Imperial College
London

Department of Computing

QARC Review of Undergraduate Teaching in Computing

Imperial College London

Department of Computing

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1.1 The Future Direction of Undergraduate Teaching in the Department

1.1 The future direction of undergraduate teaching in the department

Our main teaching goal is to continue to produce the highest quality Computing graduates. They should have the background they require for whatever Computing endeavours they wish to undertake. In order to achieve this goal we plan to maintain the quality of our current provision. Computing is a discipline that is fast moving. We will continue our processes of review and updating to ensure that both our content and our delivery methods are current. We foresee an increase in the breadth of our advanced computing and interdisciplinary courses.

We plan to continue to:

1. Convey an understanding of the foundations of computing and the techniques and skills of application.
2. Enable each student to appreciate changes in the state of the art, and solve problems in applied computing.
3. Develop skills for critical independent scholarship.
4. Place special emphasis on the fundamental principles underlying computing and on the understanding of the engineering considerations involved in computing system design, implementation, application and use.
5. Give a solid background in mathematics relevant to computing and its applications.
6. Provide training in the professional aspects of computing as an engineering discipline.
7. Give students the opportunity to study a wide range of computing topics and applications.
8. Give students extensive practical experience, through a wide range of supporting laboratory and problem solving classes and through project work.

Quality and Course Development

The Department reviews its single honours undergraduate computing courses on a regular basis usually through its Academic Committee. In the academic year 2003/4 we had a successful IEE/BCS accreditation visit and are due another visit by the IET/BCS in 2008. In 2005 as part of a QAA formal audit of the University the Department along with three other departments was chosen for review. The outcome gave us specific recognition and praise for teaching innovations and “best practice”. We have also participated in the “Undergraduate Studies Committee” in (2003) where we were given a clean bill of health and very positive feedback.

Course Development Procedures:
Departmental review and approval of courses is the responsibility of the Academic Committee (AC) with strategy coming from the departmental Operations Committee. In practice, course contents are subject to review, revision and approval at several levels, with subcommittees being appointed by the AC as appropriate:

Programme Subcommittees: These undertake periodic major reviews of their programmes. They act as subcommittees to the AC and report their findings to that committee, first in draft form for approval for Department-wide circulation and full discussion, and subsequently for final approval.

Subject Teams: These undertake periodic review and discussions of courses related to a particular subject area. These are formed to ensure adequate up-to-date coverage of the topic, and to integrate courses so as to minimise any overlap and avoid gaps. Proposals are then brought before the AC. Currently there are reviews of Systems and Artificial Intelligence underway.

Course evaluations and revision are regularly instigated by the AC as a result of monitoring performed by the Year or Course (Programme) Co-ordinator, reports from committees such as the Staff-Student Committee and individuals. In fact, the Department has a number of feedback mechanisms for course monitoring, which together cover a wide spectrum of opinion:

Staff-Student Committees
College and Departmental lecturer evaluation questionnaires
Peer review of teaching
External accreditation bodies
External Examiners reports
Quality and Academic Review Committee reviews
College and University level Committee comment and approval
Alumni and industrial contacts

The Director of Studies and Head of Department consider all comments and recommendations. The Academic Committee, where specific proposals responding to the comments and recommendations are discussed and normally approved, considers reports from accreditation or review visits. When updating courses, the accreditation and review documents of the current courses are fully considered.

Aims and Learning Outcomes to satisfy the QAA

We have procedures in place for all six of the key aspects of the provision as defined by QAA procedures. Both QAA Computing and general Engineering benchmarks are fully accounted for in the aims and learning outcomes of our degree programmes. Please see Programme Specifications for details.

http://www3.imperial.ac.uk/computing/teaching/programme-specifications

Student Population

Although demand for our Computing courses has declined our admissions team has instituted procedures that continue to ensure us a high quality intake. There are 437 undergraduate Computing students in total; the ratio of academics to undergraduate Computing students is approximately 1:8. Our teaching space in the Department is well maintained and well equipped. We are confident that so long as teaching space remains adequate, we can continue to maintain and even improve our teaching quality and that we can provide the required advanced computing equipment necessary for the quality of courses we deliver.

Changes in Undergraduate and Postgraduate Taught Courses Offered

In recent years we have been putting substantial resources into decreasing the prevalent marks based culture and getting our students to appreciate the value of learning as well as assessment. We also believe that the first year is most important for engaging our undergraduates; therefore we provide extra resources to achieve this. We aim to ensure that both ends of the student spectrum are well catered for. At the weaker end (bottom 10%) we provide surgeries manned by other students and remedial lecturers. At the strong end (top 25%) we provide both advanced programming and advanced maths lectures. These are taken by PhD students. Informally the first year attendees often say that these are the most interesting lecturers they attend.

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Undergraduate Recruitment

Entry Routes

Below is a list of qualifications we require students to hold in order to be considered for a place on our undergraduate degrees. All home and EU students who meet our criteria are invited for interview. Overseas students are also invited for interview but those who for logistical reasons cannot attend are asked to sit an admissions test which helps to inform the Admissions Officer as to their suitability for the course they are applying for.

Applicants for admission to the MEng Computing (International Programme of Study) should additionally hold a GCSE in a foreign language at grade B or above, or otherwise be able to demonstrate linguistic competence.

A-levels

Our minimum A-level offer is: *AAA* with an *A in Maths*. We encourage applicants to take Further Maths at A2 or AS level.

International Baccalaureate

Our standard IB offer is: *38 points* with a *6 in Maths at higher level* and a 6 in one other relevant subject at higher level.

Other International Qualifications

We accept qualifications from all over the world. Below is a selection of the most common that we take. Imperial has an English language requirement which equates to a C-grade at English GCSE. The IELTS requirement for Computing is 6.5.

European Baccalaureate

Our typical European Baccalaureate offer is: *8.5 overall* with a 9.0 in Maths and 9.0 in one other relevant subject.

French Baccalaureate

Our typical French Baccalaureate offer is: *15 or higher overall* with a 15 in Maths and 15 in one other relevant subject.

German Abitur

Our typical German Abitur offer is: *1.3 or less overall* with a 15 in Maths and 14 in one other relevant subject.

Foundation Courses

We only currently accept students from two high-quality UK foundation courses. These are specialised courses for overseas students whose home qualifications are not usually accepted for study at UK universities.

The University Preparatory Certificate for Science and Engineering is a high quality foundation programme. We would typically look for scores at or above *80%*. A student would also be expected to take the Advanced Maths exam.

Warwick HEFP

The Higher Education Foundation Programme has a Science & Engineering specialisation that we accept. We would typically look for scores at or above *85%*.

Undergraduate Computing Admissions Statement

The incoming students vary in their amount of programming experience, from none to those who have spent a gap year in the software industry. About half the intake has no programming experience prior to starting the course. We encourage all to have as much mathematical grounding as possible in excess of the compulsory Maths A-level. We often encourage students to take an extra A or AS level in Further Maths or take the Advanced Extension Award (AEA) or Sixth Term Examination Paper (STEP) in Maths. It is not unusual for these extra qualifications to be part of a student's offer if they are taking them.

Home and EU-based applicants considered likely to receive an offer of admission are invited to attend an interview. The interview is preceded by a talk outlining the major features of the degree and its constituent courses, and by a tour of the campus conducted by our second, third and fourth year students. The interview has two main purposes: to enable the interviewer to obtain an impression of the candidate's motivation and academic suitability for the course, and to give candidates the chance to raise questions about the courses or College life in general.

We interview about 340 applicants every year and send admissions exercises to a further 100 predominantly overseas applicants typically. Of those 440, between 300 to 330 get offers. A measure of the success of the interview day is that about 60% of the students we make offers to choose us as their first choice institution. Only between 10 and 20 select us as their insurance choice, of which we only end up taking 1 or 2 each year. We determine that this is because we have some of the highest admissions requirements of any computing department in the UK, so that for most applicants it does not make sense to consider us as an insurance choice department.

This year our Computing courses are in the world top four in the Times Higher Education league table; they are also 3rd in the Independent league table and 2nd in the Guardian league table. Continued good performance in the league tables ensures a steady interest from EU and overseas students who often use these as a first selector of their university choices.

Overseas applications to Computing demonstrate a much more well-informed attitude to studying in the UK than they used to. Many avail themselves of the increasing number of university-run foundation courses that exist at high-quality institutions. By the far the largest proportion of overseas applicants have either studied in the UK or studied at international schools abroad, taking A-levels or IB qualifications. The department continues to assess new international qualifications and foundation year courses for suitability. We see India and Eastern Europe as key growth areas in undergraduate admissions in the next few years, with India and China being substantial growth markets in the medium term. Currently the college does not accept native Chinese qualifications - more progress in this area is required.

Undergraduate Joint Maths Computing Admissions Statement

This year, the Computing Department took over admission to the Joint Maths Computing degrees. We stringently apply the same criteria as would be asked for entry to the Maths degree; hence there is a requirement for Further Maths to A2 level. In instances where schools do not offer this qualification, we look for a good performance in the Advanced Extension Award in Mathematics. Where students are not taking quite the correct selection of qualifications, we have had some success in pointing this out early in the admissions process and giving them the opportunity to register for extra required qualifications.

Apart from this, JMC applicants are treated very similarly to Computing applicants. Home and EU students

are invited to interview while overseas students receive the international test paper. At interview day they are given course specific talk from the JMC course director and a representative of the Maths department.

This year (2008) we saw 120 applications for the JMC degrees. From these about 85 offers were made and we anticipate that 45-50 students will accept the offer as first choice. We aim to select 30 students for the course.

1.2 The Objectives and Relevance of Undergraduate Computing Courses

1.2 The objectives and relevance of undergraduate computing courses.

The Department of Computing provides education and professional formation in the applied science and engineering of computation. Our objectives are to develop the intellectual, personal and practical skills of our students, to engage their enthusiasm for computing, and enable them to develop into mature engineers.

Computing is the youngest of the engineering disciplines; it has undergone phenomenal change and development in less than 50 years, and there is every reason to believe that the pace of change will be maintained for many years to come. Consequently our objective is to equip our students with the skills that will enable them to evaluate and assimilate the developments that will inevitably occur during their working lives.

Our courses have therefore been designed to give each student an overview of computing, a deep understanding of the basic concepts and principles, extensive skills in their application and extension, wide practical experience of applied computing, and the ability to appreciate and adapt to changes in the state of the art.

Each of our degree courses provides education and development both in breadth and depth. Breadth is provided by a common set of core courses that introduce a student to all aspects of the subject, and depth by providing a wide selection of optional advanced courses. As one of the largest Computing departments in the country, and with an outstanding record of research achievement, we are uniquely placed to offer a wide variety of courses and an up-to-date view of the subject, taught in depth by leading researchers.

All undergraduate computing courses have a common two year study period: students follow one of the specialist M.Eng courses then select options from a group of advanced courses set down for that specialisation. In this way, the Integrated Engineering Study Scheme in Computing is designed to provide core foundational material to all students while still offering the opportunity to specialise and the flexibility to change.

There is a central “spine” of engineering project and design work running through all years, and a substantial part of the final year (fourth year for M.Eng students, third year for B.Eng students) is devoted to group and individual projects.

A notable feature of all our degree courses is that core lecture courses are supported by an *Integrated Laboratory Course* in year one and two. These are integrated with the lecture courses and tutorials, reinforcing concepts introduced there, and organised so as to provide a coherent learning progression, which makes uniform demands on student effort and equipment use.

All M.Eng courses include an approved period of professional formation (industrial placement) between Easter of the third year and the start of the fourth year. Students following the M.Eng (International Programme of Study) complete a similar period of professional formation and spend either their third or their forth academic year abroad in an institution of higher education with which Imperial College has an exchange arrangement. These arrangements have been established with comparable institutions in Belgium, France, Germany, Spain, Italy, Switzerland and the USA.

The four-year M.Eng degrees were developed in response to a set of emerging needs and imperatives i.e. the development of computing science and software engineering; the requirements for professional recognition both in Europe and in the UK; the requirements for engineers with improved language skills and understanding of international industry; demand from perspective students; opportunities for improved use of resources and College policy.

If MEng students wish to specialise in their final years they can choose Artificial Intelligence, Software Engineering or Computational Management.

1.3 Course Content and Structure

1.3 Course and Content Structure

Course Description

The scheme is designed to develop the intellectual and practical skills of its students and to engage their enthusiasm for computing. It is based on the four-year MEng courses and the three-year Computing BEng course. Specialisations are also available.

- **BEng Computing G400** provides an education and develops skills in the science and engineering of computation.
- **MEng Computing G401** provides a general education and professional formation in the science and engineering of computation to an advanced level.
-

The MEng degree courses with specialisations provide an education and professional formation in the science and engineering of computation and also knowledge of the following specialised fields:

- **MEng Computing (Software Engineering) G600** provides specialised engineering education in the methods, tools, techniques and processes underlying development of large and complex software.
- **MEng Computing (Computational Management) G500** provides specialisation in the management of software development and the application of software technology to management and organisational information systems.
- **MEng Computing (Artificial Intelligence) G700** provides specialisation in artificial intelligence and knowledge engineering; that is, the development of computational and engineering models of complex cognitive and social behaviours.
- **MEng Computing (International Programme of Study) G402** provides development of linguistic and technical skills through a programme of engineering study in the UK and abroad at a participating institution. All courses have a two-year common study period. To give maximum flexibility students may transfer between courses, within the Computing Integrated Engineering Study Scheme, at any time within that period. All students will initially be registered on the MEng Computing course. Current participating exchange institutions are: **France** ENST (Telecomm Paris) and ENSIMAG (INP Grenoble); **Germany** TU Karlsruhe and RWTH-Aachen; **Switzerland** ETH Zurich; **USA** University of California.

Those students who are unsure of their area of specialisation can therefore select MEng Computing and transfer later if desired.

Course structure

The course structure is very flexible providing many option courses. There is also a central spine of engineering project and design work running through all years. A substantial part of the final year (fourth year for MEng Students, third year for BEng students) is devoted to an individual project allowing detailed study of a topic relevant to the student's chosen specialisation. Students following one of the specialised MEng courses will select some of their options from a group of advanced courses set down for that specialisation. All MEng courses include an approved period of professional formation in an industrial placement. It takes place during the period between Easter and the start of the fourth year. The Computing Integrated Engineering Study Scheme has been developed to satisfy the requirements set down by the engineering institutions.

Accreditation for all courses is give by the Institution of Engineering and Technology (IET) and British Computer Society (BCS).

Students following the MEng Computing (International Programme of Study) spend either the first two terms of their third year abroad or their entire fourth year abroad in a recognised institution of higher education

(with which Imperial College has an exchange arrangement). Currently this involves institutions in the European Union and the University of California.

The scheme has been designed to give each student an overview of computing, an understanding of the basic concepts and principles, skills in their application and extension, the ability to appreciate and to adapt to changes in the state of the art, and practical experience in applied computing. Special emphasis is placed on the fundamental principles underlying computing and on an understanding of the engineering considerations involved in computing system design, implementation and usage. A solid background is given in discrete mathematics (logic, sets, relations and grammars) which is the basic mathematics of computing, as well as in the classical mathematics and statistics relevant to applications engineering and management. Students are introduced to computing architecture and hardware alongside the software which can exploit them. Advanced techniques such as artificial intelligence are presented throughout the scheme.

All courses are supported by laboratory and problem solving classes which give 'hands-on' experience. First Year programming tests must be passed for entry into year two.

First Year

<table>
<tr><th>Term 1</th><th>Term 2</th><th>Term 3</th></tr>
<tr><td>Discrete Mathematics I (required)
Hardware (required)
Logic (required)
Mathematical Methods (required)
Professional Issues (required)
Programming Pt1 (required)
Programming Pt2 (required)</td><td>Databases (required)
Discrete Mathematics II (required)
Object Oriented Programming (required)
Reasoning about Programs (required)</td><td>Programming Pt3 (required)</td></tr>
<tr><td colspan="2">Computer Systems (required)
Foreign Language I (required for ME)</td><td></td></tr>
<tr><td></td><td colspan="2">Topics in AI</td></tr>
</table>

Second Year

Term 1	Term 2	Term 3
• Complexity and Computability (required) • C short Course (required) • Networks and Communications (required) • Operating Systems (required) • Statistics (required) • Software Engineering – Design I (required)	• Algorithms • Compilers (required) • Computer Architecture • Computational Techniques (required for MM) • Concurrency (required for MSE) • Introduction to Artificial Intelligence (required for MAI) • Software Engineering – Design II (required)	
• Foreign Language II (normally required for ME)		

Third Year

Term 1	Term 2	Term 3
• Advanced Databases (required for MSE) • Computer Interfacing • Decision Analysis (required for MM) • Graphics • Machine Learning (required for MAI) • Operations Research (required for MM) • Software Engineering – Methods (required) • Simulation and Modelling	• Advanced Computer Architecture • Applied Operational Semantics • Cognitive Perception (required for MAI) • Custom Computing • Distributed Systems (required for MSE) • Introduction to Bioinformatics • Multimedia Systems • Organisation and Management Processes (required) • Performance Analysis • Robotics • Software Engineering – Systems Verification (required for MAI and MSE)	• Industrial Placement (required for MEng)
• Humanities (normally required for ME)		

Fourth Year

Term 1	Term 2	Term 3
• Advanced Issues in Object Oriented Programming • Advanced Topics in Software Engineering (required for MSE) • Automated Reasoning (*) • Computing for Optimal Decisions (required for MM) • Computer Vision • Intelligent Data and Probabilistic Inference • Management – Economics and Law (required for MM) • Modal and Temporal Logic (*) • Models of Concurrent Computation • Network Security (required for MSE)	• Advanced Graphics and Visualization • Advanced Operations Research • Complexity • Cognitive Robotics (*) • Distributed Algorithms • Knowledge Representation (*) • Multi-agent Systems (*) • Parallel Algorithms • Type Systems for Programming Languages • Quantum Computing * Students on MAI need to study at least 3 of the following courses: • Modal and Temporal Logic • Cognitive Robotics • Automated Reasoning • Multi-agent Systems • Knowledge Representation	
• Humanities		

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1.4 Details of Course and Student Progression

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Student Progression

The first year of study assumes that the student has no previous knowledge of Computer Science. What is taught and learnt forms a foundation from which the student can build upon in terms of more advanced study in subsequent years. Progression in the first year focuses on three main identifiable areas of competence. By the end of this first year of study we would expect a student to be able to program any problem, which can be solved within a single module (usually with approximately 100 lines of code). They are currently taught Haskell (first), Java, Pentium Assembler and Prolog. They have practical tests in the high level languages, which they are required to pass. We would expect that they have developed a model of how a computer works in terms of both hardware and software. They have a course in Computer Hardware and in Computer Systems (Architecture and Operating Systems). And finally we would expect that a student has learnt the underlying Mathematics to be able to cope with the rest of the course. They have courses in Logic, Discrete Mathematics, Mathematical Methods and Reasoning about Programs. Additionally they have a Databases course in order to provide relevance for their mathematical courses. As we are training computing professionals they have a course in"Professional Issues". They also have a choice of a foreign language or Topics in Artificial Intelligence where they develop both their research and their communication skills.

