

POSTGRADUATE DEGREE PROGRAMMES IN

ADVANCED MANUFACTURING AND ENTERPRISE ENGINEERING

SCHOOL OF ENGINEERING AND DESIGN



Brunel
UNIVERSITY
L O N D O N

www.brunel.ac.uk/sed



Prof Savvas Tassou
Head of the School of Engineering and Design

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A Message from the Head of Advanced Manufacturing and Enterprise Engineering (AMEE) Group – Professor Kai Cheng

The changes to the global economy have led to massive upheavals in most industries and manufacturing in particular. Issues with the global economy, energy costs and CO₂ emissions are driving industry in new directions, leading to new thinking and a search for new solutions.

In the light of these changes, leading government, academic and industry representatives all agree that we need to redefine our idea of what the future industry will offer and to pursue a course towards high value, advanced and innovative manufacturing as a key driver of the future economy. These concepts are becoming the foundations of government policies everywhere. We need to be able to design and manufacture products and run industry with less waste, fewer emissions and improved re-use and recycling. In short, all our activities need to become sustainable.

To meet these challenges, industry will need enthusiastic, educated, knowledgeable and skilled people to move manufacturing ahead and meet the challenges of the 21st century. We at AMEE, are a distinct Subject Area within the School of Engineering and Design at Brunel University. We have designed our academic MSc programmes to reflect the needs of the global economy. All our research is commissioned by industry or from national and internationally funded research projects. Our four MSc courses: Advanced Engineering Design; Advanced Manufacturing Systems, Packaging Technology Management and Engineering Management are logically linked, and represent all the activities required in a real manufacturing environment. This allows you, as individuals, to acquire, develop and enhance the necessary advanced design, manufacturing and engineering management knowledge, skills and capabilities needed for your future work.

We believe the combination of opportunities our programmes here at Brunel offer is truly unique, and can help you pursue the career path you desire, and develop into the specialist that you need to be to allow you to become key drivers and decision makers of the future.

MSc PROGRAMMES

MSc Engineering Management (EM)

MSc Advanced Engineering Design (AED)

MSc Advanced Manufacturing Systems (AMS)

MSc Packaging Technology Management (PTM)

ACCREDITATION:

All four AMEE courses are accredited by both the Institution of Mechanical Engineers (IMechE) and the Institution of Engineering and Technology (IET), providing a route to Chartered Engineer status in the UK.

AMEE MSc Courses

EM	AED	AMS	PTM
Core Modules			
Project Management	Computer Aided Engineering 1		Overview of Packaging
Systems Modelling and Simulation	Computer Aided Engineering 2	Systems Modelling and Simulation	Polymer Packaging
Logistics and Global Supply Chain Management	Sustainable Design and Manufacture		Packaging Design
Manufacturing Systems and Economics			
Quality Management and Reliability	Design Experience	Robotics and Automation	Quality Management and Reliability
Managing People and Organisations		Advanced Manufacturing Measurement	Metal, Glass, Paper and Board
Elective Modules			
Human Factors in Design		Quality Management and Reliability	Managing People and Organisations
Advanced Manufacturing Measurement	Robotics and Automation	Project Management	
Global Manufacturing	Microprocessors and Embedded Control		Computer Aided Engineering 1
Sustainable Design and Manufacture	Advanced Manufacturing Measurement	Global Manufacturing	Branding Strategy Studies
Financial Management	Design of Mechatronic Systems		Financial Management

LEGEND:



module shared across all or some courses



module unique to the course



MSc ENGINEERING MANAGEMENT (EM)

Course Director for the MSc Engineering Management



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Message from the Course Director

Success in today's business environment requires a solid foundation in essential management and business skills. The Brunel Engineering Management MSc develops both breadth and depth of essential business skills across systems thinking, operations, human resources, project management, strategy and the design and management of the supply chain, within an engineering business context. The programme balances academic theory with practical opportunities to demonstrate engineering management capabilities and deliver real solutions through assignments and projects.

Our aim is to produce engineering management professionals who

can take the skills they develop here at Brunel, and make a significant difference in the marketplace. Our School draws on significant experience in the commercial world, to deliver teaching and support that brings the best out in you as a Brunel postgraduate.

Mode of study and course details:

1 Year Full-time – The taught element of the course (September to May) includes eight modules; delivery will be by a combination of lectures, tutorials and group/seminar work. A further four months (May to September) is spent undertaking the dissertation.

3-5 Years Distance Learning – There is no requirement to attend lectures at Brunel University, instead you follow a structured programme of self-study at home or at work. Students are supplied with a study pack in the form of text books and CD-ROMs which are supported by e-learning web – based lecture materials. There are two entry points to the course – September and May

Course Aims:

The aims of this course are to enable engineering managers to:

- Critically examine a range of current and developing management and engineering issues and develop creative solutions /approaches to these issues at both operational and strategic levels.

