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ISO 9001:2015 Certified

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PROGRAMME BROCHURE · UNDERGRADUATE

Bachelor of Technology in Electrical and Electronic Engineering

8 Semester(s) · Part Time · School of Engineering and Technology

Qualification level	Undergraduate
Duration	8 Semester(s)
Mode of study	Part Time
Awarded by	Technical University of Mombasa
Sponsorship	Government-Sponsored
School / institute	School of Engineering and Technology
Department	Electrical and Electronic Engineering
Programme code	BTEE

Overview

Bachelor of Technology (B.Tech) in Electrical and Electronic Engineering: Programme Overview

The Bachelor of Technology (B.Tech) in Electrical and Electronic Engineering programme is designed to equip students with a comprehensive understanding and practical skills in the vast and dynamic fields of electrical power systems, electronics, control systems, and telecommunications. This programme emphasizes a strong foundation in engineering principles combined with hands-on experience, preparing graduates for the challenges and innovations of modern industry.

Programme Highlights

- **Practical Focus:** Asignificant emphasis on laboratory work, project-based learning, and real-world applications to bridge theory and practice.
- **Industry Relevance:** Curriculum developed in consultation with industry experts to ensure graduates possess skills highly sought after in the job market.
- **Core Disciplines:** Covers fundamental and advanced topics in electrical power generation, transmission, distribution, electronic circuit design, digital systems, microcontrollers, control systems, and communication networks.
- **Innovation &Design:** Encourages creative problem-solving, system design, and the development of innovative solutions for contemporary engineering challenges.
- **Experienced Faculty:** Learning from dedicated faculty members with academic expertise and industry experience.

Programme Aims

Upon completion of this programme, students will be able to:

- Apply fundamental principles of electrical and electronic engineering to analyze, design, and implement complex systems.
- Developexpertise in areas such as power electronics, control systems, embedded systems, digital signal processing, and telecommunications.
- Utilize modern engineering tools and software for simulation, design, and analysis of electrical and electronic systems.
- Conduct experiments, analyze data, and interpret results to draw valid engineering conclusions.

- Work effectively in multidisciplinary teams and communicate technical information clearly and professionally.
- Understand ethical responsibilities and the impact of engineering solutionsin a global and societal context.

Core Areas of Study (Examples)

- Circuit Analysis and Design
- Digital and Analogue Electronics
- Microcontrollers and Embedded Systems
- Power Systems Engineering (Generation, Transmission, Distribution)
- Electrical Machines and Drives
- Control Systems and Automation
- Signal Processing
- Communication Systems
- Renewable Energy Systems
- IndustrialElectronics and Instrumentation

Career Prospects

Graduates of the B.Tech in Electrical and Electronic Engineering programme are well-prepared for diverse and rewarding careers across various sectors, including:

- **Electrical Engineer:** Design, develop, and maintain electrical systems and components.
- **Electronics Design Engineer:** Work on the design and development of electronic circuits and systems for various applications.
- **Control Systems Engineer:** Develop and implement automation and control solutions for industrial processes.
- **Power Systems Engineer:** Focus on the generation, transmission, and distribution of electrical power.
- **Embedded Systems Engineer:** Design and programembedded systems for consumer electronics, automotive, and industrial applications.
- **Telecommunications Engineer:** Work on the design and maintenance of communication networks and systems.
- **Automation Engineer:** Implement and manage automated systems in manufacturingand other industries.
- **Research and Development Engineer:** Contribute to innovation and technological advancements in electrical and electronic fields.
- **Consultant:** Provide expert advice on electrical and electronic engineering projects.

This programme provides a solid foundation for further postgraduate studies or a successful career in the rapidly evolving world of electrical and electronic engineering.

Entry requirements

KCSE C+ (plus) with at least C+ in English, Mathematics, Physics and Chemistry OR Kenya Advanced Certificate of Education (KACE) of at least two principal passes in Mathematics and physics and a subsidiary pass OR KNEC-TEP/TUM Diploma OR Higher Diploma in one of the following relevant areas: Electrical and Electronic Engineering (Electrical Power, Electronics, Instrumentation, Telecommunication, Computer Engineering).