The second year has three objectives each of which expands skills and knowledge established in the first year. By the end of the second year students should be able to solve medium sized problems (using several modules), be knowledgeable about the major areas of computing and have been introduced to the major specialisms offered by our department. To develop their problem solving skills they have two courses in Software Engineering (one on design and one on hci) and a course on Algorithms and Complexity. Whereas in the first year they have a practical each week, in the second year the lab programme consists of labs that are 2-5 weeks long. In addition to these courses they have a course in Compilers (which builds on both programming and first year mathematics), in Operating Systems (which builds on first year Computer Systems), in Networks and Communications (which builds on first year Hardware and Mathematics) and in Statistics. In order to introduce them to specialisations they also have to choose three options from Architecture II (which builds on Computer Systems), Artificial Intelligence (which builds on Logic), Computational Techniques (which builds on Mathematical Methods), Concurrent Programming (which builds on Programming and Software Engineering), Algorithms (which builds on Programming and Reasoning) and a European language.

The third year has three objectives. Firstly, students should be able to solve large programming problems. These include problems that need to be solved by more than one person. All students participate in a group project. BEng students also do an individual project. MEng students have a six-month work placement. Secondly, they should have an understanding of professional issues. They are all required to take courses in Software Engineering, which includes a component of Ethics and Management. Thirdly, they should have the opportunity of developing a breadth of knowledge across their choice of options. They have a choice of six courses out of approximately twenty in our department and all the courses offered by the Business School and the Humanities department.

The fourth year is about developing depth of computing knowledge. Students choose eight courses from approximately twenty-five. These courses reflect the research expertise within the department and students can specialise in certain areas or take a broad range of subjects. At this level almost all of the courses have a fairly large mathematical content. We expect our graduates to be well prepared to undertake research as well as enter whatever Computing area they wish to undertake. These students are normally excellent programmers as well, as can be seen by their individual projects.

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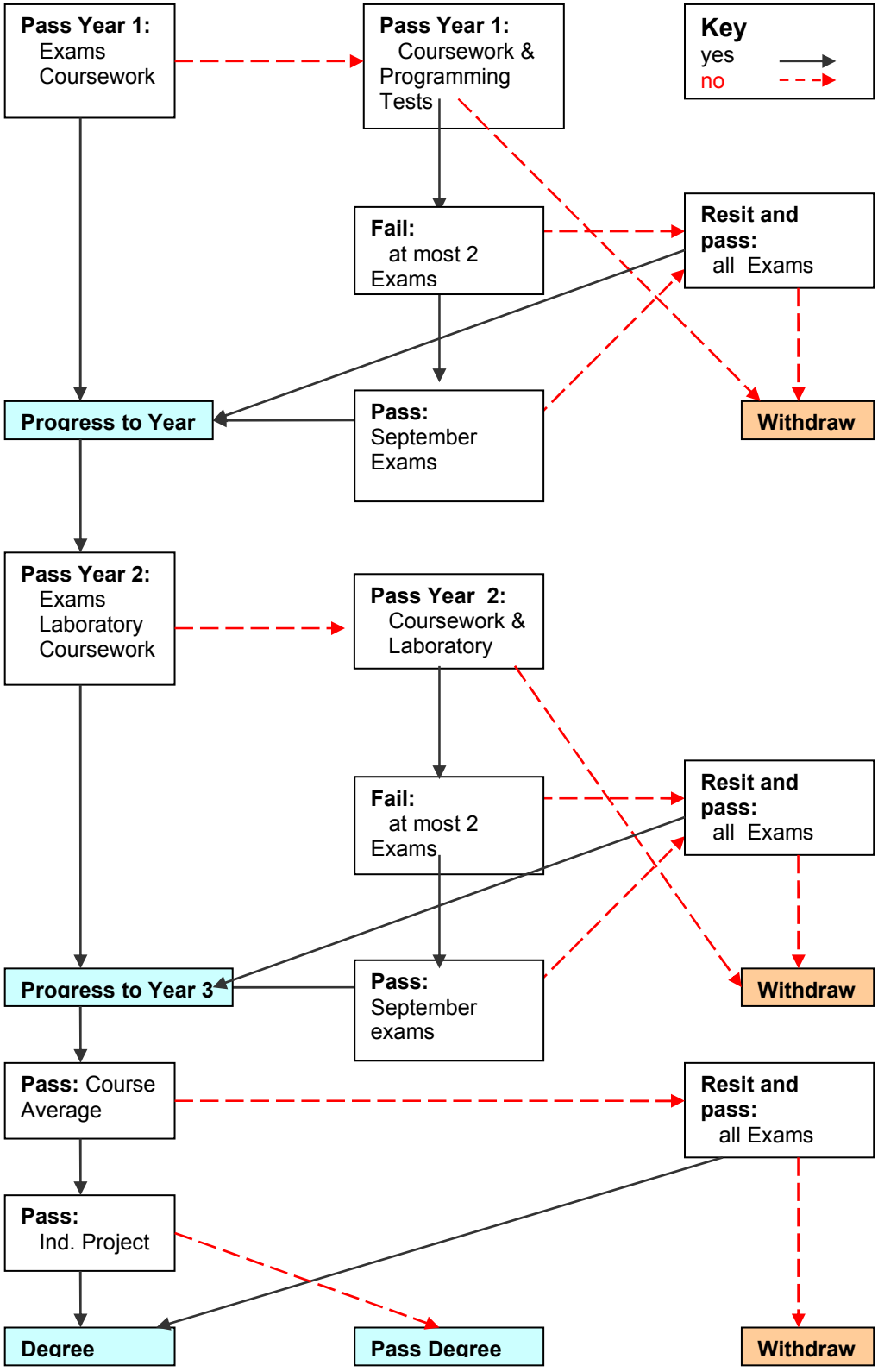
BEng Progression



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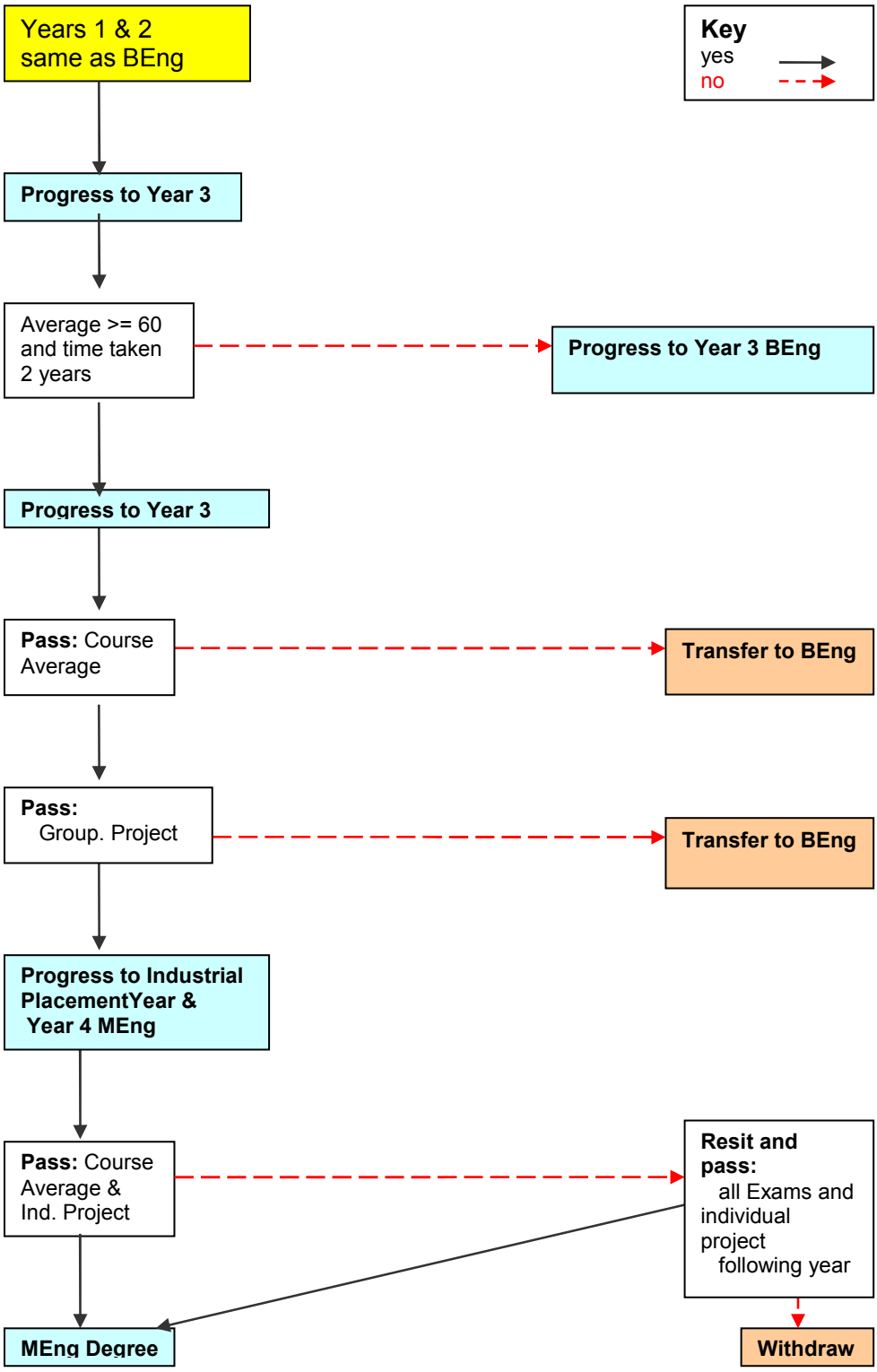
MEng Progression



1.5 Details of Joint Courses Offered Within the Department

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The Joint Maths & Computing Degrees.

Entrance requirements
The normal minimum entry requirements are three A levels at A grade, including Further Mathematics and a hard science subject (such as Physics, Chemistry or Biology). Applications from individuals with suitable non-GCE qualifications, such as Scottish Highers, International, French and European Baccalaureates are also considered.

General Notes

First Year Programme

The degrees are unit based. The students may accumulate up to four units per year, making a maximum of twelve for the BSc and sixteen for the MSci. To proceed to the following year they need generally to have passed at least three units in the preceding year. If they fail to obtain a particular unit or half-unit they may be allowed to resit, either in September or in the following year.

The marks from each discipline are accumulated over the three or four years to obtain two final marks. These are then used to decide the final degree classification. The marks from each year are weighted as follows:

Course	Year Weighting
BSc degree	1 : 3 : 4
MSci degree	1 : 2 : 3 : 4

Year 1 (from 2007/8 entry)

Students take four half-units in Mathematics, assessed by examination and coursework. Coursework contributes 10% to each Mathematics half-unit.

They take two units in Computer Science. Computer Science I, a full unit, is obtained by examination and coursework in the Computing courses: Logic, Reasoning about Programs and Architecture I. Coursework and examination marks are weighted 1:6 respectively. The second full unit is Programming and Data Structures. Comprising Haskell, Kenya, Object Oriented Programming, Prolog and Mathematics group project taken in Term 3. Programming courses are assessed through final Lab Tests.

Students must obtain three Mathematics half-units and all the Computing units in order to enter the second year. To pass each Mathematics half-unit 30% is required. To pass Computer Science I students are required to pass all the exams, and obtain an overall average, including coursework, of 40%. To pass Programming and Data Structure unit, students are required to have an overall average of 40%.

Year 2 (from 2003/4 entry)

In Mathematics, students offer three compulsory half-units and one half-unit option. Coursework contributes 10% to Mathematics half-units.

In Computing, students offer one compulsory full unit and one optional full unit. The compulsory Computing full unit comprises examination and coursework in Software Engineering - Design and Operating Systems,

together with laboratory work. The optional Computing full unit comprises examination and coursework in three Computing courses selected from a specified list of options. Coursework is weighted as one-seventh of the examination/coursework contribution for each Computing course.

Students must obtain three units in total in order to enter the third year. To pass each Mathematics half-unit 30% is required. To pass the compulsory Computing full unit an examination average of 40% is normally needed and an overall average, including coursework, of 40%. To pass the optional Computing full unit, an average of 40% in the examination is normally required, with at least two marks at 30% or more, and 40% overall average, including coursework.

Year 3 (BSc)

Students must offer seven half-unit options, of which at least two must be chosen from Computing and at least two from Mathematics. The remaining three options may include a non-language Humanities course from a specified list. There is a group project in Computing in term 1, that includes attendance to and assessment through reports of the Software Engineering Method course, and an individual project from either Computing or Mathematics in terms 2 and 3, which together contribute to an eighth half-unit, which has enhanced weighting. The group project contributes one quarter and the individual project three-quarters of this half-unit.

Each half-unit, except the project half-unit, comprises examination and coursework. Coursework contributes 10% to Mathematics half-units and is weighted as one-seventh of the examination/coursework contribution for each Computing course.

To pass each Mathematics half-unit 30% is required. To pass each Computing half-unit 40% overall is needed. The project half-unit is weighted as if it was 0.9 full unit. (i.e., it counts 1.8 x other third year half-units.)

To obtain an honours degree, students must obtain nine units in total over the three years.

Year 3 (MSci)

Students must offer eight half-units, at least two must be chosen from Computing and at least two more from Mathematics. One of the options may be a non-language Humanities course from a specified list. There is a group project in Computing in terms 1 and 2, that includes attendance to and assessment through reports of the Software Engineering Method course, and a group project from Mathematics in terms 2 and 3, which together contribute additional marks equivalent to approximately one-half unit.

Each normal half-unit comprises examination and coursework. Coursework contributes 10% to Mathematics half-units and is weighted as one-seventh of the examination/coursework contribution for each Computing course.

To pass each Mathematics half-unit 30% is required. To pass each Computing half-unit 40% overall is needed. To enter the fourth year students must normally obtain three units.

Year 4 (MSci)

Students must offer seven half-units, of which at least two must be chosen from Computing and at least two from Mathematics. One of the options may be a non-language Humanities course from a specified list. There is a final project half-unit including an individual project from either Computing or Mathematics, which has enhanced weighting.

Each half-unit, except the project half-unit, comprises examination and coursework. Coursework contributes 10% to both Mathematics and Computing half-units.

Mathematics options chosen in the fourth year must be offered as an M4 unit with advanced study, when this is made available.

To pass each Mathematics half-unit 30% is required. To pass each Computing half-unit 40% overall is needed. The project half-unit is weighted as if it was 0.75 full unit. (i.e., it counts 1.5 x other fouth year half-units.)

To obtain an honours degree students must obtain twelve units in total over the four years.

Assessment

The means of assessment is the same as that described in for the Computing BEng/MEng. The degree structures of BSc and MSci are as follows.

First Year

Students are assessed on Computing lecture courses on the basis of one 2 hour examination and 1 hour examination, relevant coursework (associated with their lecture courses), their online programming tests and their MatlLab group project. They are assessed on the Mathematics lecture courses on the basis of four 2 hour examinations, and relevant coursework and progress test (associated with their lecture courses).

Marks

One 2 hour Computing examination	133
One 1 hour Computing examination	67
Programming and Data Structures	200
Four 2 hour Mathematics examination (each contributing 100)	400
Total Marks	800

Progression Requirements

In order to pass the Part I examination and qualify to progress to the second year, the candidate must have:

1. Achieved at least 40% in the Computing Unit MC178 composed of the two Computing examinations, aggregated with a ratio of 2:1
2. Achieved at least 40% in Programming and Data Structure unit
3. Achieved at least 40% in 3 of the four Mathematics half units

The pass mark for each written Computing examination is 30%. All written Computing examinations must be passed. From the 2008 entry, the minimum pass mark for each written examination will be increased to 40%.

The pass criteria for Computing unit MC178 is to have passed all the Computing examinations, to have achieved at least 40% of the weighted exam average, and to have achieved at least 40% of the weighted overall courses mark that include examination and coursework.

Supplementary Qualifying Tests

At the discretion of the Examiners, Supplementary Qualifying Tests may be offered to a candidate who marginally fails to achieve the conditions laid down for a pass in the Part I Examination.

