	Polymer Composite

***N.B.:**

The Open Elective Subjects (*OE 1) are specifically open for all programs of Schools/ Departments, other than the School/ Department offering the same subject.