MSc Process Automation, Instrumentation and Control
Diploma, Certificate and CPD modules
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Introduction from the PROGRAMME CO-DIRECTORS

The type of plant used in the chemical and process industries is specialised, extensive and invariably automated. Over the years the dependence upon automation has grown and continues to grow inexorably. Today, it is inconceivable that anybody would contemplate building a new plant or carrying out a major refurbishment without putting in comprehensive instrumentation, control and related systems.

That growth has been driven in part by developments in control technology because the systems themselves have evolved in both capacity and functionality. But the primary driver has been economic, recognising that the technology can deliver substantive benefits. Process automation has become the primary means of realising many, if not most, aspects of operability, productivity, quality, reliability, safety, security, sustainability and viability.

Control systems, with their real-time and historic data, are increasingly seen as a platform for realising further higher level benefits. For example, advanced control techniques such as predictive control and optimization are becoming the norm. Systems also now support a variety of powerful tools and techniques for analysing process data, abstracting statistical information and manipulating it for management purposes.

Process automation therefore includes the immediate objectives of process control but also addresses the wider issues of enterprise management. It is an interdisciplinary subject, lying at the interfaces between chemical and electrical engineering, instrumentation and control, maths and computing, software and IT, business and management.

In many respects, the development of automation systems can be more complex than the design of the plant being controlled itself. Unfortunately there is a chronic shortage of personnel with the depth of understanding and breadth of knowledge necessary to apply the techniques and technology involved.

The Process Automation, Instrumentation and Control (PAIC) programme has been established to meet that need. It is endorsed and supported by the Partnership in Automation and Control Training (PACT) which involves a consortium of major companies in the chemicals and process industry.

The PAIC programme consists of a suite of modules within the framework of an accredited MSc degree and is organised on a Continuing Professional Development (CPD) basis. It is aimed at and designed around the needs of personnel working in the industry in some control and automation capacity. The purpose of this brochure is to provide information about and hopefully stimulate interest in the Programme.

Professor Nina Thornhill and Dr Daryl Williams
Programme Co-directors.
The aim of the programme is to broaden and deepen the expertise and experience of personnel concerned with process automation, either in the design and development of control and related systems, in their application, or in their operation and management.

It comprises a suite of 16 modules offered within the framework of an accredited MSc degree and delivered on a Continuing Professional Development (CPD) basis. Students may take individual modules for CPD purposes. Alternatively, by means of assessment, the MSc in Process Automation, Instrumentation and Control is a part-time programme which, by design, is equivalent to a one-year full-time MSc degree of 90 European Credits Transfer System (ECTS) credits.

The MSc degree requires completion of eight modules (7.5 ECTS credits each) and an industrial project (30 ECTS credits). The expectation is that students will typically take 2-3 modules per year completing the module requirements in 3-4 years. Allowing an extra 1-2 years (elapsed time) for the industrial project, it follows that the MSc degree takes some 4-5 years to complete. There is a hard 5-year constraint on completion of the MSc degree.

A postgraduate Certificate and a postgraduate Diploma in Process Automation, Instrumentation and Control are also offered. These are subsets of the MSc degree requiring completion of 4 and 8 modules respectively.

The ethos of PAIC is inherently different to that of a conventional one-year full-time MSc course. Some of the essential characteristics are as follows:

- Organised in one-week blocks of intensive tuition which enables students to sensibly handle both work and family commitments alongside their studies.
- Typically aged 25 to 40, students have often made a career move into process automation after gaining experience in other fields, and are mostly sponsored by their companies.
- A variety of optional modules which cater for students’ different backgrounds (chemical, electrical, instrumentation, etc) and enable them to steer a route through the programme according to their interests, needs and career direction.
- Scope for students without first degrees (HND, HNC, etc), but with significant relevant industrial experience, to be registered and progress to MSc.
- Strong applications emphasis throughout, with approximately one quarter of tuition being given by speakers from industry.
- Healthy balance between breadth and depth, theory and practice, classical and modern, conventional and advanced, technology and technique, information and understanding.
- Intensive tuition in small groups of students with similar interests (process automation) but different backgrounds (suppliers, contractors, end-users) which makes for good quality interaction.
- A typical module includes presentations, demonstrations, discussion (and argument), problem solving, case studies, practical work and simulation exercises.