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Second Year

Students are assessed on the basis of five 2-hour Computing examinations, laboratory work and relevant coursework (both associated with their lecture courses), project work, and four 2-hour Mathematics examination, with relevant associated coursework:

Marks

Five two-hour Computing examinations (each contributing 66.7)	333.3
Laboratory work and Project work	66.7
Four two-hour mathematics examinations (each contributing 100)	400
Total Marks	**800**

Progression Requirements
The five two-hour Computing examinations and Laboratory/Project work are divided into two Computing Full Units. Unit MC271 is composed of two core Computing courses and the Laboratory/Project work, whereas Unit MC272 is composed of the three Computing courses, chosen from a list of five options. Each of the Mathematics courses is counted as half unit.

In order to pass the Part II examination and qualify to progress to the third year, the candidate must have obtained 3 Full Units from Computing and Mathematics overall.

To pass Computing Unit MC271, students must have:

a. Achieved an average of 40% in the exam component
b. Achieved 40% overall for the Unit including coursework.

To pass Computing Unit MC272, students must have:

- Achieved an average of 40% in the Computing examination component
- At most *one* fail (i.e. obtained less than 30%) for the examination component
- Achieved at least 40% overall for the Unit, including coursework

To pass a Mathematics half unit, students must have achieved 40% overall including examination and coursework.

In order to proceed to MSci3, candidates must normally have achieved an overall mark of 60% in both Mathematics and Computing.

BSc Third Year

Students are assessed on the basis of seven option assessments (one per course taken), each contributing 1 half unit, a group project and an individual project. The seven options have to comprise at least 2 and at most 5 in Computing, and at least 2 and at most 5 in Mathematics; they each involve a 2-hour written examination and associated coursework.
The group project and individual project are combined in the ratio 1:3 to form 1 half unit. This is weighted to have a maximum mark of 1.8 times that of a normal half unit (which is 100 marks).

Marks

Seven courses each with an examination and coursework	700
Software Engineering with Group Project	45
Individual Project	135
Total marks	**880**

BEng Honours Classification

The pass mark for each half unit is 40% (including examination and coursework).

Part I, II and III each contribute a maximum of 4 full units from Computing and Mathematics combined, making a total of 12 full units for the degree.

In order to be awarded a degree, students must normally have passed at least 9 full units. Students who have taken at least 9 units but have passed only 8 or 8.5 of them may exceptionally be awarded a Pass Degree.

Parts I, II and III are aggregated with the ratio 1:3:4.

The Computing marks for of the three years of the course are aggregated into an overall Computing; similarly for Mathematics marks. The two overall marks are then integrated into a single (joint) overall mark that defines the class of Honours awarded.

For each year, the total possible weighted marks are:

Year 1 total	800
Year 2 total	2400
Year 3 total	3520
Total over 3 years	**6720**

The class boundaries, based in the Mathematics scale, are:

I	75%
II/1	60%
II/II	45%
III	35%
Pass	30%

MSci Third Year

MSci students are assessed on the basis of eight option assessments (one per course taken), each contributing 1 half unit, a Computing group project and a Mathematics group project. The eight options have to comprise at least 2 and at most 6 in either Computing or Mathematics, and they each involve a 2-hour written examination and associated coursework.

The group projects contribute no units but carry marks equivalent to a quarter of a full unit in Computing and Mathematics respectively.

Marks

Eight courses each with a written examination and coursework	800
Software Engineering with Computing Group Project	50
Mathematics Group Project	50
Total marks	**900**

Progression Requirements

In order to proceed to Part IV students must have achieved at least 3 full units from Computing and Mathematics overall, and have gained at least 10 full units over the three years.

The pass mark for each half unit is 40% including examination and coursework.

MSci Fourth Year

Students are assessed on the basis of seven (overall) option assessments from each department, each contributing 1 half unit, and individual project. Each option assessment includes a 2-hour written examination and associated coursework. The individual project forms 1 half unit, and is weighted to have a maximum mark of 1.5 times that of a normal half unit.

Marks

Seven courses each with an examination and coursework	700
Individual Project	150
Total marks	**850**

Honours Classification

The pass mark for each half unit is 40%.

Parts I,II, III and IV each contribute a maximum of 4 full units from Computing and Mathematics combined, making a total of 16 full units for the degree.

In order to be awarded a degree, students must normally have passed at least 12 full units.

Students who have taken at least 12 units but have passed only 11 or 11.5 of them may exceptionally be awarded a Pass Degree.

Parts I, II, III and IV are aggregated with the ratio 1:2:3:4.

The Computing marks for of the four years of the course are aggregated into an overall Computing mark; similarly for Mathematics marks. The two overall marks are then integrated into a single (joint) overall mark that defines the class of Honours awarded.

The marks for all components of the four years of the course are aggregated into an overall mark. The class of Honours awarded depends on this overall mark, with the proviso that candidates must have achieved at least 40% overall in Part IV and normally at least 40% in their individual project.

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In addition to these requirements, candidates are normally expected to successfully complete the MSci degree programme in four continuous years.

For each year, the total possible marks are:

Year 1 total	800
Year 2 total	1600
Year 3 total	2700
Year 4 total	3400
Total over 4 years	**8500**

The class boundaries, based on the Mathematics scale, are:

I	75%
II/1	60%
II/II	45%
III	35%

BSc/ MSci Courses Year 1

Mathematics		Number of lectures / classes (approx.)	Term	Course unit value
M1GLA	Geometry and Linear Algebra	30/10	1	½
MC1MF	Analytical Methods and Analysis	40/24	1	½
M1P1	Analysis I	30/10	2	½
M1P2	Algebra I	30/10	2	½

Computing			Number of lectures / classes (approx.)	Term	Course unit value
MC172	**Programming and Data Structures**				1
	C120.1	Programming (I)	10/5	1	
	C120.2	Programming (II)	10/5	1	
	C123	Object Oriented Programming	18/9	2	
	C120.3	Programming (III)	8/2	3	
	C176	Laboratory I	30/150	1+2+3	
MC178	**Computer Science I**				1
	MC110	Architecture	18/9	1+2	
	MC144	Reasoning about Programs	18/9	2	
	MC140	Logic	18/9	1	

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BSc/ MSci Courses Year 2

Mathematics			Term	Course unit value
Compulsory	**M1S**	Probability and statistics I	1	½
	M2PM2	Algebra II	1	½
	M2AA3	Orthogonality	1	½
Option	one/two from [subject to timetabling and see footnote]			
	M2OD	Graphs, algorithms and optimisation	2	½
	M2PM4	Rings and fields	2	½

Computing			Term	Course unit value
Compulsory	**C220**	Software engineering - Design I	1	
	MC211	Operating Systems (JMC)	1	
Option	Three additional courses must be selected from the following:			
	C240	Complexity and computability	1	
	C222	Software engineering Design II	2	
	C221	Compilers	2	
	C231	Introduction to Artificial intelligence	2	
	C223	Concurrency	2	
	C202	Advanced Algorithms	2	
	These three additional courses comprise a full course unit C272			

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BSc/ MSci Courses Year 3

Mathematics			Prerequisite
M2AA3		Orthogonality	
M3N3	*	Optimisation	
M3N4	*	Computational linear algebra	
M3N5		Methods of approximation	
M3N6		Theoretical numerical analysis	
M3N7	*	Numerical solution of ordinary differential equations	
M3N8	*	Finite element method	
M3N9	*	Finite difference methods for partial differential equations	
M2PM2		Algebra II	
M2PM4		Rings and fields	
M2OD		Graphs, algorithms and optimisation	
M3P9	*	Linear algebra and matrices	
M3P10	*	Group theory	
M3P11	*	Galois theory	
M3P12	*	Group representation theory	
M3P13	*	Rings and modules	
M3P14	*	Elementary number theory	
M3P15	*	Algebraic number theory	
M3P17	*	Discrete Mathematics	
M3PA45	*	Tilings and patterns	
M2S1		Probability and statistics II	
M2S2		Statistical modelling	M2S1
M2S3		Statistical theory	M2S1
M3S2	*	Statistical modelling II with application in finance	
M3S3	*	Statistical theory II	
M3S4	*	Applied probability I	M2S1
M3S7	*	Statistical pattern recognition	
M3S8	*	Time series	
M3S9	*	Stochastic simulation	
M3S10	*	Design of experiments and surveys	
M3S11	*	Games, risks and decisions	
M3S12	*	Biostatistics	
M3S14	*	Survival models and actuarial applications	
M3S15	*	Monte Carlo methods in financial engineering	
M3T	2	Communicating Mathematics	

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BSc/ MSci Courses Year 3

Computing		Term
C314	Applied Operational Semantics	2
M311	Databases	2
C395	Machine Learning	1
MC221	Compilers	2
C336	Performance analysis	2
C317	Graphics	1
C344	Decision analysis	1
C328	Cognitive Perception	2
C343	Operations research	1
C337	Simulation and modelling	1
M313	Computer Networks and Distributed Systems	2
C223	Concurrency	2
C341	Introduction to Bioinformatics	2
M231	Artificial intelligence	2
C335	Distributed Systems	2
C318	Custom Computing	2

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MSci Courses Year 4

	Mathematics
M4N3	Optimisation with advanced study
M4N4	Computational linear algebra with advanced study
M3N5	Methods of approximation
M3N6	Theoretical numerical analysis
M4N7	Numerical solution of ordinary differential equations with advanced study
M4N8	Finite element methods with advanced study
M4N9	Finite difference methods for partial differential equations with advanced study
M4P9	Linear algebra and matrices with advanced study
M4P10	Group theory with advanced study
M4P11	Galois theory with advanced study
M4P12	Group representation theory with advanced study
M4P13	Rings and modules with advanced study
M4P14	Elementary number theory with advanced study
M4P15	Algebraic number theory with advanced study
M4P17	Discrete Mathematics with advanced study
M4PA45	Tilings and patterns with advanced studies
M4P31	Riemann surfaces
M4P32	Number theory: elliptic curves
M4P33	Algebraic geometry
M4P34	Groups and representations
M4P35	Ring theory
M4P36	Representation theory of symmetric groups
M4P37	Mathematics in molecular biology
M4P38	Geometric and combinatorial group theory
M4P39	Sympletic geometry and quantisation
M4P40	Homological algebra
M4P41	Analytic methods in partial differential equations
M4P42	Analysis on manifolds and heat kernels
M4P43	Algebraic topology
M4P44	Riemannian geometry
M4P45	Differential geometry and Lie groups
M4P46	Lie algebra
M4P47	Stochastic filtering
M4P48	Introduction to infinite dimensional analysis
M4P49	Model theory
M4S2	Staitistical modelling II with application in finance with advanced study
M4S3	Statistical theory II with advanced study
M4S4	Applied probability with advanced study
M4S7	Modern statistical methods for pattern recognition with advanced study
M4S8	Time series with advanced study
M4S9	Stochastic simulation with advanced study
M4S10	Design of experiments and surveys with advanced study
M4S11	Games, risks and decisions with advanced study
M4S12	Biostatisticswith advanced study
M4S14	Survival models and actuarial applications with advanced study
M4S15	Monte Carlo methods in financial engineering with advanced study

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MSci Courses Year 4

Computing		Prerequisites	Term
C317	Graphics		1
C336	Performance analysis		2
C332	Advanced computer architecture		2
M313	Computer networks and distributed systems		2
C335	Distributed systems		2
C418	Computer vision		1
C429	Parallel algorithms		2
C430	Network security		1
C438	Complexity	C240 or M20D	2
C474	Multi-agent systems	C231	2
C475	Advanced Topics in Software engineering.		1
C477	Computing for optimal decisions	C343 or M3N3	1
C478	Advanced operations research		2
C480	Automated reasoning		1
C481	Models of concurrent computation		1
C491	Knowledge representation		2
C493	Intelligent data and probabilistic inference		1
C499	Modal and temporal logic		1
C437	Distributed Algorithms		2
C312	Advanced Databases	CV311	1
C417	Advanced Graphics and Visualisation	C317	2
C328	Cognitive Perception		2
C395	Machine Learning		1
C318	Custom Computing		2
C471	Advanced Issues in Object Oriented Programming		1
C420	Cognitive Robotics		2
C482	Type Systems for Programming Languages		2
C484	Quantum Computing		2

1.6 Student Workload and its Distribution Throughout the Year

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Student workload for BEng and MEng Years 1 and 2.

Year	unit		Level	Teaching hours					Other hours				Total Hours
				Lectures	Lab hrs	Classes	Tutorials	Sum	Private Study	Project or placement work	Exams	Sum	
		Code											
									2.5				
1	Hardware	112	B	18			9	27	68		1.5	69	96
1	Computer Systems	113	B	26			12	38	95		2	97	135
1	Programming	120	B	42			15	57	143		1.5	144	201
1	Object Oriented Programming	123	B	18			9	27	68		1.5	69	96
1	Databases I	130	B	18			9	27	68		1.5	69	96
1	Logic	140	B	18			9	27	68		1.5	69	96
1	Reasoning about Programs	141	B	18			9	27	68		1.5	69	96
1	Discrete Mathematics I	142	B	18			11	29	73		1.5	74	103
1	Mathematical Methods	145	B	25			9	34	85		1.5	87	121
1	Personal Programming Tutorial	146	B	0			10	10	25			25	35
1	Personal Mathematical Tutoring	146	B	0			10	10	25			25	35
1	Foreign Language I	152	B	18			9	27	68		1.5	69	96
1	Laboratory 1	161	B	64	156		10	230	575			575	805
1	Laboratory Workshop 1	162	B	10			0	10	25			25	35
1	Topics in AI	163	B	12			6	18	45			45	63
1	Professional Issues	164	B	4			0	4	10			10	14
1	Lab Test	180	B	0			0	0	0		17	17	17
1	total			309	156	0	137	602	1505	0	32.5	1537.5	2140
									2.5				
2	Optional Courses (Must choose 3 from 5)	210	B	54			27	81	202.5		6	209	290
2	Operating Systems	211	B	18			9	27	67.5		2	70	97
2	Networks and Communications	212	B	18			9	27	67.5		2	70	97
2	Software Engineering - Design I	220	B	18			9	27	67.5		2	70	97
2	Compilers	221	B	18			9	27	67.5		2	70	97
2	Software Engineering - Design II	222	B	18			9	27	67.5		2	70	97
2	Complexity and Computability	240	B	18			9	27	67.5		2	70	97
2	Statistics	245	B	18			9	27	67.5		2	70	97
2	Laboratory 2	261	B	0	170			170	425			425	595
2	Laboratory Workshop 2	262	B	3				3	7.5			8	11
2	C Short Course	264	B	6				6	15			15	21
2	2nd Year Group Projects	271	B		20			20	50	200		70	90
2	total			189	190	0	90	469	1173	200	20	1213	1682

Student workload for BEng Year 3

Year	unit		Level	Teaching hours					Other hours				Total Hours
				Lectures	Lab hrs	Classes	Tutorials	Sum	Private Study	Project or placement work	Exams	Sum	
		Code											
									3				
3	Opional Courses (Must choose 7 from 20 courses)		B	126			63	189	567		14	581	770
3	Software Engineering - Methods	303	B	18			9	27	81			81	108
3	Organisations and Management Processes	355	B	18			9	27	81		2	83	110
3	3rd Year Group Projects	362	B		10		20	30	90	200		290	320
3	Individual Project	401	B		10		50	60	180	436		616	676
3	Coursework							0	0	48		48	48
3	total			162	20	0	151	333	999	684	16	1699	2032

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Student workload for MEng Years 3 and 4

Year	unit		Level	Teaching hours					Other hours				Total Hours
				Lectures	Lab hrs	Classes	Tutorials	Sum	Private Study	Project or placement work	Exams	Sum	
									3				
3	Opional Courses (Must choose 7 from 20 courses)		B	126			63	**189**	567		56	**623**	**812**
3	Software Engineering - Methods	303	B	18			9	**27**	81			**81**	**108**
3	Organisations and Management Processes	355	B	18			9	**27**	81		8	**89**	**116**
3	3rd Year Group Projects	362	B		10		20	**30**	90	200		**290**	**320**
3	Coursework		B					**0**	0	48		**48**	**48**
3	Industrial Placement		M					**0**	0	960		**960**	**960**
3	total			162	10	0	101	273	819	1208	64	2091	2364
									3				
4	Optional Courses (Must Choose 8 from 20 Courses)		M	144			72	**216**	648		64	**712**	**928**
4	Industrial Placement - Presentation & Report		M					**0**	0	40		**40**	**40**
4	Project Outsourcing Exercise		M					**0**	0	60		**60**	**60**
4	Coursework		M				32	**32**	96	64		**160**	**192**
4	Individual Project		M					**0**	0	536		**536**	**536**
4	total			144	0	0	104	248	744	700	64	1508	1756

1.7 Assessment Methods

1.7 Assessment methods

Assessment Methods - 2007/8 entrants

The assessment of student performance is through a combination of written examinations, assessed coursework (individual and small groups), assessed laboratory exercises, laboratory tests done under exam conditions, group project documentation and presentation, individual project report(s) and presentation and, for MEng, an industrial placement report and presentation. All components of the assessment must be passed.

Students on MEng Computing (International Programme of Study) are assessed during their final year based on their performance in project work, coursework and examinations at their receiving institution.

BEng Computing - 2007/8 entrants

BEng Computing Regulations

Year 1

Examinations

There are four written papers. Three of 2 hours duration: Hardware and Databases, Logic and Reasoning, Discrete Mathematics and Mathematical Methods. The fourth, Computer Systems has a written paper of 1.5 hours duration.

Continuous Assessment

Lecture courses have coursework associated with them.
Programming is assessed by a series of on-line tests.

