

Birmingham City University Technology Innovation Centre

Undergraduate Programme

Programme Specification including Student Guide and Employer Guide

BEng (Hons) Management of Manufacturing Systems

| Date of Course Approval/Review | Version Number | Version Date |
|---------------------------------------|-----------------------|---------------------|
| 5 April 2005 | 2.04 | 20 July 2007 |



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Definitive Documents and Version Control

This document has a version number and reference date in the footer. Documents originating from the 1999 scheme follow the sequence 1.01, 1.02, 1.03 etc. Documents originating from the 2004 scheme begin with 2.01 as the first released version and follow the same sequence.

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 validation 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 validation, 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.

| BEng Management of Manufacturing Systems Programme Specification, Student and Employer Guides | | | |
|--|--|----------------------|----------------------|
| Version | Event | Date of event | Authorised by |
| 2.01 | Review & Re-Approval | 5 April 2005 | Dean of Faculty |
| 2.02 | Notification of IIE (now IET) accreditation | 7 Sept 2005 | Dean of Faculty |
| 2.03 | Special Board of Studies - Desemesterisation | 22 June 2006 | Dean of Faculty |
| 2.04 | Minor changes Board of Studies | 20 July 2007 | Dean of Faculty |

BEng (Hons) Management of Manufacturing Systems

PROGRAMME SPECIFICATION

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 <https://web.tic.ac.uk>, (2) in the Module Specification Handbook, 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.

| | | |
|----------|-------------------------------------|---|
| 1 | Awarding Institution / Body: | Birmingham City University |
| 2 | Teaching Institution: | Birmingham City University / TIC |
| 3 | Programme accredited by: | Institution of Engineering and Technology * see note below |
| 4 | Final Award: | BEng (Hons) |
| 5 | Programme Title: | Management of Manufacturing Systems |
| 6 | UCAS Code: | H7N2 |
| 7 | QAA Benchmarking Group: | Engineering |

*** Application to Institution of Engineering and Technology for re-accreditation pending (May 2008).**

8 Aims of the programme

The programme aims to provide learners with:

1. An understanding of the systems approach encompassing the themes of Industrial Systems, Manufacturing Systems, Manufacturing Processes and Engineering Design,
2. An integrated scheme of study from which the student can develop an overall perspective of manufacturing systems and acquire synthesis and analysis skills,
3. Training in engineering applications so that students will gain additional experience of the problems encountered by industrial engineers,
4. An understanding of new technologies and apply these to the solution of problems in manufacturing industry,
5. Experience of the techniques of management and business organisation,
6. Awareness of the economic, social and ecological implications of engineering decisions and to encourage a sense of responsibility to society,
7. Opportunity to develop personal investigative skills by means of a substantial individual project, and
8. The basis for professional development and further study.

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

| | |
|--|--|
| <p>Knowledge and understanding of:</p> <ol style="list-style-type: none"> 1. The principal features of the manufacturing enterprise including its major managerial, organisational, creative, technical, practical and operational functions, designs and processes. 2. Business management and organisational theories and techniques applied to successful manufacturing enterprise and the legal and regulatory systems within which they operate. 3. The principal management, design and manufacturing technologies and systems that underpin manufacturing practice, technology application, system design and design engineering. 4. The role, structure and organisation of the manufacturing industry within the European Community and the economic, social and ecological implications of engineering decisions encouraging a sense of responsibility to society. 5. The communication of ideas through graphical and written media and by presentation techniques. 6. An understanding of the systems approach encompassing the themes of Industrial Systems, Manufacturing Systems, Manufacturing Processes and Design Engineering. 7. An understanding of new technologies and their application to the solution of problems in manufacturing industry. 8. The organisational, teamwork and practical management approaches employed throughout a typical product life cycle. | <p>Teaching, learning and assessment methods used:</p> <p>Knowledge and understanding are acquired through formal lectures, practical work with manufacturing plant and equipment, laboratory experiments, the use and application of ICT, student-led seminars and other directed independent learning activities at all stages.</p> <p>A range of assessment methods are employed, the criteria for each module being published within each specified module guide.</p> <p>Knowledge is assessed, formatively and summatively, by a number of methods, including seminars, coursework, examinations (seen and unseen, open- and closed- book), presentations, and practical work.</p> |
|--|--|