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**The Structure of THE PROGRAMME**

**Section 1: Introduction**

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSc Degree</td>
<td>8 modules + industrial project</td>
</tr>
<tr>
<td>Postgraduate Diploma</td>
<td>8 modules</td>
</tr>
<tr>
<td>Postgraduate Certificate</td>
<td>4 modules</td>
</tr>
</tbody>
</table>

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**IMPERIAL COLLEGE LONDON – DEPARTMENT OF CHEMICAL ENGINEERING**
Positioned within London’s main cultural area, between the Royal Albert Hall and the Science Museum at the top of Exhibition Road, is the South Kensington campus of Imperial College London. Our university, founded in 1907, is unique in the UK for being a purely science and engineering-based institution with a globally respected reputation in teaching and research.

Chemical Engineering was established in 1912, and is one of the largest Departments within the UK with over 1000 students and staff. The aim of the Department is to be one of the world’s leading institutions in both the teaching and research of chemical engineering and technology and we continually succeed in this ambition.

In 2012 the Department opened its new state-of-the-art teaching and research facilities, including the world’s most advanced Carbon Capture Pilot Plant in an educational facility.

This £9 million investment means the Department is offering the very best in chemical engineering, continuing to offer excellence in teaching and research opportunities.

There are three undergraduate programmes:

- MEng Chemical Engineering (including a specialization in fine chemicals)
- MEng Chemical Engineering with a year abroad
- MEng Chemical with Nuclear Engineering

The four-year, full time MEng programmes have a firm foundation in science and mathematics, which is integrated from the first term onwards with practical applications in engineering subjects. Engineers from industry participate in some of the teaching, and studies in business management, economics and accounting are integrated across all four years. Students travel from all over the world to join these flagship undergraduate chemical engineering programmes.

We also offer a range of one-year postgraduate programmes where students are given the opportunity to explore advanced topics in chemical engineering and to develop their research and professional skills:

- MSc in Advanced Chemical Engineering
- MSc in Advanced Chemical Engineering with Biotechnology
- MSc in Advanced Chemical Engineering with Process Systems Engineering
- MSc in Advanced Chemical Engineering with Structured Product Engineering

and these, the newest part-time programmes taking up to five years:

- MSc in Process Automation, Instrumentation and Control, (part-time);
- Postgraduate Diploma in Process Automation, Instrumentation and Control, (part-time); and,

It follows from the demanding nature of the programmes that the students are highly qualified and motivated at entry, and that each year the graduating students will enter well-rewarded jobs or will see their promotional prospects considerably enhanced and can be of great asset to their sponsoring companies.

Industry sectors employing and sponsoring graduates

The main categories of employers for Imperial Chemical Engineering graduates are companies in the oil energy, petrochemical and other chemical and process industries, including manufacturers of pharmaceuticals, fine chemicals and speciality chemicals. Also, substantial numbers enter the engineering industry as employees of technology supply and contracting companies, and through consultancy, in both engineering and management professions.

In all these areas chemical engineers undertake a diversity of jobs: plant operation, plant and process design and development and also computing and technical services, sales and marketing, safety, supply and planning.
Get the IMPERIAL ADVANTAGE...

...Imperial College London is one of the world’s top universities, with a reputation built on solid principles and hands-on practical expertise.

Studying at Imperial will open doors across the world and give access to the very latest research in science and technology. Successful graduates will become members of our extensive alumni network and be a part of a diverse cultural environment.

Imperial’s Department of Chemical Engineering offers:

A world class education
Imperial College London is ranked among the top 10 universities in the world.* The Department of Chemical Engineering features a world-renowned high standard of teaching and research as evidenced by it being ranked 3rd place globally.**

A faculty of leading industry experts
The Process Automation, Instrumentation and Control teaching staff all have an in-depth understanding of their fields and are actively collaborating with companies within the industry in a variety of research and development projects. They will inspire learning and development with hands-on experiments and practical case-studies so that you may graduate with the very latest knowledge and methodologies.

A supportive learning environment
The learning environment encourages collaborative skills, develops confidence, provokes good-quality interaction, generates outstanding results and helps in the building of personal and professional networks. Most of the programme is taught intensively in small groups of students with similar interests but different backgrounds (suppliers, contractors, end-users), providing the skills, theories, knowledge and management expertise essential to students and their current and future employers.

A stimulating and exciting location
Imperial is sited in South Kensington, central London, with access to some of the world’s most famous museums, art galleries, parks and restaurants which are right on our doorstep.

* 8th THE World University Rankings 2015-16  ** 2015 QS rankings
The programme consists of a suite of 16 modules. Their structure is illustrated in the above diagram.

