

**Gautam Buddha University**  
**School of Engineering**  
**Electrical Engineering Department**

- [B.Tech.\(4Years\)-Electrical Engineering](#)
- [05 Year Integrated Dual Degree B.Tech.+ M.Tech. /MBA-\(EE\)](#)

**PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**

The students of Electrical Engineering department should be able to demonstrate:

- PEO1: Skill in professional / academic career using the knowledge of mathematical, scientific and engineering principles.
- PEO2: Expertise in solving real life problems, designing innovative products and systems that are techno-economically and socially sustainable.
- PEO3: Sustained learning and adaptation to modern engineering tools, techniques and practices through instructions, group activity and self-study.
- PEO4: Leadership and team work while working with diverse multi-disciplinary/interdisciplinary groups.
- PEO5: Professional ethics and commitment organizational goals.

**PROGRAMME OUTCOMES (POs)**

- PO1: An ability to apply knowledge of mathematics, science, and engineering
- PO2: An ability to design and conduct experiments, as well as to analyze and interpret data
- PO3: An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- PO4: An ability to function on multidisciplinary teams
- PO5: An ability to identify, formulate, and solve engineering problems
- PO6: An understanding of professional and ethical responsibility
- PO7: An ability to communicate effectively
- PO8: The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- PO9: A recognition of the need for, and an ability to engage in life-long learning
- PO10: A knowledge of contemporary issues
- PO11: An ability to use the techniques, skills, and modern engineering tools necessary for Engineering practice.

## **Int. M.Tech/ M.Tech. 02 Year: Instrumentation & Control (IC)**

### **PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)**

PEO 1: Students should be able to meet intricate technological challenges in the area of Instrumentation and Control for betterment of society.

PEO 2: To impart effective training in state of the art in the area of Instrumentation and Control to meet educational and industrial needs of the society.

PEO 3: To impart research and technological skills amongst the Instrumentation and Control graduates to become leading professionals in the sector.

PEO4: To produce technically competent Electrical Engineers with ethical attitudes.

### **PROGRAM OUTCOMES (POs)**

PO1: Students will demonstrate an ability to identify, formulate and solve problems in the area of Instrumentation and Control.

PO2: Students will demonstrate an ability to design a component, system or process, as per needs and specifications within realistic constraints.

PO3: Students will acquire qualities to become entrepreneur and leader in the Instrumentation and Control and allied fields.

PO4: Students will acquire ability of creative thinking, critical analysis and decision making for productive research and development.

PO5: Students will be able to find feasible and optimal solutions to the problems faced by the industry through innovative practices.

PO6: Students will acquire understanding of tools and techniques, and their usage in analysis and design of measurement and control problems.

PO7: Students will be able to contribute in newly emerging areas through collaborative and multidisciplinary research.

PO8: Students will learn to communicate effectively.

PO9: Students will be sensitized towards the professional and ethical responsibilities.

## Int. M.Tech. /M.Tech (02 Year): Power Electronics and Drives (PED)

### **PROGRAM EDUCATIONAL OBJECTIVES (PEOs)**

**PEO1:** Ability to identify, analyze, design and solve complex and emerging problems of Power Electronics and Drives.

**PEO2:** Attain intellectual leadership skills to cater to the changing needs of power electronic industry, academia, society and environment.

**PEO3:** Engage in life-long learning through independent study, projects, research and to work in multidisciplinary teams.

**PEO4:** Solve the real world problems in the emerging fields like smart grid, renewable energy interfaces, and electric vehicles and to develop innovative technologies relevant to social, ethical, economic and environmental issues.

**PEO5:** Apply technical knowledge, skills and analytical ability to design, develop and test power electronic converters and drives using modern tools and technologies.

### **PROGRAM OBJECTIVES (POs):**

**PO1:** To impart education and train post graduate engineers in the field of power electronics & Drives to meet the emerging needs of society.

**PO2:** To study design, analysis and control of power electronic circuits for variable frequency drives application.

**PO3:** To understand and design power electronic and drive systems for different application.

**PO4:** To facilitate post graduates in research activities leading to innovative solutions in interfacing of power electronic controllers with renewable energy sources.

**PO5:** To analyze and design switch mode regulators/Power Converters for various industry applications.

**PO6:** To take the students through essential stages of technology starting from circuit and system level understanding, modeling, control, design, numerical simulations and finally experimental implementation.

**PO7:** To expose the students to real-world industry oriented problems in the field of power electronics and drives and enable them to find feasible practical solutions to them.

**PO8:** To design and develop innovative products and services in the field of Power Electronics & Drives.

**PO9:** To make the students conceptually strong and also aware of the state-of-the-art technology/practices in the area of power electronics and drives.

