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Institute of mathematics & its applications

promoting mathematics

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Appendix A

Course Accreditation

Mathematical, Educational and Professional Requirement

1. Introduction

The IMA Course Accreditation scheme accredits university degree courses from which all its graduates will meet the educational requirements for the Chartered Mathematician (CMath) or associated designations. The Chartered Mathematician designation recognises individuals as professional mathematicians, whose skills, experience and professionalism are alongside related chartered designations such as within the broader Chartered Scientist (CSci). An increasingly important outcome for mathematics graduates is their graduate employment outcomes. These can be enabled and enhanced by including the development of appropriate soft skills across STEM (Science, Technology, Engineering and Mathematics) embedded systematically within an intensive academic provision. The Chartered Mathematician designation recognises the importance of developing mathematical competencies that may be gained within a degree alongside an intensive study of specific mathematical topics.

2. Mathematical, Educational and Professional Requirement

The Institute's Course Accreditation scheme accredits university degree courses providing all its graduates will meet the educational requirements for the IMA Chartered Mathematician (CMath) designation. *Graduates of mathematics, statistics and operational research courses have an extremely wide choice of careers available to them. Employers greatly value the intellectual ability, rigour, logical thinking and abstract reasoning that graduates acquire, their familiarity with numerical and symbolic thinking, and the analytic approach to problem solving that is their hallmark. These skills, when developed alongside more generic skills (such as communication and team-working skills) make mathematics, statistics and operational research graduates highly employable.*

(QAA MSOR Benchmark, 2015)

Broad criteria (in whole or partially) for Course Accreditation include

i) An honours degree, normally consisting of 360 credits for a Bachelor's degree or 480 credits for an integrated Master's degree.

ii) Mathematically-based modules must normally constitute at least two-thirds of the total content at each stage of the course. If any particular year has less than this it can be compensated for in later years.

Increasingly, mathematics courses incorporate relevant generic and specialist skills to enhance both the educational and employability potential of their graduates.

iii) The degree course must provide graduates with the opportunity to have developed transferable skills that will be of value in a wide range of situations, including

- The ability to apply their skills in:
    o Problem solving;
    o Professional communication;
    o Digital capabilities including information retrieval, programming, and the effective use of general IT facilities;
    o Working with others.

- Reflection, to support:
  - Planning self-learning and improve performance, as the foundation for lifelong learning/CPD;
  - Monitoring and adjusting a personal course of work on an on-going basis.

- Exercise initiative and personal responsibility, which may be as a team member or leader.

3. Guidelines for External Assessors on mathematical content, competencies and skills

Employability skills can be developed through courses as part of the core mathematical studies, or through bespoke employability skills modules. The following table provides some examples of where employability skills could be applicable to a mathematical sciences curriculum:

	Definition	Sample Activities	Desired Outcomes
Problem solving			
Professional communication	Ability to communicate effectively and appropriately through a variety of means, including oral presentations and communication to different audiences	• Briefing report • Project dissertation • Placement • Blog • Poster • Presentation	• An understanding of professional expectations • Ability to communicate in a clear, positive and impactful way to different audiences • How to structure and deliver relevant (technical) content • Effective delivery (e.g. use of visual aids, use of time)
Digital capabilities including information retrieval and the effective use of general IT facilities	• Information, data and media literacies • Digital learning and development • Digital creation, problem solving and innovation • Communication in a specialist mathematical sciences context	• Projects that involve the use of appropriate mathematical, statistical and presentation software • Using digital resources • Presenting and interacting over digital platforms • Coding & programming	• Understanding effective uses of digital technologies • Confident to interact with others through digital platforms • Agility and willingness to use digital communications and technologies
Working with others	Working inclusively and effectively together to collectively achieve a common goal	• Group projects • Group reports • Seminars • Group presentations	• Understanding your impact and contribution within the team • Recognising the contributions of others • Achieving a common goal
Reflection	Consideration to develop enhanced understanding and insight in relation to professional outcomes and areas/ opportunities for further enhancement	• Post activity reflection • Self-evaluation • Action planning	• Greater self-awareness • Willingness to receive and act upon feedback • To be a reflective practitioner for self-improvement

4. Mathematical, Educational and Professional Requirement

Mathematical modules typically include the opportunity for the development of high-level employability skills relevant to mathematics graduates alongside core mathematical studies. Mathematics specific modules with a strong employability skills element (for example, individual or group project project-based modules, or simply requiring students to present their solutions to problems to their peers) may correspond directly to the total mathematics content for the purposes of Course Accreditation.

Permitted modules should have a strong emphasis on developing mathematical competencies that are typically based on mathematical knowledge gained within the course and are relevant to professional mathematics graduates. These may correspond to:

i)   *Development of skills relevant to a mathematics graduate through the direct application of mathematical knowledge and techniques gained within their degree course core studies.*

ii)   *Demonstrate problem solving skills through the use of appropriate mathematical ideas and methods in the analysis and solution of a non-academic nature.*

iii)   *Communication of mathematical aspects to specialist and non-specialist orally and through presentations;*

iv)   *Developing and demonstrating skills relevant to a professional mathematician to enhance their effective use of their mathematical core studies through team working and their appropriate use of general and mathematical IT software.*

Generic employability skills modules do not contribute to the required mathematical content at any stage for the purposes of Course Accreditation.