- Develop an understanding of management principles and practices and how they are effectively implemented at a senior and strategic level.
- Develop an advanced understanding of the key strategic issues involved in developing and implementing engineering projects and solutions.
- Develop breadth and depth of essential management and business skills across multidisciplinary functions, necessary in the management of modern business.

COMPULSORY MODULES (6 MODULES)

- Logistics and Global Supply Chain Management (15 credits)
- Manufacturing Systems and Economics (15 credits)
- Reliability Maintenance and Quality Management (15 credits)
- Managing People and Organisations (15 credits)
- Project Management (15 credits)
- Dissertation (60 credits)
- Systems Modelling and Simulation (15 credits)

OPTIONAL MODULES (2 MODULES)

- Advanced Manufacturing Measurement (15 credits)
- Sustainable Design and Manufacture (15 credits)



- Global Manufacturing (15 credits)
- Human factors in Design (15 credits)
- Financial Management (15 credits)

Why study Engineering Management at Brunel?

Engineering Management is a hugely popular programme at Brunel's School of Engineering and Design. The School has a very strong research base that is underpinned by substantial links with industry, together with a long tradition of excellence in both teaching and research in manufacturing systems and engineering management.

Furthermore, we take our students' career progression and professional development very seriously. The Engineering Management course has a significant reputation with employers worldwide, and our dedicated Placement and Careers development centre ensures that you have access to the best information and training to help you search for the right position. We want you to relish the challenge of gaining this specialist qualification and to leave feeling this was both a career enhancing experience and a rewarding personal journey.

Who is this course designed for?

The programme is aimed at both new graduates and also engineering professionals who have reached a stage in their careers when they have become managers, or are currently in a senior role and are aspiring to a management position as part of their future career in the Manufacturing, Engineering or Technology sectors.

The programme is intended to benefit a wide range of participants, in particular:

- Engineering and technology graduates who aspire to management positions
- Established engineers working in industry and faced with the challenge of new areas of responsibility following promotion to management positions
- Managers working in engineering organisations who have the technical knowledge and skills, but need to broaden their experience and update their expertise
- Others with engineering, technology or appropriate business backgrounds, working in advisory, consultancy or research roles, who need to familiarise themselves with engineering management principles and practices

European and other overseas engineers who wish to broaden their education in the UK.

Your Career Development

The Engineering Management Masters equips students with the skills and knowledge to secure positions within many leading organisations including Shell, P&G, BAA, Tesco, Heinz and many others. Typical Roles include: Logistics Consultant; Supply Chain Analyst; Purchasing Manager ; Project Manager; Business Development Manager ; Continuous Improvement Manager; Supply Chain Management Trainee ; Project Manager for Logistics Development (Europe and Middle East)



Michael Beck, graduate on Engineering Management MSc



The teaching at Brunel is state of the art, as all lecturers are experts in their fields of study. The course content not only covers best practices and theory, but also practical examples and current research trends, which cannot be found in any academic publication yet.



Many more comments from former students are available on the University website: www.brunel.ac.uk/sed/amee



MSc ADVANCED ENGINEERING DESIGN (AED)

Course Director Advanced Engineering Design MSc



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Message from the Course Director

The Advanced Engineering Design course is a unique masters program with a very high international reputation. The course aims to educate the students to the state-of-the-art in the area of engineering design. We put every effort to help our students obtain practical skills, and to gain real-life experience in development of new products for the market. The whole course is closely linked and work together with industrial partners providing most of the topics for the group projects and most of the dissertation topics for the students. We transfer your knowledge into skills and prepare you for real life,

with real examples, and real people from the industry. Your career is very important to us, as we see you as our ambassador in the commercial world.

Mode of study and course details:

1 Year Full-time – The taught element of the course (September to May) includes eight modules; delivery will be by a combination of lectures, tutorials and group/seminar work. A further four months (May to September) is spent undertaking the dissertation.

2 years part-time – The part-time mode has one full day per week of lectures.

The Advanced Engineering Design MSc is run over twelve months, beginning with the taught phase followed by a four month focussed individual dissertation project. Six compulsory modules and an outputting 'Design Experience' module are taught from September to May. The dissertation project starts in June, after the examinations for the taught modules, and finishes in September.

Balance of Inputting and Outputting:

Out of the 180 credits required for the MSc award, 90 credits are for what is known as 'INPUTTING', where the student learns new and advanced engineering, and 90 credits are for 'OUTPUTTING', where the student uses the knowledge on engineering activities.

Course Aims:

The course aims at development of the new generation of design engineers with multidisciplinary knowledge and skills capable of designing sustainable high tech and high added value products for the demanding market.

This course is designed to differentiate itself from similar courses in the UK by:

- advanced study in three themes: Mechanical Engineering, Control Engineering and Advanced Engineering analysis methods;
- Focused training on many contemporary Computer Engineering software packages;
- Design experience in an industrial context and dedicated individual work on the dissertation;
- Designing products requiring multidisciplinary knowledge and comprehensive engineering analysis;
- Practical experience by taking part in developing real products for real companies. This is a life time experience.