Skills and other attributes

Intellectual / cognitive skills:

1. Analyse, critically evaluate and produce a synthesis of a variety of manufacturing principles and concepts.
2. Use proficiently information and materials from a variety of sources.
3. Transfer learning and study skills to new fields of the programme discipline.
4. Analyse ideas and suggest appropriate techniques in the realisation of manufactured goods.
5. Recognise and apply appropriate managerial, creative, technical and practical operational technique to support/suit a diverse range of practical issues and problems.
6. Make critical judgements about the merits of differing points of view / perspectives.
7. Evaluate manufacturing products, processes and designs; expose the strengths and weaknesses, and make reasoned choice between them and offer alternatives.
8. Demonstrate an understanding of the use of technical, business and creative operations applied to manufacturing systems, processes, technologies, practice and products.

Teaching, learning and assessment methods used:

Intellectual skills are developed through the 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- and task-based learning scenarios.

Assessment includes practical work, individual and group presentations, written coursework, laboratory experimentation, examinations (seen and unseen, open- and closed- book).

Skills and other attributes (cont.)

Practical, research and independent learning skills:

1. Apply practical and organisational skills to the fields of engineering design, operational systems and manufacturing practice, paying attention to the underpinning research and design methods employed in the management and synthesis of manufactured products.
2. Act independently to construct learning models, plan and undertake tasks, work to deadlines, and accept accountability for learning decisions.
3. Apply appropriate methodologies to the realisation of a major project, using primary and secondary, print and electronic sources.
4. Collect relevant information, assimilate knowledge, marshal a coherent and rational argument, and relate theory and practice.
5. Draw independent conclusions based on a rigorous, analytical and critical assessment of argument, opinion and data.
6. Use appropriate laboratory and workshop equipment to execute safely a series of applied experiments and to generate useable data and information.

Teaching, learning and assessment methods used:

The acquisition of appropriate and transferable practical skills is central to the learning strategy of the programme. Initiative and independence are fostered throughout, and develop incrementally as the course progresses. Emphasis is placed on guided, self-directed and student-centred learning, with increasing independence of approach, thought and process.

Learners are encouraged to plan their own work schedules and are required to meet strict deadlines. Diaries / logbooks are required to be kept in some modules. Learners undertake a major individual practical / research project and complete a related dissertation.

| | |
|---|--|
| <p>Transferable / key skills:</p> <ol style="list-style-type: none"> 1. Work with, and relate effectively to, others. 2. Manage time and prioritise workloads. 3. Make effective oral and written presentations which are coherent and comprehensible to others. 4. Access and make appropriate use of relevant numerical and statistical information. 5. Make effective use of information and communications technologies, including word and data processing packages, the Internet, email and electronic information retrieval systems. 6. Understand career opportunities and begin to plan a career path. 7. Show confidence and self-awareness, reflect on own learning, and be self-reliant and constructively self-critical. | <p>Teaching, learning and assessment methods used:</p> <p>Transferable/key skills are core to the learning strategy of the programme. They are pervasive, and are incorporated into modules and assessments as appropriate, e.g. team-working skills are fostered via group, task-based practical projects. Reflection and self awareness are fostered by keeping logbooks and submitting self assessment documentation in support of personal performance.</p> <p>The use of information and communications technology plays an active role throughout the course.</p> <p>Assessment methods include practical projects, presentations, coursework, peer- and self-assessment.</p> |
|---|--|

10 Programme structure and requirements, levels, modules, credits and awards

The BEng (Hons) programme is normally studied over three years full-time or five years part-time, and students may if they wish move between full and part-time modes of attendance. The academic year runs from September to June. The course is divided into study units called modules, each of 24 credits. Students complete 120 credits at levels 4, 5 and 6 (corresponding to years 1, 2 and 3 of the full-time programme). Each 24 credit module represents 240 hours of student learning and assessment.

