

**technology innovation centre**

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## **Postgraduate Programme**

### **Programme Specification including Student Guide and Employer Guide**

### **MSc Mechanical Engineering Research**

Date of Course Approval/Review	Current Version Number	Version Date
25 April 2006	1.01	25 April 2006



## Definitive Documents and Version Control

This document has a version number and reference date in the footer. The process leading to introduction of new courses, and major changes to courses follows tic procedure QA 1 and culminates in approval by the University's Senate.

The process leading to introduction of minor changes to modules and courses follows tic procedure QA 5 and culminates in approval by the Dean.

The reference date will be that of the approval event, minor changes board, or other meeting at which formal consideration was given.

Further details about the course and document development may be obtained from minutes of the approval meeting, or minor changes board. A history of the document is summarised in the table below and further information relating to past versions can be obtained from the tic Registry.

<b>MSc Mechanical Engineering Research Programme Specification, Student and Employer Guides</b>			
<b>Version</b>	<b>Event</b>	<b>Date of event</b>	<b>Authorised by</b>
1.01	Approval	25 April 2006	Dean of Faculty

## **PROGRAMME SPECIFICATION**

### **MSc Mechanical Engineering Research**

**NOTE:** This specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes advantage of the learning opportunities that are provided. More detail on the specific learning outcomes, indicative content and the teaching, learning and assessment methods of each module can be found (1) at <http://web.tic.ac.uk>, (2) in the Theme Book, and (3) in the Student Handbook. The accuracy of the information contained in this document is reviewed by the University and may be checked within independent review processes undertaken by the Quality Assurance Agency.

The information from this specification may be selectively extracted and included in documents that are more appropriate for students, intending students and employers.

<b>1</b>	<b>Awarding Institution / Body:</b>	<b>UCE Birmingham</b>
<b>2</b>	<b>Teaching Institution:</b>	<b>Technology Innovation Centre, UCE Birmingham</b>
<b>3</b>	<b>Programme accredited by:</b>	<b>N/A</b>
<b>4</b>	<b>Final Award:</b>	<b>MSc</b>
<b>5</b>	<b>Programme Title:</b>	<b>Mechanical Engineering Research</b>
<b>6</b>	<b>UCAS Code:</b>	<b>N/A</b>
<b>7</b>	<b>QAA Benchmarking Group:</b>	<b>N/A</b>

#### **8 Aims of the programme**

##### **The programme aims to provide learners with:**

- research skills and an opportunity to demonstrate these skills through the execution of a research based master's project.
- an opportunity to develop skills in securing research funding through the production of research proposals based on sound technical and economic rationale.
- a course which will develop skills of analysis, synthesis, decision making and the ability to cope with unfamiliar problems through effective research methods.
- skills within the design role in the sector with a rigorous grounding in industrial standard simulation tools.
- an opportunity relate to industry and commerce and apply new technologies and techniques to solve present and future problems concerning not only UK but also international companies.
- to enable the students to develop the skills required to design and analyse components and systems within the engineering environment.
- a wide range of transferable and marketable skills and knowledge leading to employment opportunities in a variety of roles within a wide range of industries.
- a teaching and learning environment which emphasises active and participative education;
- an opportunity to acquire skills necessary for lifelong learning;

**9 Intended learning outcomes and the means by which they are achieved and demonstrated: the programme provides learners with opportunities to develop and demonstrate knowledge and understanding, skills and other attributes as follows:**

**Knowledge and understanding**

<b>Knowledge and understanding of:</b>	<b>Teaching, learning and assessment methods used:</b>
<p>Why the development of sound research methods are essential in order to plan and execute research projects at Master’s level and beyond.</p> <p>The skills necessary to develop a sound research proposal based on a good technological and economic basis.</p> <p>The application of appropriate research methodologies to a range of topics.</p> <p>The requirements of various funding bodies with respect to the development of a full research proposal in either academia or for commercial R&amp;D.</p> <p>The approvals process for the acceptance of research proposals.</p> <p>A defined body of knowledge, relating to the fundamental principles of mechanical engineering and, where appropriate, professional practice in industry and commerce.</p> <p>Design and analysis aspects of the field in respect of Stress Analysis, Dynamics and Vibration Analysis.</p> <p>Analysis and design tools such as Adams Mechanisms, Finite Element Analysis and Solid Modelling techniques.</p> <p>Dynamics and control of mechanical vibrations and systems.</p>	<p>Face-to-face traditional lecture, seminar, tutorial, self-directed study and peer review sessions.</p> <p>Directed independent learning activities are encouraged at all stages of the course.</p> <p>Knowledge and understanding are also acquired through web based curricula and use of collaborative technologies where appropriate.</p> <p>The course adopts a case study approach to learning which allows students to apply the concepts and techniques of research methodology to a given task within the mechanical engineering field.</p> <p>Knowledge and competence assessment is undertaken by tutors and peers, this both formative and summative. This includes seminars, viva-voce, coursework, practical case studies, theory projects, time constrained examinations, and practical assessments.</p> <p>Students are supported beyond the traditional face-to-face delivery by appropriate tools and technologies developed to support collaborative working.</p>