COMPULSARY MODULES (6 MODULES)

- Sustainable Design and Manufacture (15 credits)
- Manufacturing Systems and Economics (15 credits)
- Computer Aided Engineering 1 (15 credits)



- Computer Aided Engineering 2 (15 credits)
- Dissertation (60 credits)

OPTIONAL MODULES (2 MODULES)

- Microprocessors and Embedded Systems (15 credits)
- Advanced Manufacturing Measurement (15 credits)
- Human Factors in Design (15 credits)
- Robotics and Automation (15 credits)
- Design of Mechatronic Systems (15 credits)

Why study Advanced Engineering Design?

Engineering Design is the application of engineering principles (Physics Chemistry), experience of 'making', and mathematical models and analysis. The design and production of complex engineering products often require the use multidisciplinary approach where:

- Advanced theoretical knowledge and a wide range of computer driven tools, methods and methodologies are essential.
- Experienced engineers require (a) advanced theoretical knowledge, and (b) skills and understanding in the use of Computer Aided Engineering software.

The Advanced Engineering Design MSc is designed to meet the above design requirements.

Who is the course designed for?

The course is aimed at high calibre and ambitious Mechanical, Manufacturing, Electrical and Electronic Engineers, as well as graduates from the pure sciences like Physics and Chemistry.

The programme is also for experienced engineers from industry who wish to gain advanced knowledge and to learn new methodologies and techniques.

Your Career Development

The Advanced Engineering Design Masters Course provides the required advanced theoretical knowledge and essential practical skills for designing high tech and high-added value products for the market. More than 90% of all graduates have secured jobs within one year after graduation in design bureaus or manufacturing establishments.

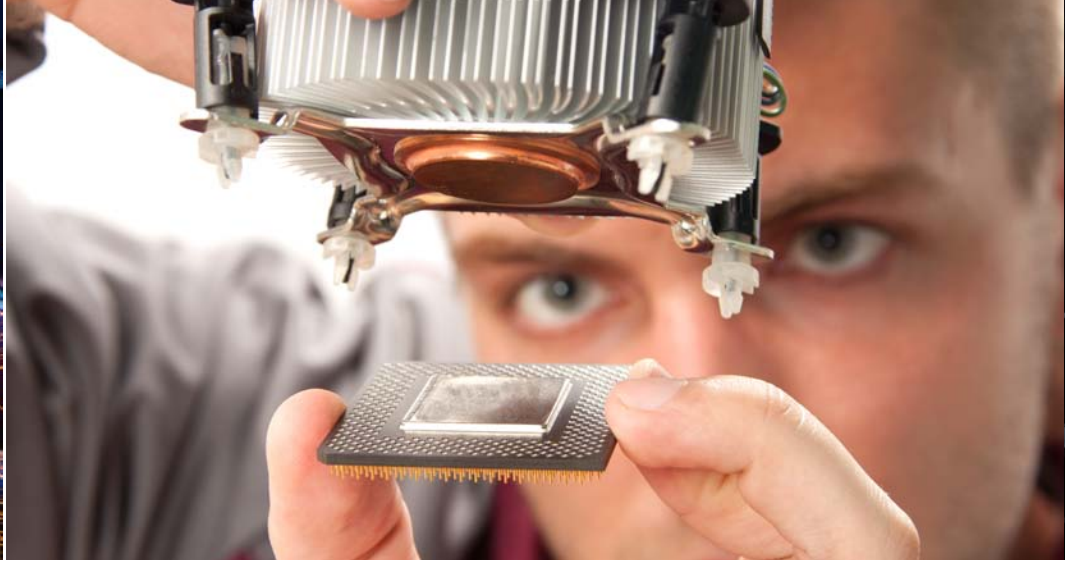
Vishesh Tokas, graduate on Advanced Engineering Design MSc



The course is unique covering all the modules which a Design Engineer must know. The Design Experience module gave a real world experience with a client company sponsoring the project, which gave a lot of insight about the UK industry. My postgraduate experience has been extremely positive.



Many more comments from former students are available on the University website: www.brunel.ac.uk/sed/amee



MSc ADVANCED MANUFACTURING SYSTEMS (AMS)

Course Director for Advance Manufacturing Systems



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Message from the Course Director

The challenges of a multidisciplinary work environment require a new generation of engineers that are highly specialised, but at the same time need to understand product life cycle from inception (design) to the end (recycling and reusability). For the engineering and academic community it is therefore essential to train and educate the next generation of engineers, who will be able to work in the challenging environment where a systems approach to problem solving is crucial. For example,

appreciation of critical decision-making under uncertainty, application of a combination hardware/software technology to address enterprise resource planning issues, development of manufacturing techniques, usage and creation of advanced material such as alloys, manufacturing processes, and dealing with shopfloor automation.

The Advanced Manufacturing Systems course consists of three main elements: Technology, Systems and Management.

The technology element: enables the candidate to appreciate the technological challenges of modern industrial systems. The scheme provides the necessary skills to tackle issues in product design and engineering. It covers plant automation and control, as well as precision manufacturing.

