

Programme Specifications

B. Voc. Programme



Programme: Bachelor of Vocation (B.Voc.)
Course: Mechatronics

Faculty of Engineering and Technology
Directorate of Training & Lifelong Learning
M. S. Ramaiah University of Applied Sciences
University House, New BEL Road, MSR Nagar, Bangalore – 560 054
www.msruas.ac.in

PROGRAMME SPECIFICATIONS - MECHATRONICS

1	Title of The Award <ul style="list-style-type: none"> • Vocational Diploma in Mechatronics • Vocational Advanced Diploma in Mechatronics • Bachelor of Vocational Degree in Mechatronics
2	Modes of Study Full Time & Part Time
3	Awarding Institution /Body M.S. Ramaiah University of Applied Sciences
4	Joint Award Not Applicable
5	Teaching Institution Faculty of Engineering and Technology, M.S. Ramaiah University of Applied Sciences
6	Date of Programme Specifications July 2022
7.	Date of Programme Approval July 2022
8	Next Review Date: July 2025
9	Programme Approving Regulating Body and Date of Approval Board of Studies, Academic Council
10	Programme Benchmark UGC Guidelines
11	Rationale for the Programme Mechatronics is a systematic integration of mechanical, electrical and electronic components for systems to handle modern industrial requirements with high precision and accuracy. In recent times, due to the rapid development in the electronics and computer technologies, conventional mechanical systems are being replaced by mechatronic systems and there is an increased demand for cost effective, compact, efficient, accurate and reliable products in industries. Mechatronic systems are integral part of consumer products, home appliances, industrial robots, assembly & automation systems, road vehicles, aircrafts, ships and sub marines, electronic gadgets and military applications. Mechatronic systems encompasses sensors and actuation technology, signal conditioning, data acquisition, and processing, control system development, measurement and instrumentation, PLC and embedded ICs for automation and robot development.

	<p>This program is mainly aimed to develop the competency in modelling & design of Mechatronic systems using sensors, signal conditioning & signal processing circuitry, embedded micro controller IC s and PLCs. They are also used to build controllers for robots and industrial automation along with testing, evaluation and diagnosis of mechatronic system. This program also imparts Knowledge in the field of project management, organizational behavior and other managerial aspects.</p> <p>At present, Mechatronics is one of the emerging multi-disciplinary domain, gaining popularity with increased demand in industries for the development of efficient industrial products. However very few institutions offering job oriented courses for young aspirants in the similar domain. MSRUAS offers vocational program to candidates with ITI, Diploma and PUC background on Mechatronics. Students can choose the duration of the courses according to their need for 1 year, 2 years and 3 years based on the level of knowledge and experience required. Since most of the product development industries are running in a collaborative business environment, there is a need for professionals with a knowledge and skill sets of multi- domain to handle the requirements of product development</p>
12	<p>Programme Aim</p> <p>The aim of the Programme is to develop skilled professionals to identify, analyze, implement the model, test, evaluate and diagnose the key elements of Mechatronic systems to meet the need of present industrial applications</p>
13	<p>Programme Objectives</p> <ul style="list-style-type: none"> • To impart knowledge on general education including physics, mathematics, electrical, electronics, sensor applications, control systems, robotics and industrial automation • To accord the knowledge on modelling, controlling and testing of the different Mechatronic system applications. • To correlate the knowledge of designing, modelling, analyzing and testing of the robotic Systems for Industry Specific applications • To develop geometric models, simulate and analyze various mechatronics systems/assemblies for their kinematic and dynamic behavior • To impart knowledge on managerial subjects like communication skills, Labor laws, Occupational Health, Safety and Environment, Project Management, Principles of Management and Organizational Behavior • To impart the knowledge on Industry 4.0, Internet Of Things and Future Manufacturing Technologies to create work force in industries

14	<p>Intended learning outcomes of the course</p> <p>The Intended Learning Outcomes(ILO's) are listed under three headings: 1. Knowledge and Understanding 2. Practical Skills and 3.Capability/Transferable Skills</p> <p>Knowledge and Understanding</p> <p>After undergoing this course, the student will be able to:</p> <ol style="list-style-type: none"> 1. Explain Physics and Underlying principles of mechatronics systems 2. Describe various sensors, circuitry, components, machine elements, measurement systems, control systems and robotic systems 3. Read and interpret various engineering drawings and their usage related to mechatronic systems, safety regulations, labor laws connected with usage & operation of such mechatronic system 4. Describe various elements of IoT, Industry 4.0 and Understand Future Manufacturing technologies <p>Practical Skills</p> <p>After undergoing this course, the student will be able to:</p> <ol style="list-style-type: none"> 1. Identify various mechatronic systems and their applications. 2. Create views of robotic model that can be used in modelling and Simulation Process. 3. Select required sensors, circuitry, systems and networks for Industrial automation 4. Build robotic models, actuation systems and control systems 5. Identify various working stages of Industry 4.0, Sub systems of Internet Of Things and Future Manufacturing Technologies <p>Capability/Transferable Skills</p> <p>After undergoing this course, the student will be able to :</p> <ol style="list-style-type: none"> 1. Handle the various mechatronic system applications 2. Generate detailed drawings, modelling and analysis reports of various Mechatronic Systems 3. Communicate efficiently, manage and lead teams
15	<p>Programme Structure</p> <p>A student is required to successfully complete the following modules for the award of the Degree. The Programme is delivered as per the Time-Table for every batch</p>

