DEPARTMENT OF MECHATRONICS

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

Vision

Create eminent and ethical leaders committed to profession and society in the field of Mechatronics through quality professional education to excel in industrial automation and innovation.

Mission

- To impart orientation to meet the challenges of the modern industry and provide motivation for research.
- To provide quality education to create graduates with professional and social commitment.

Programme Specific Objectives

PSO 1: **Professional skills:** Associate the concepts related to electrical, electronics, Mechanical, Robotics, Control and Instrumentation to solve the challenges of modern industries.

PSO 2: **Problem solving ability:** Analyze and design systems with modern tools for the benefit of the society.

Programme Educational Objectives

- Graduates shall possess fundamental and advanced knowledge in electronics, electrical and mechanical along with fundamental knowledge in mathematics, basic sciences and computer programming to analyze and solve the challenges related to automation.
- Graduates shall have ability to design and create novel solutions with modern tool usage which lead to a lifelong learning or higher qualification, making them experts in their profession.
- Graduates shall have the ability to work in a multidisciplinary environment with good professional and ethical commitment

Programme Outcomes

Engineering Graduates will be able to:

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

Dr. SUNNY JOSEPH KALAYATHANKAL
M.Tech, MCA, M.Sc, M.Phil, B.Ed
Ph.D (Computer Science), Ph.D (Maths)
PRINCIPAL
Jyothi Engineering College
Cheruthuruthy P.O.- 679 531

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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.
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.
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.
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.
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.
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.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
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.
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.
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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Dr. SUNNY JOSEPH KALAYATHANKAL
M.Tech, MCA, M.Sc, M.Phil, B.Ed
Ph.D (Comp... Science), Ph.D (Maths)
PRINCIPAL
J... Engineering College
C...thuruthy, PC... 679 531

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 Objectives	Deployment Strategy and Tool	Cross cutting Issues Integrated
1	Introduction To Sustainable Engineering	BE 103	To have an increased awareness among students on issues in areas of sustainability.To understand the role of engineering and technology within sustainable development.To know the methods, tools, and incentives for sustainable product-service system development. To establish a clear understanding of the role and impact of various aspects of engineering and engineering decisions on environmental, societal, and economic problems.	Chalk and talk method ,PPT,video	Environment and Sustainability
2	Design And Engineering	BE 102	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	Chalk and talk method and PPT	Environment and Sustainability, Human Values and Professional Ethics
3	Engineering Physics	PH 100	Most of the engineering disciplines are rooted in physics. In fact a good engineer is more or less an applied physicist. This course is designed to provide a bridge to the world of technology from the basics of science and to equip the students with skills in scientific inquiry, problem solving, and	Chalk and talk method and ppt	Environment and sustainability

Dr. SUNNY JOSEPH KALAYATHANKAL M.Tech., M.E., M.Sc., M.Phil., B.Ed (Maths) PRINCIPAL Jyothi Engineering College Cheruthuruthy, P.O. - 679 531

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			laboratory techniques.		
4	Engineering Chemistry	CY 100	To enable the students to acquire knowledge in the concepts of chemistry for engineering applications and to familiarize the students with different application oriented topics like new generation engineering materials, storage devices, different instrumental methods etc. And to develop abilities and skills that are relevant to the study and practice of chemistry.	Chalk and talk method, ppt	Environment and sustainability
5	Business Economics	HS 200	To familiarize the prospective engineers with elementary principles of economics and business economics. To acquaint the students with tools and techniques that are useful in their profession in business decision making which will enhance their employability. To apply business analysis to the firm under different market conditions. To apply economic models to examine current economic scenario and evaluate policy options for addressing economic issues. To gain understanding of some macroeconomic concepts to improve their ability to understand the business climate. To prepare and analyse various business tools like balance sheet, cost benefit analysis and rate of returns at an elementary level.	Chalk and talk method, ppt	Human values and professional ethics
6	Life Skill	HS 210	To develop communication competence in prospective engineers. To enable them to convey thoughts and ideas with clarity and focus. To develop report writing skills. To equip them to face interview & group discussion. To inculcate critical thinking process. To prepare them on problem solving skills. To provide symbolic, verbal, and graphical interpretations of statements in a problem description. To understand team dynamics & effectiveness. To create an awareness on engineering ethics and human values. To instill	Chalk and talk method, ppt	Gender, environment and sustainability, human values and professional ethics

			moral and social values, loyalty and also to learn to appreciate the rights of others. To learn leadership qualities and practice them.		
7	Design Project	MR 341	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	Presentation & implementation	Gender, environment and sustainability, human values and professional ethics
8	Principles Of Management	HS 300	To develop ability to critically analyse and evaluate a variety of management practices in the contemporary context. To understand and apply a variety of management and organisational theories in practice. To be able to mirror existing practices or to generate their own innovative management competencies, required for today's complex and global workplace. To be able to critically reflect on ethical theories and social responsibility ideologies to create sustainable organisations.	Chalk and talk method, PPT	Gender, Environment and Sustainability, Human Values and Professional Ethics
9	Energy Engineering Management	MR 364	To study the engineering aspects of solar, wind and bio energy sources. To create awareness about the auditing and management techniques related to energy and technology	Chalk and talk method, ppt	Environment and sustainability
10	Entrepreneur ship	MR 465	To impart knowledge on enterprises and entrepreneurship.To impart knowledge on the various elements in a business systems	Chalk and talk method, PPT	Gender, Environment and Sustainability, Human Values

Dr. SUNNY JOSEPH KALAYATHANKAL
M.Tech, MCA, M.Sc, M Phil, B Ed
Ph D (Computer Science), Ph D (Maths)
PRINCIPAL
Jyothi Engineering

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					and Professional Ethics
11	Industrial Psychology & Organizational Behaviour	MP469	To create a knowledge about human psychology,to learn about theories of motivation and group behavior,to understand the socio-cultural aspects in organizations	Chalk and talk method,ppt	Human values and professional ethics into the curriculum
12	Sustainable Energy Process	BT362	To introduce the current and potential future energy systems, covering resources, extraction, conversion, and applications, with emphasis on meeting regional and global energy needs in a sustainable manner	Presentation and implemenation	Cross cutting issues relevant to gender, environment and sustainability, human values and professional ethics into the curriculum
13	Seminar	MR 451	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	Presentation & implementation	Gender, Environment and Sustainability, Human Values and Professional Ethics into the Curriculum
14	Project	MR 492	To apply engineering knowledge in practical problem	Presentation &	Gender,

			solving.To foster innovation in design of products, processes or systems.To develop creative thinking in finding viable solutions to engineering problems	implementation	Environment and Sustainability, Human Values and Professional Ethics into the Curriculum

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M.Tech, MCA, M.Sc, M.Phil, Ed
Ph.D (Computer Science), PI ths)
PRINCIPAL
College