Programme Outcomes

The Electrical and Electronic Engineering department at the University of Nottingham Malaysia Campus considers and integrates the programme outcomes (POs) from both the Malaysia Engineering Accreditation Council (EAC) and Institution of Engineering and Technology (IET).

For the Malaysia Engineering Accreditation Council (EAC), the programme outcomes for the Master of Engineering (MEng) in Electrical and Electronic Engineering (Hons) and Master of Engineering (MEng) in Mechatronic Engineering (Hons) are:

Programme Outcome 1 (PO1)	**Engineering Knowledge** - Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialisation to the solution of complex engineering problems;
Programme Outcome 2 (PO2)	**Problem Analysis** - Identify, formulate, research literature and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences;
Programme Outcome 3 (PO3)	**Design/Development of Solutions** - Design solutions for complex engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations;
Programme Outcome 4 (PO4)	**Investigation** - Conduct investigation into 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;
Programme Outcome 5 (PO5)	**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;
Programme Outcome 6 (PO6)	**The Engineer and Society** - Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice;
Programme Outcome 7 (PO7)	**Environment and Sustainability** - Understand the impact of profesional engineering solutions in societal and environmental contexts and demonstrate knowledge of and need for sustainable development;
Programme Outcome 8 (PO8)	**Ethics** - Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice;
Programme Outcome 9 (PO9)	**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;
Programme Outcome 10 (PO10)	**Individual and Team Work -** Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings;

Programme Outcome 11 (PO11)	**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;
Programme Outcome 12 (PO12)	**Project Management and Finance -** Demonstrate knowledge and understanding of 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.

Also, in delivering the same course as in the UK, the Electrical and Electronic Engineering department at UNMC adopts the same POs which maps onto those from IET and ECUK. The POs encompass different levels of competency and skill which include:

- Knowledge and understanding
- Intellectual skills
- Professional practical skills
- General transferable skills

These levels of competency/skill are structured and presented in the table below.

Knowledge and understanding of	**US1** - Knowledge and understanding of scientific principles and methodology necessary to underpin their education in their engineering discipline, to enable appreciation of its scientific and engineering context, and to support their understanding of historical, current and future developments and technologies. **US1m-** A comprehensive understanding of the scientific principles of own specialisation and related disciplines. **US2-** Knowledge and understanding of mathematical principles necessary to underpin their education in engineering discipline and to enable them to apply mathematical methods, tools and notations proficiently in the analysis and solution of engineering problems. **US2m-** An awareness of developing technologies related to own specialisation. **US3-** Ability to apply and integrate knowledge and understand of other engineering disciplines to support study of their own engineering discipline. **US3m-**A comprehensive knowledge and understanding of mathematical and computer models relevant to the engineering discipline, and an appreciation of their limitations. **US4m-**An understanding of concepts from a range of areas including some outside engineering, and the ability to apply them effectively in engineering projects.

Intellectual skills - ability to	**EA1** - Understanding of engineering principles and the ability to apply them to analyse key engineering processes. **EA1m** - Ability to use fundamental knowledge to investigate new and emerging technologies. **EA2** - Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques. **EA2m** - Ability to apply mathematical and computer-based models for solving problems in engineering, and the ability to assess the limitations of particular cases. **EA3** - Ability to apply quantitative methods and computer software relevant to the engineering discipline, in order to solve engineering problems. **EA3m** - Ability to extract data pertinent to an unfamiliar problem, and apply in its solution using computer based engineering tools when appropriate. **EA4** - Understanding of and ability to apply a systems approach to engineering problems and to work with uncertainty. **D1** - Investigate and define a problem and identify constraints including environmental and sustainability limitation, health and safety and risk assessment issues. **D1m** - Wide knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations. **D2** - Understand customer and user needs and the importance of considerations such as aesthetics. **D2m** - Ability to generate an innovative design for products, systems, components or processes to fulfil new needs. **D3** - Identify and manage cost drivers. **D4** - Use creativity to establish innovative solutions. **D5** - Ensure fitness for purpose for all aspects of the problem including production, operation, maintenance and disposal. **D6** - Manage the design process and evaluate outcomes.

Professional/practical skills	**S1** - Knowledge and understanding of commercial and economic context of engineering processes. **S1m** - Extensive knowledge and understanding of management and business practices, and their limitations, and how these may be applied appropriately. **S2 -** Knowledge of management techniques which may be used to achieve engineering objectives within that context. **S2m** - The ability to make general evaluations of commercial risks through some understanding of the basis of such risks. **S3 -** Understanding of the requirement for engineering activities to promote sustainable development. **S4** - Awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk). **S5** - Understanding of the need for a high level of professional and ethical conduct in engineering.
Transferable/Key Skills	**P1** - Knowledge of characteristics of particular materials, equipment, processes, or products management and the engineering approach to the solution of problems. **P1m** - A thorough understanding of current practice and its limitations, and some appreciation of likely new developments. **P2** - Workshop and laboratory skills. **P2m** - Extensive knowledge and understand of a wide rage of engineering materials and components. **P3** - Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, technology development, etc). **P3m** - Ability to apply engineering techniques taking account of a range of commercial and industrial constraints. **P4** - Understanding use of technical literature and other information sources. **P5** - Awareness of nature of intellectual property and contractual issues. **P6** - Awareness of appropriate codes of practice and industry standards. **P7** - Awareness of quality issues. **P8** - Ability to work with technical uncertainty. **P9** - Effective communication **P10** - Independent learning **P11m** - Team work and leadership, time and resource