The modules on the left hand side of the diagram are of a foundation nature, their emphasis being on breadth rather than depth. The purpose of these modules is to fill in gaps in students’ background knowledge. They have no pre-requisites other than the expectation of an appropriate first degree or equivalent.

The green modules on the top of the diagram are more theoretical with an emphasis on techniques. It is important that these are taken in the correct order unless students happen to be familiar with the content of prior modules.

The yellow modules on the bottom of the diagram are technology orientated with an emphasis on applications, knowhow, practice and standards. The order indicated is desirable but by no means essential.
Choice of MODULES

All modules are optional – none are core or compulsory – except the Industrial Project at the end of the MSc degree programme.

With 16 modules in the programme of which 8 have to be successfully completed for the MSc degree, there is a good deal of choice. Students may take different combinations of modules according to their backgrounds and interests, the nature and needs of their work, the availability of funding, the schedule of modules and to any prerequisites, etc.

Two modules in particular have been designed to fill any gaps in students’ backgrounds:

<table>
<thead>
<tr>
<th>Mathematics and MATLAB</th>
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<tbody>
<tr>
<td>Chemical Engineering Principles</td>
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</table>

Students with a non-chemical engineering background are encouraged to take the Chemical Engineering Principles module. Students with a chemical engineering background are not permitted to count that module towards the MSc degree.

Students whose first degree was studied a number of years ago are encouraged to take the Maths and Matlab module. If students do not wish to take this module they are advised to purchase the student version of Matlab (Simulink is bundled in with it) and study these packages in their own time.

The more popular modules, most of which are taken by most students, are as follows:

<table>
<thead>
<tr>
<th>Instrumentation and Measurement</th>
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<tbody>
<tr>
<td>Control Schemes and Strategies</td>
</tr>
<tr>
<td>Control Systems Technology</td>
</tr>
<tr>
<td>Modelling and Simulation</td>
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<tr>
<td>Management of Automation Projects</td>
</tr>
</tbody>
</table>

The modules on the top of the diagram opposite build upon each other and need to be taken in the correct order.

<table>
<thead>
<tr>
<th>Classical Control Systems Design</th>
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</thead>
<tbody>
<tr>
<td>Modern Control Systems Design</td>
</tr>
<tr>
<td>Advanced Process Control</td>
</tr>
<tr>
<td>Optimization and Scheduling</td>
</tr>
</tbody>
</table>

We do not recommend that Advanced Process Control (APC) is taken without first being familiar with the content of Modern Control Systems Design (MCSD). However, the prerequisite can be assessed case by case, for example the prerequisite could be waived for a student who is sufficiently familiar with the basics of MCSD from their first degree. The criterion would be the prospect of successfully completing APC without taking MCSD first.

For students working in the fine and speciality chemicals, pharmaceuticals, food and drinks sectors of the industry, the following modules are particularly appropriate:

<table>
<thead>
<tr>
<th>Control Systems Technology</th>
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</thead>
<tbody>
<tr>
<td>Batch Processing and Automation</td>
</tr>
<tr>
<td>Management of Automation Projects</td>
</tr>
<tr>
<td>Process Analytical Technology</td>
</tr>
<tr>
<td>Advanced Process Automation</td>
</tr>
</tbody>
</table>

For students working in petrochemicals, refining, oil and gas sectors:

<table>
<thead>
<tr>
<th>Dynamics &amp; Control of Distillation Columns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Process Control</td>
</tr>
<tr>
<td>Optimization and Scheduling</td>
</tr>
</tbody>
</table>

For students working in the power, utilities, steel, minerals processing and pulp and paper sectors:

<table>
<thead>
<tr>
<th>Modern Control Systems Design</th>
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</thead>
<tbody>
<tr>
<td>Advanced Process Automation</td>
</tr>
<tr>
<td>Advanced Process Control</td>
</tr>
</tbody>
</table>

All modules are optional – none are core or compulsory – except the Industrial Project at the end of the MSc degree programme.
The MODUL ES and INDUSTRIAL PROJECT

The 16 modules are listed here together with major topics covered in each.

There are detailed descriptions of all the modules in terms of objectives and syllabus content on the Imperial website*. Coherent subsets of modules may be offered to companies as one-day and two-day short courses, again please refer to our website for more details.

