

Department of Robotics and Automation

1.3.1 Institution integrates cross-cutting issues relevant to Gender, Environment and Sustainability, Human Values and Professional Ethics into the Curriculum

Vision

To be a pioneer in robotics and automation education and create distinguished and ethical leaders committed to the profession and society via quality education, research and development.

Mission

- To provide students with opportunities to become leaders in robotics and automation education and research by facilitating learning, exposure, and skill.
- To provide a high-quality education that will result in graduates who are both professional and socially committed.
- To instil long-term skills in automation technologies, research and learning mindsets, and societal values in students.

Programme Specific Objectives

On the completion of Robotics and Automation program, the students will possess:

- An ability to analyse Automation systems/problems and recommend relevant technology for a more productive industrial ecosystem.
- An ability to Model, simulate, and design automation for increased industrial yield using engineering skills.
- An ability to explain and resolve problems in factory automation, create indigenous systems using current tools.
- An ability to develop robotics and automation engineering applications to solve human problems.
- Graduates will have a basic and deep understanding of various engineering concepts in order to build, analyze, and develop systems to solve real-world challenges using Robotics and Automation.
- Graduates are equipped with cutting-edge technology to design and build unique solutions using current tools, resulting in lifelong learning or improved skills, allowing them to become experts in their profession.
- Graduates will be trained in multidisciplinary technologies to support societal innovation, creativity, and entrepreneurship

Programme Outcomes

Engineering Graduates will be able to:

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PO 1 Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2 Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3 Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4 Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5 Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6 The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7 Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9 Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10 Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11 Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12 Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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List of courses that integrates cross cutting issues relevant to Gender, Environment and Sustainability, Human Values and Professional Ethics into the Curriculum

Sl.no	Subject	Subject code	Course objective	Deployment strategy and tool	PO	PSO	CO	Crosscutting issues integrated
1	Design and engineering	EST 200	<ul style="list-style-type: none"> • Explain the different concepts and principles involved in design engineering. • Apply design thinking while learning and practicing engineering • Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering 	Chalk and talk method and PPT	PO 1-12	PSO 1-4	CO 1-5	Environment and Sustainability, Human Values and Professional Ethics
2	PROFESSIONAL COMMUNICATION	HUN 102	<ul style="list-style-type: none"> • Develop vocabulary and language skills relevant to engineering as a profession • Analyze, interpret and effectively summarize a variety of textual content • Create effective technical presentations • Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus • Identify drawbacks in listening patterns and apply listening techniques for specific needs • Create professional and technical documents that are clear and adhering to all the necessary conventions 	Chalk and talk method and PPT	PO 1-12	PSO 1-4	CO 1-5	Human Values and Professional Ethics

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3	DISASTER MANAGEMENT	MCN 301	<ul style="list-style-type: none"> • Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle (Cognitive knowledge level) • Distinguish between different hazard types and vulnerability types and do vulnerability assessment • Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk • Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community (Cognitive knowledge level) • Identify factors that determine the nature of disaster response and discuss the various disaster response actions • Explain the various legislations and best practices for disaster management and risk reduction at national and international level 	Chalk and talk method and PPT	PO 1-12	PSO 1-4	CO 1-5	Human Values and Professional Ethics
4	Sustainable Engineering	MCN 201	<ul style="list-style-type: none"> • Understand the relevance and the concept of sustainability and the global initiatives in this Direction • Explain the different types of environmental pollution problems and their sustainable Solutions • Discuss the environmental regulations and standards 	Chalk and talk method .PPT, video	1,2,3,4,6,7	1,2,3	1,2,3,4	Environment and Sustainability



