

Programme Specification

B. Voc. Programme



Programme: Bachelor of Vocational Degree
Course: Mechatronics

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

Directorate	Training & Lifelong Learning
Programme	Bachelor of Vocational Degree (B.Voc)
Course	Mechatronics
Course Manager	Mr. Manjunath CK & Manjunath Nayak
Programme Administrator	Mr. Vijay Kumar S
Director DTLL	Mr. Arup Bhattacharya

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 Directorate of Training & Lifelong Learning M.S. Ramaiah University of Applied Sciences
6	Date of Programme Specifications July 2018
7.	Date of Programme Approval by Training and Lifelong Learning Council of MSRUAS May 2018
8	Next Review Date: --
9	Programme Approving Regulating Body and Date of Approval --
10	Programme Accredited Body and Date of Accreditation --
11	Grade Awarded by the Accreditation Body --
12.	Programme Accreditation Validity --
13	Programme Benchmark UGC Guidelines
14	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.

	<p>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> <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 & understanding the skills in the field of business communication, project management 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</p>
15	<p>Course Aim</p> <p>The aim of the course 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>
16	<p>Course 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

17	<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, design and analysis reports of various Mechatronic Systems 3. Communicate efficiently, manage and lead teams
18	<p>Course Structure</p> <p>A student is required to successfully complete the following modules for the award of the Degree. The course is delivered as per the Time-Table for every batch</p>

19 Programme Structure

Vocational Diploma**Semester-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: 18 Credits, 270 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VMS001	Basic Computer Skills	6	90
2	VMS002	Basic Electronics Circuits	6	90
3	VMS003	Basic Electrical Circuits	6	90

Semester-2

General Education: 12 Credits, 180 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VGE052	Mechanical Engineering Sciences	4	60
2	VGE024	Digital Electronics and ICs	4	60
3	VGE028	Elements of Mechatronics	4	60
Vocational Education: 18 Credits, 270 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VMS004	Engineering Drawing	6	90
2	VMS005	Wiring and Soldering Practice	6	90
3	VMS006	Basic Mechanical Workshop	6	90

20 Programme Structure

Vocational Advanced Diploma**Semester-1**

General Education: 12 Credits, 180 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VGE007	Basic Electrical & Electronic Systems	4	60
2	VGE010	Basic of Mechanical Systems	4	60
3	VGE063	Sensors and Signals	4	60
Vocational Education: 18 Credits, 270 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VMS007	Mechanical Drawing & Assembly	6	90
2	VMS008	Electrical and Electronic System Analysis and Simulation	6	90
3	VMS009	Mechanical System Analysis and Simulation	6	90

Semester-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: 18 Credits, 270 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VMS010	Computer Applications and Networks	6	90
2	VMS011	Modelling and Building of Mechatronic Systems -1	6	90
3	VMS012	Mechatronics Project - 1	6	90

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Programme Structure**Vocational Degree****Semester-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: 18 Credits, 270 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VMS013	PLC and its Applications	6	90
2	VMS014	HMI, SCADA and Robotics	6	90
3	VMS015	Industrial Automation	6	90

Semester-2

General Education: 12 Credits, 180 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VGE047	Labor 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: 18 Credits, 270 Hours				
S. No.	Code	Module Title	Credit	Hours
1	VMS016	Modelling and Building of Mechatronic systems-2	6	90
2	VMS017	Mechatronics Industrial Standards and Frameworks	6	90
3	VMS018	Mechatronics Project - 2	6	90

22	<p>Programme Delivery Structure</p> <p>The course is in a semester pattern with an average of 30 hours of interactions per week and 15 weeks per semester</p>
23	<p>Teaching and Learning Methods</p> <p>The module delivery comprises of a combination of few or all of 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
24	<p>Assessment and Grading</p> <p>Each module is assessed for a total of 100 marks with two tests each of 25 marks and a final examination of 50 marks for general education modules and similar pattern is followed for Vocational based modules with emphasis on skills. A candidate is required to score a minimum of 40% overall in each of the modules</p>
25	<p>Failure</p> <p>If a student fails in a module, he / she is required to take up the make-up examination by paying fees which will be decided by the university from time to time</p>
26	<p>Attendance</p> <p>A student is required to have a minimum attendance of 80% in each of the modules.</p>
27	<p>Award of Class</p> <p>As per the Academic Regulations for Vocational Programme</p>
28	<p>Student support for Learning</p> <ol style="list-style-type: none"> 1. Course 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
29	<p>Quality Control Measures</p> <p>Following are the Quality Control measures:</p> <ol style="list-style-type: none"> 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

