University of Cambridge

Planning Round 2011

<u>**Objectives and plans for the planning period**</u>

School of Technology

Mission:

The mission of the School of Technology is to provide a focus and framework for its constituent departments to formulate and express views pertinent to technology, methods and processes, both within and without the University, recognising that technology has its own priorities and its own criteria for success: above all, technology departments recognise a duty to influence and be influenced by society at large and to work towards the creation of wealth and an improved quality of life.

Objective 1
Maintain and enhance the outstanding research undertaken by Departments within the School

Actions to be taken to achieve the objective:				
	2012-13	**2013-14**	**2014-15**	**2015-16**
Financial Invest in research, seek financial recognition and diversify funding reducing reliance on research councils	Continue to invest in a School Strategic Fund for pump-priming activities. Ensure that full economic costs are adequately identified on grant applications. Recover more overheads from research grants by charging IT and technical support to the appropriate grants.			
	Seek to receive additional allocations from the Chest in recognition of the School's RAM surplus.		Seek to be rewarded financially on the School's performance in REF2014 via the Resource Distribution Model.	
	Increase EU grants by 5% p.a. Increase industrial grant income by 5% p.a. Maintain research council grant income at 2010/11 levels.			

	Develop additional sources of funding, for example, through corporate engagement. Seek philanthropic income to support the creation of new high-profile professorships and lectureships in strategic areas.			
Staff Invest in staff	Continue to appoint leading researchers to academic posts in strategic areas. Build capacity of staff skilled in winning grants. Encourage staff to apply for fully costed large grants by putting incentives and support in place.			
	Fund and appoint a research facilitator to provide pro-active support to help prepare grant applications in the Computer Laboratory			
Estate Enlarge the School's estate	Build a new building for the unified Department of Chemical Engineering and Biotechnology at West Cambridge to enhance research integration.			
	Increase flexible space for Engineering research initiatives and new staff and projects by erecting a new building in the car park at Royal Cambridge Hotel.			

	Fundraise for the Engineering Courtyard Building to support project meetings between research groups and sponsors, and to improve social integration between staff, post-doctoral researchers, postgraduate students and undergraduates (Trumpington Street site).	Build the Engineering Courtyard building.		
		Start the development of Keynes House for expansion of JBS.		
Strategic research themes	Encourage and promote work that supports the School's strategic research themes.		Review and further develop the School's strategic research themes.	

What are the criteria by which you will know if you have achieved the objective?	1. the number of leading researchers appointed 2. the number of large grants awarded 3. the profile of the research grants between sponsors 4. publications in high quality journals (academically and practice oriented)

Objective 2

Achieve the best possible results for the Research Excellence Framework 2014 (and similar exercises thereafter), aiming to continue to top the relevant Units of Assessment.

Actions to be taken to achieve the objective

	2012-13	2013-14	2014-15	2015-16
Financial Invest in research and seek financial recognition	Seek to receive additional allocations from the University in recognition of the School's RAM surplus to invest in staff and resources in preparation for the REF.		Seek to be rewarded financially on the School's performance from the REF.	
	Continue to invest in a School Strategic Fund, £300k p.a., so departments can bid for pump-priming activities.			
Staff Retain the right staff	Continue to appoint leading researchers to academic posts in strategic areas. Continue to attract the best post docs. Acknowledge and implement the employment and career management scheme and other moves to improve support for post docs and the general research environment.			
	Retain current staff in strategic areas in preparation for the REF and possibly recruit new staff to proleptic appointments.			
	Ensure sufficient administrative resources are available to support the REF submissions at both School and UoA level.		Release staff specially retained for REF.	
Estate	Ensure estate is fit-for-purpose in conducting top-level research.			
	Build a new building for the unified Department of Chemical Engineering and Biotechnology at West Cambridge to remedy RAE 2008 criticisms.			

		Increase space of Engineering research initiatives and new staff by building in the car park at Royal Cambridge Hotel.	
	School Oversight	Ensure the sufficient School oversight, review and feedback is implemented.	Review the preparation and seek improvement for the next round.
	Other	Enhance engagement with the general public by better promotion of research outcomes.	