* www.imperial.ac.uk/engineering/departments/chemical-engineering/courses/postgraduate/process-automation/
Fuzzy, neural and expert systems
• Membership functions
• Production rules
• Multi-layer perceptrons
• Radial basis function networks
• Training
• Knowledge – based systems
• Inheritance
• Inferencing
• Functionality, benefits and applications

Instrumentation and measurement
• Use of differential pressure cells
• Measurement of flow, level, weight, pressure and temperature
• Valve characteristics and sizing
• Fieldbus
• Intrinsic safety
• System layout

Mathematics and MATLAB
• Use of Laplace transforms
• Numerical methods
• Statistics
• Vectors, matrices and matrix algebra
• Eigenvalues and eigenvectors
• Introduction to MATLAB and Simulink

Modelling and simulation
• First principles model development
• Linearisation and deviation variables
• Assumptions and approximations
• Process and plant models
• Transfer function and state-space models
• Input-output relationships
• Dynamic simulation

Modern control systems design
• Sampled data systems
• Pulse transfer functions
• Impulse compensator design
• Pole cancellation
• State space models
• State feedback and observers
• Multivariable controllers
• Introduction to model reference control and adaptive control

Optimization and scheduling
• Linear programming
• Simplex method
• Steepest descent
• Lagrangian functions
• Constraint handling
• Quadratic programming
• Real time optimisers
• Integration with predictive controllers
• Branch and bound
• Genetic algorithms

Process analytical technology
• Chromatography
• Infrared spectroscopy
• Online analysers
• Manual and automated sampling
• Calibration, validation and operation
• Analyser technology
• Electrochemical measurements
• Sensors for gas species
• Emissions monitoring
• Pharma applications
• Oil and gas applications
• Introduction to chemometrics

Industrial Project

The Industrial Project is the culmination of the MSc programme. It represents a major piece of design, development or research work done on an in-company basis for which a dissertation is submitted. The project must satisfy the academic criteria of relevance and difficulty to justify the award of an MSc degree. It must also be of sufficient importance to the student’s sponsoring company to justify the time and cost involved. Supervision is carried out on a joint academic/industrial basis.

The expectation is that the project will take the equivalent of four months full-time work to complete, including the writing of the dissertation. Officially, students have up to one year to complete the project, so that four months full-time work may be done over an elapsed time of up to one year.

In practice, students often spend a couple of months agreeing upon the scope of work in the form of a written specification and getting the project organised before formally ‘starting the clock’ on the one year’s elapsed time. Completion of the Industrial Project has to be within the 5-year constraint for the MSc degree itself.

Notice that it is an Industrial Project. That is one reason why admission to the programme is restricted to students working in the industry. The project has to come from within the student’s sponsoring company: the College provides academic supervision but does not specify the projects.

It is therefore important that the sponsoring company understands, at the stage when the student is registering for the MSc degree, that there is a requirement for an industrial project some 3-4 years in the future.
Students taking the MSc degree in Process Automation, Instrumentation and Control have to be assessed for each module taken.

Each module has two stages of formal assessment, an assignment and an examination, as follows:

- An assignment, equivalent to one week’s full-time effort, for which a report is submitted within two months of the start of the module. Late submission of assignments is permissible but only with prior approval.
- A formal written examination which is normally held about two and a half months after the start of the module.

The overall result for any module is the average of the marks of both stages, the assignment and examination being weighted equally. The pass mark for the module as a whole is 50% but there is also a constraint of a minimum of 40% for each stage.

Examinations are held at Imperial College. To reduce the time and cost of travelling, arrangements can be made to enable students to take their exams on a remote basis, typically at one location in the north of England and another in Scotland. For overseas students, arrangements can be made for them to take their exams at a suitable office of the British Council.

For those students registered for the MSc degree, a dissertation is submitted on the basis of the work done for the Industrial Project.

For award of the MSc degree (90 ECTS credits), students are required to take and pass eight taught modules (7.5 credits each) and the Industrial Project (30 credits).

For award of the Diploma (60 ECTS credits), students are required to take and pass eight taught modules (7.5 credits each).

The MSc degree may be awarded as a Pass or as a Pass with either Merit or Distinction. The Certificate and Diploma may only be awarded as a Pass.

There is a time limit of five years for completion of the part-time MSc degree, and four years for the Diploma, starting from when a student’s first module is taken. However, students’ registrations may be suspended if, for good cause, they are unable to progress their studies for significant periods of time, in which case the time limit will be extended.

Note that all MSc students will initially be registered for the Postgraduate Certificate. Once they have successfully completed four modules (30 ECTS credits) their registrations will be upgraded to the Postgraduate Diploma. Once they have successfully completed a further four modules (60 ECTS credits in total) their registrations will be upgraded to the MSc degree.