The Faculty's BEng (Hons) degrees can be studied in sandwich mode. Students who, in addition to satisfying requirements for an honours degree, successfully complete an approved industrial placement between levels 5 and 6 (full time year 2 and 3) obtain the award of a sandwich honours degree.

The structure of the course, the modules, levels and credit ratings, and the awards which can be gained are shown below.

Level 4, Stage 1

| Module number | Module name | Credit |
|---------------|--|--------|
| | <p>Applied Mechanics D1 Study and experimental skills, data analysis, experimental applications. Dynamics: Newton's laws, circular motion, free, damped, and forced vibrations. Statics: Stresses in beams and shafts, principal stresses, experimental stress analysis techniques.</p> | 24 |
| | <p>Applied Thermofluids D1 Study and experimental skills, data analysis, experimental applications. Heat transfer, first law of thermodynamics, gas laws. Thermodynamic properties, gas laws, fluid flow.</p> | 24 |
| | <p>Engineering Design and Practice D1 Drawing skills and techniques in design, design process, assembly drawings, CAD. Engineering applications, basic analysis of ac and dc circuits, instrumentation, sensor types and their uses.</p> | 24 |
| | <p>Maths Analysis D1 Algebra, calculus, complex numbers, vectors, statistics, computer packages. Matrices, partial differentiation, differential equations, Laplace transforms, computer packages.</p> | 24 |
| | <p>Materials Science D1 Material testing, structure of metals, failure of materials, structure and properties of ceramics, structure and properties of polymers, structure and properties of composites, surface engineering, material selection, introduction to manufacturing technologies.</p> | 24 |

Award: Cert HE (120 credits)

Level 5, Stage 2

| Module number | Module name | Credit |
|----------------------|--|---------------|
| | <p>Design Elements and Methods D2 Mechanisms, design and redesign, concepts, materials and manufacturing processes, component selection, joining methods, ergonomics, presentation of design solutions. Design for manufacture, problem solving, economic decision making.</p> | 24 |
| | <p>Market-led Business for Engineers D2 Market-led business analysis and planning: Marketing; Finance; Strategy and Change; General Management Principles; Business Applications of ICT; Professional Development; Communications.</p> | 24 |
| | <p>Operations Systems D2 Capacity management and work analysis, activity scheduling, materials management, design of quality control systems. Operations planning, work measurement and work standards, operations scheduling and control.</p> | 24 |
| | <p>Environmental Performance D2 Environmental impacts & legislation. Sustainability. Waste management & minimisation. Environmental management systems. Health and safety. Pneumatic and hydraulic power distribution. Electrical power distribution. Energy efficiency & management.</p> | 24 |
| | <p>Computer Aided Manufacture D2 Failure of materials – ductile and brittle failure, fatigue, creep, corrosion, friction and wear, metal cutting, sheet and metal work. CNC machines and programs, CAD/CAM systems, flexible and dedicated automation, work holding systems, tooling systems and management, performance testing.</p> | 24 |

Award: Dip HE (240 credits)

Level 6, Stage 2

| Module number | Module name | Credit |
|---------------|---|--------|
| | <p>Operations and Supply Chain Management D3 Risk analysis and decision making processes, material flow analysis, maintenance and replacement, development of manufacturing strategy. Logistics, distribution and transport, simulation techniques.</p> | 24 |
| | <p>Business Process Improvement D3 Application of Total Quality Management techniques. Historical context of Q&R. Design and apply sampling plans; apply statistical techniques to perform process evaluation; calculate and predict the reliability of a system; improve system reliability; analyse failure data.</p> | 24 |
| | <p>Advanced Manufacturing D3 CAD/CAM, CNC data forms, simulation of machining operations, manufacturing cells, calibration, measurement and testing, 3-D System simulation; assembly systems; post processor configuration and application; advanced process simulation and product development and advanced product quality planning.</p> | 24 |
| | <p>Design in Practice D3 Tools of design quality, FMEA/FTA, DFx, risk and hazard analysis, reliability. management of design, design reviews, design planning, design information systems, design optimisation.</p> | 24 |
| | <p>Individual Project D3 To provide opportunity to develop in-depth knowledge and skills in an area relevant to the course and ability to manage activities and resources, and to generate, implement and report on solutions to meet project objectives.</p> | 24 |