The systems element: enables the candidate to deal with modern mathematical tools for measuring systems performance techniques such as discrete event simulation, modelling, stochastic analysis, queuing theory, quality and reliability issues.

The management element: enables the candidate to appreciate the necessary project management skills in small and large manufacturing organisations. The candidate will acquire the necessary skills to design and manage industrial systems under financial and resource constraints.

Mode of study and course details:

1 Year Full-time – The taught element of the course (September to May) includes eight modules; delivery will be

by a combination of lectures, tutorials and group/seminar work. A further four months (May to September) is spent undertaking the dissertation.

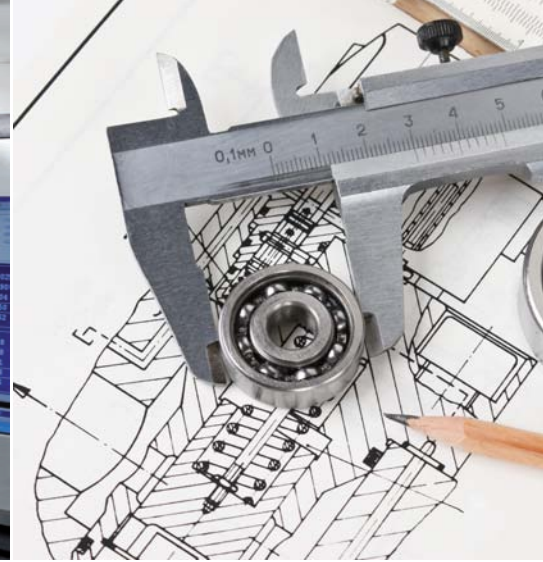
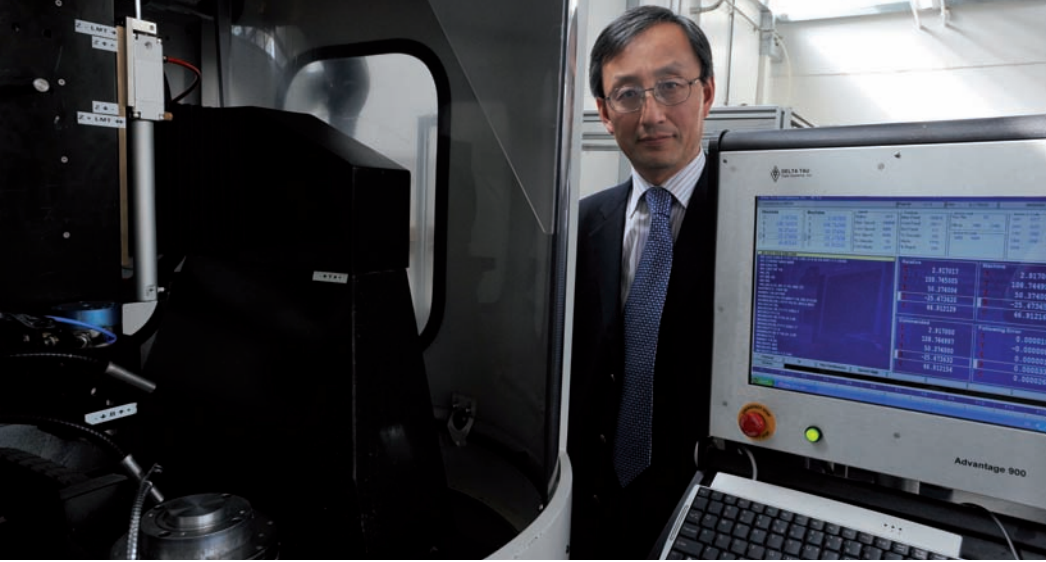
3-5 Years Distance Learning – There is no requirement to attend lectures at Brunel University, instead you follow a structured programme of self-study at home or at work. Students are supplied with a study pack in the form of text books and CD-ROMs which are supported by e-learning web – based lecture materials.

Course Aims:

The programme is designed to enable its students to learn, understand and implement the principles and techniques in manufacturing and industrial systems. The knowledge and skills gained will help you design new and bring innovative solutions within the global context.

COMPULSARY MODULES (6 MODULES)

- Systems Modelling and Simulation (15 credits)
- Manufacturing Systems and Economics (15 credits)
- Sustainable Design and Manufacture (15 credits)
- Advanced Manufacturing Measurement (15 credits)
- Robotics and Automation (15 credits)
- Computer Aided Engineering (15 credits)



- Dissertation (60 credits)

OPTIONAL MODULES (2 MODULES)

- Microprocessors and Embedded Systems (15 credits)
- Design of Mechatronics Systems (15 credits)
- Project Management (15 credits)
- Quality Management and Reliability (15 credits)
- Global Manufacturing (15 credits)

Why study Advance Manufacturing Systems?

The course is run by one of the strongest research groups in Brunel University and within the UK, and this is underpinned by substantial links with industry. We have a long tradition of excellence in both teaching and research in manufacturing systems and engineering management. Brunel University has been designated by the Engineering and Physical Sciences Research Council (EPSRC) as one of the designated Centres of Excellence for Manufacturing and Materials Sciences.