If, for some reason, a student is unable to complete the MSc degree, he or she may be awarded the Certificate or Diploma depending upon number of modules successfully completed.
Accreditation is governed by the Engineering Council of the UK of which all of the major UK professional engineering institutions are members. The ECUK policy on accreditation is defined in Specification for Professional Engineering Competencies (UK-SPEC) which originally came into effect in March 2004.

The current position is that, for students with an accredited BEng degree at 2.2 Honours standard, the MSc degree in Process Automation, Instrumentation and Control is accredited for ‘further learning to Master’s level’ under the UK-SPEC guidelines.

Thus, broadly speaking, for students with an accredited BEng degree, together with the non-academic requirements of relevant industrial experience and responsibility necessary to demonstrate the required competencies for corporate membership:

BEng + MSc (PAIC) ➞ CEng

**Individual Route**

For students who do not satisfy the academic criteria for CEng status there is the individual route. This involves a case-by-case assessment of an individual’s non-accredited qualifications together with any accredited further learning.

A likely requirement is that a student will have to demonstrate further learning: this may be achieved as a result of work based learning programmes or other academic courses. Another means of achieving this, at the discretion of the professional body, is the submission of a technical report derived from the student’s experience and responsibility.
**Imperial offers this programme IN PARTNERSHIP WITH PACT**

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**Endorsement by PACT**

The Partnership in Automation and Control Training (PACT) was established in 1992 and consists of Partners (end-users, contractors, suppliers and trade associations), Hosts (Imperial College is currently the only Host) and Members (representatives of the Partners and Hosts).

The broad aim of the PACT is to enable companies in the chemicals and process sectors of industry to maintain and improve their competitive edge by creating a supply of personnel who understand and are able to effectively apply modern automation techniques. The PACT endorses and supports the Process Automation, Instrumentation and Control (PAIC) programme at Imperial College.

There is a Local Management Committee (LMC) comprised of Members of the PACT and representatives of Imperial College. The LMC acts in an advisory capacity to the College, providing an industrial perspective to most aspects of operation of the programme including its structure, module specification, curriculum content, academic standards, quality auditing, management, marketing, etc. The LMC underpins the relevance and usefulness of the PAIC programme to the industry.

Involvement of the Members is fundamental to the ethos of the programme. Quite apart from their involvement in the LMC, they are all involved, to varying extents, in the operation of the programme, contributing to its delivery in terms of teaching and access to supporting materials, enabling Industrial Projects and encouraging personnel within their own companies to register for the MSc or modules for CPD purposes.

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**The current Partners are**

- bp
- GAMBICA
- Honeywell
- Sanofi
- Schneider Electric
- Jacobs
- Emerson
- EEMUA
- ABB
- Sellafield Ltd
- سابك
Our world class faculty contains experts and academics who are leaders in the field of process automation, actively engaged in cutting-edge research, development and design. Many also work as consultants for leading international organisations, which brings highly practical and relevant experience to their teaching. They include:

**Professor Nina Thornhill**
Nina is the MSc Process Automation, Instrumentation and Control Programme Co-director as well as our Director of Undergraduate Studies. She is also the ABB/Royal Academy of Engineering Chair of Process Automation within the Department.

The research interests of Professor Thornhill’s Process Automation research group include dynamic signal analysis of industrial process measurements for detection and diagnosis of plant-wide disturbances, together with optimization taking account of process units, utilities, rotating equipment and electrical systems. They apply the methods in oil and gas, chemicals, bioprocesses, and electricity supply.

**Dr Daryl R Williams**
Daryl is Programme Co-director with Professor Thornhill. He is also our Director of Discovery Space – facilities for chemical engineering students and researchers, Director of our stunning carbon capture pilot plant – the largest educational facility of this type in the world, and Director of Studies of our summer school programme for visiting institutions.

As Reader in Particle Science, Dr Williams heads a research group currently focusing on particulate materials and material surfaces and has significant interests in industrial and scientific instrumentation.

**Jonathan Love**
Jonathan Love was formerly Director of the IGDS at Sheffield and Newcastle universities and it was largely through his efforts that the IGDS established its reputation within the industry.

