1.1 Overview

[Jointly offered by Faculty of Engineering and School of Computing]

The Departments of Computer Science and Electrical & Computer Engineering jointly offer a Bachelor of Engineering in Computer Engineering (CEG) programme.

The Computer Engineering programme produces graduates with a solid and balanced foundation in both hardware and software skills required to create computing systems. A uniquely multidisciplinary programme, CEG transcends the traditional boundary of computer science and electrical engineering. The CEG programme has been designed based on the Conceive-Design-Implement-Operate framework that places much emphasis on teamwork and aims to develop mature individuals who can work effectively in teams and communicate professionally. A major thrust of this programme is to train students to be technically competent to design-build-and-operate complex value-added computing systems in a modern team-based engineering environment. Graduates will have the opportunity to consolidate this experience through a unique year-long industrial attachment, and through overseas work and/or learning experience. Graduates will be able to attain significant knowledge and abilities in key technologies for real-time embedded systems, computer networking and wireless communication systems, medical imaging and information systems, intelligent control systems, and many others. In the workplace, computer engineers span a wide range of skills introducing intelligence into every conceivable device — from the smart phones and MP3 players to massive industrial control systems. They create the electronic systems in a modern car containing dozens of computing systems communicating through a network. They connect the physical world with cyberspace to enhance everything from entertainment to healthcare and the environment.

The educational objectives of the BEng (Computer Engineering) programme is to graduate students who, 5 years after their graduation,

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

The success of the CEG programme is assessed through the following student learning outcomes:

a. **Engineering Knowledge**: apply the knowledge of mathematics, natural science, engineering fundamentals, and an engineering specialisation to the solution of complex engineering problems

b. **Problem Analysis**: identify, formulate, research literature, and analyse complex engineering
problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

c. **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 public health and safety, cultural, societal, and environmental considerations

d. **Investigation:** conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions

e. **Modern Tool Usage:** 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

f. **The Engineer and Society:** apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and consequent responsibilities relevant to the professional engineering practice

g. **Environment and Sustainability:** understand the impact of the professional solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for the sustainable development

h. **Ethics:** apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice

i. **Individual and Team Work:** function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings

j. **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

k. **Project Management and Finance:** 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

l. **Life-long Learning:** 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

m. **Specific Programme Criteria for Computer Engineering:** have knowledge of probability and statistics, differential and integral calculus, discrete mathematics, basic sciences, computer science, and engineering sciences for the analysis and design of complex electrical and electronic devices, software, and systems containing hardware and software components.

Accreditation of engineering academic programmes is a key foundation for the practice of engineering at the professional level. The BEng (Computer 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.