Who is the course designed for?

The programme is intended to benefit a wide range of participants, in particular:

- Recent engineering and technology graduates who have decided to move into manufacturing and related disciplines.
- Established manufacturing engineers working in industry and faced with the challenge of new areas of responsibility.
- Managers and product designers

working in manufacturing organisations that need to invest in their personal career development.

- Engineering, and Technology professionals/graduates from Electrical and Electronics, Mechanical, Material, Chemical, Industrial, Manufacturing, and Production.

Graduates and professionals with backgrounds in Mathematics, Physics and Chemistry who are, or wish to enter, career paths in the General Engineering discipline.

Your Career Development

The AMS graduates will be equipped with the latest techniques in manufacturing and systems engineering in:

- Design and development of highly flexible Mechatronics and Embedded control systems at shopfloor levels.
- Managing and providing solutions for advanced automated and semi-automated industries.
- Application of advanced computer and mathematical modelling for improved performance, design and management of industrial systems.
- Deploying the latest advanced measurement techniques and technologies for calibration (Applied Metrology).
- Management and implementation of Projects and Operations under time and resource constraints.



Alexander Komashie,
graduate on Advanced
Manufacturing Systems MSc



My MSc was both challenging and motivating. I learnt a lot of new things during my course including my new interest, Systems Modeling and Simulation. It is a fascinating area that cuts across every field from healthcare to Banking.



Many more comments from former students are available on the University website: www.brunel.ac.uk/sed/amee



MSc PACKAGING TECHNOLOGY MANAGEMENT (PTM)

Course Director for Packaging Technology Management



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Message from the Course Director

The increasing global importance of using less energy, creating less waste and generally behaving in a more sustainable manner, both in industry and as individuals, has driven the packaging industry to play an increasingly important role in modern manufacturing, retail and distribution.

It is the aim of this course to produce high-calibre packaging technologists and managers who have the vision and flexibility to create opportunities, solve problems and allow industry to play its part in the drive to reduce unnecessary consumption, reduce CO₂ emissions and battle climate change.

This course is relevant to a wide range of industries including:

packaging design; raw materials producers; packaging converters and printers; product manufacturers; packaging machine suppliers; and retailers. You will benefit from this programme if you are or intend to be involved in the design, manufacture, specification or use of packaging.

The content and challenge of this programme has given it a considerable reputation with employers in packaging and retail organisations worldwide. The majority of students on this course enrol with a clear idea of the direction they wish to move, and the kind of career they wish to pursue. However, career progression and professional development are two of the principal aims of study at post graduate level, and to this end the University has a Placement and Careers Development Centre to ensure that you have access to the best information and training to help you search for the right position.

Mode of study

1 Year Full-Time. The taught element of the course (September to April) includes eight modules (six core, two electives). Delivery will be by a combination of lectures, tutorials and group/seminar work. A further four months (June to September) is spent undertaking the dissertation.

3-5 Years Distance Learning. The distance learning programme is

designed to enable you to conduct most of your studies at home, in your own time and at your own pace. There is no requirement to attend lectures at Brunel University; instead you follow a structured programme of self-study at home or at work.

You are supplied with a study pack supported by eLearning web based lecture materials. You can take between 3 and 5 years to complete the course, it is entirely up to you how long you take, but usually the minimum is 3 years, with you taking four modules in the first year, four modules in the second year and the dissertation in the third year. However, depending on your other commitments you can take longer, up to a maximum of 5 years.

Assessment is by a combination of assignments and examinations. Examinations can be taken either at Brunel University or in the country you are resident in. We have an extensive network of organisations (universities, colleges and British Council Offices) throughout the world that will provide invigilation services. The cost of invigilation away from Brunel is your responsibility. The exams are held in May and September each year.



COMPULSARY MODULES (6 MODULES)

- Overview of Packaging (15 credits)
- Polymer Packaging (15 credits)
- Packaging Design (15 credits)
- Manufacturing Systems, Design and Economics (15 credits)
- Quality Management and Reliability (15 credits)
- Metal, Glass, Paper and Board (15 credits)
- Dissertation (60 credits)

OPTIONAL MODULES (2 MODULES)

- Managing People and Organisations (15 credits)
- Project Management (15 credits)
- Branding Strategy Studies (15 credits)
- Computer Aided Engineering 1 (15 credits)
- Financial Management (15 credits)

Your Career Development

Graduates from this programme typically work as engineers, technologists and managers in the sectors of packaging materials, packaging for FMCG and retail, cosmetics, food and drink, converted products packaging, packaging supply chain and distribution and packaging design.

Students graduating from this programme have progressed to careers within world leading organisations involved in the packaging area, including: Coca Cola, Heinz, Unilever, Proctor and Gamble, PepsiCo International, Muller, Zeneca Agrochemicals, Dairy Crest, SAB Miller and Bemis Packaging. A number of students who already worked in these organisations have seen, post graduation on this MSc, their careers progress into senior management, technical and developmental positions.