Award: BEng (Hons) (360 credits)

Course Structure – BEng (Hons) Management of Manufacturing Systems (FC0159)

Level 6

| | | | | |
|-------------------------------------|---|---|---|-------------------------------------|
| Individual Project D3 FM6019 | Operations and Supply Chain Management D3 FM6055 | Business Process Improvement D3 FM6054 | Advanced Manufacturing D3 FM6007 | Design In Practice D3 FM6012 |
|-------------------------------------|---|---|---|-------------------------------------|

Level 5

| | | | | |
|--|-------------------------------------|--|---|--|
| Market-led Business for Engineers D2 FM5056 | Operations Systems D2 FM5064 | Environmental Performance D2 FM5076 | Computer Aided Manufacture D2 FM5038 | Design Elements and Methods D2 FM5045 |
|--|-------------------------------------|--|---|--|

Level 4

| | | | | |
|--|--|------------------------------------|------------------------------------|---------------------------------------|
| Mathematical Analysis D1 FM4037 | Engineering Design and Practice D1 FM4027 | Materials Science D1 FM4036 | Applied Mechanics D1 FM4011 | Applied Thermofluids D1 FM4012 |
|--|--|------------------------------------|------------------------------------|---------------------------------------|

Project Theme

Operations Management Theme

World Class Manufacturing Theme

Manufacturing Technology Theme

Design Management Theme

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:

An induction programme dealing with orientation and the dissemination of essential information.

A dedicated Learning Centre with open access learning materials, resources and full-time staff specialising in a variety of support areas.

Access to the services of the Learning Centre and IT support staff.

A Student Handbook, containing information relating to the University, Faculty, course and modules.

Access to administrative staff and to academic staff, including the Tutors, Course Director and Head of Division, at reasonable times.

Support staff to advise on pastoral and academic issues, and to offer support and assistance with the keeping of Students' Progress Files.

Access to Faculty resources, including the Faculty Resource Centre, and a range of supported IT equipment.

Access to the University's Student Services, including those offered by the careers service, financial advisers, medical centre, disability service, crèche, counselling service and chaplaincy.

12 Criteria for admission (BEng)

Entry requirements are in accordance with section D of the University's Academic Regulations and Policies.

All applicants must have GCSE (grade C or above) in Physics (or Science which includes a study of physics) and English Language or equivalent. In addition, applicants should have one of the following, for which the typical tariff offer is 220 points for Curriculum 2000, or equivalent for other qualifications. Actual tariff offers may vary from 220 points.

| Qualification | Requirements |
|---|--|
| Curriculum 2000, A Levels | Five GCSEs/GCEs including at least two subjects at A2 level. Points tariff can include AS level. A minimum of AS level grade C in Mathematics must be offered. |
| Curriculum 2000, AVC. | Two 6-unit or one 12-unit AVCE. |
| Irish Leaving Certificate | Passes in six subjects at the higher grade including Mathematics. |
| Scottish Certificate of Education | Passes in five subjects at the higher grade including Mathematics. |
| International Baccalaureate or European Baccalaureate | Including higher level Mathematics. |
| BTEC/Edexcel National Certificate/National Diploma | In an appropriate subject. |
| A pass in a recognised Access or Foundation Year for BEng course | |
| An appropriate Advanced General National Vocational Qualification | |
| A professional qualification of an appropriate standard | |
| A qualification deemed equivalent to one of the above | |

Other learning and experience may be considered for entry to the programme. A student may be allowed entry to a course if he or she does not have the standard entry qualifications but can provide evidence of necessary knowledge and skills to successfully enter and complete the course.