What are the criteria by which you will know if you have achieved the objective?	1. the outcome of the REF results 2. the financial benefits that subsequently accrue to the School

Objective 3

Recruit the best researchers (research students and post doctoral staff) both nationally and internationally, giving them an excellent training in research and preparing them for a range of employment opportunities.

Actions to be taken to achieve the objective

	2012-13	2013-14	2014-15	2015-16
Financial Increase funding	Fund-raise for scholarships to fund the best PhD students and award scholarships in a timely way. Win funding for more Research Council DTCs (or equivalents).			
Staff	Encourage PhD supervisors and advisors to conform to the best supervisory practices, recognising the need for transferable skills training as well as technical research expertise and the importance of pursuing impact of the research undertaken. Acknowledge and implement the employment and career management scheme and other moves to improve support for post docs and the general research environment.			
Estate	Ensure adequate facilities are provided for all researchers. In particular, increase flexible space for large scale research projects by extending the footprint of the Engineering Trumpington Street site by building in/over Royal Cambridge Hotel car park and a Courtyard Building, and building a new building for CEB.			

	Fundraise for the Engineering Courtyard Building to support informal teaching of small groups, project meetings and improved social integration between staff, post-doctoral researchers, postgraduate students and undergraduates.	Build the Engineering Courtyard Building.		
College interaction	Engage in the collegiate university's discussions on the College Graduate Fee issue, particularly in light of the likelihood that this will cease to remain a legitimate charge to research sponsors.			
	Engage in obtaining enhanced Collegiate opportunities for post doctoral staff.			
Other	Collaborate more, both within the School and also with other Schools, in DTC applications. Provide quick turnaround of applications and acceptance of excellent applicants.			
	Work with the Board of Graduate Studies to encourage better application and admission processes.			
	Implement the agreed structure and agreed mechanism for the governance of the Graduate School. Monitor progress.	Review the role of the Graduate School.		

What are the criteria by which you will know if you have achieved the objective?	1. improvements in PhD completion rates within four years, outcomes in student satisfaction surveys
	2. being able to compete more effectively with other HEIs for the best students
	3. Increase in PhD student numbers
	4. winning some DTCs
	5. the results from the career researcher online survey

Objective 4

Increase the provision for high-quality Masters students in strategic areas across the School, addressing the learning needs of postgraduates, innovating and adapting as necessary, taking a collaborative approach where appropriate to ensure efficient use of resources.

Actions to be taken to achieve the objective

	2012-13	**2013-14**	**2014-15**	**2015-16**
Financial	Raise funds to support innovative courses, addressing the needs of postgraduates and industries. Provide strategic funds for departments to pump-prime initiatives. Seek appropriate financial reward from the additional income to the University.			
Staff	Consolidate staff or recruit new staff as necessary. Ensure the administrative structure for each course is appropriate.			
Estate	Build a new building for the unified Department of Chemical Engineering and Biotechnology Department to provide more suitable accommodation for the MPhil in BioScience Enterprise.			
	Expand CPSL into 2 Trumpington Street so that better facilities may be provided for staff to support MSt students.			New CPSL office accommodation at the New Museums Site to provide better facilities for staff to support MSt students.
Academic developments	The Graduate School to take an overview of Masters' courses, oversee quality assurance issues and facilitate collaborative programmes.			
	Press for student numbers on Masters courses to rise to the level in the courses' Business Plans as agreed at the planning stage by BoGS and Education Committee.			

		A possible new MPhil to be introduced by Engineering, subject to lifting of the student number cap	A possible new MRes to be introduced by Chemical Engineering & Biotechnology, subject to lifting of the student number cap	
	CPSL to develop new Postgraduate Diploma	CPSL to launch new Postgraduate Diploma		A new MSt to be phased in by CPSL building on Postgraduate Diploma
College Interactions	Continue to engage with Colleges for the provision of extra student numbers.			