### Skills and other attributes

**Intellectual / cognitive skills:**

Argue rationally and draw independent conclusions based on a rigorous, analytical and critical approach to demonstration and argument.

Synthesise theory and practice to design/implement a range of solutions.

Assess and resolve issues relating to competing demands on resources.

Write fully researched and referenced reports, which evaluate technical issues. This will involve the use of a variety of IT tools.

Demonstrate, in an analysis of a specified problem, a high level of competence and understanding of the data manipulation, information presentation and delivery.

Apply new technologies and techniques to solve present and future industrial and commercial problems locally, nationally and internationally.

Use relevant analytical and modelling techniques to plan and complete a design project.

Apply, where appropriate, software tools for design and analysis.

**Teaching, learning and assessment methods used:**

Intellectual skills are developed through teaching and learning programme previously outlined.

Analytical and problem solving skills are further developed using a range of appropriate 'real' and 'theoretical' case-studies and problem based learning scenarios.

The course comprises 4 themes, 2 core to the domain and 2 research orientated. All themes require an element of written work, which will demonstrate the students' ability to apply the knowledge gained to a specific problem.

Each Theme attracts 27 credits with a notional 270 hours. The theme will normally have up to 3 elements of assessment.

Assessment includes practical work, individual written coursework, group presentations, viva voce, individual and group reports, practical assessments, closed and open book time constrained examinations.

<p><b>Practical, research and independent learning skills:</b> Access information from the internet, journals, books, research papers and appraise its suitability for master's level research.</p> <p>Demonstrate the ability to work autonomously or in a group and accept responsibility for the action taken.</p> <p>Reflect on personal practice, attributes, both theory and practice and modify approach to maximise learning opportunities as required.</p> <p>Interpret and critically evaluate knowledge, concepts and ideas and/or forms of creative expression, to deliver a quality product or service.</p> <p>To demonstrate the knowledge and skills outlined within the PSDU and PPDU Learning Outcomes.</p> <p>Apply the knowledge, skills and methodologies of project management to the analysis and solution of complex problems.</p> <p>Possess a defined body of knowledge, skills and understanding and analyse its relationships with conceptual frameworks and, where appropriate, professional practice.</p> <p>Draw independent conclusions based on analysis of argument, opinion and data.</p>	<p><b>Teaching, learning and assessment methods used:</b> Initiative and independence are fostered throughout, and develop incrementally as the course progresses.</p> <p>Emphasis is place on guided, self-directed and student-centred learning, with increasing independence of approach, thought and process. This independent learning includes a process of peer review in order to evaluate the effectiveness of the learning.</p> <p>Learners are encouraged to plan their own work schedules and are required to meet strict deadlines.</p> <p>Learners are required to plan and execute a related dissertation.</p> <p>The <b>Postgraduate Study Development Unit</b> provides the vehicle for the development learning skill developments. The PSDU, which is of 60-hours duration comprises:</p> <p><b>Learning Review-</b> The Postgraduate Learning Review will be started during the Postgraduate Study Development Unit and completed to Stage 1. Assessment of Stage 1 will take place at the end of the PSDU.</p> <p><b>Learning, Research and ICT skills development-</b> Report writing skills, Information skills, IT skills, Basic mathematical / statistical skills, Oral presentation, Time management, CV preparation.</p> <p>PSDU Assessment includes a variety of competence based formative and summative assessment including interview, preparation of a formal written report, an oral presentation, group activity and the production of an electronic presentation.</p> <p>The <b>Postgraduate Project Development Unit</b> focuses on the identification of a potential Master's project. The PPDU , which is of</p>
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	<p>60-hours duration comprises:</p> <p><b>Learning Review-</b> The Postgraduate Learning Review will be completed up to stage 2 and reviewed as part of the assessment of the PPDU.</p> <p><b>Research and Report writing skills:</b> Types and structure of reports (essays/technical reports/conference papers/executive summaries). Stages of report generation. Reference lists and Bibliographies.</p> <p>Primary and Secondary Research Methodologies.</p> <p><b>Time management:</b> Analysing weekly schedule. Planning activities. Background/easy/difficult tasks, prioritising.</p>
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<p><b>Transferable / key skills:</b></p> <p>Elicit the co-operation of others and contribute to team goals</p> <p>Manage time and prioritise workloads</p> <p>Make effective oral and written presentations which are coherent and comprehensible to others</p> <p>Access and make appropriate use of relevant mathematical, statistical and theoretical information.</p> <p>Use various forms of communication and expression, then to employ them selectively, appropriately and effectively according to the requirements of the solution.</p> <p>Plan and deliver an oral presentation, including viva-voce, lead</p>	<p><b>Teaching, learning and assessment methods used:</b></p> <p>Transferable/key skills are core to the learning strategy of the programme. They are pervasive, and are incorporated into themes and assessments as appropriate, for example; team-working skills are fostered through the use of group, task-based practical projects.</p> <p>Keeping logbooks and submitting self-assessment documentation in support of personal performance fosters self management and personal development.</p> <p>The use of information technology plays an integral role throughout the course. The support materials are available through the URLs provided on the theme guides.</p> <p>A full range of resources are identified including books, journals as well as locally created material.</p>
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<p>discussion and facilitate arguments, in an eloquent and professional manner, making use of a computer-based presentation aids, where necessary.</p> <p>Identify career opportunities and begin to build a recruitment strategy, including obtaining placement opportunities.</p> <p>Show confidence and self-awareness, reflect on own learning, and be self-reliant and constructively self-critical.</p>	
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## 10 Programme structure and requirements, levels, modules, credits and awards