Marks

Three 2 hour examinations (each contributing 120)	360
One 1.5 hour examination (contributing 90)	90
Coursework	150
Programming	200
Projects in Artificial Intelligence or language option	50
Total Marks	**850**

Requirements

In order to pass the Part I examination and qualify to progress to the second year, the candidate must satisfy the following conditions:

1. Achieved at least 40% in the Coursework
2. Achieved at least 40% in Programming
3. Achieved at least 40% in the aggregate of written and practical examinations.

The pass mark for each written examination is 30%. All written examinations must be passed.

Supplementary Qualifying Tests

At the discretion of the Examiners, Supplementary Qualifying Tests may be offered to a candidate who marginally fails to achieve the conditions laid down for a pass in the Part I Examination.

Year 2

Examinations

All examinations are of two hours duration.
All required subjects must be taken.
Three optional subjects must be taken.

Total 20 hours (or 18 hours plus the language assessment).

Coursework

Assessed coursework is associated with lecture courses.
There is also supporting laboratory work which is assessed.

Marks

Ten two-hour examinations (each contributing 120)	1200
Laboratory work	200
Coursework	200
Project work	100
Total Marks	**1700**

Requirements

In order to pass the Part II examination and qualify to progress to the third year, the candidate must satisfy the following conditions:

1. Achieved at least 40% in the coursework
2. Achieved at least 40% in the laboratory work
3. Achieved at least 40% in the aggregate of written papers.

The pass mark for each written examination is 30%. All written examinations must be passed.

Supplementary Qualifying Tests

At the discretion of the Examiners, Supplementary Qualifying Tests may be offered to a candidate who marginally fails to achieve the conditions laid down for a pass in the Part II Examination.

Year 3
Students will be offered a choice of computing courses from an approved course list (see *"1.3 Course and Content Structure"* for details). Students take eight options, including compulsory professional material, each of which is examined by written paper or coursework. In addition to the required course "Organisation and Management Processes" and with prior approval from the Department up to two of the eight courses may be studied in other Imperial College departments. BEST courses from the Tanaka Business School

and Humanities courses however do not need explicit approval. Students are expected to participate in a group project and must also submit an individual project.

Coursework

Each lecture course has assessed course work associated with it.

Marks

Seven courses each with an examination (contributing 180) and coursework (contributing 30)	1470
Software Engineering with Group Project	410
Individual Project	670
Total marks	**2550**

Honours Classification

The marks for all components of the three years of the course are aggregated into an overall mark. The class of Honours awarded depends on this overall mark, with the proviso that candidates must normally have achieved at least 40% overall in Part III and at least 30% in their individual project.

For each year, the total possible marks are:

Year 1 total	850
Year 2 total	1700
Year 3 total	2550
Total over 3 years	**5100**

MEng Computing - 2007/8 entrants

MEng Computing Regulations

Year 1
Examinations

There are four written papers. Three of 2 hours duration: Hardware and Databases, Logic and Reasoning, Discrete Mathematics and Mathematical Methods. The fourth, Computer Systems has a written paper of 1.5 hours duration.

Continuous Assessment

Lecture courses have coursework associated with them.
Programming is assessed by a series of on-line tests.

Marks

Three 2 hour examinations (each contributing 120)	360
One 1.5 hour examination (contributing 90)	90
Coursework	150
Programming	200
Projects in Artificial Intelligence or language option	50
Total Marks	**850**

Requirements

In order to pass the Part I examination and qualify to progress to the second year, the candidate must satisfy the following conditions:

1. Achieved at least 40% in the Coursework
2. Achieved at least 40% in Programming
3. Achieved at least 40% in the aggregate of written and practical examinations.

The pass mark for each written examination is 30%. All written examinations must be passed.

Supplementary Qualifying Tests

At the discretion of the Examiners, Supplementary Qualifying Tests may be offered to a candidate who marginally fails to achieve the conditions laid down for a pass in the Part I Examination.

Year 2

Examinations

All examinations are of two hours duration.
All required subjects must be taken.
Three optional subjects must be taken.

Total 20 hours (or 18 hours plus the language assessment).

Coursework

Assessed coursework is associated with lecture courses.
There is also supporting laboratory work which is assessed.

Marks

Ten two-hour examinations (each contributing 120)	1200
Laboratory work	200
Coursework	200
Project work	100
Total Marks	**1700**

Requirements

In order to pass the Part II examination and qualify to progress to the third year, the candidate must satisfy the following conditions:

1. Achieved at least 40% in the coursework
2. Achieved at least 40% in the laboratory work
3. Achieved at least 40% in the aggregate of written papers.

The pass mark for each written examination is 30%. All written examinations must be passed.

Supplementary Qualifying Tests

At the discretion of the Examiners, Supplementary Qualifying Tests may be offered to a candidate who marginally fails to achieve the conditions laid down for a pass in the Part II Examination.

Third Year

Students will be offered a choice of computing courses from an approved list. Students take eight options, including compulsory professional material, each of which is examined by written paper or coursework. In addition to the required course "Organisation and Management Processes" and with prior approval from the Department up to two of the eight courses may be studied in other Imperial College departments. BEST courses from the Tanaka Business School and Humanities courses however do not need explicit approval. Students are expected to participate in a group project.

Coursework

Each lecture course has assessed coursework associated with it.
There is also supporting project work which is assessed.

Marks

Seven courses each with a test (contributing 150) and coursework (contributing 30)	1260
Software Engineering with Group Project	440
Total marks	**1700**

Requirements

In order to secure a place on the MEng degree course a student must pass the Group Project submitted in the Autumn Term of the third year. Failure in this component of the course will ordinarily lead to discussion and negotiation about transfer to the BEng degree for the remainder of the third year.

To pass Part III and qualify for the fourth year students must obtain an overall mark of at least 40%. Furthermore, they need to obtain a combined mark of at least 40% in their laboratory work, coursework and projects.

Fourth Year

All other MEng programmes

Those students not going abroad complete their final year as described below.

Students will be offered a choice of courses from the approved course list. Students take eight options, each of which is examined either by a written paper or by essay/coursework. Students must submit an outsourcing report and an individual project, and must also give an individual presentation.

Coursework

Each lecture course has assessed coursework associated with it.
There is also supporting project work which is assessed.

Marks

Eight courses each with an examination (contributing 240) and coursework (contributing 30)	2160
Industrial Placement	100
Outsourcing Exercise	200
Individual Project	940
Total marks	**3400**

Honours Classification (All MEng programmes)

The marks for all components of the four years of the course are aggregated into an overall mark. The class of Honours awarded depends on this overall mark, with the proviso that candidates must have achieved at least 40% overall in Part IV and normally at least 40% in their individual project.

In addition to these requirements, candidates are normally expected to successfully complete the MEng degree programme in four continuous years.

For each year, the total possible marks are:

Year 1 total	850
Year 2 total	1700
Year 3 total	1700
Year 4 total	3400
Total over 4 years	**7650**

1.8 Tutorial and Pastoral Arrangements

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1.8 Tutorial and Pastoral Arrangements

1. Tutorial Support

First year weekly tutorials

In the first year, students are put into tutorial groups of six by pairing up the personal tutees (see below) of two members of the academic staff - one a specialist in programming and the other in discrete maths and logic. There are weekly tutorials in each subject. The same group of students also attends a series of tutorials in Mathematical Methods (continuous mathematics) in the first term.

The students' prior programming experience is taken into account when allocating the groups: students with similar backgrounds are placed together and their experience and ongoing performance is taken into account when conducting weekly tutorials. The weekly tutorials play a major role in helping the tutor to get to know their own personal tutees. Students keep the same personal tutor throughout the course.

Undergraduate teaching assistants (UTAs) are paid to mark weekly submissions in programming and logic and discrete maths, and lead the tutorial discussions in collaboration with the academic tutor. The UTAs are selected from a pool of third and fourth year student volunteers with "A" averages in the relevant topic (programming/discrete maths). The weekly exercises are un-assessed, but students are told that they are otherwise compulsory. Students who fail to submit an exercise will be encouraged to catch up and submit after the deadline by the academic tutor/UTA. Students who display a pattern of non-submission are referred to the Senior Tutor. Where necessary, students will be given additional support by either the UTA or academic tutor.

The UTA scheme is currently the subject of an Envision project.

Tutorials in mathematical methods are run by a single academic or by a suitably qualified RA or PhD student.

In the first year attendance at the small group tutorials is recorded on CATE and is visible to the student and the Senior Tutor. After the first year, students and personal tutors are asked to meet twice each term, and reminders are sent by the Senior Tutor.

Course-related tutorials

All courses are allocated a certain number of helpers for tutorials specific to that course (on a ratio of 35 students per helper, including the lecturer, with variations depending on previous years needs). Once the term starts, if the lecturer needs (more) helpers, then a request is made to the Tutorial Support Coordinator.

Each Laboratory Organiser will look after the provision of the required number of Lab demonstrators according to the expected number of students and the nature of the various laboratory exercises. In first year labs the ratio of helpers to students is higher.

Instructions for Lecturers and Lab Organisers

When Helpers are allocated for a particular course, lecturers are expected to contact them and arrange a group meeting. The purpose of the meeting is to welcome everyone and to encourage a useful dialogue between the helpers in order to plan and organise future student tutorials. The lecturer will explain how he or she expects the tutorials to be run and a general discussion and planning session will follow.

All members of the Department that act as tutorial assistants/lab demonstrators/UTAs will have been trained by the Department before they engage in such activities.

Helpers are also expected to assist in the marking of assessed coursework and to participate in the formulation of precise guidelines for the marking schema. Once marked all coursework is returned to the lecturer for moderating.

Finally the Lecturer is expected to monitor the performance of the helper throughout the term; if the person proves to be unsuitable or unsatisfactory he or she is expected to contact the relevant Tutorial Support Coordinator with a view to finding a replacement.

Teaching Associates.

Teaching Associates are at present, requested by the Department to provide academic with one course per term: a total of 10 tutorials plus the marking of the corresponding assessed coursework.

Research Assistants.

At present, Research Assistants are requested by the Department to provide academic help with one course per term: a total of 10 tutorials plus the marking of the corresponding assessed coursework.

2. Personal Tutors

All students are allocated a personal tutor for the duration of their studies. The role of the personal tutor is to support:

1. Academic Development. This involves providing input in the following ways:

Study skills: Advise students on drawing up study plans, learning strategies, time management, note taking in lectures, how to research a topic and write a report. Information on study skills is issued in the 'Learning to Learn' booklet which each student receives early in their first year of study.

Exam preparations: Advise students on preparing for assessment and examination. The College runs special Exam Stress Workshops at the Health Centre; students who report exam stress problems will be advised to attend these workshops either by their Personal Tutor or the Senior Tutor.

Examiners meeting: Personal Tutors may be asked to comment on their tutee's performance, particularly if there are any special circumstances that need to be considered, at departmental examiners meetings.

Academic progress: Assist students to develop responsibility for their own academic progress. Monitor and review student academic progress and provide reports on this to Senior Tutor and departmental files where requested.

2. Professional Development: This in part overlaps with and builds on aspects of the Personal Tutor's role in student academic development.

References: Students usually name their Personal Tutor as a referee on job applications and/or applications for further study, and this can continue long after a student has graduated. When writing references Personal Tutors will make sure they are factually correct and any opinion expressed in them could be justified on reasonable grounds if ever questioned.

Personal development plans: Students can discuss their personal development plans as it helps them take charge of their own educational, personal and career development by reflecting on what and how they are learning.

Career planning: Personal Tutor will often advice about selecting option courses and on choosing a career direction. Similar advice will be offered on suitable vacation work.

Curriculum Vitae: Some students might ask for advice on preparing a CV. All MEng students prepare CV's for their industrial placement.

3. Pastoral Care: Students are able to discuss with their Personal Tutor any problems they might have, including personal problems. Personal tutors give students compassionate assistance and if appropriate give advice, but will refer serious cases to the Senior Tutor.

In addition, personal tutors play a major role in identifying "At Risk" Students, who they will normally refer to the Senior Tutor. Absence, e.g. due to illness: forced absence, or requests for absence from the student are also referred to the Senior Tutor.

3. Senior Tutor

The Senior Tutor has overall responsibility for the academic and pastoral care of undergraduate students in the department.
The Senior Tutor carries out the following range of activities:

* Ensure that each undergraduate student is allocated a personal tutor and that the personal tutorial system works effectively, e.g. that personal tutors meet regularly with their tutees.
* Liaise with the Director of Undergraduate Studies to ensure that the pastoral and academic roles of personal tutors fully support the degree programmes.
* Liaise with personal tutors to monitor the academic progress of students and take action where necessary whey there is cause for Concern.
* Liaise with personal tutors to monitor student attendance.
* Liaise with the College Disabilities Officer and the Registry to ensure that students with special educational needs are advised and assisted appropriately.
* Liaise with Registry to implement the withdrawal procedure where there is no improvement over an extended period.
*Advise on individual student problems as referred by personal tutors or directly to students as an alternative to the personal tutor.
* Refer students to other sources of help in the College as appropriate and liaise with these other agencies.
* Inform Boards of Examiners of extenuating circumstances affecting in students performance.
* Advise students who fail examinations and are required to withdraw from the College
* Advise students wishing to withdraw from the College or transfer from another department.
* Maintain accurate and comprehensive student records for the Department, liaising with Registry as appropriate.
* Provide regular reports on students as required to LEAS and other funding bodies.
* Provide references for students, liaising with personal tutors as necessary.
* Serve as member of Staff-student Committee.
* Serve as member of other departmental/Faculty/College committees concerned with student learning and welfare as appropriate.
* Serve as member of College Disciplinary Committees or Appeals
* Administer nominations for prizes and scholarships.
* Take responsibility for departmental academic procedures, such as the granting of extensions for submission of coursework.
* Take responsibility for dealing with examination irregularities, including plagiarism.
* Deal with disciplinary cases, liaising with College Tutors, Registry and other sections of College as necessary.

4. Special needs provision

Provision for students with disabilities is arranged by the Disabilities Officer in consultation with the College Disabilities Officer under the SENDA guidelines. This includes teaching and examination arrangements. Students are encouraged to access the Disabled Student Allowance where appropriate, or otherwise are supported by the Department.

Students that are likely to require additional support through disability are identified during the admissions process and receive special consideration by the Senior Tutor. Where an interview is possible the Senior Tutor conducts the interview in part to acquire an accurate picture of the applicant's likely needs. The Senior Tutor arranges appropriate support before they arrive, for these students, and for any others who respond to an invitation made with the August admissions letter to declare special needs.

1.9 Undergraduate Exam Papers

Please see DVD for samples

1.10 Availability of Resources

1.10 Availability of Resources

Lecture theatres.

The Department has pursued a rolling programme of refurbishment, which has encompassed all teaching and learning rooms within the department.

Flat rooms.

The Department has flexible flat space which can be used as one large room or divided into up to four smaller rooms. This space was refurbished two years ago. It also has two rooms that each hold forty and can be combined into one larger room. This space is shared with Mathematics.

Laboratories.

The Department's teaching laboratories were refurbished in the summer of 2004. They have over 200 workstations available for students to use at any one time (less than two undergraduates per workstation). We renew over one-third of the workstations and upgrade another one third every year. Those students who prefer to use their own laptops also have access to high-speed wireless networking with dedicated special areas set aside. The Department boasts some of the best university computing facilities in the UK. There are an array of servers for disk space, email, web, and database provision and special purpose equipment for high performance projects. As a practical based subject the department is committed to ensuring that students have sufficient resources to get a good practical education. Equipment is purchased for both courses and project work. For instance in the last year position sensors have been purchased for group and individual projects and compasses and Lego for the Robotics course.

Library.

Students have access to the main College library which has an associated electronic catalogue that is accessible from the world-wide web.

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1.11 Academic Staff Activities, Development and Appraisal

1.11 Academic Staff Activities, Development and Appraisal

The Department is organised into eight sections, which serve both an administrative function as well as reflecting common research interests and collaboration between members. The sections thus indicate the research focus of the Department. Sections also provide a support environment for research students, and for organising seminars and workshops. Senior academics often work with junior staff to formulate research proposals and help to promote their external visibility by involving them in conference organisation, suggesting their names for seminars and invited talks etc.

Below is a brief summary of each research section:

Computational Bioinformatics

The main research focus in Computational Bioinformatics is on the use of Inductive Logic programming, together with vector machine learning for Bioinformatic applications such as identification of toxins which inhibit enzymes in metabolic networks, prediction of 3 dimensional structure of molecules in biochemical reactions for drug development and the missing functions within metabolic and gene expression networks. Main interdisciplinary collaborations are via the College Centre for Bioinformatics.

Computer Systems

The main research focus is on optimisation of performance, productivity and power consumption in designing hardware/software systems. The work includes theory and practice of custom instruction sets, hardware accelerators (e.g. based on FPGAs), static and dynamic architecture and code optimisation, as well as dynamic code generation. The section has strong links with industry and collaborative projects with the EE Department.

Distributed Software Engineering

The DSE section combines sound, rigorous and formal software engineering approaches with practical techniques to build tools for the design, analysis and implementation of complex software systems, with particular interest on those that are distributed, pervasive and/or adaptive. Research topics include software modelling and analysis, requirements engineering, policy-based security and systems management, autonomic computing, language semantics for distributed programming, and data and knowledge engineering for heterogeneous databases and sensor networks. The section is involved in collaborative inter-disciplinary projects related to systems biology and healthcare.

High Performance Informatics

The HPI section focuses on developing sophisticated mathematically-based methods and advanced software technologies to bridge the gap between challenging e-Science applications and the complex computing platforms (distributed resources, the Grid) required to support them. The HPI section works on performance modelling and engineering to provide quantitative understanding of complex systems to provide effective scheduling of resources, Web Services and component software technologies and intelligent Grid middleware to provide software environments to support the advanced application of these methods.