Jonathan is a founder member and former chair of the IChemE Process Control Subject Group. He is the author of the industry standard text: “Process Engineering Handbook” [Springer-Verlag 2007]

He is currently a Principal Automation Consultant at BP.
Benefits of the PAIC PROGRAMME

Benefits to Students
The following benefits of participating in the PAIC programme can all be claimed to a varying degree for every student:

- Self improvement: deeper expertise and broader experience through study and employment in parallel
- Interaction: both with lecturers (academic and industrial) and students from other companies
- Alternatives: exposed to new/different ideas and practices
- Recognition: the PAIC programme has an established reputation and is of a high standard
- Demanding: students are stretched intellectually in a way that relates to their work
- Satisfying: opportunities to apply theory to practice
- Flexibility: students can tailor the PAIC programme to suit themselves and their employer

Benefits to Sponsoring Companies
All of the following benefits can be claimed by the students’ sponsoring companies to justify sponsorship:

- Usefulness: employees are more knowledgeable about and have a deeper understanding of control and automation
- Credibility: employer can demonstrate to clients that staff are well qualified and being further developed
- Reward: demonstrates employees’ worth to the company through investment in staff development
- Motivation: involvement in the PAIC programme stimulates employees’ interest in and enthusiasm for work
- Loyalty: sponsorship over five years commits employees to the company
- Confidence: that the PAIC programme is designed to meet the needs of industry, is relevant and up to date
CONTINUING PROFESSIONAL DEVELOPMENT (CPD)

Imperial’s Centre for Continuing Professional Development addresses the life-long learning needs of professionals through the delivery of postgraduate short course training. The 16 modules featured on pages 10 and 11 can also be taken as CPD courses through the Centre.

CPD short courses are delivered cyclically and to see when a preferred subject is being delivered, as well as finding details of how to book places and fees, please visit our dedicated web page at:
www.imperial.ac.uk/cpd/paic

Certificates of attendance will be issued on completion of a CPD short course. A CPD short course does not feature an examination or assessment. Therefore we strongly advocate that students wishing to gain a qualification should apply for the Postgraduate Certificate which is achieved by taking and passing the assessments for four modules.
Entry requirements

The entry requirements for the part-time MSc degree (PAIC) are as follows:

• A first degree in an appropriate discipline such as BEng in chemical or electrical engineering, a BSc in physics, etc, at 2.2 Honours standard minimum. The first degree has to be recognised by Imperial College as being equivalent to a UK first degree;

• Employment in the chemical and/or process industry sector (embracing operating companies, contractors and suppliers) in some automation, instrumentation or control job function;

• Sponsorship, either by employer or else by other private/public means;

• A study visa for nationals from outside the European Economic Area or Switzerland. Please refer to: www.imperial.ac.uk/international/studentsupport/visas

• A minimum score of 6.5 in the IELTS test is required for students whose native language is not English. Please refer to: www.imperial.ac.uk/registry/admissions/pgenglish

Applications can be considered from students who do not satisfy the above criteria, such as not having a BEng 2.2 Honours or equivalent, or whose UK equivalence is not recognised by Imperial College. However, any such applicant must have a minimum of three years relevant industrial experience. All such applications are dealt with on a case-by-case basis.

For specific information and enquiries about the PAIC programme, please contact:

Hannah Taylor
PG administrator for PAIC and CPD
ACEX 311
Department of Chemical Engineering
Imperial College
South Kensington
London
SW7 2AZ.
Tel: +44 (0)20 7594 6053
Email: hannah.taylor@imperial.ac.uk

For generic information about admissions and further guidance, please refer to:
www.imperial.ac.uk/registry/admissions/howtoapplypg

All students will initially be registered for a Postgraduate Certificate and, according to the number of modules passed (and credits accumulated), will progress through the Postgraduate Diploma to the MSc degree.
Postgraduate Programme & CPD Modules in Process Automation, Instrumentation and Control

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n.thornhill@imperial.ac.uk

Admissions:
hannah.taylor@imperial.ac.uk

Marketing:
c.rodgers@imperial.ac.uk
Take the first step in developing your career by visiting us at:
http://www.imperial.ac.uk/engineering/departments/chemical-engineering/courses/postgraduate/process-automation/

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THE PACT
The Partnership in Automation and Control Training (PACT) is based upon a grouping of companies from the UK chemicals, process, oil and energy sectors of industry.

The aim of the PACT is to enable companies in those sectors to maintain and improve their competitive edge by creating a supply of personnel who understand and are able to effectively apply modern automation techniques.

PAIC PROGRAMME
The PACT endorses and supports the Process Automation, Instrumentation and Control (PAIC) programme at Imperial College London.

The PAIC programme has been created to broaden and deepen the expertise and experience of personnel concerned with process automation, either in the design and development of control and related systems, in their application, or in their operation and management.