National Apprenticeship - Occupational Profile

Apprenticeship Title	Principal Engineer
NFQ Level	10
Duration	4 Years

Typical tasks/ responsibilities

- Theoretical analysis, functional design and prototyping of capabilities which transform industry practice
- Research new algorithms and techniques to improve automatic, self-aware, evolutionary systems.
- Design, develop, and execute research experiments/POCs and prototypes in an individual or collaborative team based environment.
- Implement industry best practices and address gaps in state of the art methodologies.
- Develop approaches for self-managing, learning and adaption at scale.
- Contribute to company intellectual property, evaluate patents for specific technology areas and participate in patent filings.
- Form strong relationships with internal and external stakeholders..

On successful completion, the learner will have/will be able to:

Knowledge

- Diverse knowledge of technology principles, disruptive inventions, and new designs, processes and techniques.
- Systematic acquisition and understanding of a substantial body of knowledge at the cutting edge of industry and the forefront of academic research.
- Familiarity with a range of standard and specialised research tools and techniques of inquiry.
- Knowledge and expertise to apply existing theory and principles to real-world scenarios in industry.
- Strong technical knowledge of computational applied mathematics and numerical methods.
- The creation and interpretation of new knowledge, through original research.

Skills

- Ability to respond to abstract problems that expand and redefine existing procedural knowledge.
- Innovative thinking capacity to build a deep understanding of domain expertise in, and across, technology disciplines.
- Ability to contribute to the creative process through: problem solving, heuristics, theory of inventive problem solving, technical analysis, and critical evaluation.
- Proficiency in numerical and statistical methods.
- Capability, interest and hands-on ability in conducting transformative research.
- Experience in numerical computing environments.
- Familiarity with the use of software, information systems and electronic encapsulation of knowledge for quantitative analysis, simulation and solutions of engineering problems
- Demonstrate a significant range of core skills, techniques, tools, practices and/or materials.
- Technical and project leadership skills to oversee complex design, development, and research projects.

Competencies

- Exercise original thought, technical credibility and independent judgement.
- Deep understanding of organisational behaviour.
- Exercise personal responsibility and largely autonomous initiative in complex and unpredictable situations, professional or equivalent contexts.
- Communicate results of research and innovation to peers.
- Act in a wide and unpredictable variety of professional levels and ill-defined context.
- Engage in critical dialogue, and critique the broader implications of applying knowledge to particular contexts.
- Excellent leadership, interpersonal, problem solving, negotiating and communication skills.
- Demonstrate sound moral and ethical principles in research and professional capacity.
- Confidentiality and capability to build trust and comply with legal obligations and requirements.
- Encourage honest and open communication and effective relationships within and between co-workers.

Industry/ industries served by the proposed apprenticeship

The role is found across the following industries:

- Information Communication Technology
- Software
- Manufacturing
- Chemical
- Pharmaceutical
- Medical Devices
- Electronics
- Automotive and Aerospace.

Proposed minimum entry requirements for apprentices on the programme

- Minimum requirements for a PDEng would typically be a 2.1 honours degree in a relevant area, or equivalent, in the broad field of engineering and related disciplines and not less than 5 years' experience.
- The consortium would also facilitate recognition of prior learning (RPL) and would recognise candidates with a lower qualification provided they have considerable industrial experience, and evidence of the ability to study at Masters level or above.
- Research-based patents or peer-reviewed publications would also be recognised. Applicants in this category may be required to complete some additional learning activities prior to starting the apprenticeship. Also, modules taken under the auspices of the Engineers Ireland, the Irish Computer Society, and other providers CPD programs could be accumulated to meet entry criteria.
- As part of the supports in making the decision to undertake the Principal Engineer apprenticeship it is proposed to offer a preparatory module to interested apprentices so that they can better understand the requirements of the apprenticeship and make an informed decision as to whether the apprenticeship is in line with their career plans.