What are the criteria by which you will know if you have achieved the objective?	1. the implementation of enhanced procedures for the development and support of courses. 2. the number of recruited students in strategic areas

Objective 5

Continue the development of undergraduate education within the School through (a) inspiring lectures, (b) innovative laboratory exercises and mini-projects, (c) close coordination between the teaching in departments and colleges, and (d) opportunities to experience the creative side of technological design. Some departments in the School also wish to explore: (e) links between departments and shared courses (both inside and outside the School) that enhance the educational experience, and (f) efficient delivery strategies, such as large class sizes or e-learning resources, which do not compromise quality.

Actions to be taken to achieve the objective

	2012-13	**2013-14**	**2014-15**	**2015-16**
Financial	Foster mutually beneficial links between teaching and research which can lead to funding and greater efficiency.		Raise funds to support teaching quality and innovation.	
Staff	When opportunities for recruitment arise, ensure that these are targeted to areas that enhance strategic development of the School's undergraduate courses.			
	Ensure that innovation and course development are maintained in spite of financial pressures and other commitments on staff time. Prioritise these pedagogic skills when recruiting staff and acknowledge these skills internally during promotion procedures.			
	Ensure that all newly appointed staff are enabled and encouraged to enhance teaching excellence as well as aspiring to international research leadership.			
Estate	Where appropriate, maintain large teaching rooms and lecture theatres that can be used to deliver teaching in a way that makes efficient use of staff time.			
	Improve teaching laboratory facilities. Where appropriate, refurbish lecture rooms and lecture theatres to bring them up to modern standards of appearance and functionality.			
	Construct a new building for Chemical Engineering & Biotechnology to bring together different parts of the Department and provide space for lecturing, classes and laboratories.			

	Plan and fundraise for the Engineering Creativity Centre to provide a flexible resource where students build projects, both within and beyond the requirements of the course.			
	Develop minor works projects to develop social spaces to support informal teaching of small groups, project meetings and improved social integration between staff, post-doctoral researchers, postgraduate students and undergraduates.			
	Fundraise for Engineering Courtyard Building to support informal teaching of small groups, project meetings and improved social integration between staff, post-doctoral researchers, postgraduate students and undergraduates.	Build Engineering Courtyard building.		

Academic developments	Maintain a balance between successful traditional teaching methods and innovative new techniques.			
	Continue development of innovative experimental work and mini-projects in the Engineering course.

Consider implications of new Part III on the structure of the rest of the Computer Science Tripos.

Engineering to achieve renewal of course accreditation by appropriate professional engineering institutions. | Evaluate further possibilities for the sharing of modules between Triposes and expand or re-arrange as necessary. | | |
| | Chemical Engineering & Biotechnology to promote interaction with their *Teaching Consortium.*

Further development of the teaching of Design in the Chemical Engineering course.

Computer Laboratory to focus on enhanced links between departmental and college teaching. | | | |

What are the criteria by which you will know if you have achieved the objective?	1. The overall quality and dynamism of the undergraduate teaching in the School as witnessed by external and internal reviews such as International Visiting Committees, visits of Professional Accrediting bodies, reviews by the General Board's Education Committee and triennial departmental programme reviews.
	2. The results of student satisfaction surveys
	3. The employability statistics of our students
	4. Tripos performance statistics

Objective 6

To be an internationally leading provider in executive and professional education (EPE), through the further development of:

- distinctive and compelling market offerings, reflecting the breadth and depth of the School's expertise
- capability and capacity to develop and deliver world class executive and professional education
- rigorous underpinning course design and quality assurance frameworks

Actions to be taken to achieve the objective

	2012-13	**2013-14**	**2014-15**	**2015-16**
Financial Consider equitable taxation	Plan the income and the expenditure of EPE activities in order to maintain a healthy profit margin, subject to market conditions, that can be used to enhance research and teaching within the departments and to provide an income stream for the University.			
	Develop an equitable "taxation" return to the University that encourages future investments in EPE, following the development of a pricing framework across the School, subject to the demand of the markets.		Recommend the School proposal on "equitable taxation" to the University and implement as appropriate.	
Staff	Increase the pool of "affiliated" staff to JBS, CPSL and Engineering.		Review the quality and quantity of the "affiliated" staff.	
	Invest in the administrative structure to deliver better services (paid for from increased revenues).		Review the administrative structure to ensure it is value-for-money and to ensure efficiency.	
Estate Ensure sufficient accommodation	CPSL to expand into 2 Trumpington Street. Plan for adequate accommodation provision for JBSEEL.			CPSL to relocate to office accommodation at the New Museums Site.