What you will learn

Expected Learning Outcomes for Bachelor of Technology in Electrical and Electronic Engineering

Upon successful completion of the Bachelor of Technology (B.Tech) program in Electrical and Electronic Engineering, graduates will be able to:

1. **Apply EngineeringFundamentals:** Apply knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex electrical and electronic engineering problems.
2. **Problem Analysis:** Identify, formulate, 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:** Designsolutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental

considerations.

4. **ConductInvestigations of Complex Problems:** Conduct investigations of complex problems using 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.

The Engineer and Society:

1. Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to professional engineering practice.
2. **Environment and Sustainability:** Understand the impact of professional engineering solutions in societal and environmental contexts, and demonstrate knowledge of and need for sustainable development.
3. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
4. **Individual and Team Work:**Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
5. **Communication:** Communicate effectively on complex engineering activities with theengineering 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.
6. **ProjectManagement 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.
7. **Lifelong 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.

Career prospects

Career Prospects for B.Tech in Electrical and Electronic Engineering
A Bachelor of Technology (B.Tech) in Electrical and Electronic Engineering (EEE) opens up a vast array of career opportunities across diverseindustries. Graduates are equipped with a strong foundation in both electrical power systems and modern electronics, making them highly versatile and sought after in various sectors.

The interdisciplinary nature of EEE allows graduates to pursue roles thatinvolve designing, developing, testing, and maintaining electrical systems, electronic devices, and software applications. Here are some key career prospects:

Core Electrical Engineering Roles:

- **Power Systems Engineer:** Involved in the generation, transmission, distribution, and control of electrical power. This includes roles in power plants, utility companies, and renewable energy sectors (solar, wind, hydro).
- **Control Systems Engineer:** Designs and implements control systems for automatedprocesses, robotics, and industrial machinery.
- **Instrumentation Engineer:** Focuses on the design, development, and maintenance of measuring and control instruments used in various industries.
- **Electrical Design Engineer:** Designs electrical systemsfor buildings, infrastructure, and industrial facilities.

Electronic Engineering & Technology Roles:

- **Electronics Design Engineer:** Develops and designs electronic circuits, components, and systems for consumer electronics, medical devices, and industrialapplications.
- **Embedded Systems Engineer:** Works on designing and programming embedded systems, which are specialized computer systems part of a larger device, common in IoT, automotive, and aerospace industries.
- **VLSI Design Engineer:** Specializes in Very Large Scale Integration (VLSI) for designing integrated circuits (chips) for microprocessors, memory, and other electronic devices.
- **Telecommunications Engineer:** Designs, develops, and manages telecommunication systems and networks, includingmobile, satellite, and internet communication.
- **RF Engineer:** Works with radio frequency systems, designing and testing wireless communication devices and networks.

Emerging and Interdisciplinary Fields:

- **AutomationEngineer:** Integrates electrical and electronic systems with mechanical components to automate manufacturing processes and production lines.
- **Robotics Engineer:** Designs, builds, and maintains robots and robotic systems for various applications, from manufacturing to healthcare.
- **Data Scientist/AI Engineer:** While not traditionally core EEE, the strong analytical and problem-solving skills of EEE graduates are highly valued in data science and AI, especially when dealing with sensor data or hardware-softwareintegration.
- **IoT Engineer:** Develops and implements solutions for the Internet of Things, involving sensor integration, embedded programming, and network communication.
- **Consulting Engineer:** Provides expert technical advice to companies on electrical and electronicprojects.
- **Research and Development (R&D) Engineer:** Engages in cutting-edge research and development of new technologies, products, and systems in various domains.

Public Sector and Government Jobs:
Many government organizations, public sector undertakings (PSUs), and defense establishments recruit EEE graduates for roles in power, telecommunications, railways, and strategic technologies.

Entrepreneurship:
Witha comprehensive understanding of both hardware and software, many EEE graduates also venture into entrepreneurship, starting their own companies in areas like renewable energy, smart devices, automation, or specialized electronics.

The continuous evolution of technology ensuresthat the demand for skilled EEE professionals remains strong, offering dynamic and rewarding career paths.

How to apply

Apply online through the student information system at **smis.tum.ac.ke/application/register**. Have your academic certificates, national ID or passport and a passport photograph ready. For admission dates, requirements for your intake and help with your application, contact the office above.

Contact us

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