

## **NMiTE New Approaches Case Study**

### **Main Approach: Interdisciplinarity**

### **New Model in Technology and Engineering (NMiTE)**

#### **Programme**

Master's in Integrated Engineering

#### **New Approach**

Interdisciplinary, studio and challenge-based learning, real-world challenges, sequential block format.

#### **About the programme**

NMiTE's MEng Programme in Integrated Engineering is an overwhelmingly challenge-based programme that uses block learning with deep integration of employers and the community in the learning experience.

Modules are taken sequentially and are typically either one week or 3.5 weeks in duration. In each module students undertake real-world challenges while working predominantly as teams in a studio environment. Each challenge highlights and hones areas of engineering expertise while maintaining the integrated approach intrinsic to the programme.

As students progress through the degree, challenges become more demanding, needing an increasingly interdisciplinary approach that requires both engineering and broader expertise. Later challenges are built around the thematic areas of Infrastructure; health, security and energy, and the impact that future engineers will have on developing sustainable, appropriate and affordable solutions within these areas. Creativity, design, and innovation are emphasised throughout the programme, thus appealing to a wider range of applicants.

#### **Overview of the new approach**

NMiTE realises that engineering is at its heart all about systems and connections, and that the best engineers understand how economics, geopolitics, culture, technology and more work together to enable it. This is why NMiTE's MEng not only integrates traditionally separate strands of engineering, but also integrates engineering with other disciplines such as arts, humanities and business.

Unlike degrees where options to take outside subjects are available but not part of a coherent programme of learning, NMiTE's integrated approach means disciplines are not isolated and all disciplines inform all learning at every stage. Modules focused on engineering challenges are designed in such a way that the implications of other disciplines for engineering, and the interactions between technical and non-technical considerations, are fully woven into the learning throughout the degree. Indeed, in the MEng liberal elements comprise 30% of the programme. Communication and ethics are required in every module and these concepts and skills are built upon with increasing complexity. Taken together, this integration of the technical and non-technical, and the personal and the professional, equips students to not only be students of problems, but solvers of them.

## **How the programme relates to other New Approaches facets**

By using a challenge-based learning approach, the programme enables students to become agile, intellectually curious, integrated engineering graduates with the broad skill sets necessary for future employment. The programme incorporates fundamental technical topics in engineering, together with an emphasis on professional and social skills and behaviours, and a diverse range of 'liberal' subjects.

The programme aims to:

- Satisfy the necessary educational standards for the award of Chartered Engineer by meeting the requirements of the Engineering Council Accreditation of Higher Education Programmes.
- Imbue students with knowledge and understanding of engineering gained through innovative learning approaches and interacting with employers and the community.
- Nurture an ability to integrate, synthesise, apply and gain knowledge, with an awareness of social and ethical responsibilities.
- Encourage a desire to identify problems that need solving and to find creative solutions to society's challenges.
- Develop agile, independent, curious, resilient and passionate engineers.

As a result, NMiTE's Master's in Integrated Engineering has highlighted and responded to the New Approaches facets.

## **Leading and managing the change**

The group of people who have been involved in the creation of NMiTE were moved to action by the belief that engineering education, both in the UK and globally, can and should be improved. From all over the world, in every kind of educational institution and industry, we had independently come to the same realisation, that the current prevailing methods of educating engineers are not as effective as they could be and that by working together to introduce a new model of engineering education, we could open up the profession to new and different kinds of thinkers and practitioners with the potential to do great things. The result was NMiTE.

## **Benefits of the new approach**

Overall, the MEng programme responds to two key changes facing engineering – the blurring of boundaries between traditional disciplines and the increasingly interwoven nature of society's challenges. Both require engineers able to range across disciplines and to synthesise knowledge of different types and work effectively in teams.

This new approach has therefore been developed to appeal to a much more diverse intake than many other degrees. Firstly, A-level maths is not an entry requirement, immediately making the degree open to a much wider range of students coming from school. It also makes the degree available to those who wish to change careers but who lack a formal maths qualification.

Secondly, the degree is taught as a continuous programme rather than with extensive breaks in study as in most universities, so that an MEng is completed in only three years. This makes the degree much more accessible to those looking to change career but not

wishing to devote four years of time – and the associated money – to the task. Thirdly, teaching is not via lectures and exams, making the degree attractive to those who find such teaching methods unappealing and ineffective.

Taken together these distinctive aspects mean the degree is a unique opportunity for those who have creativity, imagination, and a desire to solve society's technical challenges (i.e. ideal engineers) but who find existing degrees either closed or unappealing.

### **Making the changes: learning points**

Beginning with a blank page has allowed NMiTE to incorporate these new approaches in the design of its MEng programme. Others may experience difficulties in developing an entirely new and novel programme within an existing framework. However, they may be able to successfully adopt and implement elements of these approaches within their current learning environment.

### **Quotation from student**

“Throughout this year I have learnt that engineering is far more diverse and covers much more than I could have ever anticipated. I have also learnt a lot more about the range of topics that need to be covered to create an effective engineer. Part of this has been discovering how much of my own experience in the arts can be applied to engineering.”

Ollie Parry, Design Cohort Member

### **Statistics**

- Elements of the programme have been tested over the past twelve months and will begin in 2020.
- 25 students have participated in programme testing via the design cohort. The first intake will be 50 students.
- 50/50 gender balance among trial students. NMiTE aims for 50/50 gender balance in first intake.