School oversight	The School's EPE Committee will monitor compliance and the growth of EPE activities within the School and ensure compliance with the expectations of the University's BEPE.
Academic Integration	Improve the alignment of the executive education provisions so that they are consistent with and can be used to enhance the research interests of the Departments.

What are the criteria by which you will know if you have achieved the objective?	1. a consistent annual increase in the total profit from EPE activities within the School 2. a significant increase in the volume of EPE provision by the end of the planning period

Objective 7

Enhance and, where appropriate, enlarge the School's estate to achieve all the above objectives.

Actions to be taken to achieve the objective

	2012-13	**2013-14**	**2014-15**	**2015-16**
Financial	Fund raise for the CEB building to integrate the unified Department. Funds of up to £40m will be required to commence work on the development of the Old Addenbrooke's site for JBS. Much of this has already been identified.	Plan repayment schedules for the loans from the University as required, taking into account terms and conditions imposed on the Departments, and the financial budgets and reserves available.		
	Fund raise for the car park building (£10m).	Fund raise for the Courtyard building in Engineering (£5-7m).		
Staff				Move the unified Department of Chemical Engineering & Biotechnology into the new building.

		Move some of the CPSL staff into 2 Trumpington Street.			Move CPSL into the new office accommodation at the New Museum Site.
	Estate	Campaign for the extension of social and infrastructural facilities on the West Cambridge site to ensure that staff and students in the School are content with their working environment.			
		To support economically-prudent provision of additional accommodation and social support for graduate students, research workers and other staff to ensure that the School is able to expand its numbers, recruit at the highest levels of international excellence and engage its members in the Collegiate University in order to achieve its planning objectives.			
		Build a new building for the unified Department of Chemical Engineering and Biotechnology Department.			
		Build flexible research space for Engineering's strategic research initiatives in / over Royal Cambridge Hotel car park.			
			Start the development of the Old Addenbrooke's site for the JBS.		New CPSL office accommodation at the New Museums Site.
		Plan for and build the Engineering Courtyard Building.			
	Carbon reduction	Introduce low-carbon measures across the School, with emphasis on a particular retrofitting programme in Engineering Department, Trumpington Street site.			

What are the criteria by which you will know if you have achieved the objective?	1. the School's estate being considered state-of-the-art for its various purposes
	2. the amount of additional space occupied by the School

Carbon

(Planning Guidance, Page 4, Paragraph 17)

Schools are asked:

a) *To provide information on areas of teaching and learning in their departments, involving the areas of carbon and sustainability;*
b) *If departments are planning any research initiatives that they will seek to benefit from studies of the operations of the University in managing sustainability and carbon emissions;*
c) *To indicate any significant initiative that they have conducted in the last year, independent of the activities of the University's Energy and Carbon Reduction.*

a) Teaching and learning in areas of carbon reduction and sustainability

Sustainability is a strong component in the teaching and learning provided by the Departments within the School of Technology. Our activities are summarised below in the areas of undergraduate, postgraduate and executive education.

Undergraduate Teaching:

23% of incoming Engineering Tripos students have indicated "sustainability" as a main interest (a show of hands by the Lent Term suggests that this increases over the year). Engineering aims to provide both named courses at Part II level (Building Physics, Sustainable Energy, etc) and to embed sustainability as a context in all disciplines throughout the course, with an emphasis on quantitative, technical solutions, not just the problems.