Logic and Artificial Intelligence

The research spans theoretical studies of logical systems and their computational properties, automated reasoning techniques, multi-agent system technologies, cognitive robotics, knowledge representation form

alisms, and applications. There is a particular focus on abductive reasoning and machine learning, and on logics of time, action, and change, agent communication, agent and robot programming languages and organisational structures. The section is involved in collaborative international projects relating to multi-agent systems, web services, business rules and procedures, as well as trust and security in virtual organisations. Several members of the section are working on applications in bioinformatics and systems biology.

Quantitative Analysis & Decision Science

The QUADS section integrates effort in algorithm and software design to offer state-of-the-art quantitative and decision analysis methodology for a wide range of dynamical systems in defence, engineering, economics, finance, infrastructure planning, energy, environment and earth and life sciences. This integration is achieved through the creation of novel algorithmic and semantic foundations and their transfer into frameworks and tools for quantitative analysis and decision systems. Research topics include data mining and knowledge discovery, games, optimization, uncertainty, risk and safety, and security and information flow. The section is involved in collaborative and interdisciplinary projects in grid-based informatics, stochastic and robust optimisation within the context of uncertainty and risk.

Theory of Computational Systems

The research focus includes programming language types and concurrency issues; analysis and verification of programs for correctness, efficiency and security of code; theory relating to distributed processes and data including reasoning about updating XML-based data and structures and fundamental models of dynamic web data. There is also work on new paradigms of computation which includes exact computation, complex systems and quantum computation.

Visual Information Processing

The VIP group works on medical image computing, perceptual intelligence and ubiquitous sensing with a focus on biomedical applications. They develop methods and tools which make use of novel vision and image processing, virtual and augmented reality, biomechanical modelling, machine learning and Bayesian inferencing. There are strong links with the Institute for Biomedical Engineering and the Medical School.

See http://www3.imperial.ac.uk/computing/research/areas for more details about each section.

Staff recruitment, development and training

The Department recognises the importance of training and development for all staff and actively encourages staff to attend relevant personal development courses run by the College. Researchers who teach for example have to undergo departmental training and induction. Probationary lecturers are expected to have completed five mandatory courses or the Imperial College Certificate of Advanced Study in Learning and Teaching (CASLAT) by the end of their probationary period. Half of the Teaching Associates in the Department have also undertaken the CASLAT certificate. Everyone who provides teaching support undergoes our departmental teaching induction. The Department carries out peer review of teaching regularly. It also runs a full appraisal scheme in line with College directives. New Staff are appointed a mentor. All academic staff are expected to maintain an active research programme.

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To assist new academic members of the Department various internal web pages are maintained with information on teaching duties, departmental structure, workshops etc. (see https://www.doc.ic.ac.uk/internal/problecturers/index.html). Other web pages are maintained with information on a wide range of teaching-related topics (see https://www.doc.ic.ac.uk/internal/teachingsupport/index.html). All these arrangements provide effective support and opportunities for student progression and achievement.

Use of teaching fellows, postgraduate tutors, demonstrators and visiting staff

The Department places great emphasis on its teaching and believes that as many staff as possible should have some role in supporting students and their learning. All research staff are expected to undertake certain teaching duties. This usually includes Research Associates and Research Assistants. Nearly all lectures within the Department receive some teaching support. Support staff can help as tutorial helper, give guest lectures on specialised topics that related to their own area of expertise, or can help with the setting and/or marking of assessed coursework. Most will be expected to invigilate exams.

Teaching Associates are specifically employed to carry out teaching duties and to coordinate and supervise lab work. Most Teaching Associates will deliver lectures in varying number. In some cases they deliver and examine whole courses.

Visitors to the Department often give seminars and our students are encouraged to attend these as much as possible. Many of these outside talks from visiting speakers are organised by our departmental student society called DoC SoC. Regular visitors are sometimes invited to deliver guest lectures.

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Academic staff

1 **Full name and title**	2 **Present post**	3 **Area of expertise and Senior Departmental roles/responsibility**	4 **Professional Activity, e.g. membership of professional bodies, external examiner, ,QAA reviewer etc**
Dr Jeremy Bradley	Lecturer	High Performance Computing. Undergraduate Admissions Tutor and Schools Liaison Officer	2004-2007 EPEW Programme Committee member. 2006 Member of EPSRC ICT Final Report Panel
Dr Krysia Broda	Senior Lecturer	Logic and Artificial Intelligence. PhD Admissions Tutor Coordinator of Postgraduate Studies	IFIP AI 2006-07: 'Artificial Intelligence in Theory and Practice', part of the 19th IFIP World Computer Congress. Acquired MBCS and CITP (Chartered IT Professional) status.
Prof Keith Clark	Professor	Logic and Artificial Intelligence. Alumni Coordinator.	Association of Logic Programming: Designated Founder and Pioneer of Logic Programming. Invited Keynote Speaker at Applied Computing, Salamanca, Feb. 2007: Contract Related Agents. Editorial Board, Journal Co-operative Information Systems.
Dr Simon Colton	Senior Lecturer	Bioinformatics. PhD Admissions Tutor, Deputy Undergraduate Admissions Tutor	Chair/co-chair of 7 international workshops, and the programme chair of the AISB convention. Special issue editor of the Machine Learning Journal. Committee membership for the UK AISB society (2001 - 2007) & guest editor AISBJ Journal
Mrs Margaret Cunningham	Senior Lecturer	Senior Tutor & Disabilities Officer	
Prof John Darlington	Professor	High Performance Informatics. Director London e Science Centre, Head of Section	Key note speaker Summer Conference on Topology and its applications 2004
Dr Andrew Davison	Lecturer	Visual Information Processing	EPSRC Advanced Research Fellowship 2002-07 Dyson Ltd Consultant. Programme Committee ICCV 2007, Robotics: Science and Systems 2005--2007.
Prof Sophia Drossopoulou	Professor	Theory of Computational Systems (THEORY)	Program Committee Chair for European Symposium on Programming (ESOP) 2008 Associate Editor in Chief IEEE Software Member of the ESPRC College January 2006 – December 2010 2007 WOSP Publicity Chair and Programme Committee Member

Dr Naranker Dulay	Senior Lecturer	Distributed Systems Engineering	Delegate, British Council IT Mission to India, May 2007. Programme Committee: Middleware 2007, 8th Intl Middleware Conference, Orange County, USA, Nov 2007. Programme Committee: MMM-ACNS 2007, Intl Conf Mathematical Methods, Models and Architectures Programme Committee: AMACS 2007, Workshop on Adaptive Methods in Autonomic Computing Systems, Florida, USA. June 2007.
Prof Abbas Edalat	Professor	Theory of Computational Systems (THEORY) Head of Section	Member of Editorial Board of Mathematical Structures in Computer Science 20O0-2OO7 Guest Editor Special issue on Domain Theory, Mathematical Structures in Computer Science, volume 14,2004 A Continuous Derivative of Real Functions, Invited article in New Computational Paradigms, Changing Conceptions of What is Computable,
Prof Susan Eisenbach	Professor	Distributed Systems Engineering Director of Studies	Co-Editor-in-Chief of IET Software. Member of Swedish Research Council Computer Science Board. Fellow of the British Computer Society Member of editorial board for the Journal of Object Technology. Member of Victoria University of Wellington Advisory Board.
Dr Anthony Field	Reader	Deputy Director of Studies, Undergraduate Studies Coordinator, Undergraduate Projects Organiser	PC Co-chair, International Conference on Modelling and Simulation of Computer and Telecommunication Systems (MASCOTS), 2007. Awarded Envision's prestigious inaugural Award for Teaching Excellence in Engineering Education. CEng and Member of IET.
Dr Philippa Gardner	Reader	Theory of Computational Systems (THEORY)	RAE/Microsoft Senior Research Fellowship. Invited lecture course on `Local Reasoning about Data Update' at the PhD summer school in 2005 associated with the EU Working Group APPSEM
Prof Duncan Gillies	Professor	Visual Information Processing ISO Coordinator	International Editorial Board Member, Machine Vision and Graphics Journal (since 1994)
Prof Yike Guo	Professor	Parallel applications and network computing Director of Data Mining Technical Director of ICPC	Editor Journal of Computational Bioinformatics Editor Journal of System Biology Editor Journal of Computational Management Science Invited Speaker and Scientific Committee in Grid@Asia Finalist THES award

Prof Chris Hankin	Professor	Quantitative Analysis and Decision Support Deputy Principal of the Faculty of Engineering	Editor-in-Chief ACM Computing Surveys (April 2007-March 2010) Chair ESOP Steering Committee (2006 --) Member of Advisory Board, Institute for Informatics and Mathematical Modelling, Danish Technical University (2006-2008) PC Chair Static Analysis Symposium (2005), SAS PC (2001-2007)
Prof Peter Harrison	Professor	High Performance Informatics Mathematics Coordinator	Editor, Performance Evaluation Journal. Invited keynote at Performance Modelling, Engineering and Optimisation, IPDPS, March 2007.
Prof Ian Hodkinson	Professor	Logic and Artificial Intelligence. Post Graduate Senior Tutor	Editor, Algebra Universalis (1999-) Plenary talk, British Logic Colloquium, Oxford, September 2006 This is the UK's premier conference for all aspects of logic, held annually. Invited talk, Advances in Modal Logic (Toulouse, Oct 2002). AiML is the main world organisation for developments in modal logic. See http://www.aiml.net/ Co-chair, program committee of Advances in Modal Logic 2006, steering committee 2004-12
Dr Christopher Hogger	Senior Lecturer	Logic and Artificial Intelligence. First Year Coordinator	Co-chair, program committee of Advances in Modal Logic 2006, steering committee 2004-12 Conference Co-Chair, Int. Conf. on Computational Intelligence and Intelligent Systems [ICCISS-2007], London, UK, 2007. Programme Committee Member, Int. Conf. on Computational Intelligence, Man-Machine Systems and Cybernetics [CIMMACS-05],
Dr Michael Huth	Reader	Quantitative Analysis and Decision Support Third Year Coordinator	Co-chair 13th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'07), co-edited Springer LNCS 4424, 738 pages, March 2007 Steering Committee Member of the European Joint Conferences on Theory and Practice of Software (ETAPS), October 2006 - September 2007 Guest Editor Vol. 9, No. 1, February 2007, Special Section on Advances in Automated Verification of Critical Systems International Journal on Software Tools for Technology Transfer (STTT) Programme Committee Member of TACAS 2004 - 2008,

Prof Paul Kelly	Professor	Head of the Software Performance Optimisation research group. Deputy Senior Tutor	PC Co-chair, International Conference on Modelling and Simulation of Computer and Telecommunication Systems (MASCOTS), 2007. Invited address at the 2006 PASTA (Process Algebra and Stochastically Timed Activities) Workshop. PC Co-chair, International Conference on Modelling and Simulation of Computer and Telecommunication Systems (MASCOTS), 2007. PC member, WOSP (Workshop on Software Performance), 2007
Dr William Knottenbelt	Senior Lecturer	High Performance Informatics Industrial Liaison Officer, Deputy MSc Computing Course Coordinator,	Business Fellow in the London Technology Network International Conference on Quantitative Evaluation of Systems (QEST 2007) Tools Chair Invited lecture on “Tackling Large State Spaces” at School on Formal Methods (SFM-07), Bertinoro, Italy May 2007. Program Committee Member for MASCOTS 2007, PDMC 2007, ICSEA 2007, SMCTools 2007, PMEO-PDS 2007, PAEWN 2007, ADVCOMP 2007. Winner of the Engineering Teaching Prize from Royal Academy of Engineering
Prof Jeff Kramer	Professor	Distributed Systems Engineering Dean of Engineering	2006 Editor-in-Chief of IEEE Transactions on Software Engineering (IEEE TSE) FACM 2007 Awarded Fellowship of the City and Guilds of London Institute.
Dr Daniel Kuhn	Lecturer		Member of the program committee of the Computational Management Science Conference 2008 at Imperial College, London Principal grant holder: Active Portfolio Management Using Stochastic Programming. Fellowship from Swiss National Science Foundation (Grant Nr. PBSG2-108890, April 2006-March 2007)
Dr Alessio Lomuscio	Senior Lecturer	Logic and Artificial Intelligence Research Grants Facilitator	Programme vice chair IAT07 - 6th IEEE/WIC/ACM International Conference on Intelligent Agent Technology Senior PC member for AAMAS International Joint Conference on Autonomous Agents & Multi-Agent Systems 2005-2007 PC IJCAI 2005-2007

Prof Wayne Luk	Professor	Custom Computing Research Group Head of Section	Founding Co-Editor-in-Chief, ACM Transactions on Reconfigurable Technology and Systems, 2007 Program Co-Chair, 2006 and General Co-Chair, 2007, IEEE International Conference on Application-Specific Systems, Architectures and Processors (ASAP). Program Co-Chair, 2006 and General Co-Chair, 2007, IEEE International Conference on Application-Specific Systems, Architectures and Processors (ASAP).
Dr Emil Lupu	Reader	Distributed Systems Engineering European Studies Coordinator	IBM Faculty Award - PARIS A Policy Analysis, Refinement and Integration System. Membership of the Program Committee of the IFIP/IEEE Symposia on Integrated Network Management and Network Operations and management - 1999-2007. Invited keynote: IEEE Workshop on Policies for Distributed Systems and Networks, Bologna, June 2007.
Prof Jeff Magee	Professor	Distributed Systems Engineering Head of Department	Winner (with Jeff Kramer) of the 2005 ACM SIGSOFT Outstanding Research Award http://www.sigsoft.org/awards/outResAwd.htm Associate Editor of ACM Transactions on Software Engineering and Methodology from 2003 – 2006 Full Member of IFIP WG 2.9 on Requirements Engineering Distinguished Speaker Series Winter-Spring 2006 2007
Prof Istvan Maros	Professor	Quantitative Analysis and Decision	Academic Doctor of Science (DSc) title from the Hungarian Academy of Sciences, Budapest, Defended: 14/06/2006, title awarded: 05/12/2006. Member of International Program Committee: Conference on Computational Management Science 2003-2007
Dr Peter McBrien	Senior Lecturer	Distributed Systems Engineering Computing Support Coordinator	Chair of DIWeb 2004, and PC member 2004-2006 CAiSE Conference "Doctoral Consortium" panel member 2005 onwards, and co-chair 2008
Dr Julie McCann	Reader	Distributed Systems Engineering Post Graduate Senior Tutor	Technical director - DTI funded £1M Bop project CAiSE Conference "Doctoral Consortium" panel member 2005 onwards, and co-chair 2008 Programme Committee ACM/IEEE International Conference on Autonomic Computing (ICAC) (2005-present)
Dr Oskar Mencer	Senior Lecturer	Computer Architecture Research Deputy ISO Coordinator	Advanced Research Fellowship plus ~500K EPSRC grant, one of three EURYI nominees in Science and Engineering from the UK, 2005. Keynote: IEEE COOL Chips Conference, April 2006. DAFCA Inc., Technology Advisory Board.

Prof Stephen Muggleton	Professor	Computational Bioinformatics Head of Section	Royal Academy Chair in Machine Learning Director of Modelling at the Centre for Integrative Systems Biology at Imperial College (CISBIC) Editor-in-chief of the Machine Intelligence Series Fellow of American Association for Artificial Intelligence RAEng Research Chair in Machine Learning (2007-2012) Royal Institute Lecture on Computational Systems Biology, June 2007.
Dr Maja Pantic	Reader	Visual Information Processing Multimodal Human-Computer Interaction	Associate Editor of the International Journal on Image and Vision Computing) Member of the Young Academy, Dutch Royal Academy of Arts and Sciences, nominated for the membership as the sole nominee of Dutch Scientific Organization, May 2007 (final decision due in November 2007) Associate Editor of the IEEE Transactions on Systems, Man and Cybernetics – Part B: Cybernetics Key Note: “Machine Analysis of Facial Expressions” Int’l Conference on Artificial Intelligence Applications and Innovations (AIAI 2006), Athens, Greece, June 2006
Dr Dirk Pattinson	Lecturer	Theory of Computational Systems (THEORY) Mathematics Coordinator	Guest Editor, special issue of ``Mathematical Logic Quarterly'' on Recent Trends in Constructive Mathematics (with Schuster, Berger, Zappe) PC Member, ``Conference on Algebra and Coalgebra in Computer Science'' (CALCO 2007), Bergen, Norway Joint editor of special issue of journal Theoretical Computer Science devoted to selected papers from the 12th International Workshop on Expressiveness in Concurrency (will appear 2007/8).
Dr Iain Phillips	Senior Lecturer	Theory of Computational Systems (THEORY) Examinations Coordinator	Co-chair of 12th and 13th International Workshops on Expressiveness in Concurrency Joint editor of special issue of journal Theoretical Computer Science devoted to selected papers from the 12th International Workshop on Expressiveness in Concurrency (will appear 2007/8).