The MSc programme is normally studied over one year and one term full-time or two years part-time, and students may if they wish move between full- and part-time modes of attendance. The academic year is divided into semesters of approximately 15 weeks each, which run from September to January and February to June. The course is divided into 7 distinct study units, a Postgraduate Study Development Unit (6 Credits at level 7), a Postgraduate Project Development Unit (6 Credits at level 7), four themes, (each 27 credits) and a Master's project (60 credits). Students complete 120 credits at the Postgraduate Diploma stage and 180 credits at the MSc stage. Each credit represents 10 hours of student learning and assessment.

The structure of the course, the theme, levels and credit ratings and the awards that can be gained are shown below. Personal Development Planning is an integral part of the learning process of each element of the course.

Stage 1	
Element name	Credit
<b>POSTGRADUATE STUDY DEVELOPMENT UNIT</b>	<b>6</b>
<p><b>Learning Review-</b> The Postgraduate Learning Review will be started during the Postgraduate Study Development Unit and completed to Stage 1. Assessment of Stage 1 will take place at the end of the PSDU.</p> <p><b>Learning, Research and ICT skills development-</b> Report writing skills, Information skills, IT skills, Basic mathematical / statistical skills, Oral presentation, Time management, CV preparation.</p>	
<b>SIMULATION TECHNIQUES</b>	<b>27</b>
<p>The aim of this theme is to provide the industrial standard simulation techniques which enable students to model complex engineering components and systems</p> <p>The theme will cover a number of specific areas:</p> <p><b>Finite Element Analysis</b> Linear Elastic Statics and Modal Analysis. Techniques and methods for checking results. Quality assurance processes. Standards and practices.</p> <p><b>Multibody Dynamics</b> The analysis of mechanisms and rigid or semi-rigid bodies connected by joints and other constraints.</p> <p><b>Control Simulation</b> Control simulation packages. Control system modelling, step response, time and frequency domain analysis. Response specifications.</p>	
	<b>27</b>

## RESEARCH METHODS

This Research Methods theme aims to provide the learning support necessary to acquire these generic and transferable skills, either as preparation for the Master's project and subsequent research programmes or for application in employment following completion of the MSc programme. The theme covers three main areas:

### Planning and Managing Research Projects

- Literature searches and Information gathering skills
- Ethical considerations; the UCE Research Ethics Framework;
- Research questions: Hypothesis formulation; hypothesis testing; model building; model validation
- Intellectual Property: identification; ownership and protection of IP. Patents, copyright; design registration;
- Time management skills, project planning using MS Project,
- Information Management: references; experimental data; the Data Protection Act; design and use of databases for data handling