16 Programme Structure

Vocational Diploma**Trimester-1**

General Education: 12 Credits, 180 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VGE050	Mathematics	4	60
2	VGE058	Physics in Mechatronics	4	60
3	VGE017	Communication Skills	4	60
Vocational Education: 12 Credits, 180 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VMS001	Basic Computer Skills(T&P)	4	60
2	VMS002	Basic Mechanical Workshop(T&P)	4	60
3	VMS003	Basic Electrical Circuits (T&P)	4	60

Trimester-2

General Education: 12 Credits, 180 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VGE052	Mechanical Engineering Science	4	60
2	VGE024	Digital Electronics and IC's	4	60
3	VGE028	Elements of Mechatronics	4	60
Vocational Education: 12 Credits, 180 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VMS004	Engineering Drawing(T&P)	4	60
2	VMS005	Wiring and Soldering Practice(T&P)	4	60
3	VMS006	Basic Electronics Circuits (T&P)	4	60

Trimester-3

Vocational Education: 12 Credits, 180Hours				
S. No.	Code	Module Title	Credit	Hours
1		Industrial Internship/Project	12	180

Advanced Vocational Diploma

Trimester-1

General Education: 12 Credits, 180 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VGE007	Electrical & Electronics Systems	4	60
2	VGE010	Elements of Mechanical Systems	4	60
3	VGE063	Sensors and Signals	4	60
Vocational Education: 12 Credits, 180 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VMS007	Mechanical Drawing & Assembly(T&P)	4	60
2	VMS008	Electrical and Electronics Systems Analysis and Simulation(T&P)	4	60
3	VMS009	Mechanical Systems Analysis and Simulations(T&P)	4	60

Trimester-2

General Education: 12 Credits, 180 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VGE011	Basic Hydraulics and Pneumatics	4	60
2	VGE051	Measurement and Control Systems	4	60
3	VGE019	Communication Systems	4	60
Vocational Education: 12 Credits, 180 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VMS010	Computer Applications and Networks (T&P)	6	90
2	VMS011	Modelling and Building of Mechatronic systems (T&P)	6	90

Trimester-3

Vocational Education: 12 Credits, 180 Hours				
S. No.	Code	Module Title	Credit	Hours
1		Industrial Internship/Project	12	480

Vocational Degree**Trimester-1**

General Education: 12 Credits, 180 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VGE046	Internet of Things and Industry 4.0	4	60
2	VGE016	Cloud Storage and Computing	4	60
3	VGE038	Future Manufacturing Technologies	4	60
Vocational Education: 12 Credits, 180 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VMS013	PLC and its Applications(T&P)	6	90
2	VMS014	HMI, SCADA and Robotics(T&P)	6	90

Trimester-2

General Education: 12 Credits, 180 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VGE047	Labour Laws, Occupational Health and Safety	4	60
2	VGE060	Principles of Management and Organizational Behavior	4	60
3	VGE062	Project Management	4	60
Vocational Education: 6 Credits, 90 Hours				
1	VMS015	Industrial Automation(T&P)	6	90

Trimester-3

Vocational Education: 18 Credits, 270 Hours				
S. No.	Code	Module Title	Credit	Hours
1		Industrial Internship/Project	18	720

19	<p>Programme Delivery Structure</p> <p>The Programme is in a tri semester pattern with an average of 30 hours of interactions per week and 12-13 weeks per semester</p>
20	<p>Teaching and Learning Methods</p> <p>The module delivery comprises of a combination of few or all the following.</p> <ol style="list-style-type: none"> 1. Face to Face Lectures using Audio-Visuals 2. Demonstrations 3. Laboratory-work/Field work/workshop 4. Industry Visit 5. Group Exercises 6. Project work 7. Project Exhibitions 8. Technical Festivals
21	<p>Assessment and Grading</p> <p>Students' performance is assessed through Component 1 (Continuous Evaluation CE) and component 2 (Semester End Examination SEE).</p> <p>1. Component 1 (Continuous Evaluation CE):</p> <p>Two tests of 25 marks each will be conducted in each subject. The average of the marks will be considered. An average of 40% is compulsory in each subject. This is applicable for both general and vocational education</p> <p>2. Component 2 (Semester End Examination SEE):</p> <p>A semester end exam of 50 marks will be conducted in each subject. An average of 40% is compulsory in each subject. This is applicable for both general and vocational education</p> <p>A student must score 40% of the combined CE and SEE scores to pass the subject and module</p>
22	<p>Failure</p> <p>If a student fails in a module, he / she is required to take up the make-up examination</p>
23	<p>Attendance</p> <p>A student is required to have a minimum attendance of 75% in each of the modules.</p>
24	<p>Award of Class</p> <p>As per the Academic Regulations for Vocational Programme</p>
25	<p>Student support for Learning</p> <ol style="list-style-type: none"> 1. Programme Notes 2. Reference Books in the Library 3. Magazines and Journals 4. Internet Facility 5. Computing Facility 6. Laboratory Facility 7. Workshop facility 8. Staff support 9. Lounges for Discussions 10. Any other support that enhances their learning

26

Quality Control Measures

Following are the Quality Control measures:

1. Review of module notes
2. Review of question papers
3. Student feedback
4. Moderation of assessed work
5. Opportunities for the students to see their assessed work
6. Review by external examiners and external examiners reports
7. Staff student consultative committee meetings
8. Student exit feedback
9. Subject Assessment Board
10. Programme Assessment Board