Dr Peter Pietzuch	Lecturer	Distributed Systems Engineering	IEEE Distributed Systems Online Editorial Board Appointment (pending IEEE CS Pubs board approval) Co-organiser DEBS 2007; DEBS steering committee PC DEBS 2004-2006 (Distributed Event-Based Systems) PC GLOBECOM 2007 (IEEE Global Telecommunications Conference) PC RDDS 2006-2007 (Reliability in Decentralized Distributed Systems) PC IPDPS 2008 (Parallel & Distributed Processing Symposium)
Prof Daniel Rueckert	Professor	Visual Information Processing Deputy PhD Admissions Tutor	Associate Editor: IEEE Transactions on Medical Imaging (since 2003) Guest Editor: IEEE Transactions on Medical Imaging – Special Issue on Mathematical Methods in Biomedical Image Analysis: To appear 2007 Conference Chair and Organizer: IEEE Computer Science Workshop on Mathematical Methods in Biomedical Image Analysis (MMBIA) 2006 Entrepreneurial activities: Advisory board (scientific) of VisionRT (http://www.visionrt.com) which produces real time 3D surface imaging systems for applications including image guided surgery and facial biometrics.
Dr Alessandra Russo	Senior Lecturer	Distributed Systems Engineering JMC Course Director	Co-editor of IEE Proceedings Software, May 2005 – June 2006, editor in Chief form 2006 Automatica; Computational Management Science; Assoc
Prof Berc Rustem	Professor	Quantitative Analysis and Decision Head of Section Director of Finance	Programme co-chair Computing in Economics & Finance, 2006, program member for Computing in Economics & Finance, 2001, 2, 3, 4, 5; 5th International Conference on Computer Science, 2004; Computational Management Science, 2003, 4, 5, 5, 7. Chair of ASAMI (Agent societies for ambient intelligence) 2007 Programme co-chair Computing in Economics & Finance, 2006, program member for Computing in Economics & Finance, 2001, 2, 3, 4, 5; 5th International Conference on Computer Science, 2004; Computational Management Science, 2003, 4, 5, 6, 7.

Dr Fariba Sadri	Senior Lecturer	Logic and Artificial Intelligence MSc Computing Science Coordinator, MSc in Advanced Computing	Chair of ASAMI (Agent societies for ambient intelligence) 2007 Chair of AmITA (Ambient intelligence technologies and applications) 2007 Invited speaker at Fourth International Conference of Applied Mathematics and Computing, Bulgaria, August 2007 Programme Committee: AAMAS 2007 (International Conference on Autonomous Agents and Multiagent Systems), Programme Committee: IADIS 2007 (International Conference Intelligent Systems and Agents) Programme Committee: ICCIIS 2007 (International Conference of Computational Intelligence and Intelligent Systems)
Prof Marek Sergot	Professor	Logic and Artificial Intelligence MSc in Bioinformatics Coordinator & Head of Section	Keynote speaker 8th International Conference on 'Engineering Societies in the Agents World' (ESAW'08), Athens, October 2007. Editorial board: Journal of Artificial Intelligence and Law (Kluwer/Springer). Editorial board: Journal of Applied Logic (Elsevier). Fellow of the British Computer Society
Prof Murray Shanahan	Professor	Logic and Artificial Intelligence Cognitive Robotics	Author of two invited encyclopedia articles (Macmillan Encyclopedia of Cognitive Science and Stanford Encyclopedia of Philosophy) Reviewer for EU FP6 project Mathesis Chair of UKCRC Grand Challenge 5: The architecture of brain and mind
Prof Morris Sloman	Professor	Distributed Systems Engineering Director of Research, Deputy Head of Department.	2006 Fellow Royal Academy of Engineering 2005, 2006 Chairman funding panel for Nederlandse Organisatie voor Wetenschappelijk Onderzoek Global Computer Science Program (GLANCE) 2006 Defence Scientific Advisory Council, Information Superiority Board.
Dr Francesca Toni	Senior Lecturer	Logic and Artificial Intelligence Second Year Coordinator	Senior Research Fellowship from The Royal Academy of Engineering and the Leverhulme Trust, 1 August 2006-31 July 2007 Prize for best paper at ATAL2001 Now AAMAS conference: Dialogues for negotiation: agent varieties and dialogue sequences, by Fariba Sadri, Francesca Toni and Paolo Torroni.

Dr Sebastian Uchitel	Reader	Distributed Systems Engineering	Philip Leverhulme Prize. The Leverhulme Trust, 2005. Associate Editor of the IEEE Transactions on Software Engineering (TSE) from 2006. Program Co-Chair of the 32nd IEEE/ACM International Conference on Software Engineering, Cape Town, 2010 Steering Committee Member of the IEEE/ACM Automated Software Engineering Conference since 2006.
Dr Steffen van Bakel	Lecturer	Theory & Formal Methods Fourth Year Coordinator	Co-editor for special issue for Annals of Pure and Applied Logic on Classical Logic and Computation. Programme Co-Chair and organiser for the Classical Logic and Computation (CL&C 2006) workshop, Venice, Italy, July 15, 2006. Guest editor for Annals of Pure and Applied Logic; preparing special issue on Classical Logic.
Dr Herbert Wiklicky	Senior Lecturer	Quantitative Analysis and Decision Seminars Coordinator	Keynote Talk at MFCSIT06: 4th Irish Conference on the Mathematical Foundations of Computer Science and Information Technology, Cork, August 2006 Keynote Talk at MFCSIT06: 4th Irish Conference on the Mathematical Foundations of Computer Science and Information Technology, Cork, August 2006 Guest Editor TCS: Quantitative Aspects of Programming Languages, 2007 Invited Observer IFIP WG 2.2 "Formal Description of Programming Concepts"
Prof Alexander Wolf	Professor	Distributed Systems Engineering Head of Section	Fellow of the ACM Chair, ACM SIGSOFT (3000 member organization) Keynote, 12th Int. Symposium on Foundations of Software Engineering Member, ACM Council Associate Editor, ACM Transactions on Software Engineering and Methodology Associate Editor, IEEE Transactions on Software Engineering

Prof Guang-Zhong Yang	Professor	Visual Information Processing Director of Medical Imaging & Head of Section	Royal Society Research Merit Award – in recognition of personal research achievements and international research profile. Tyco Healthcare Global Advisory Board PI for Major Collaborative Grants - SAPHE: Smart and Aware Pervasive Healthcare Environment, DTI £3.6M, involving major industrial partners including BT, Philips, and Medtronic. Associate Editor IEEE TMI General Chair: BSN 2004, BSN 2005, PC Chair BSN 2006 – Pioneering effort in Body Sensor Networks, now a fast moving inter-discipline research field that has significant impact on the future development of pervasive healthcare.
Dr Nobuko Yoshida	Reader	Theory of Computational Systems (THEORY)	EPSRC Advanced Fellow Web Services Choreography Working Group Invited Expert **POPL 2008** the 35th ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages, Programme Committee Member. **FoSSaCs 2008** Foundations of Software Science and Computation Structures (a member conference of ETAPS), Budapest, Spring 2008. Programme Committee Member. **CONCUR 2007** the 18th International Conference on Concurrency Theory, Programme Committee Member.

1.12 Industrial Contacts and Participation

1.12 Industrial Contacts and Participation

The Industrial Liaison Board

We acknowledge the importance of formal input from industry to help guide the Department's future teaching and research activities. Our Industrial Liaison Board (ILB), which consists of senior industrialists from a range of industry sectors, in line with the Department's student career destination profile, convenes once a year. Members are drawn from senior technical management and have an empathy with the goals of an engineering education. The Board includes:

* two representatives from relevant professional bodies (e.g. IET, BCS)
* one representative from College industry-related professional support services (e.g. the Research Development Unit)
* one representative from Academic Committee
* one representative from Research Committee

The Board's Terms of Reference is as follows:

* To advise the Department on the industrial relevance and suitability of the curriculum of its taught courses (both undergraduate and postgraduate), including suggestions for new (or changes to existing) courses and degree programs
* To review the Department's portfolio of research projects, both planned and current, with respect to their industrial relevance and suitability, and to support them with practical help, letters of support, internships etc.
* To identify opportunities for commercialisation of research
* To identify overlapping interests and to facilitate the formation of research consortia in precompetitive areas
* To explore other ways in which the Department can catalyse, encourage and foster a higher level of industry involvement in its degree and research programmes
* To identify any recent or longer term developments and/or concerns of industry which are likely to have a significant impact on the Department's activities
* To advise on major strategic initiatives, such as the establishment of research centres, fund-raising initiatives etc.
* To award a final year undergraduate project as the winner of the Industry Project Prize

The current membership of the Industrial Liaison Board is:

Professor Robert Berry, IBM
Dr Robert Chatley, Google
Mr Patrick Goldsack, HP
Mr Simon Holden, Morgan Stanley
Dr David Jeffery, Betfair
Professor David A. Oxenham, Dstl
Dr Mike Rodd, British Computer Society
Dr Will Knottenbelt (Department of Computing, Imperial College)

Ms Amy Allinson (Department of Computing, Imperial College)

The Boards inaugural meeting will be on the 20th May 2008.

Industry Lectures

Where appropriate, we invite members of industry to give guest lectures on our courses and to contribute to the supervision (in a non-executive capacity) of individual projects. This year, for example, guest lectures were given by Ian Page (Seven Spires Investments) on entrepreneurship and Robert Chatley (Google) on software testing and domain-specific languages. Nat Pryce (UBS Consultant) will be contributing lectures on software engineering in the forthcoming academic year.

Individual and Group Projects

A large number of individual and group projects are inspired by, and in some cases proposed by, our industry collaborators. For example, this year's projects include industry-inspired projects from IBM (parallel pub/sub infrastructure) Betfair (strategy testing, ecosystem modelling), Alcatel-Lucent (access control policies), IBM TJ Watson Research Laboratories NY (information quality in mobile sensor networks), Introversion Software Ltd (AI automation of game playing avatars), Chelsea and Westminster Hospital (neo-natal nutrition database), Functional Intelligent Training (online gym booking), Nokia (A distributed filesystem for mobile phones), IBM (RAID systems modelling), Trayport (Multi-agent trading simulations), Ubisense (Location tracking), Escher Technologies (Tool support for Object-Z).

Industrial sponsorship / training

The Six-Month Industrial Placement for MEng Computing students

The MEng undergraduate programme consists of four years of study, including six months of industrial training in the summer term of their third year**.** Acceptance on this programme is conditioned by a result of at least 60% at the end of their second year of studies. The placement takes place from the beginning of April to the end of September, after the second term of the third year. During this time, the students typically work on a small number of (usually one or two) large projects.

Participating companies this year include ARM, Barclays Capital, Betfair, Citi, Credit Suisse, Deutsche Bank, FactSet Europe Ltd, Formicary, Goldman Sachs, Google Irvine, IBM, KBC Financial Products, LShift, MIK, Morgan Stanley, NewVoiceMedia, Philips, Pixel Addicts Ltd, Symbian, Thales, UBS, Vodafone and youDevise.

The department employs an Industrial Liaison Officer who co-ordinates the application process, including testing, interviews and placement offers. Although it is usually preferable for the students to be interviewed at the company, company representatives can also meet and interview students in the department. Before recommending a particular placement to the students, the department has to ensure that the company will provide suitable projects and that the students will get adequate supervision by a qualified member of staff.

Students are paid for their work whilst on placement. However, the College does not stipulate a rate of pay, so this will be agreed between the company and the student. Other statutory terms and conditions will also apply, including holiday leave allowance. These conditions will be stipulated in the contract of employment or appointment letter agreed between the company and their employee, i.e. the student.

The student keeps in close contact with the department during their placement. In the period June/July the tutor and/or the industrial Liaison Officer will visit the student and their mentor/supervisor at their place of work. At the end of the visit the tutor submits a report on the student’s progress, the level of supervision they are receiving and the suitability of the placement itself. the tutor will notify the supervisor of any perceived problems or recommendations. Companies are generally very receptive to suggestions and generally act quickly to resolve any problems.

Throughout the placement, the student will be monitored by their academic tutor, who will also visit them at their workplace during this period. The tutor will also get in touch with the students manager/ mentor to gauge how the student is doing. The tutor's assessment, made during a visit at the placement site, will go on the student's personal file.

Students are required to hand in a logbook containing an executive summary and a week-by-week account of their work. The logbook contains:

- a brief description of the organization and where they worked.
- a one page description of each week's work.
- an explanation of the key technical tasks, difficulties and achievements.
- a conclusion outlining the skills the students have acquired, the lessons they have learned and the extent to which they were able to link their work experience to their course of study.

The logbook is signed by their Company supervisor or manager before they leave the placement.

The students are also required to prepare a typed four page executive summary of their placement outlining where they worked, what they aimed to do, what they actually did and what they learned whilst on placement. The objective of the summary is to enable the reader to understand the whole placement by reading just a few pages.

In the first week of the autumn term students are required to make a presentation to academic staff and industrial visitors
describing their industrial placement experience and outcomes. The presentation makes up 40% of the final placement grade. The remaining 60% of their final placement grade are determined as follows:

– At or near the end of the placement, the student's line manager will complete a quantitative questionnaire about the students placement performance, including questions about the quality of their logbook and executive summary.

– The tutor uses the output from the questionnaire, together with the logbook and executive summary, and details of the visit, to determine a mark for the placement.

Industrial Sponsorship

Companies can provide support for teaching in the form of donation of or substantial discounts for equipment or software for teaching as this provides exposure to students who then become decision makers in industry. Examples include the Apple Computing Laboratory, SunSite archive servers, Sony Playstations, custom hardware development kits from Altera, Xilinx, Celoxica and Symplicity, and the Medical Imaging Computing Laboratory. Companies have also provided funding for high-profile infrastructure such as the Systems Engineering Studios partly funded by Symbian.

Companies are invited to sponsor prizes for outstanding student achievements such as academic excellence in examinations, or exemplary individual or group project work. These prizes are displayed on our web site and are announced at Imperial's annual Commemoration Day ceremonies. Minimum prize sponsorship is £1000 per year for a minimum of five years, with prizes taking the form of cheques, book tokens or medals. Companies that already offer prizes are BT, IBM, Formicary Software, Microsoft, Deutsche Bank, Stanley, Phillips and Trayport,

Morgan Stanley also offer one-off bursaries of £500 to the top ten students in the first year; the recipients are chosen on the basis of a test taken prior to the Christmas break.

4.8 Scholarship/research and consultancy

Our academics provide a very broad range of expertise in all aspects of Computing which companies respect and call upon for consultancy or collaborative research.

All our academics have teaching responsibilities and all our research staff are expected to play some role in teaching support. Their research interests and expertise invariably feeds into their teaching and thus paves the way for innovative education. For example, a significant proportion of student projects are motivated by current research in the Department. Each year, a number of student projects (both individual and group) lead to published research papers. In addition, it is quite common for coursework and laboratory exercises, for third and fourth year courses in particular, to be inspired by problems resulting from recent research.

A particularly successful scheme is the College's Undergraduate Research Opportunities (UROP) scheme that gives students the opportunity to contribute to the activities of a research team via small-scale projects, usually over the summer vacations. Students are normally paid for their contribution with funding from research grants or industry. The Department is an enthusiastic contributor to this scheme with, typically, around ten students per year participating. We find that a significant proportion of students who have been employed under UROP move into research (e.g. via a PhD) after graduation. Students who have participated in the scheme invariably benefit from the experience when it comes to their individual project, as they tend to choose projects with a high research content.

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1.13 Student Demand for Programmes

1.13 Student Demand for Programmes

The undergraduate degrees offered by the department are oversubscribed. Even with an entry criteria of three A levels at grade A or equivalent the number of applicants applying for a place on the relevant courses far outnumbers the number of places available by 5 to 1 or higher. On average every Student accepted on an Undergraduate Computing course within the department has 30+ A level or equivalent points before entry (in 2007/08, the average was 35 points).

In 2007, the number of applicants for an undergraduate course was 705. We made approximately 320 offers, after either an interview or admissions test, and saw 180 applicants select Imperial as their first choice. From those 180 students, we selected the best 117 students, 25 of whom were overseas and 19 of whom were EU students.

1.14 One Year Placement Abroad Programme

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1.14 One Year Placement Abroad Programme

M.Eng (International Programme of Study) G402

A requirement of the M.Eng (International Programme of Study) is that students must spend either their two terms of their third year or the whole of their fourth year abroad at a participating institution. Students will take an approved selection of courses from the institution they are attending. These will be of the same overall standard as courses offered to other MEng Computing students and earn marks commensurate with those earned at Imperial College.

To qualify for the MEng Computing (International Programme of Study) a student must obtain a mark of at least 60% in Parts II and III, and must be accepted at a participating institution approved by the Department. Acceptance is usually dependent on recommendation by the Department, but this recommendation will only be made if the Department obtains assurances from appropriate authorities in the College, or participating institution, on the suitability of the student regarding the language of study, the available course options and any special needs of the student.

Students can receive financial support from the College for additional expenses accrued during this exchange year. Links to these Institutions are maintained under the Erasmus Scheme. Below are some of the institutions we currently send our students to:

INP Grenoble ENSIMAG

ENSIMAG
BP 72
F-38402 St Martin d'Hères

TELECOM PARIS
école nationale supérieure des télécommunications

Télécom Paris (école nationale supérieure des télécommunications)
46, rue Barrault - 75634 Paris Cedex 13

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Universität Karlsruhe (TH) Fakultät für Informatik

Universität Karlsruhe
Fakultät für Informatik
Postfach 6980
76128 Karlsruhe
Germany

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Swiss Federal Institute of Technology Zurich
(Recipient)
ETH Zentrum
CH - 8092 Zurich
Switzerland

1.15 Career Prospects for Graduates

1.15 Career Prospects for Graduates

Career opportunities

Computers are widely used in a great variety of industrial and commercial organisations and the demand for computing graduates exceeds the supply. Thus there is a wealth of opportunities for new graduates seeking both creative and rewarding work. In addition to the major computer manufacturers and software houses, most large industries now write much of their own specialised software and many also design projects with embedded microprocessors; these include companies dealing in oil, chemicals, telecommunications, instruments, microelectronics, transport and aerospace.

For graduates with a commercial inclination there are many opportunities in areas such as management consultancy and accountancy. Employers range from small companies to large multi-nationals offering scope for work and travel abroad.

