4.4 Department of Mechatronic Engineering

4.4.1 The Department

Mechatronic Engineering is the newest department (established in the year 2021) by the University. Initially, the Master in Mechatronic Engineering degree program was offered from the year 2014. Subsequently, Ph.D. in Mechatronic Engineering was also offered. Both of these postgraduate programs are Higher Education Commission (HEC) approved. The four-year undergraduate degree program in Mechatronic Engineering was launched in the year 2016 under the administration of the Mechanical Engineering Department. After the establishment of the separate Department of Mechatronic Engineering, this program is being managed by the same. Mehran University of Engineering and Technology is the first and the only public sector university in the province of Sindh offering the four-year B.E. in Mechatronic Engineering program. The first batch of this program has already graduated. The program has been adapted to Outcome-Based Education (OBE) and is duly accredited by Pakistan Engineering Council (PEC) in level II (highest possible level).

A mechatronic engineer pursues an inter-disciplinary approach, which enables him/her to design and develop devices and systems that encompass multiple conventional engineering disciplines. With the advent of the Fourth industrial revolution (Industry 4.0), modern smart technology is taking automation to the next higher level thus bringing fundamental changes to our lives. The undergraduate program in mechatronic engineering provides a right mix of subjects from mechanical, electronic and computer engineering domains that is aimed to design and develop innovative technological interventions into the modern-day challenges of industrial, medical and agricultural sectors. In addition to faculty of the Mechatronic Engineering Department, the subjects are also taught by faculty members from Mechanical Electronic and Computer System Engineering departments. In addition to the Department's dedicated laboratories, practical work is also carried out in the labs of other departments of the University.

Mechatronic Engineers have opportunities to work in emerging fields in public and private sectors. A Mechatronic system is composed of integration of mechanical and electronic components, sensors, actuators, and controllers. Modern industry has transformed from electromechanical type to fully automated type; thus, Mechatronic engineering skills are in demand by both national and international companies. They require personnel with multi-disciplinary expertise having knowledge of all the related systems to run industries and improve automated systems. Plenty of opportunities exist for postgraduate studies/scholarships nationally and internationally. Mechatronic Engineers are in demand in the following sectors:

- Automation and Control
- Robotics
- Automobile
- Renewable energy
- Power Plants
- Oil refineries
- Manufacturing process plants
- Marine engineering
- Biomedical
- Food processing
- Petrochemical
- Research and Development, etc.

Vision of the Department

The Department's vision is to be a leader in mechatronic engineering education and research by building capabilities for technological solutions to achieve sustainable development.

Mission of the Program

The missions of the B.E in Mechanical Engineering Programs is to provide a high-quality education by dissemination knowledge and developing problem-solving abilities. The program also strives to nurture integrity, professionalism and leadership skills.

Program Education Objectives (PEOs):

PEO-1: To produce Mechatronic Engineers with core knowledge of related multiple disciplines.
PEO-2: To inculcate analytical and problem-solving abilities in graduating students.
PEO-3: To produce professionals with integrity and demonstrable communication and leadership skills.

4.4.2 The Faculty

Chairman of the Department:
Prof. Dr. Jawaid Daudpoto
Phone: +92-22772250-70 / **Ext.:** 2331

a. Dedicated Faculty:

Professor:
Dr. Jawaid Daudpoto
PhD, United Kingdom.

Assistant Professors:
Dr. Saifullah Samo
PhD, China.

Dr. Shadi Khan Baloch
PhD, Turkey.

Engr. Raheel Ahmed Nizamani
M.E, Pakistan.

Lecturer:
Engr. Adrash Ali
M.E, Pakistan.

Engr. Aeeman Soomro
M.E, Pakistan.

Engr. Memona Memon
M.E, Pakistan.

b. Shared Faculty:

Assistant Professors:
Engr. M. Atif Qaimkhani
M.E, Pakistan.

Engr. Imtiaz Ali Memon
M.E, Pakistan.

Mr. Arbab Ali Samejo
M.E, Pakistan.

Engr. Abdul Jabbar Memon
M.E, Pakistan.

Dr. Wahid Bux Mangrio
PhD, Pakistan.

Mr. Abdul Saleem Memon
M.Phil., Pakistan.

Lecturers:
Dr. Mahesh Kumar Rathi
PhD, Malaysia.