Applicants with a Higher National Certificate or Higher National Diploma, including Merits, in an appropriate subject, or an equivalent qualification, may be offered entry with advanced standing.

UCAS applicants are invited to visit the **tic** during open days held through the academic year. Open day programmes include a tour of facilities and an introduction to the **tic**'s courses and activities. Meetings are arranged between course tutors and prospective students to ensure opportunity is provided for individual questions and clarification of the course content.

13 Evaluation and improvement of quality and standards

| Committees: | Mechanisms for review and evaluation: |
|---|--|
| Course Committee Board of Studies Examination Board Learning Management Committee Faculty Board Learning Quality Committee | Review and validation events Accreditation by professional bodies Annual Monitoring Report Student feedback questionnaires Annual staff appraisal External Examiners' Reports Course team meetings |

14 Regulation of assessment

Details of the mechanisms and criteria for assessment in individual modules, and the means of determining final degree classifications, are published widely. Students are able to access the University's Standard Undergraduate Assessment Regulations on the Intranet and individual and collective guidance is given by academic staff on their operation at appropriate times throughout the course.

To qualify for an Honours degree a student must successfully complete all required modules and obtain 360 credits (each module has a 24 credit value). Only assessments at levels 5 and 6 (that is second and third year modules on the 3-year full-time programme) are used to calculate the degree classification. The pass-mark in all modules is 40%.

Degree classifications are determined, after successful completion of all the course modules from whichever is the best of:

1. The average of the marks for the level 5 and level 6 modules, or
2. The average of the marks for the five level 6 modules, or
3. The average of the final year Individual Project module mark plus the best three from the remaining four level 6 modules.

The highest average is used to obtain the degree classification according to the following bands:

| | |
|----------------------------|--------------------------------|
| First class honours | aggregate mark of 70% or above |
| Upper second class honours | aggregate mark of 60%-69% |
| Lower second class honours | aggregate mark of 50%-59% |
| Third class honours | aggregate mark of 40%-49% |

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 review processes.

BEng (Hons) Management of Manufacturing Systems

Student Guide

Background

The Course has been developed to provide future graduates with a good knowledge of a range of manufacturing principles. The programme offers an exciting course of study that prepares graduate engineers for the rapidly developing field of manufacturing and its systems. The successful graduate will have the intellectual, creative and personal qualities necessary for undertaking a leadership role and a depth of knowledge that will enable the application of new and emerging technologies to the solution of manufacturing problems.

Why the focus upon Systems?

The Course aims to develop engineers who can apply the principles of systems management, engineering and information technology to the solution of operational problems in industry and commerce. Manufacturing systems engineers are employed in a wide range of engineering, educational and commercial organisations. Graduates from the course are equipped to progress to positions of responsibility in senior management or further programmes of specialised study or research.

What does the industry want?

The management of manufacturing systems is an essential feature in the vast arena that is manufacturing – an area that makes large contributions to the wealth of many countries throughout Europe and the rest of the world. It is a fast-changing scene where the competition between industrial organisations is keen and lean: only those companies prepared to apply modern philosophies and technologies will survive.

There are many challenges facing manufacturing industry. Companies now strive for competitive advantage and have to evaluate their performance more effectively in order to make best possible use of all resources: Talented, innovative, ambitious engineers are required to introduce essential systems such as Just-In-Time, Total Quality Management and Computer-Aided Engineering to ensure success in a global manufacturing environment.

Who will teach me?

The Course Team at the Technology Innovation Centre of Birmingham City University has a great deal of Business and Technical expertise.

External industrialists complement existing academics, providing guest lectures or offering more substantial contributions across entire modules.

What does the Course consist of?