### Experimental Design and Data Analysis

- Experimental Design: design of experiments; analysis and selection of variables, choice of experimental design
- Statistical Techniques: Probability Distributions; Multivariate Distributions; Estimation; Hypothesis testing; ANOVA, Linear regression; Cluster Analysis
- Statistical Software: Minitab, SPSS, Matlab Statistics Toolbox
- Other Analysis Techniques: Frequency Domain; Time-Series; Wavelets

### Technical Writing and Presentation Skills

- Introduction to technical writing
- Writing a research degree project proposal
- Writing a conference paper
- Oral presentation skills
- Developing effective presentations using Microsoft PowerPoint
- Writing a thesis

Stage 2	Element name	Credits
	<b>POSTGRADUATE PROJECT DEVELOPMENT UNIT</b>	<b>6</b>
<p><b>Learning Review-</b> The Postgraduate Learning Review will be completed up to stage 2 and reviewed as part of the assessment of the PPDU.</p>		
<p><b>Research and Report writing skills:</b> Types and structure of reports (essays/technical reports/conference papers/executive summaries). Stages of report generation. Reference lists and Bibliographies.</p>		
<p><b>Primary and Secondary Research Methodologies.</b></p>		
<p><b>Time management:</b> Analysing weekly schedule. Planning activities. Background/easy/difficult tasks, prioritising.</p>		
		<b>27</b>

## **DYNAMICS NOISE AND CONTROL**

The theme aims to provide the student with the ability to develop and analyse model representations of dynamic and vibrating systems for the purposes of control

The theme will covers specific areas of:

### **Dynamics**

Mechanisms analysis and dynamics  
Contact forces, springs and dampers  
Automotive and general mechanical engineering components

### **Noise**

Combining sound pressures, loudness.  
Masking, weighting networks, sound level meters and their grades.  
Time-varying sound and noise dose.

### **Control**

Review of block diagram algebra and transfer function modelling  
Feedback, feedforward and PID control  
State space analysis and modern controller design

## **RESEARCH PROPOSAL DEVELOPMENT**

The theme aims to develop the necessary knowledge through the development of a research funding application, appropriate for submission to a UK Research Council or other OST funding source, for example the DTI. Students will be required to develop both the technical and supporting economic case for undertaking the research, including a well defined project plan and a project budget based on the Full Economic Cost (FeC) model. The theme covers two main areas:

### Developing a Research Proposal

Structuring a Research Funding application  
Building the technical case for research  
Building the economic case for support  
Partners and collaborators  
IP protection and exploitation plans  
Internal and External approval processes

### Sources of Research Funding

Research Council funding including Faraday Centres  
DTI Funding Sources – Technology and Innovation  
KTP Programme funding  
EU FP7 Programme funding  
Innovation funding sources  
The FeC model for Research Funding  
Partial- funding models for collaborative programmes

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**Award: Postgraduate Diploma (120 credits)**

MSc Stage	Element name	Credit
<b>Master's Project -</b>	The project is the ultimate test of the student's ability to integrate and synthesise what has been learnt on the course. It provides an opportunity to apply knowledge gained to a substantial research problem.	60

**Award: MSc (180 credits)**

## 11 Support for Learning

Students are encouraged to identify and, with guidance, to reflect on their own learning needs and are offered the following support as appropriate to those needs:

A 60 hours PSDU, that includes an intensive review and assessment of the fundamental requirements of the study units.

A 60 hours PPDU, that includes an intensive review and assessment of the fundamental requirements of the study units.

A fully resourced Learning Centre.

A student handbook containing information relating to the University, **tic** and the themes of study.

A virtual learning environment to support students remotely via collaborative tools and technologies.

Access to teaching, support and management staff.

Access to **tic** and UCE resources seven days per week e.g. Library, eLearning materials – outside normal class times.

Access to student services, including Students Union.

## 12 Criteria for admission

Candidates must satisfy the general admissions requirements of the programme, which are as follows:

Minimum 2(ii) Honours degree from a UK University or equivalent in a relevant subject.

**Alternative Entry Routes**

Students who do not hold the standard entry requirements may be considered for admission provided they can satisfy the Course Director and relevant Theme tutors that their qualifications and/or industrial experience are equivalent to that attained through the completion of an appropriate honours degree programme.

**13 Evaluation and improvement of quality and standards**

<b>Committees:</b> Course Committee Board of Studies Examination Board Learning Management Committee (LMC) Learning Quality Committee (LQC) Faculty Board Academic Quality and Support	<b>Mechanisms for review and evaluation:</b> Review and validation events Annual Monitoring Student feedback questionnaires Annual staff appraisal External Examiners' Reports Course team meetings and Away Days
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**14 Regulation of assessment**

Students are issued with copies of the University's Standard Postgraduate Assessment Regulations on commencing the course, and individual and collective guidance is given by academic staff on their operation at appropriate times throughout the course.