**PO10:** Ability to design and analysis of various controllers for improvement of performance of Power electronics & Drives.

**PO11:** To learn how to use the knowledge of power electronics for the control of electrical systems. Design system or component to meet the desired needs with in realistic constraints.

**PO12:** Deliver technological solutions in the field of power electronics and drives by assimilating advances in allied disciplines.

### **PROGRAM OUTCOMES (POs):**

**PO1:** Will be able to apply the knowledge of science and mathematics in designing, analyzing and using the power converters and drives for various applications that meet specific needs.

**PO2:** To enable students to develop, construct, operate and test power electronic converters and machine in the laboratory.

**PO3:** Students will understand current and emerging issues to analyze and evaluate the merits and disadvantages of large power electronic systems.

**PO4:** To enable students to design, analyze, model, build and test the operation of drives in a lab environment.

**PO5:** Detailed understanding of the operation, function and interaction between various components and sub-systems used in power electronic converters, electric machines and adjustable-speed drives.

**PO6:** Propose, plan and execute projects subjected to financial, personnel and time constraints in allied fields assimilating power electronics and drives advancements.

### **PROGRAMME SPECIFIC OUTCOMES (PSOs):**

**PSO1:** Will be able to apply the knowledge of science and designing in analyzing the power converters and drives for various applications that meet specific needs in providing good quality power to consumers.

**PSO2:** To enable students to develop, construct, operate and test power electronic converters and machine in the laboratory. It will build the technical skills, communication skills and ethical skills.

**PSO3:** Detailed understanding of the operation, function and interaction between various components and sub-systems used in power electronic converters, electric machines and adjustable-speed drives. It will also make up the mind of student to run their own small industry and develop their entrepreneurship skills.

**PSO4:** Students will understand current and emerging issues to analyze and evaluate the merits and demerits of power electronic systems. It will develop their research skill and help in overall development of nation worldwide.

## INT. M.TECH. /M.TECH. (02 YEAR): POWER SYSTEM ENGINEERING (PSE)

### PROGRAM OBJECTIVES(POs):

**PO1:** Design and develop innovative products and services in the field of electrical power systems.

**PO2:** Keep abreast with the latest technology and toolset.

**PO3:** Communicate effectively to propagate ideas and promote teamwork.

**PO4:** Attain intellectual leadership skills to cater to the changing needs of power industry, academia, society and environment

### PROGRAM OUTCOMES(POs):

**PSO 1:** Design and develop electric power and energy systems.

**PSO 2:** Deliver technological solutions in the field of power systems by assimilating advances in allied disciplines.

**PSO 3:** Simulate and experiment in the field of power systems using modern tools.

**PSO 4:** Design renewable energy systems to protect environment and ecosystems.

**PSO 5:** Practice professional ethics with social sensitivity.

**PSO 6:** Develop innovative and entrepreneurial solutions.

**PSO 7:** Develop an attitude to learn with self-motivation.

**PSO 8:** Communicate effectively at all levels and demonstrate leadership qualities.

**PSO 9:** Pursue research to enhance the existing pool of knowledge.

## M.Tech. 02 Year in Instrumentation & Signal Processing

### **Program Educational Objectives**

1. **Preparation** To prepare students to excel in post graduate programs or to become a successful Entrepreneur/Professional through rigorous education with high moral values.
2. **Core-Competence** To provide students a strong foundation in mathematical, scientific and engineering fundamentals with more emphasis in Electrical and Electronics engineering to analyze and solve engineering challenges in their professional career and also to pursue higher studies.
3. **Breadth** To train students with good scientific and engineering breadth so as to comprehend, analyze, design and create novel products and solution for real life problems.

4. **Professionalism** To inculcate in students professional and ethical attitude, effective communication skills, team work skills, multi-disciplinary approach and ability to relate engineering issues to broader social context
5. **Learning Environment** To provide a student with an academic environment aware of excellence leadership, written ethical codes and guidelines, and the lifelong learning needed for a successful professional career.

### **Program 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.
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.

### **Program Specific Outcomes**

1. Analyze, design and simulate systems and applications related to electrical & electronics engineering and its allied areas.
2. Analyze and develop models related to control & automation sectors by applying the knowledge of electrical and electronics engineering.

## M.TECH. 02 Year IN RENEWABLE ENERGY SOURCES (RES)

### **PROGRAM OBJECTIVES (POs):**

**PO1: Scholarship of Knowledge** - Acquire in-depth knowledge of specific discipline and global perspective, with an ability to discriminate, evaluate, analyze and synthesize existing and new knowledge, and integration of the same for enhancement of knowledge pool.