The course is based on the synthesis and application of practical knowledge. Through the study of the essential themes of *Industrial Systems* such as Total Quality Management, quality engineering and manufacturing services, *Manufacturing Systems* including decision making in operations management, *Manufacturing Processes* encompassing integrated manufacturing strategies and technologies, and *Design Engineering* methodologies and management, along with *Professional Skills* such as project planning and the role of the engineer in industry and the economy, the course aims to produce professional engineers with:

- An integrated mix of manufacturing systems theory, application and experience,
- An appreciation of modern manufacturing, management and systems practice, together with the confidence and ability to contribute effectively to their profession,
- A commitment to keep abreast of current developments in technology and human resources management,
- The initiative to apply new technologies and techniques from other disciplines to the solution of problems, and
- The intellectual, creative and personal qualities necessary for leadership.

Course Aims and Objectives

The aims of the Faculty's modular degree programme are set out in the Modular Degree Programme Scheme Book. The following aims and objectives are specific to the course and supplement the Programme aims.

The specific aims of the course are:

- to develop an understanding of the manufacturing systems approach encompassing the themes of Industrial Systems, Manufacturing Systems, Manufacturing Processes and Design Engineering,
- to provide an integrated scheme of study from which the student can develop an overall perspective of manufacturing systems and acquire synthesis and analysis skills,
- to provide training in engineering applications so that students will gain additional experience of the problems encountered by industrial engineers,

- to develop an understanding of new technologies and apply these to the solution of problems in manufacturing industry,
- to educate the student in the techniques of management and business organisation,
- to make the student aware of the economic, social and ecological implications of engineering decisions and to encourage a sense of responsibility to society,
- to provide an opportunity to develop personal investigative skills by means of a substantial individual project, and
- to provide the basis for professional development and further study.

Work experience

The Technology Innovation Centre has a placements officer who manages a scheme designed to give students an opportunity to work in industry as a part of their studies. Industry placements offer students stimulating challenges and the chance to further develop practical expertise, to take on real responsibility and gain valuable experience of commercial life in a variety of organisations.

Employment prospects

The philosophy of the programme is upon creating multi-skilled and versatile graduates. That is not to say that you cannot concentrate your interests within a particular field.

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

- Project Engineer, whether in a Design scenario, a Production environment, Manufacturing Engineering, Commissioning or Operations Management;
- Technical appointments in Information Technology, Manufacturing, Research and Development and with New Technologies;
- Managerial posts such as Marketing, Sales and Advertising.

Accreditation

The BEng (Hons) Management of Manufacturing Systems is accredited by the Institution of Engineering and Technology as satisfying partial academic requirements towards CEng. Holders of BEng (Hons) awards are required to complete Further Learning in order to meet the full requirements for CEng. (Subject to confirmation of re-accreditation)

How do I apply?

University: Birmingham City University
Faculty: [Technology Innovation Centre](#)
Millennium Point, Curzon Street, Digbeth
Birmingham B4 7XG
Telephone: (+44) (0)121 331 5400
<http://www.tic.ac.uk>

Applications: UCAS
Rosehill
New Barn Lane
Cheltenham
Gloucestershire GL52 3LZ
Telephone (+44) (0)1242 223707
<http://www.ucas.ac.uk/>

UCAS code: H7N2

Course Length: 3 years full-time
4 years sandwich
3 years part-time for stage 2 entry with appropriate
HNC or equivalent, 5 years if no exemptions apply

Location: Millennium Point, Birmingham

Enquiries: Information Officer (at the above address)
Telephone: (+44) (0)121 331 5400
Email: enquiries@tic.ac.uk

BEng (Hons) Management of Manufacturing Systems

Employers' Guide

Introduction

The degree of Bachelor of Engineering in the Management of Manufacturing Systems has been developed to provide future graduates with a good knowledge of a range of manufacturing principles. The programme offers an exciting course of study that prepares graduate engineers for the rapidly developing field of manufacturing and its systems. The successful graduate will have the intellectual, creative and personal qualities necessary for undertaking a leadership role and a depth of knowledge that will enable the application of new and emerging technologies to the solution of manufacturing problems.

Industrial/Commercial Context

The management of manufacturing systems is an essential feature in the vast arena that is manufacturing – an area that makes large contributions to the wealth of many countries throughout Europe and the rest of the world. It is a fast changing scene where the competition between industrial organisations is keen and lean: only those companies prepared to apply modern philosophies and technologies will survive.

