3.2.5.1 Overview

The BEng (Electrical Engineering) is offered by the Electrical & Computer Engineering (ECE) Department. Electrical Engineering (EE) deals with the innovative and creative applications of electrical sciences, mathematics and other associated disciplines. ECE technologies drive much of today's development. Nanotechnology and biomedical engineering, interactive and digital media, and distributed computing will see the next wave of major developments. The BEng (Electrical Engineering) curriculum is specially designed to provide its graduates with a head start in these rapidly advancing fields. It provides the requisite balance of breadth and depth for a professional electrical engineering education. It also seeks to establish a solid foundation for lifelong learning throughout an electrical engineer's career.

The structure of the Electrical Engineering programme is designed to prepare engineers who will be:

- technically competent to solve complex problems in electrical engineering and can adapt effectively in a fast changing environment
- able to critically think, analyse and make decisions that give due consideration to global issues in business, ethics, society and the environment.
- able to communicate effectively, act with integrity, and have the inter-personal skills needed to engage in, lead, and nurture diverse teams
- committed to lifelong learning, resourceful, resilient and embrace global challenges and opportunities to make a positive impact in society

The success of the Electrical Engineering programme is assessed through the attainment of learning outcomes. On graduation from the programme, students are expected to be able to:

- apply the knowledge of mathematics, natural science, engineering fundamentals and an engineering specialisation to the solution of complex engineering problems;
- Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.
- 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 conclusion.
- 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.
- 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.
- Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for the sustainable development.
- Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.
- 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.
- Demonstrate knowledge and understanding of the engineering and management principles and economic decision-making, and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
- Graduates of the Electrical Engineering Programme must have the knowledge to analyse and design complex electrical and electronic devices, software, and systems containing hardware and software components. The graduates must have a good understanding of the principles and applications of the basic sciences, engineering science and advanced mathematics, including probability and statistics, differential and integral calculus, linear algebra and complex variables.

The EE programme comprises of four components – a strong core in basic sciences, computing and engineering; technical competence through a minimum of breadth and depth modules; general education; and an enhancement programme. The core provides knowledge and skills considered essential for electrical engineers. In addition to core subjects, these also include group projects, a product design and innovations project, and capstone project. A minimum number of breadth modules ensures that each student is exposed to most aspects of the state-of-the-art EE areas. In addition, students can achieve depth in one or two areas of their choice. General education modules complement the technical education through a wide array of modules in humanities, social sciences, philosophy and professionalism to make our graduates educated members of the global community.

Students are offered a creative learning environment through special enhancement programmes which include activities like independent study modules, research internships, technopreneurship and student exchange programmes. They help students to achieve skills for lifelong learning and prepare them for the work place of the future.

Accreditation of engineering academic programmes is a key foundation for the practice of engineering at the professional level. The BEng (Electrical Engineering) programme undergone a re-accreditation exercise by the Engineering Accreditation Board (EAB) of Singapore in 2018 and is currently accredited for students graduating from the programme up to AY2022/23. Via the accreditation from the EAB, all signatories in the Washington Accord recognise the substantial equivalence of our programmes in satisfying the academic requirements for the practice of engineering at the professional level. This means that our graduates can be accepted for engineering practice in the countries that are part of the Washington Accord. Signatories in the Washington Accord include Canada, USA, UK, Hong Kong, New Zealand, Australia and others.