**PO2: Critical Thinking** - Analyze complex engineering problems critically, apply independent judgement for synthesizing information to make intellectual and/or creative advances for conducting research in a wider theoretical, practical and policy context.

**PO3: Problem Solving** - Think laterally and originally, conceptualize and solve engineering problems, evaluate a wide range of potential solutions for those problems and arrive at feasible, optimal solutions after considering public health and safety, cultural, societal and environmental factors in the core areas of expertise.

**PO4: Research Skill** - Extract information through literature survey and experiments, apply appropriate research methodologies, techniques and tools, design, conduct experiments, analyze and interpret data, contribute individually/in group(s) to the development of scientific/technological knowledge in one or more domains of engineering.

**PO5: Usage of modern tools** - Create, select, learn and apply appropriate techniques, resources, and modern engineering and IT tools, including prediction and modelling, to complex engineering activities with an understanding of the limitations.

**PO6: Collaborative and Multidisciplinary work**—Demonstrate collaboration to foster multidisciplinary scientific research, also demonstrate decision-making abilities to achieve common goals.

**PO7: Project Management and Finance** - Demonstrate knowledge and understanding to manage projects efficiently in respective disciplines and multidisciplinary environments after consideration of economical and financial factors.

**PO8: Communication** - Communicate with the engineering community and with society, regarding complex engineering activities confidently and effectively and give and receive clear instructions.

**PO9: Life-long Learning** - Recognize the need for, and have the preparation and ability to engage in life-long learning independently, with a high level of enthusiasm and commitment to improve knowledge and competence continuously.

**PO10: Ethical Practices and Social Responsibility** - Acquire professional and intellectual



integrity, professional code of conduct, ethics of research and scholarship, consideration of the impact of research outcomes on professional practices and an understanding of responsibility to contribute to the community for sustainable development of society.

**PO11: Independent and Reflective Learning** - Observe and examine critically the outcomes of one's actions and make corrective measures subsequently, and learn from mistakes without depending on external feedback.

### **PROGRAM OUTCOMES (POs)**

**PSO1:** To develop workplace skills that can meet industry requirements, by imparting theoretical knowledge and practical training in Renewable Energy resources and technologies.

**PSO2:** To provide a good knowledge of Renewable Energy technologies for improving the quality of life of the rural as well as the urban population in India through research and development.

**PSO 3:** Apply engineering techniques to build solar photovoltaic, wind, tidal, geothermal, biofuel, fuel cell, hydrogen and integration of grid/off-grid.

**PSO 4:** Analyze and evaluate the implication of renewable energy.

**PSO 5:** Concepts in solving numerical problems pertaining to solar radiation geometry and wind energy systems.

**PSO 6:** Demonstrate self-learning capability to design & establish renewable energy systems.

**PSO 7:** Conduct experiments to assess the performance of solar PV, solar thermal and biodiesel systems

## **M.Tech. 02 Year: CONTROL AND ROBOTICS**

### **Program Educational Objectives (PEOs):**

The Department of Electrical Engineering runs one 2-year M.Tech. program in Control and Robotics. The components of the Educational Objectives of the program listed below provide the opportunities to the students to achieve:

After two years of post-graduation, the students of M. Tech. will:

**PEO-1:** Have successful professional career in industry, government, academia and military as innovative engineers.

**PEO-2:** Successfully solve engineering problems associated with the lifecycle of Electronics and Communication Systems by communicating effectively either leading a team or as a team member.

**PEO-3:** Continue to learn and advance their careers through activities such as participation in professional organizations, attainment of professional certification for lifelong learning and seeking higher education.

**PEO-4:** Be active members ready to serve the society locally and internationally and will take up entrepreneurship for the growth of economy and to generate employment.

### **Program Outcomes (POs):**

Electrical Engineering Post Graduates will be able to:

**PO1:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3:** 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.

**PO4:** 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.

**PO5:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

**PO6:** 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.

**PO7:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

**PO9:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**PO10:** 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.

**PO11:** 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.

**PO12:** 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.

### **Program Specific Outcomes (PSOs)**

On successful completion of the program, the students of M. Tech. (Control & Robotics) program will be able to:

**PSO-1:** Design and Development of robotic systems that are cost effective, environment friendly to solve engineering and societal problems using advanced tools and techniques.

**PSO-2:** Model, program and build an error free, safe and productive control systems for various manufacturing processes.

**PSO-3:** Apply domain knowledge of Control and Robotics to provide solutions in interdisciplinary areas to meet current industrial challenge.