There are many challenges facing manufacturing industry. Companies now strive for competitive advantage and have to evaluate their performance more effectively in order to make best possible use of all resources: Talented, innovative, ambitious engineers are required to introduce essential systems such as JIT, kanban, TQM and CAE to ensure success in a global manufacturing environment.

Facilities / Partnerships

Students following the programme have access to state-of-the-art facilities within the Technology Innovation Centre (Birmingham City University).

The Curriculum

The content and structure of the course is designed to produce professional engineers who have been exposed to a broad mix of engineering theory, application and practice.

There are five themes on the course:

- Design Management
- Manufacturing Technology
- World Class Manufacturing
- Operations Management
- Project

The major themes of Design, Manufacturing Processes and Manufacturing Systems are present at all levels within the course though are principally developed within Levels 2 and 3. The Manufacturing Systems theme includes decision making in operations management, Manufacturing Processes encompassing CIM strategies and technologies, and Design Engineering includes methodologies and management.

The minor themes of Industrial Systems and Professional Skills Development with Experimental Methods provide an underpinning knowledge base for the above major themes and the Individual Project.

Industrial Systems will provide an understanding of key areas such as TQM, reliability engineering and manufacturing services. The Professional Skills theme will provide an essential range of core skills to enable the undergraduate to become effective communicators and have a good understanding of business practice and organisation.

Programme Aims

The course aims to develop engineers who can apply the principles of systems management, engineering and information technology to the solution of operational problems in industry and commerce. The specific aims of the course are:

- to develop an understanding of the manufacturing systems approach encompassing the themes of Industrial Systems, Manufacturing Systems, Manufacturing Processes and Design Engineering,
- to provide an integrated scheme of study from which the student can develop an overall perspective of manufacturing systems and acquire synthesis and analysis skills,
- to provide training in engineering applications so that students will gain additional experience of the problems encountered by industrial engineers,
- to develop an understanding of new technologies and apply these to the solution of problems in manufacturing industry,
- to educate the student in the techniques of management and business organisation,

- to make the student aware of the economic, social and ecological implications of engineering decisions and to encourage a sense of responsibility to society,
- to provide an opportunity to develop personal investigative skills by means of a substantial individual project, and
- to provide the basis for professional development and further study.

Expected Outcomes

Manufacturing systems engineers are employed in a wide range of engineering and commercial companies, educational and commercial organisations. Graduates from the course are equipped to progress to positions of responsibility in senior management or further programmes of specialised study or research. The course aims to produce professional engineers with:

- an integrated mix of manufacturing systems theory, application and experience,
- an appreciation of modern manufacturing, management and systems practice, together with the confidence and ability to contribute effectively to their profession,
- A commitment to keep abreast of current developments in technology and human resources management,
- The initiative to apply new technologies and techniques from other disciplines to the solution of problems, and
- The intellectual, creative and personal qualities necessary for leadership.

Statistical data

- There are currently around 80 students on the course, spread through all stages.
- The course recruits approximately 15 Part-Time and 5 Full-Time students each year. Many students are from large automotive OEMs and their supply chain, with others from areas such as aerospace, education and local government.
- A good proportion of students attain an Honours Degree at 2i level, and a significant number attain 1st Class Honours.
- The vast majority of Part-Time students are sponsored by their companies. Others have gained employment in a number of areas, including manufacturing engineering and management, business and finance, local government and education.
- It is not uncommon for Graduates from this course to be awarded prizes from professional bodies. Recent graduates have won the IEE Award for Valor, The Ford Women Into Science and Engineering

(WISE) Prize, the Professor James Cherry Award, and a number have been nominated for other prizes.

Accreditation

The BEng (Hons) Management of Manufacturing Systems is accredited by the Institution of Engineering and Technology as satisfying partial academic requirements towards CEng. Holders of BEng (Hons) awards are required to complete Further Learning in order to meet the full requirements for CEng. (Subject to confirmation of re-accreditation)