According to the latest Association of Graduate Recruiters survey, one of the largest increases in graduate vacancies is expected to be in the Information Technology sector. Starting salaries in this sector remain some of the highest. Graduates in joint Honours are well qualified for careers in both disciplines and there is a growing need for professionals well versed in both areas of expertise.

The Department has close working relationships with many of the major employers of computing graduates—not only IT and communications companies such as Microsoft, IBM, Hewlett-Packard, BT and Philips, but also important computer users, including investment banks and finance houses.

These established industrial links, as well as summer internships and, in particular, the MEng Computing course's six-month industrial placement, help a wide range of organisations worldwide to meet our students. It is quite common for our students to receive firm job offers long in advance of graduation, on the basis of their internship or industrial placement.

Many of our graduates also go on to work for smaller IT companies and quite a few have started their own businesses.

However, not all computing graduates end up working in a technology-related sector. Some go into management consulting or enter the accountancy profession, where a good knowledge of computing can be a great advantage. Others take up careers in corporate strategy and marketing or as business analysts in investment banks.

Below are the national figures for Computing graduate employment (taken from http://www.prospects.ac.uk/cms/ShowPage/Home_page/What_do_graduates_do__2008/charts_and_tables_pages/p!eaLjjjF?subject_id=17):

Survey Response	
Men	9470
Women	2330
Total in survey	11800
Total number graduating	15145
% in survey	77.9%

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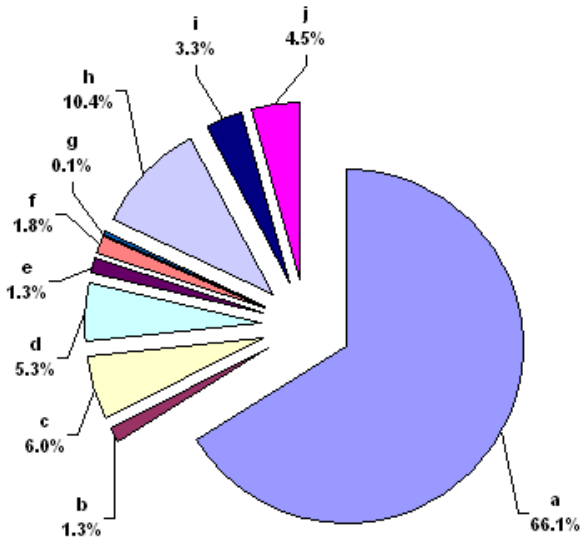
» Destinations



a:	In UK employment	66.1%
b:	In overseas employment	1.3%
c:	Working and studying	6.0%
d:	Studying in the UK for a higher degree	5.3%
e:	Studying in the UK for a teaching qualification	1.3%
f:	Undertaking other further study or training in the UK	1.8%
g:	Undertaking further study or training overseas	0.1%
h:	Believed to be unemployed	10.4%
i:	Not available for employment, study or training	3.3%
j:	Other	4.5%

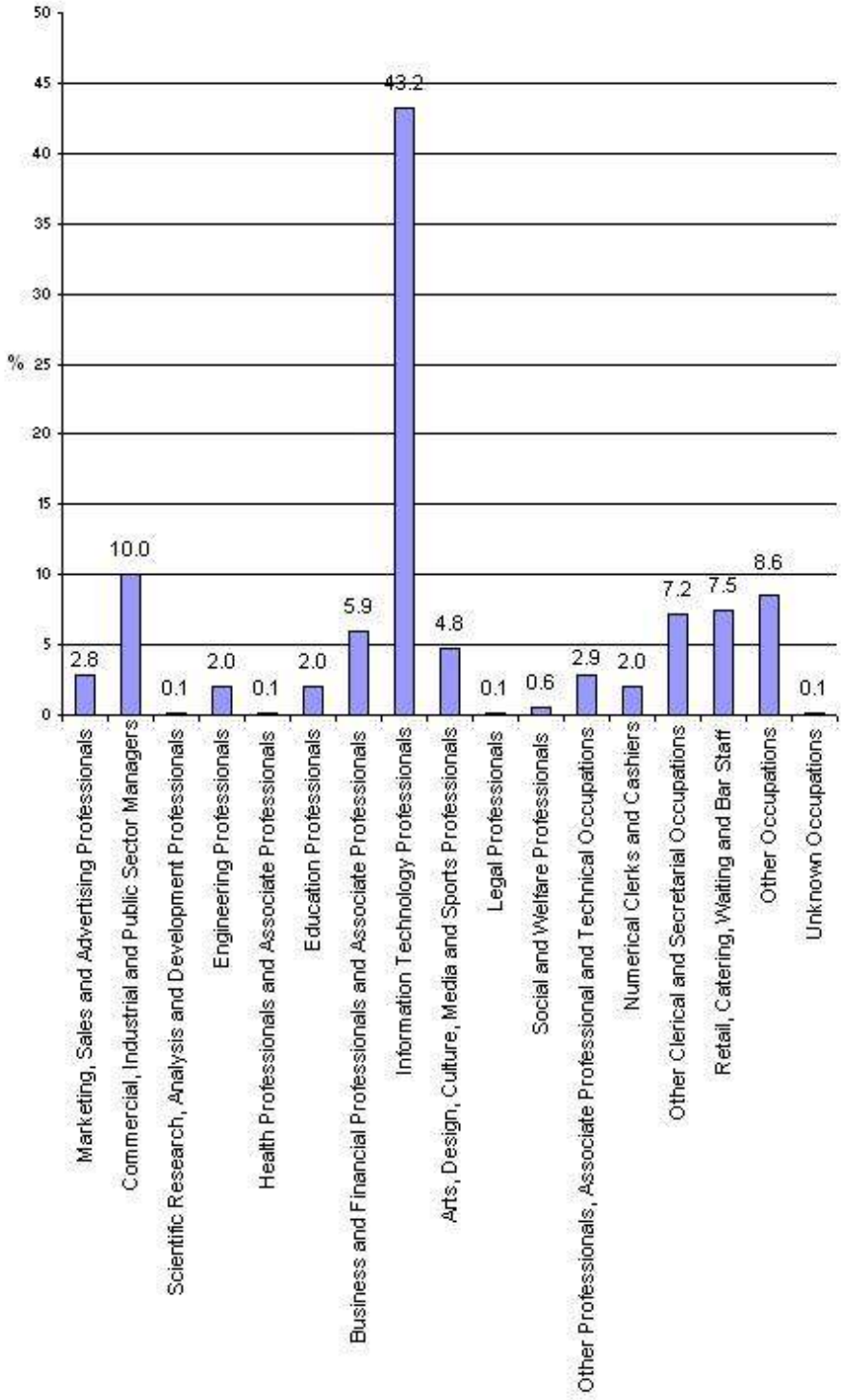
» Types of Work

Further breakdown of categories 'a' and 'c' above (UK employment only)

Men	6865
Women	1630
Total	8495

A	Marketing, Sales and Advertising Professionals	2.8%
B	Commercial, Industrial and Public Sector Managers	10.0%
C	Scientific Research, Analysis and Development Professionals	0.1%
D	Engineering Professionals	2.0%
E	Health Professionals and Associate Professionals	0.1%
F	Education Professionals	2.0%
G	Business and Financial Professionals and Associate Professionals	5.9%
H	Information Technology Professionals	43.2%
I	Arts, Design, Culture, Media and Sports Professionals	4.8%
J	Legal Professionals	0.1%
K	Social and Welfare Professionals	0.6%
L	Other Professionals, Associate Professional and Technical Occupations	2.9%
M	Numerical Clerks and Cashiers	2.0%

N	Other Clerical and Secretarial Occupations	7.2%
O	Retail, Catering, Waiting and Bar Staff	7.5%
P	Other Occupations	8.6%
Q	Unknown Occupations	0.1%



(Please note that due to the rounding of percentages to one decimal place, the percentages may not equal 100.0% when added together. All numbers used, where they refer to people, are rounded to the nearest five in accordance with Higher Education Statistics Agency methodology.)

1.16 Destinations of Recent Cohorts

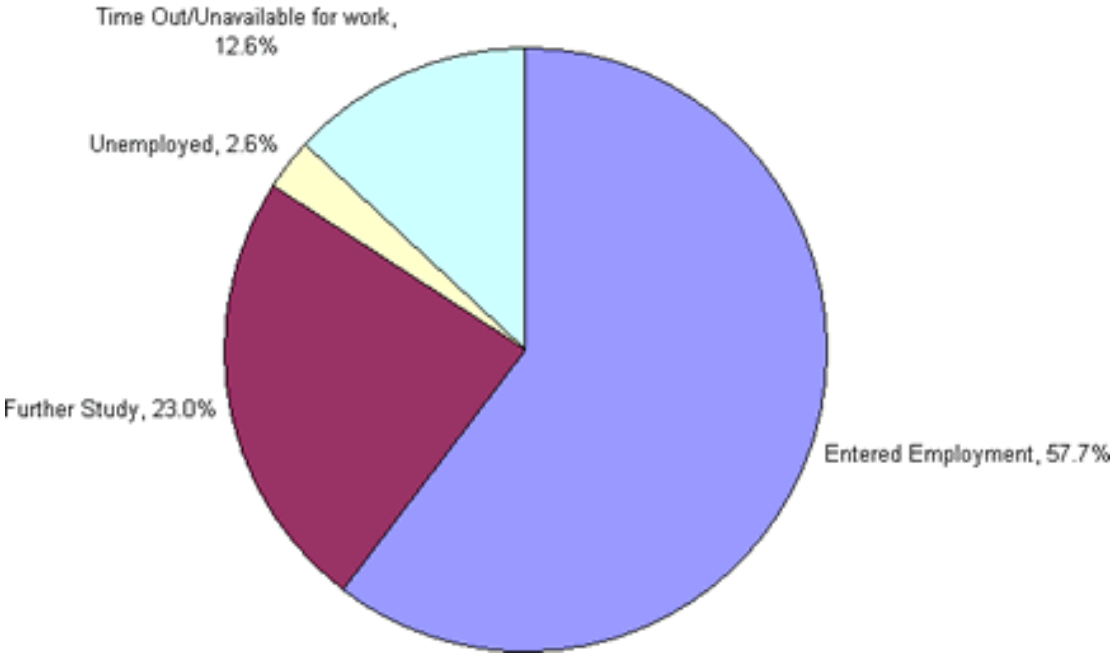
1.16 Destinations of Recent Cohorts

The data below is taken from http://www3.imperial.ac.uk/careers/resources/destinations/undergraduates/computing

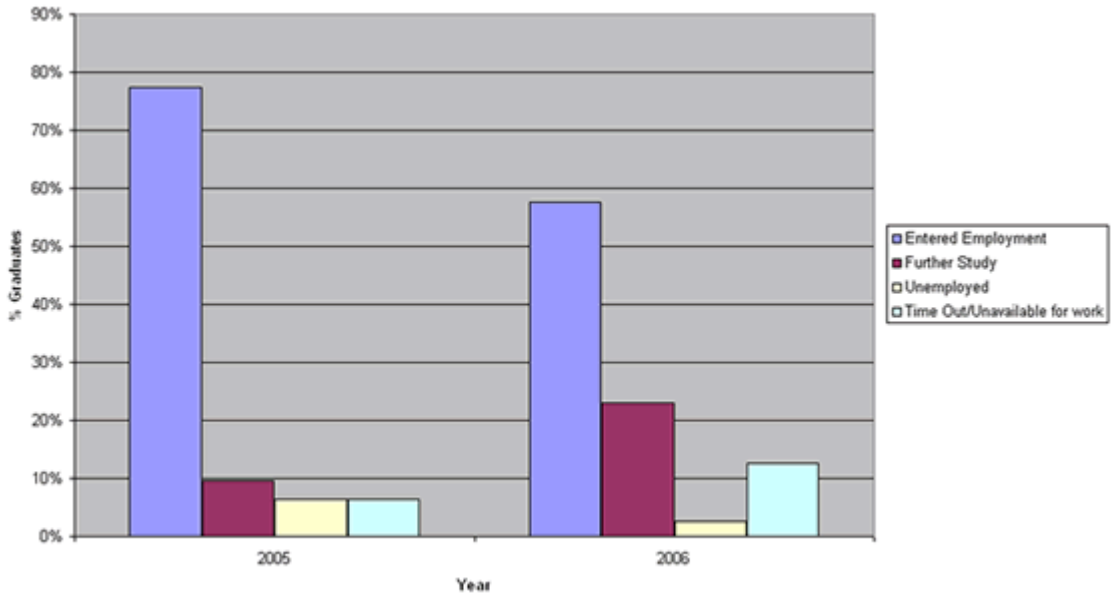
Destination Table - there were 78 known destinations of the 2006 Computing graduates (home & EU students.)

Destination	Total Graduates
Entered Employment	45
Further Study	20
Unemployed	2
Time Out/Unavailable for Work	11

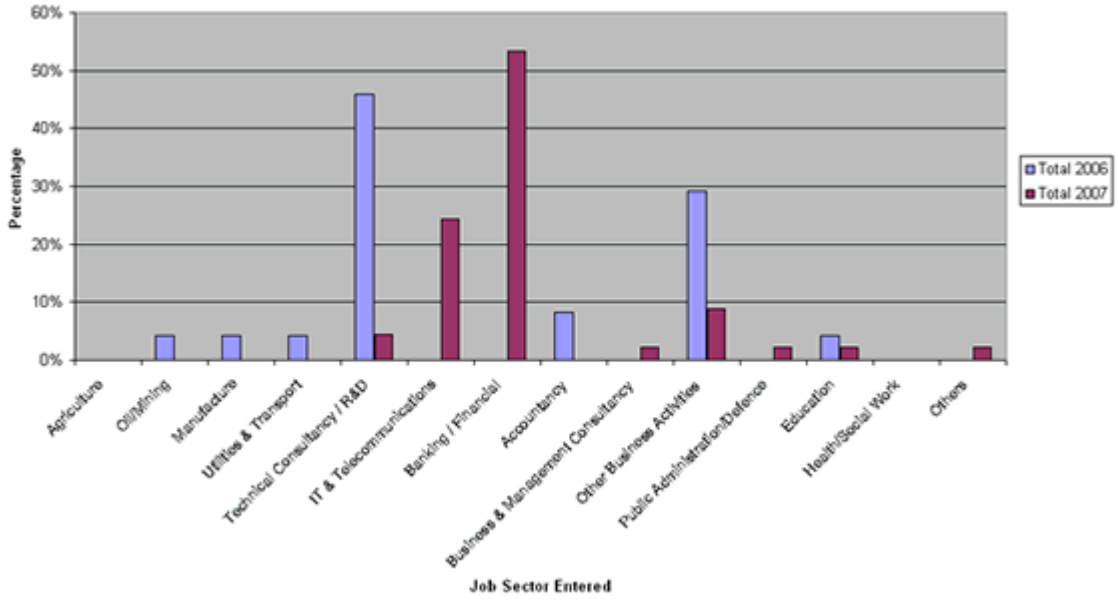
Graph 1



Graph 2



Graph 3



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Below are some examples of employers and occupations that Computing graduates have moved on to.

Examples of Employers

Accenture
Age Concern
Bain & Company
Bank of America
Barclays
BNP Paribas
Citigroup
Deloitte
EXPW Consulting
Goldman Sachs
L.E.K. Consulting
Ladbrokes
Merrill Lynch
Ministry of Defence
MX Telecommunications
Phillips
PricewaterhouseCoopers
Royal Blue Group PLC
Sapient
Teach First
Transport for London
UBS
World bank

Examples of Occupations
Accountant
Analyst
Auditor
Computer Programmer
Developer
Internet Business Manager
Investment Analyst
IT Analyst
IT Associate
Management Consultant
Product Controller
Software Developer
Software Engineer
Systems Analyst
Systems Developer
Technology Analyst

Postgraduate education

A number of students go on to postgraduate programmes, e.g. PhD's in Computing related subjects and Masters degrees in a wide range of topics.