Engr. Shoaib Shaikh
M.E, Pakistan.

Engr. Faheem Shafeeque Channar
M.E, Pakistan.

Mr. Shafqat Shahzoor Chandio
M.Phil., Pakistan.

4.4.3 Laboratory Facilities

Following lab facilities are available to students of Mechatronic Engineering.

1. Instrumentation Lab.
2. Robotics & Control Lab.
3. Computer Lab.
4. Modeling & Simulation Lab.
5. Mechatronic System Design Lab.
6. Circuit Design & Project Lab.
7. Computer Lab
8. Engineering Drawing Lab.

9. Engineering Mechanics Lab.
10. Fluid Mechanics Lab.
11. Workshop
12. Material Testing Lab
13. Thermodynamics Lab.
14. Mechanics of Machines Lab.
15. Mechanical Vibration Lab.
16. Equipment and Training Lab.
17. Electrical Circuit and Measurement Lab.
18. Power Electronics and Control Lab.
19. Digital System Design Lab.
20. Analog Electronics Lab.
21. Embedded Systems Lab.
22. Computer Integrated Manufacturing (CIM) Lab

4.4.4 The Courses

	Course Code	Subject Name	Credit Hours	
			Theory	Practical
1st Semester	MTH108	Applied Calculus	3	0
	EN101	Functional English	3	0
	EL117	Applied Physics	2	1
	CS191	Computer Programming	2	1
	ME106	Engineering Statics	3	1
	ME116	Engineering Materials	2	0
		Total	**15**	**03**

	Course Code	Subject Name	Credit Hours	
			Theory	Practical
2nd Semester	ME126	Engineering Drawing and Computer Graphics	2	2
	IS111 / SS104	Islamic Studies / Ethics	2	0
	PS106	Pakistan Studies	2	0
	MTH112	Linear Algebra and Analytical Geometry	3	0
	EL125	Linear Circuit Analysis	2	1
	ME136	Fluid Mechanics	2	1
	ME146	Workshop Practice	0	1
		Total	**13**	**05**

	Course Code	Subject Name	Credit Hours	
			Theory	Practical
3rd Semester	ME206	Mechanics of Materials	2	1
	MTE201	Actuating Systems	3	1
	ME216	Engineering Dynamics	3	0
	CS291	Data Structures and Object-Oriented Programming	2	1
	ES216	Digital Logic Design	2	1
	MTH227	Ordinary and Partial Differential Equations	3	0
		Total	**15**	**04**

	Course Code	Subject Name	Credit Hours	
			Theory	Practical
4th Semester	MTH217	Laplace Transforms and Discrete Mathematics	3	0
	ME226	Fundamentals of Thermal Sciences	3	1
	ES246	Electronic Devices and Circuits	3	1
	ME236	Mechanics of Machines	3	1
	MTE211	Instrumentation and Measurements	3	1
		Total	**15**	**04**

	Course Code	Subject Name	Credit Hours	
			Theory	Practical
5thSemester	MTH336	Numerical Analysis and Computer Applications	3	1
	ES316	Microcontroller and Embedded Systems	3	1
	TL301	Signals and Systems	2	1
	ME306	Mechanical Vibrations	3	1
		Total	**11**	**04**

	Course Code	Subject Name	Credit Hours	
			Theory	Practical
6thSemester	MTH317	Statistics and Probability	3	0
	MTE301	Control Systems	3	1
	ME316	Machine Design and CAD / CAM	3	1
	EN113	Communication Skills	2	0
	EL329	Power Electronics	3	1
		Total	**14**	**03**

	Course Code	Subject Name	Credit Hours	
			Theory	Practical
7thSemester	ME406	Engineering Economics and Project Management	3	1
	MTE401	Robotics	3	0
	CS492	Digital Signal & Image Processing	3	1
	ME416	Manufacturing Processes	3	1
	MTE499	Project / Thesis –I	0	3
		Total	**12**	**06**

	Course Code	Subject Name	Credit Hours	
			Theory	Practical
8thSemester	CS491	Machine Intelligence	3	1
	MTE411	Mechatronic System Design	2	1
	MTE421	Industrial Automation	2	1
	EE425	Safety, Health and Environment	3	0
	STD951	Entrepreneurship	2	0
	MTE499	Project / Thesis -II	0	3
		Total	**12**	**06**