Standard Postgraduate Assessment Regulations have been reviewed and comply with the National Qualifications Framework.

To qualify for a **Postgraduate Diploma** a student must successfully complete all required assessments and obtain a minimum of 120 credits of which at least 90 must be at level 7. The pass-mark in all modules is 40%.

The award of **Postgraduate Diploma with Commendation** will be made to students who satisfy the requirements for the award and achieve an overall average mark of 60 – 69% at the first sitting in the marks awarded for Stage 2 modules equivalent to 60 credits.

The award of **Postgraduate Diploma with Distinction** is made to students who achieve an average mark of 70% at the first sitting in the marks awarded for Postgraduate stage, which is equivalent to 60 credits.

To qualify for a **Master's Degree** a student must successfully complete all required assessments and obtain a minimum of 180 credits of which at least 150 must be at level 7. The pass-mark in all modules is 40%.

The award of **Master's Degree with Commendation** will be made to students who satisfy the requirements for the award and achieve an overall average mark of 60 - 69% at the first sitting in the marks awarded for Stage 3 modules equivalent to 60 credits.

The award of **Masters Degree with Distinction** is made to students who achieve an average mark of 70% at the first sitting in the marks awarded for the Master's Project, which is equivalent to 60 credits.

**External Examiners** are appointed. Their work includes:

- reviewing coursework assignments and assessment criteria
- approving examination papers
- monitoring standards through moderation of completed assessments
- attending Examination Boards
- participating in the course development processes.

## MSc Mechanical Engineering Research

### *Award of MSc (180 credits)*

#### **Master's Project**

including Project Proposal and Research Plan and the write-up  
600 hours – 60 credits at Level 7 (30 weeks)

### *Award of Postgraduate Diploma (120 credits)*

#### **Dynamics Noise & Control**

27 Credits at level 7

#### **Research Proposal Development**

27 Credits at level 7

**PPDU** (2 weeks) Preparation for the project – Deliverable 2000 report outlining the proposed area of research for the Master's Project the student would wish to undertake plus the Learning Review to stage 2 - 6 Credits 60 Hours

#### **Simulation Techniques**

27 Credits at level 7

#### **Research Methods**

27 Credits at level 7

**PSDU** (2 weeks) Learning Skills Development – Deliverable 2000 word report and presentation related to the specific course being undertaken along with a Learning Review to stage 1 - 6 Credits 60 Hours

# MSc in Mechanical Engineering Research

## Student Guide

### Background

The course is designed for those individuals who wish to follow a career in research in either academia or in commercial R&D. The course provides a blend of mechanical engineering topics along with research methods and research proposal development.

The engineering industry, particularly within the UK, is facing significant competitive pressures across global markets. The primary strategies for meeting the challenges facing the industry call for innovation in design and manufacturing processes that can be directly incorporated into products. The course offers an opportunity for researchers to gain the skills and knowledge to meet these challenges faced by industry.

In order to successfully follow required strategies for change, organisations have to make best possible use of all their resources including, and especially, their professional engineering teams. Talented, ambitious engineers versed both in current technology and processes and their research skills are especially required.

### What does the industry want?

The programme provides the opportunity to consolidate new developments in technology by providing a research based perspective to the advancements in skills and techniques, and changes in business and commercial practice.

### What type of work will I do?

The learning resources will be presented in a number of ways. Some materials may be accessed via the Faculty website, some may be sent to students as a resource pack, and some material may be available via formal lectures, tutorials and workshops. Some of these may take the form of residential sessions where guest speakers and industrial visits may form part of the learning experience.

The learning support will be provided through the use of tutorials and electronic communication methods. Research, case studies and practical activities will play a significant part of the learning process and assessment.

The MSc in Mechanical Engineering Research offers the following themes:

- **Postgraduate Study Development Unit**
- **Simulation Techniques**
- **Research Methods**
- **Postgraduate Project Development Unit**
- **Dynamics Noise And Control**
- **Research Proposal Development**
- **Master's Project**

You will experience a wide variety of subjects and many different types of learning environment including lectures, tutorials, individual tutorial support and a significant emphasis on support outside the traditional classroom environment.

The course incorporates a significant amount of project work to provide you with an opportunity to develop and apply your knowledge.