Lesley Moody, graduate on Packaging Technology MSc



I can recommend the course to all those with a Packaging related role. It has given me detailed knowledge of the processes involved in the manufacture of the most commonly used packaging materials and the experimental techniques used in their analysis. I've also gained many management related skills.



Many more comments from former students are available on the University website: www.brunel.ac.uk/sed/amee

ADVANCED MANUFACTURING AND ENTERPRISE ENGINEERING (AMEE) MODULES

Engineering Design in Perspective: (introductory 0 credit module)

This module is designed fundamentally to support the 'Design Experience' module by bringing the students to a common level of competence. It will enable students to learn (a) Essential Mechanics and Solids, (b) Design Process, (c) Preparation of Manufacturing Drawings using modern CAE software (d) Machine shop practice, (e) Hands on experience in motor control and (f) ADAMS software for mechanism synthesis. (For part time students attendance is optional).

Manufacturing Systems Design and Economics: (15 credits)

This module looks at advanced aspects of (a) Manufacturing Processes including description, analysis and classification of basic manufacturing processes; process capabilities, recent advances and developments, assembly systems, automation, robotics and CNC machines, CAD/CAM application, (b) Production Operations including Plant layout, Group Technology, Cellular Manufacturing and Flexible Manufacturing Systems. Lean manufacturing techniques, Kaizen, KANBAN, JIT, 5S, seven wastes, Poke Yoke, Value Chain, supply chain management and outsourcing and design reuse. Inventory control and MRP, and quality control. (c) Design for Manufacture and Process selection: including the relationship between design features and process capabilities, manufacturing system selection to produce a given design and (d) Economics for Manufacture: including Inventory Costing, Economic Order Quantities, Costing machine tool selection and cost of production strategy.

Computer Aided Engineering (CAE) 1: (15 credits)

In this module students will be taught (a) how to constitute entities of physical object, points, edges, surfaces and solids which are modelled for CAE, and the skills to implement them using a contemporary CAE software to create a computer model of a part, or assembly [Pro/Engineer, CATIA, Solidworks], (b) theory and some useful applications of computer models in mechanism synthesis and

analysis using a contemporary CAE packages [MATLAB, SIMULINK]

Computer Aided Engineering (CAE) 2 (15 credits)

In this module the students will be taught (a) advanced theory in Finite Element Analysis (FEA) and Structural Design (b) useful application of the FEA modelling thermal or electrostatic or electromagnetic fields and use of contemporary CAE packages like Pro/Mechanica, ANSYS, ABACUS.

Sustainable Design and Manufacture: (15 credits)

Students will be taught methodologies for assessment sustainability of a product design, and methodologies for assessing the sustainability of manufacturing procedures and operations. The module has a practical orientation, and at the same time offers common analytical tools for assessment to be used in the design and manufacturing environment.

Design experience: (30 credits)

This is a module over two terms where students will learn and experience (a) the design of multidisciplinary, large product or systems (in a manufacturing environment) (b) the skills in project planning, management and execution as a team member (c) how to use various knowledge and skill components acquired during their undergraduate and postgraduate study and, (d) how to acquire knowledge on a self-learning basis. The module is normally based on projects taken from industrial partners and with direct practical implementation of the results.

Human Factors in Design: (15 credits)

In this module the students will (a) develop an understanding of the physical characteristics of humans (b) learn to use the main qualitative and analytical methods of human centred design (c) be led to appreciate the application of human centered design techniques by means of examples chosen from the automotive, electronic and consumer product industries and, (d) acquire skills in multidisciplinary thinking and multidisciplinary design practice.

Microprocessors and Embedded Control: (15 credits)

This module covers the various elements of embedded system design i.e. the inclusion of microprocessor system into a mechanism in order to control it. The specialist microprocessor commonly used will be investigated in terms of how to program and interface them to the real world, and how to use particular features required for embedded systems. The other half of the module introduces the subject of control systems analysis and design, with the aim of providing sufficient understanding to implement a feedback control system using a microprocessor.

Advanced Manufacturing Measurement: (15 credits)

The module will provide an understanding and critical awareness to designing and controlling modern automated manufacturing systems, and employs a systems approach in doing so. The module provides an exposure to a variety of industrial and factory automation practices, and also an understanding in selecting appropriate automation and control methods for the equipment or process at hand. The students will be able to understand the criticality and importance of automation and robotics in the modern industrial environment, and will also understand the issues and differences in automation practices between discrete and process industries. Students will be able to apply current technical knowledge in, and operating a modern manufacturing system, as well as critically analyse manufacturing systems and specify select suitable approaches for control, and to evaluate and justify an automated system.

Project Management: (15 credits)

This module aims to give you a comprehensive understanding and critical awareness of the latest advanced techniques and strategies for Project Management, including management tools, management and reporting methods and team building. Opportunities are provided to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in these areas.