1.17 Distribution of Classes of Honours

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1.17 Distribution of Classes of Honours

Title of award for *BEng and MEng* programmes:

Year of entry:	**2004**	**2003**	**2002**	**2001**
(a) Initial Entry	117	112	143	114
(b) Direct Entry/transfer into course	1	0	0	0
(c) Repeats (in) (exam only + interrupted study)	5	3	0	3
(d) Repeats (out) (defered)	5	6	3	4
(e) Fail during course B/M1, B/M2	8	7	4	1
(f) Withdrawal during course	8	14	8	6
Totals	**102**	**88**	**128**	**106**
Year of graduation:	**2007**	**2006**	**2005**	**2004**
(g) BEng	47	43	55	48
Year of graduation:	**2008**	**2007**	**2006**	**2005**
(g) MEng	55	45	73	58
Total sitting finals (*)	**102**	**88**	**128**	**106**

Title of award for *BEng* programmes:

Most recent years of graduation:	**2007**	**2006**	**2005**
(a) Initial Entry to BEng 3	55	43	55
(b) Direct Entry/transfer into course	0	0	0
(c) Repeats from previous year (coming into this cohort)	0	0	0
(d) Repeats from this year (leaving the cohort) *Interrupted Study	*1	0	0
(e) Fail during course	0	0	0
(f) Withdrawal during course	0	0	0
(g) Transfer onto another programme	0	0	0
Total sitting finals (*)	**54**	**43**	**55**

Programme type: ***Honours programme (example)***			
(1st)	11	13	16
(2.1)	20	11	27
(2.2)	18	17	10
(3rd)	2	0	1
Ordinary (Exit award)	2	1	1
DipHE (Exit award)	N/A	N/A	N/A
Pass	0	0	0
Fail		1	
Other – *Project deferred to next year.	*1		
Total students graduating	**53**	**42**	**55**

(*) Note: This total should equal (a + b + c) - (d + e + f + g). [Normally d = c^n]

Title of award for *MEng* programmes:

Most recent years of graduation:	**2007**	**2006**	**2005**
(a) Initial Entry to MEng 3	45	73	58
(b) Direct Entry/transfer into course	0	0	0
(c) Repeats from previous year (coming into this cohort)	0	1	1
(d) Repeats from this year (leaving the cohort)	1	0	0
(e) Fail during course (interrupted study)	1	0	0
(f) Withdrawal during course	0	0	0
(g) Transfer onto another programme	0	0	0
Total sitting finals (*)	**43**	**74**	**59**
Awards			
(1st)	22	35	33
(2.1)	20	33	22
(2.2)	1	3	4
(3rd)	0	0	0
Ordinary (Exit award)	0	0	0
DipHE (Exit award)	0	0	0
Pass	0	0	0
Fail	0	1	0
Other – *project deferred	0	1	0
Total students graduating	**43**	**72**	**59**

(*) Note: This total should equal (a + b + c) - (d + e + f + g). [Normally d = c^n]

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Mathematics and Computer Science *BSc and MSci* (GG14, GG41)

Most recent years of graduation:	**2007**	**2006**	**2005**
(a) Initial Entry	22	24	40
(b) Direct Entry/transfer into course	0	0	0
(c) Repeats from previous year (coming into this cohort)	1	1	0
(d) Repeats from this year (leaving the cohort)	0	0	0
(e) Fail during course (interrupted study)	1	1	1
(f) Withdrawal during course	0	0	0
(g) Transfer onto another programme	0	0	0
Total sitting finals (*)	**21**	**23**	**39**
Awards			
(1st)	9	12	14
(2.1)	6	7	13
(2.2)	4	3	11
(3rd)	2	1	1
Ordinary (Exit award)	0	0	0
Pass	0	0	0
Fail	0	0	0
Other – *deferred	1	1	0
Total students graduating	**21**	**23**	**39**

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1.18 Student Opinion

1.18 Student Opinion

We encourage student active participation in the decision-making and planning that affect the course and well-being of students here in the Department. To this end we maintain a Staff/Student Committee as a formal forum in which to voice student views and opinions. Moreover the Director of Studies, the Senior Tutor the Year Coordinators and the Personal Tutors all have an “open door" policy, where they are always willing to listen to students and discuss any problems or proposals that students may wish to raise. This helps to ensure that student concerns are in most cases addressed quickly and satisfactorily.

Recent concerns which can be gleaned from the minutes of the Staff Student Committee (see DVD) are as follows.

1. The availability of lockers. No students have access to a locker at the moment and we are doing our best to address this. We do have sufficient lockers available for the students and we are creating a locker room near the computing labs for them.

2. Printing problems. We offer free unlimited printing to all our students, this can cause problems in that printing can be excessive at times thus affecting printer reliability and print queue management. To resolve this we will be setting up a pin system where students pin their personal number into the printer before it will print their work. We will monitor this to ensure it does solve the problem.

3. Coursework administration. The main concerns are getting adequately detailed written feedback. We have requested that the Reps inform us when this does not happen so that we can deal with each case on an individual basis.

4. Provision for 'quiet areas'. We have designated several quiet areas on level 2; the remaining problem is one of enforcement. We do ask staff to patrol such areas on a regular basis but ultimately feel that the students must be proactive in enforcing these areas themselves.

Other concerns that have recently featured tend to be minor, rather than fundamental, (e.g. the availability of lecture notes on CATE, the use of microphones in lectures, general dislike of 9-00 starts etc.).

On the whole students are very positive about the Department and the courses they are on. This is evident from the SOLE statistics in Section 1.21. Most students seem to have a real sense of pride and loyalty to the Department. Below are typical comments made by past and present students:

Imperial's Computing degree was the only one to offer a good balance theory and practical application throughout the course. The facilities are superb - most of the Department has been recently refurbished and the computer systems are run separately from the rest of the College, by a group dedicated to the needs Computing students.

Part of my degree was a six month placement between a short third year and the fourth year. The placement was a fantastic experience. Giving me the opportunity to work with a highly knowledgeable team and build contacts in the industry. I was flown to California by my company to attend a trade show and conference in the heart of Silicon Valley.

I am currently investigating my options for when I graduate. My industrial placement could lead to a job or I may undertake a PhD at Imperial.

Imperial pushes students hard but has the support structure and social activities to help us through it. The reward for all the hard work is not only a good degree, but also the opportunity to take part in a variety of activities and have some fun at the same time.

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I chose computing as I wanted a course with a practical vocational edge to supplement its theoretical academic content. Imperial offered this with its engineering-based approach. Having studied A level German, I also wanted to take my knowledge of language further, so I took the European Programme option. Although the course was challenging, no prior knowledge of computers was necessary.

In the third year, I did my industrial placement in Antibes, on the French Riviera, in a company that used English as the official language. It's a lot of fun to live and work with around fifty other students near the beach, under the Mediterranean sun. And the Java-based work was interesting and challenging too! I spent the entire fourth year at the University of Karlsruhe in Germany. Being an exchange student is a great way to learn the language and make European friends. I hope to work in AI, but for now I want to visit as many of my new friends across Europe as I can, before going to China to spend a year teaching English. Who knows where I will finally settle to pursue my career in computing?

I decided to study at Imperial because it has an excellent reputation and the Department of Computing is one of the best in Europe. As a student you are expected to work very hard and the standards set are very high. However, you're not expected to do all the hard work yourself - the College provides excellent support and facilities to help you along.

The course is thorough, covering in the first two years what most universities take three or four years to teach. The best thing about it is the six-month work placement which you do in the third year. This provides a lot of the experience of a sandwich course while still allowing you to get a Master's in just four years. My placement was at Fujitsu Laboratories in California. It was an excellent opportunity and I gained some valuable industrial and research experience there.

The staff and students were so welcoming, unassuming and non-judgemental at the interview that I chose Imperial over an offer from another top university. By far the most distinguishing factor here is the hard work ethic. Once you arrive, the College definitely lives up to its reputation.

The Department has excellent facilities, rivalling those of many large companies. My course options are relatively theoretical, so you get a thorough grounding before gaining practical experience on placement. I worked with Goldman Sachs investment bank for six months, where I had to adjust to real demands on time and skills. I have got a job with them and I fly out to New York at the end of my course to begin a training programme. I will come back to London afterwards to work in the equities technology division.

Below is a sample of SOLE comments taken from the last survey:

Probably the best handouts (advanced but comprehensive, brief (just enough to understand but not too much to get lost in them) but sufficient examples) and slides that I have seen around Imperial.

Very good lectures!

Nothing to change...

Ample resources

Course is useful, especially for my group project. It is being taught by two great lecturers. Although the content is quite hard, they've done a great job of teaching it, the content in the 1st half of the course seems a little trickier so some more guidance on that would be nice, and maybe if we had a tool similar to the LTSA in Concurrency (year 2) for the GSMP then that would make learning this better, so we can practice more.

Fun and engaging

Engaging, interesting, great course, taught well. Really enjoyed it! Thanks!

The lectures are very clear, loads of examples, good associations.

Concepts are explained thoroughly, both with the use of mathematical notation and without.

Very clear. Whilst all necessary notes are on slides, explains them in more details, rather than simply reading off slides.

Lecture notes and slides are extremely useful and comprehensive. Tutorials are clear, cover all topics, and include sample exam questions

Ideal structure of a course. Mixing lectures with short 10 minute exercise sessions is ideal and I think should be considered as a method of teaching for other DoC modules.

Very well structured lectures, extremely useful handouts and good tutorials that reinforced the lecture material.

Notes with extra questions were very useful and so were the mini tutorials inbedded in the lectures

I could not have asked for a better networks course. All notes, slides, problem sheets, exercises, coursework was well designed and reinforced what we were taught in lectures.

Good course overall. Support materials provided are excellent.

I enjoyed the discussion in class and feel that I learned a lot more because of it.

Great course. By far the most difficult this term but supported by good class discussions and pratical tutorials.

The few talks I had made a very competent impression. Also she did not ignore the more advanced programmers, thank you!

Very interesting course, with a fantastic coursework which covers the most important ideas of the course. It is challenging but enjoyable.

Interesting module. Notes are well-written and are a useful supplement to lectures.

Excellent. everything well explained. very helpful

Good course, taught by experts.

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1.19 Visiting Examiner's Reports

(Please see DVD)

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1.20 Minutes of Staff/ Student Committees

(Please see DVD)

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1. 21 A Summary of the numerical data from the most recent SOLE survey

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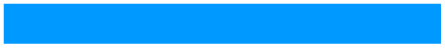
Computing Autumn Term 2007

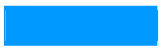
All Courses/Modules

The content of these modules are useful.

Strongly Agree

(31%)

Agree

(43%)

Neutral

(15%)

Disagree

(4%)

Strongly Disagree

(3%)

No Response

(2%)

The support materials available for the modules (e.g. handouts, web pages, problem sheets) are helpful.

Strongly Agree

(26%)

Agree

(42%)

Neutral

(20%)

Disagree

(5%)

Strongly Disagree

(3%)

No Response

(2%)

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I receive sufficient feedback and guidance.

Strongly Agree (20%)

Agree (38%)

Neutral (26%)

Disagree (7%)

Strongly Disagree (3%)

No Response (3%)

Overall, I am satisfied with the modules.

Strongly Agree (21%)

Agree (44%)

Neutral (20%)

Disagree (7%)

Strongly Disagree (2%)

No Response (4%)

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The lecture(s) are well structured.

Strongly Agree

(25%)

Agree

(36%)

Neutral

(18%)

Disagree

(3%)

Strongly Disagree

(2%)

No Response

(13%)

The lecturers explain concepts clearly.

Strongly Agree

(23%)

Agree

(30%)

Neutral

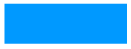
(22%)

Disagree

(6%)

Strongly Disagree

(3%)

No Response

(12%)

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The lecturers engage well with the students.

Computing Spring Term 2008

All Courses/Modules

The content of these modules are useful.

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The support materials available for modules (e.g. handouts, web pages, problem sheets) are helpful.

I receive sufficient feedback and guidance.

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Overall, I am satisfied with the modules.

The lecture(s) are well structured.

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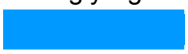
The lecturer explains concepts clearly.

Strongly Agree

(17%)

Agree

(34%)

Neutral

(16%)

Disagree

(5%)

Strongly Disagree

(1%)

No Response

(25%)

The lecturer engages well with the students.

Strongly Agree

(19%)

Agree

(29%)

Neutral

(18%)

Disagree

(5%)

Strongly Disagree

(1%)

No Response

(25%)

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1.22 Procedures for Maintaining Quality of Provision and Academic Standards

1.22 Procedures for Maintaining Quality of Provision and Academic Standards

Below is a summary of the Design, review and improvement mechanisms the Department uses to ensure quality of provision and academic standards are maintained.

Operations and Academic Committees

The top level committee in the Department is the Operations Committee. The Director of Studies is a member and issues related to teaching are on every agenda. This committee primarily performs a strategic role and there is a two-way flow of ideas to and from the Operations Committee and the Departmental Academic Committee.

Curriculum development and review is mainly the responsibility of the Department's Academic Committee (AC) which is chaired by the Director of Studies. This committee meets monthly and deals with both the strategic and the regular day to day decisions about teaching. All teaching staff are members as is the Departmental Student Representative. Normally attendance includes the Course and Year Coordinators, Senior Tutor, Teaching Administrator, Director of Studies, Quality Officer the Student Representative and anyone who has a specific interest in an agenda item.

Proposed changes to the course provision are initiated by individual members of staff and considered by the Academic Committee. Periodically, groups of courses under a common theme are reviewed simultaneously. This is done to ensure that the various themes are up to date and that there is no overlap between the courses that make up that theme

All changes affecting the Scheme for Award of Honours, or to the Degree Programme Specification, must be approved by the Engineering Studies Committee.

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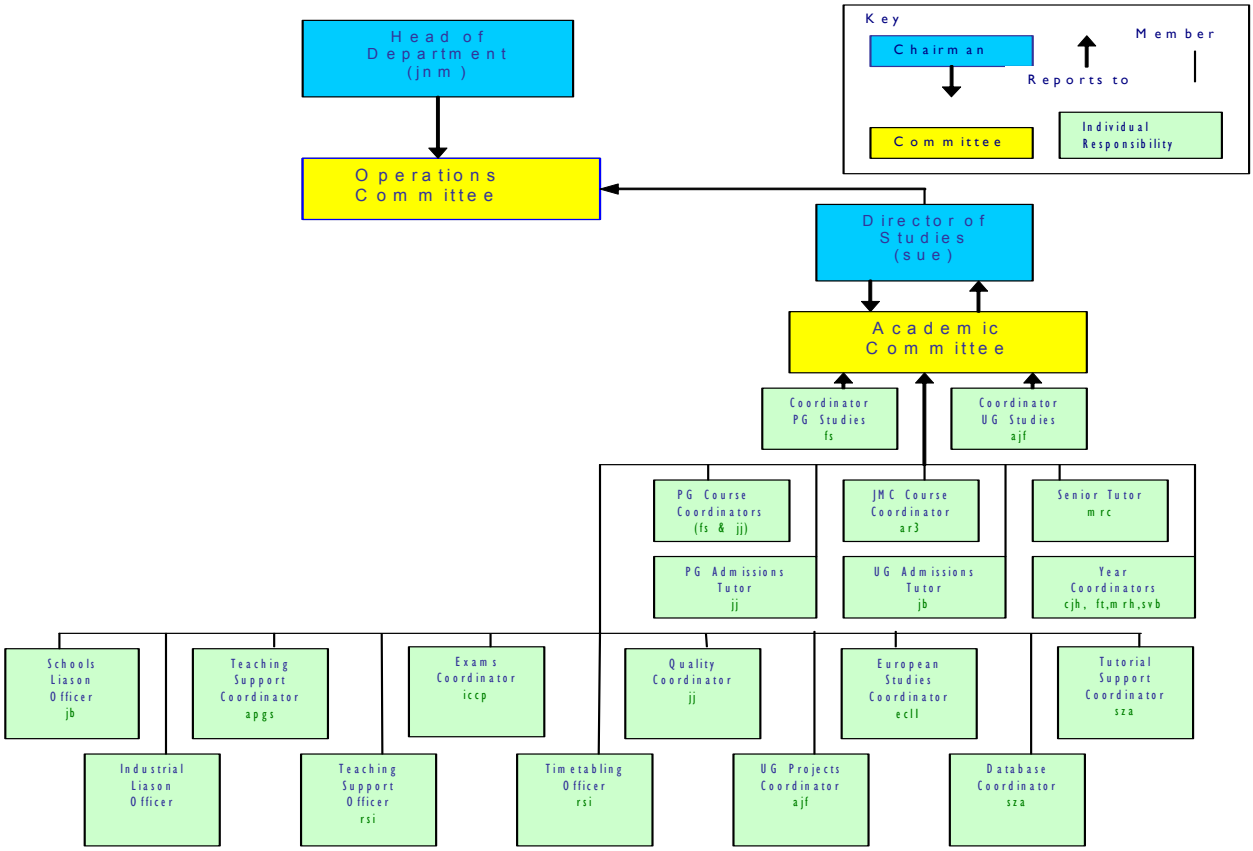

Feedback from students

We have a cooperative relationship with our students. Each year group elects two student representatives who are in regular contact with their Year Coordinator. The student body as a whole elects a Departmental Student Representative. Regular dialog between students and their representatives ensures a flow of information throughout the Department. Day-to-day problems reported to a Year Coordinator are usually resolved by the coordinator or, if necessary, brought to Academic Committee.

The elected student representatives meet with academics at the Staff-Student Committee once every term to discuss issues relating to their study and environment. Items raised by the committee are discussed by the Academic Committee if appropriate.

Students are encouraged to discuss issues related to teaching and learning with their Personal Tutors. Where it is felt that those issues are significant, and cannot be resolved by individual lecturers or assistants, the Personal Tutor will refer the matter to the Director of Studies. The Senior Tutor and Director of Studies are similarly available to see students to discuss any item of concern.

Students fill out the college online student questionnaire (SOLE) which provides feedback on all courses delivered. Members of staff take pride in their teaching and are normally responsive to criticisms from SOLE. The Head of Department and Director of Studies identify any problem cases and hold constructive discussions with the member of staff concerned. This is normally effective, but in the unusual event that it is not, a new lecturer will usually be assigned to the course.

Feedback from institutional review

The last Imperial College review of undergraduate teaching in the Department was carried out by the Undergraduate Studies Committee in 2002 using four independent external assessors - three academics and one from industry. The reviewers were complimentary of our degrees. They did recommend that we should implement provision for a Student Common Room which we now have. The next review will be this summer (2008).

Feedback from accreditation

The BCS and IET accreditation exercise often raise issues that feed back into our procedures. In last exercise, issues concerning third- and fourth-year course pre-requisites and the distinction between BEng and MEng project assessment criteria were both raised and have since been addressed.

Feedback from external examiners

External examiners annually check all examination papers to ensure that they are at an appropriate level. Prior to the final examiners meeting all examination question papers and scripts, project reports, coursework submissions and project assessment criteria are presented to the external examiners to ensure that our assessment methods are of the appropriate standard.

Reports from External Examiners commenting on the range of subjects covered and the standard achieved thus help to inform the Department of quality and standards achieved. Any suggestions for change are discussed at a subsequent Academic Committee meeting.

We believe these are a wide and effective range of mechanisms for assuring and enhancing quality.