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			<ul style="list-style-type: none"> Outline the concepts related to conventional and non-conventional energy Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles. 					
5	Engineering Chemistry	CY100	<ul style="list-style-type: none"> Apply the basic concepts of electrochemistry and corrosion to explore its possible applications in various engineering fields Understand various spectroscopic techniques like UV-Visible, IR, NMR and its applications Apply the knowledge of analytical method for characterizing a chemical mixture or a compound. Understand the basic concept of SEM for surface characterization of nonmaterial's Learn about the basics of stereochemistry and its application. Apply the knowledge of conducting polymers and advanced polymers in engineering Study various types of water treatment methods to develop skills for treating wastewater. 	Chalk and talk method, PPT	1,2,3,4,5,6,7,11	2	1,2,3,4,5,6	Environment and Sustainability
6	Engineering physics	PH 100	<ul style="list-style-type: none"> Compute the quantitative aspects of waves and oscillations in engineering systems Apply the interaction of light with matter through interference, diffraction and identify these phenomena in different natural optical processes and optical instruments. Analyze the behavior of matter in the 	Chalk and talk method and PPT	PO1, 2,3,4	PSO1	CO1,2, 9,12	Environment and Sustainability


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			<p>atomic and subatomic level through the principles of quantum mechanics to perceive the microscopic processes in electronic devices.</p> <ul style="list-style-type: none"> • Classify the properties of magnetic materials and apply vector calculus to static magnetic fields and use Maxwell's equations to diverse engineering problems • Analyze the principles behind various superconducting applications, explain the working of solid state lighting devices and fibre optic communication system 					
7	INDUSTRIAL ECONOMICS	HUT 300	<ul style="list-style-type: none"> • Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle (Cognitive knowledge level) • Distinguish between different hazard types and vulnerability types and do vulnerability assessment. • Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk. • Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community (Cognitive knowledge level) • Identify factors that determine the nature of disaster response and discuss the various disaster response 	Chalk and talk method and PPT	PO 1-12	PSO 1-4	CO 1-6	Human Values and Professional Ethics



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			<p>actions</p> <ul style="list-style-type: none"> • Explain the various legislations and best practices for disaster management and risk reduction at national and international level 					
8	Life skill	HUN 101	<ul style="list-style-type: none"> • Define and Identify different life skills required in personal and professional life. • Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress. • Explain the basic mechanics of effective communication and demonstrate these through presentations.. • To equip them to face interview & Group Discussion. • Take part in group discussions. • Use appropriate thinking and problem solving techniques to solve new problems • Understand the basics of teamwork and leadership. 	Chalk and talk method, PPT	PO1, 2,3,5,6, 8,9,10,12	PSO3	CO1,2, 3,4,5,6	cross cutting issues relevant to Gender, Environment and Sustainability, Human Values and Professional Ethics into the Curriculum
9	MINIPROJECT	ADD 334	<ul style="list-style-type: none"> • To understand the engineering aspects of design with reference to simple products, • To foster innovation in design of products, processes or systems, • To develop design that add value to products and solve technical problems 	Presentat ion & impleme ntation	PO1, 2,3,4,5,6, 7,8,9,10,11,12	PSO1,2	CO1,2, 3,4	Gender, Environment and Sustainability Human Values and Professional Ethics

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10	INDUSTRIAL SAFETY ENGINEERING	MCN4 01	<ul style="list-style-type: none"> To Provide Sufficient knowledge about promising new and renewable source of Energy To equip student in working with Projects and to take up the project work in connected areas 	Chalk and talk method , PPT	1,2,3,4,5,6,8,9,10,11,12	1-3	1-6	Gender, Environment and Sustainability, Human Values and Professional Ethics
11	Seminar	RD 413	<ul style="list-style-type: none"> To develop skills in doing literature survey, technical presentation and report preparation. To enable project identification and execution of preliminary works on final semester project 	Chalk and talk method and PPT	PO 1,2,6,7	PSO 1-4	CO 1-6	Environment and Sustainability, Human Values and Professional Ethics
12	PROJECT	RD 416	<ul style="list-style-type: none"> To apply engineering knowledge in practical problem solving. To foster innovation in design of products, processes or systems. To develop creative thinking in finding viable solutions to engineering problems 	Presentat ion and impleme ntation	1,2,3,4,5,6	1,2,3	1,2,3,4,5,6,7,8,9,10,11,12	cross cutting issues relevant to Gender, Environment and Sustainability, Human Values and Professional Ethics into the Curriculum

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