A number of specific areas are covered including contract law and health and safety. The module ends with project auditing to establish performance and project closure.

Design of Mechatronic Systems: (15 credits)

In this module the students will be taught how to (a) integrate mechanical, electronic and control functions (b) critically analyse and use mechatronic design concepts (c) apply multiple discipline expertise in an integrating mechatronic process and (d) use advanced software to simulate power electronic circuits (PSPICE).

Robotics and Automation: (15 credits)

The module aims at providing an understanding and critical awareness to designing and controlling modern automated manufacturing systems, and employs a systems approach in doing so. The module provides an exposure to a variety of industrial and factory automation practices, and also an understanding in selecting appropriate automation and control methods for the equipment or process at hand.

Managing People and Organizations (15 credits)

Main topics of study: nature of organisations and their development and effectiveness; the role of the engineering manager and the contingency theory of management; the nature and strategic role of human resource management; developments in management theory for business performance management; learning organisations and the role of innovation; managing innovation including organisational culture in a global business environment; motivation and managing high performing teams; managing change and designing organisations that support creativity and innovation.

Financial Management (15 credits)

The module content will include the nature and strategic role of Financial Management including sources of finance. The flow of money: cash flow cycle, measures of liquidity, working capital. Financial feasibility: break-even analysis; contribution; sensitivity analysis. Principal financial statements: key definitions; structure and layouts. Operating performance: relationships

between the balance sheet and P&L account; key ratios. Investment appraisal: principles and techniques.

Financial analysis: key concepts and ratios. Business Planning based on resource and cost estimation

Global Manufacturing (15 credits)

Main topics of study: enterprise systems for supporting the product manufacturing, and development and lifecycle; the marketing/services/ supply chains and their interface; e-Manufacturing and operations; digital enterprise technology (DET); virtual organisations and integration; selection and use of DET and eManufacturing tools; global manufacturing implementation issues and methodology; global manufacturing concept, methodology and implementation issues; case studies on global manufacturing operations and best practices.

Quality Management and Reliability (15 credits).

This module aims to provide an in-depth understanding of the principles of modern quality assurance which underpin the discipline, and their applications in engineering, manufacturing and enterprises. Topics covered include the history and nature of quality management; views of the gurus and ISO 9000; problem solving tools; Benchmarking; Quality function deployment; Poka Yoke; Statistical process control; Failure modes and effects analysis; Significance testing; Design of experiments and Taguchi methods.

The module also aims to provide a professional working knowledge of the reliability engineering techniques that the students can apply to improve the maintenance, the maintainability and the safety of an industrial plant. The module also seeks to explain the purpose of maintenance within an organisation and to review the development of its principles and techniques, thus enabling the students to develop a structured strategy for maintaining complex industrial plant.

Logistics and Global Supply Chain Management (15 credits)

Main topics of study: logistics and supply chain management – an introduction; managing material flow (the physical distribution and control of goods); the role of

information systems (eCommerce) in developing and enhancing supply chain management; supply chain relationships; the customer service dimension; time based competition; the Global Supply chain; managing the supply chain of the future.

Systems Modelling and Simulation (15 credits)

Main topics of study: principles of systems engineering; modelling and analysis of discrete systems; material flow systems (assembly lines, transfer lines, serial systems, shop scheduling, flexible manufacturing, group technology, facility layout); machine setup and operation sequence; material handling systems; general modelling approaches (queuing models); process simulation and data analysis, enterprise operations; supply chain and logistics-reverse logistics modelling concepts.

Overview of Packaging (15 credits)

This module provides you with an overview of the packaging industry and acts as an introduction to the whole course. You are taken through the supply chain which runs from raw materials through packaging converters, packaging users, retailers and product users, to the final disposal of the packaging. This chain involves many activities such as design, choice of material, manufacturing, retailing and distribution, all of which are covered in greater depth in subsequent modules.

A significant part of the module focuses on the basic science of materials and lays the foundation for subsequent technical modules. This allows you and your fellow students to reach a similar level of understanding of the materials science related to the four major groups of packaging materials: plastics, metals, glass, paper and board.

Polymer Packaging (15 credits)

This module focuses on polymers in packaging. You will study the main processing routes: injection moulding; extrusion; thermoforming; coatings; film and bottle production. We will cover a number of characterisation techniques such as FTIR (Fourier Transform Infrared Spectroscopy) and light/electron microscopy to determine the properties and performance of the packaging components. Characterisation of



materials is important for a number of reasons and is used in:

- The design and testing of new packs
- Evaluation of new and competing materials
- Monitoring of packaging production
- Forensic analysis, to study "What went wrong?"

We also look at new developments in polymers such as water solubility, biodegradability and nanotechnology. We will investigate environmental and legal legislation relating to polymers as these are often country dependent.