One of the aims of the course is to develop active, autonomous learning. The variety of skills and knowledge that you bring to the courses will be developed by a variety of means. As a part of each of the elements of the course you will participate in peer review sessions where your work and the work of others will be reviewed and analysed by fellow students. This simulates reality where critical peer appraisal and collaborative working is integral to innovation viability.

### **Who will teach me?**

The course team is at the Technology Innovation Centre, at the University of Central England. In addition, external industrialists are used to provide guest lectures/seminars.

### **Am I just going to be taught from a Classroom?**

No. The programme will use visits to various organisations, and introduce relevant industrial speakers to support learning. In addition, as you might expect from the 'technology innovation centre', cutting edge collaborative tools and technologies are used to facilitate learning.

### **What are my employment prospects?**

The Master of Science degree in Mechanical Engineering Research will provide you with the expertise and knowledge in specialist engineering methodologies complemented with a comprehensive foundation of generic research skills which have ready application in both public and private sector.

Typical routes of employment that could lead from this programme include:

- Academic Research, Further Study or Commercial R&D
- Design and performance engineer.
- Development engineer within industry
- Engineering Consultant
- Research or Knowledge Transfer Partnership (KTP) Associate

This list is by no means exhaustive but does reflect the broad range of roles you may consider in the next phase of your career development.

### **How do I apply?**

**University Faculty:** Technology Innovation Centre  
**Course Length:** 1 year + 1 term full-time and normally 2 years part-time  
**Location:** Millennium Point, Curzon Street, Birmingham B4 7XG  
**Enquiries:** Information Officer (at the above address) or at [enquiries@tic.ac.uk](mailto:enquiries@tic.ac.uk) or Telephone: (+44) (0)121 331 5400

# MSc in Mechanical Engineering Research

## Employers' Guide

### Introduction

The course is designed for individuals who wish to follow a research career in either academia or in commercial R&D. The course provides a blend of mechanical engineering along with research methods and research proposal development.

The Technology Innovation Centre, part of the University of Central England, offers a portfolio of engineering based programmes. The course focuses on research methods, Research Proposal Development as well as the design and analysis aspects of the field in respect of Advanced Stress Analysis and Dynamics and Vibration. The study programme is developed to support engineers within the R&D and design role in the sector by providing an advanced knowledge of new computer based simulation techniques.

Graduates empowered with these engineering capabilities will become valuable leaders/members of any team working to plan and execute engineering projects. Industry actively welcomes professionals who can demonstrate the ability to understand the needs of the whole organisation and beyond, displaying 'joined up thinking.'

### Facilities / Partnerships

Students have access to state-of-the-art facilities at the Technology Innovation Centre (**tic**). The course is based within the **tic**, which is a part of the University of Central England. The **tic** is located within Birmingham's prestigious Millennium Point building, a £114 million development providing some of the best resources and facilities in the country and the cornerstone of Birmingham's Eastside Learning Zone. The course makes full use of industrial visits and guest speakers encompassing a wide range of expertise.

### Programme Aims

The course aims to develop a new generation of mechanical design researchers competent and skilled in the use of advanced computer modelling and simulation techniques. These skills will be developed through the design and analyse components and systems within a general engineering environment.

Students will be introduced to modern computer based tools used within the industry and provide the opportunity for these tools to be applied to realistic problems. Engineering skills including problem-solving abilities, practical competencies, critical appraisal and communication skills will be developed during the projects undertaken throughout the course.

### The Curriculum

The MSc in Mechanical Engineering Research offers the following themes:

- **Postgraduate Study Development Unit**
- **Simulation Techniques**
- **Research Methods**
- **Postgraduate Project Development Unit**
- **Dynamics Noise And Control**

- **Research Proposal Development**
- **Master's Project**

### **Expected Outcomes**

Companies have always faced competition in some form or another. The need for skilled researchers able to look at the longer term developments in the application and technology of mechanical engineering principles and techniques has therefore never been more paramount.

Postgraduate students leaving this course will understand the needs of companies and be able to successfully implement a research programme based on sound technical and economic rationale.

### **Contact Details**

**University Faculty:** Technology Innovation Centre  
**Course Length:** 1 year + 1 term full-time and normally 2 years part-time  
**Location:** Millennium Point, Curzon Street, Birmingham B4 7XG  
**Enquiries:** Information Officer (at the above address) or at [enquiries@tic.ac.uk](mailto:enquiries@tic.ac.uk) or Telephone: (+44) (0)121 331 5400