NISA-UNESCO Workshop
Quality Assurance Policies and Processes

3. General Introduction of accreditation

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NISA
NETWORK OF IRAQI SCIENTISTS ABROAD
شبكة العلماء العراقيين في الخارج

School of Electrical, Electronic and Computer Engineering

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3. b. Comparison between different accreditation bodies

- The Engineering Accreditation Board (EAB)
- Accreditation Board for Engineering and Technology (ABET)
- Engineers Australia, Australia
- Canadian Engineering Accreditation Board, Canada

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The Engineering Accreditation Board (EAB), UK

- EAB is made up of all the Professional Engineering Institutions (PEIs) that are licensed by the Engineering Council to accredit academic programmes for both Chartered Engineer and Incorporated Engineer status.
- EAB aims to encourage consistent accreditation processes and practices as well as to provide a single point of contact to facilitate joint accreditation visits, where appropriate, for member PEIs.

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Purpose of accreditation

- To attract the best students.
- To provide students with a good foundation for professional registration.
- To meet the needs of industry.
- To benchmark programmes within the UK and internationally.

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The characteristics of engineering graduates

- Rational and pragmatic, interested in the practical steps necessary for a concept to become reality.
- Want to achieve sustainable solutions to problems and have strategies for being creative, innovative and overcoming difficulties by employing their knowledge in a flexible manner.
- Numerate and highly computer literate, and capable of attention to detail.
- Be cost and value-conscious, and aware of the social, cultural, environmental, health and safety, and wider professional responsibilities they should display.
- Appreciate the international dimension to engineering, commerce and communication.
- When faced with an ethical issue be able to formulate and operate within appropriate codes of conduct.
- Professional in their outlook, capable of team working, effective communicators, and able to exercise responsibility.

QAA: Subject benchmark statement, Engineering, 2010

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Accreditation criteria

- Learning outcomes, as stipulated in the UK Standard for Professional Engineering Competence (UK-SPEC)
- Aims and objectives
- Assessment regulations and progression conditions.
- Programme structure, content and industrial input
- Projects and coursework
- Staffing
- Resources and facilities
- Quality Assurance procedures
- External examiner reports

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Expectation from Accredited Programmes

- Motivate students towards the practice of engineering and technology.
- Stimulate their learning providing a foundation for a wide range of subsequent study and promotion of lifelong learning.
- Contribute to the personal and professional development of students.
- Be taught in the context of design, so that design provides an integrating theme that exposes students to a blend of analysis and synthesis.
- Present an intellectual challenge, integrating theory with current industrial practice in the context of real engineering applications.
- Provide an awareness of the environmental, social, legal, economic, ethical and regulatory contexts within which engineers operate.
- Include a strong and effective industrial input.

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Typical Accreditation Agenda – The Panel

- Day 1
  - Meet to discuss submission documents and agree on topics for discussion with staff.
  - Meet to review documentation requested.
  - Tour the laboratories, library and computing facilities.
  - Meet with Head to discuss topics for the next morning and to make relevant staff available for discussions.
  - Meet key staff at an informal reception.
- Day 2
  - Meet with Head and key staff who give a brief overview of their work.
  - Meet with students.
  - Meet with key staff to discuss where learning outcomes are being met.
  - Meet to review documentation and complete work on the Accreditors Report Form.
  - Meet with Head and Staff to present the proposed recommendations to the Degree Accreditation Committee.

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Accreditation Form

Part 1: To be emailed to IET 3 months prior to visit

1. General Information
2. Programme Specifications
3. Outcomes from the last visit

Part 2: To be emailed to IET 6 weeks prior to visit

4. The Programmes
5. Admission, Progression, Award and Graduate Destination
6. Major Individual Project &
7. Group Project Work
8. Staffing
9. Resources and Facilities
10. Quality Assurance
11. Special Features

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Engineering Learning Outcomes (IET)

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IET Accreditation Themes (e.g. EEE)

The learning outcomes allow for variety and flexibility in the design of programmes and encourage innovation while maintaining a core understanding of engineering principles.

- A Electrical Engineering
- B Electronic Engineering (Analogue/Digital)
- C Control and Instrumentation Engineering
- D Communication Engineering
- E Manufacturing Systems Engineering
- F Digital Systems Engineering
- G Computer Systems Engineering
- H Software Engineering/Computer Science

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General Learning Outcomes

- All Engineering graduates must be able to demonstrate the following General Learning Outcomes:
  - Knowledge and Understanding.
  - Intellectual Abilities.
  - Practical skills.
  - General transferable skills.

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Specific Learning Outcomes

- Engineers must also possess the following Specific Learning Outcomes:
  - Underpinning Science & Mathematics (US).
  - Engineering Analysis (E).
  - Design (D).
  - Economic, Social & Environmental Context (S).
  - Engineering Practice (P).

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Key Issues

- Range of degrees accredited by IET is very broad – learning outcomes will vary according to the nature of the subjects studied.
- Need to strike a balance between over-prescription (which inhibits diversity) and lack of definition (which inhibits objective decision making).

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Underpinning Science and Mathematics

- US1 (B1) 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.
- US2 (B2) Knowledge and understanding of mathematical principles necessary to underpin their education in their engineering discipline and to enable them to apply mathematical methods, tools and notations proficiently in the analysis and solution of engineering problems.
- US3 (B3) Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of their own engineering discipline.

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Engineering Analysis

- E1 (B4) Understanding of engineering principles and the ability to apply them to analyse key engineering processes.
- E2 (B5) Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.
- E3 (B6) Ability to apply quantitative methods and computer software relevant to their engineering discipline, in order to solve engineering problems.
- E4 (B7) Understanding of and ability to apply a systems approach to engineering problems.

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Design

- D1 (B8) Investigate and define a problem and identify constraints including environmental and sustainability limitations, health and safety and risk assessment issues.
- D2 (B9) Understand customer and user needs and the importance of considerations such as aesthetics.
- D3 (B10) Identify and manage cost drivers.
- D4 (B11) Use creativity to establish innovative solution.
- D5 (B12) Ensure fitness for purpose for all aspects of the problem including production, operation, maintenance and disposal.
- D6 (B13) Manage the design process and evaluate outcomes.

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Economic, Social, and Environmental Context

- S1 (B14) Knowledge and understanding of commercial and economic context of engineering processes.
- S2 (B15) Knowledge of management techniques, which may be used to achieve engineering objectives within that context.
- S3 (B16) Understanding of the requirement for engineering activities to promote sustainable development.
- S4 (B17) Awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues.
- S5 (B18) Understanding of the need for a high level of professional and ethical conduct in engineering.

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Engineering Practice

- P1 (B18) Knowledge of characteristics of particular materials, equipment, processes, or products.
- P2 (B20) Workshop and laboratory skills.
- P3 (B21) Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, technology development, etc).
- P4 (B22) Understanding use of technical literature and other information sources.
- P5 (B23) Awareness of nature of intellectual property and contractual issues.
- P6 (B24) Understanding of appropriate codes of practice and industry standards.
- P7 (B25) Awareness of quality issues.
- P8 (B26) Ability to work with technical uncertainty.

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Accreditation Decisions

- The programme is accredited as fully meeting the educational requirement for registration;
- The programme is accredited as partially meeting the educational requirement for registration; either of the above, provided specified constraints are met and/or specified modifications are made within a set timetable;
- The programme is not accredited.

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