Metals, Glass, Papers and Board (15 credits)

This module covers the processing and production of metallic packaging using steel, tinplate and aluminium. We look at the various pack formats and how the packaging interacts with the pack contents. Corrosion is an important aspect and can limit the use of metals packaging. Glass and papers and board are given a similar treatment. We look at glass bottles, jars and vials. For papers and board, we study fibreboard, cartons, corrugated cardboard, tubes and labels. In all cases, we look at the suitability of the packaging materials for purpose. Are they the best? As with Polymer Packaging we look at characterisation techniques and consider environmental and legal issues.

Packaging Design (15 credits)

This module introduces you to the principles and criteria to be considered in good packaging design. Many of

these criteria are drawn from the needs of the distribution and retailing chains and these are considered in some depth. You are made aware of the conflicts in finding a practical solution to a packaging design problem: cost reduction, differentiation, barrier requirements, environmental issues, ergonomics, and 'user friendliness'.

The needs of distributors are considered: palletisation, transportation, automatic warehousing, and bar coding. This module also includes a comprehensive analysis of the major printing and decoration techniques for packaging.

Dissertation (60 credits)

Following the taught part of the programme and reflecting individual interests, the dissertation is an in-depth study of a manufacturing problem or situation, requiring a high standard of investigation and presentation. The analysis of a 'real' problem is expected, frequently involving a company or workplace. Close liaison between the University, the student and, where appropriate, the company is essential when selecting a topic which has a suitable academic content and an appropriate scope, relevance and timescale.

Some students may wish their dissertations to be considered by the Chartered Engineering Institutions to satisfy requirements for corporate membership. In this case, a further set of criteria will have to be satisfied and you should contact the appropriate institute on the best way to proceed.

AMEE RESEARCH

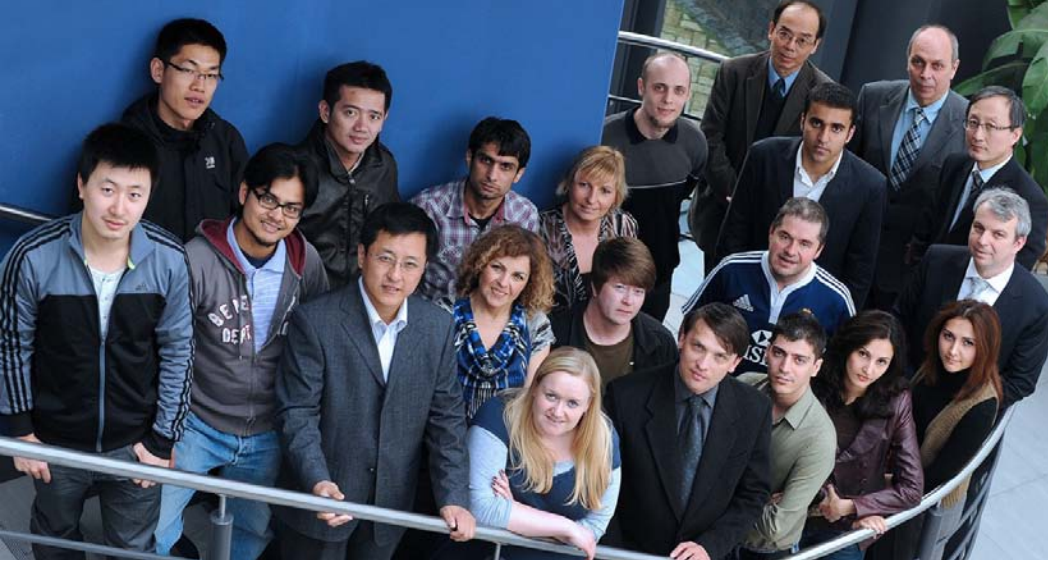
- Advanced Manufacturing Technology
- Enterprise Engineering
- Engineering Management

Research Laboratories

- Advanced Manufacturing Technology Lab
- Enterprise Engineering and Systems Lab
- CAD/CAM Lab

Research Expertise:

- Micro/Nano Manufacturing
- Enterprise Engineering
- Design of Precision and Micro Machines
- e-Manufacturing
- Nano Positioning and Manipulation
- Sustainable Manufacturing and Systems
- Manufacturing Metrology
- Agile Manufacturing
- Condition Monitoring and Control
- Supply Chain Management
- Systems – Modelling and Simulation
- Technology and Innovation Management
- Global Manufacturing and Systems
- Packaging Technology



AMEE COURSES

Fees for 2012/13 entry

Full-time : Home – £ 5,060; Overseas – £13,860

Part-time : Home – £2,530; Overseas – £6,930

Distance Learning: Home and Overseas – £7,140 or £595 per 15 credit module

English Requirements:

IELTS: score 6.0 with a minimum of 5.5 in each sub-section

TOEFL: Internet: 79 (Minimum sub scores: Reading 18, Listening 17, Speaking 20, Writing 17)

COMPANIES WORKING WITH AMEE





WHERE IS BRUNEL UNIVERSITY SCHOOL OF ENGINEERING AND DESIGN?

The School of Engineering and Design is situated at Brunel University's single campus at Uxbridge on the western outskirts of London. Its location makes it convenient for central London, Heathrow Airport and the M4, M40 and M25 motorways.

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