Specific coverage of sustainability in Engineering courses/coursework is listed below:

- IA Exposition: many use future energy strategy as the basis for their debates/presentations (e.g. using Professor David Mackay's book on Sustainable Energy)
- IB Mechanical Engineering Elective: design of renewable energy systems (focus on wind turbines)
- MET IIA/IIB: IIA module on contemporary issues in Manufacturing, and IIB module on Sustainability: address life cycle issues for materials and products, using Granta Design's "Eco-Audit" tool
- MET major projects: international development focus (water filtration, cold storage, transitional shelters) and UK focus (recycling domestic waste, assessment of domestic PV, carbon audit of rail infrastructure)
- IIA projects: light aircraft design, and new heat pump project
- IIA and IIB Engineering Area now titled "Energy, Sustainability and Environment"
- new IIA modules: Building Physics and Environmental Geotechnics, Present and Future Energy Systems

- IIB modules: Sustainable Development, Land Use/Waste management, Water Engineering, Building Physics, Architectural Engineering, Sustainable Energy, Nuclear Power, Solar/ Renewable Electric Power
- IIB projects: wind turbine design, greener aircraft, regenerative braking, geo-engineering, solar cells, renewable power, fuel cell hybrid bike, eco-house design, thermal modeling of buildings, water/energy/construction for developing countries, solar-powered vehicle (CUER)

Postgraduate Teaching:
In the Department of Engineering the MPhil course "Engineering for Sustainable Development" and the two new MPhil Courses "Energy Technologies" and "Nuclear Energy" all specifically address sustainability and carbon reduction. In addition the new MSt "Construction Engineering" is about reducing the resources used in the built environment.

The CET IIB/MPhil in Advanced Chemical Engineering course examines the central role of chemical engineering in achieving balance against economic, environmental and social benefits and impacts for projects conducted by companies in the process engineering sector. It provides an overview of sustainable development in a way that provides a framework relevant to engineers with quantification where appropriate. It also deals with issues such as social and economic factors. Specific topics include:

- Renewable Resources and Waste Management as Key Elements in Maintaining Natural Cycles
- Quantifying the Sustainability of Processes and Systems
- Industrial approach to Metrics and the Allocation of Burden in the Oil and Gas Sector
- Agricultural processes
- Energy and Climate Change
- Energy generation

In the Judge Business School, there are several taught modules on subjects such as climate change and energy policy. For example the MBA programme has a set of electives grouped under the heading of the Energy & Environment Concentration, including courses entitled Climate Leadership, Energy and Emissions Markets & Strategies and Numerical Information & Environmental Policy. Other sustainability and environment-related courses are taught on other programmes, e.g. the MFin, Tripos and MPhils.

Executive Education and other forms of learning:
CPSL's mission is to address a wide range of the most significant challenges and opportunities facing our world today, including:

- Sustainable development;
- Low carbon economies (climate change, energy, technology);
- Food security (agriculture, land use, water use, biodiversity);
- Resource security (including energy and ecosystems);
- Sustainable finance (including pensions, insurance, banking);

- Sustainable cities (including infrastructure and mobility);
- Health and wellbeing.

CPSL plans to launch the Postgraduate Certificate in Sustainable Business in South Africa once the necessary principles and criteria have been agreed within the University. In 2010 we launched our new Master of Studies (MSt) in Sustainability Leadership, in association with the departments of Engineering, Architecture, Land Economy and Geography, and the Judge Business School. CPSL is currently exploring the possibility of establishing an MSt in Sustainable Finance in response to perceived market demand. A similar collaborative approach will be adopted.

CPSL's Leaders Group and Collaboratories build on the work of the Executive Programmes and draw on the breadth of the University and on leading thinkers and practitioners from around the world, to develop practical action towards this change.

Collaboratories are small results-focused groups that meet 2-4 times/year for 1-2 years to focus on a particular sustainability trend (food, water, energy), business issue (production, manufacturing, sourcing) or sector (information technology, tourism, agriculture) and aim to find solutions to problems that can be delivered at scale. They usually involve a core group of business leaders with particular interest in the topic, and experts to explore the barriers and opportunities.

CPSL has built a significant alumni network of some 3,000 leaders from business and government around the world. Recognising the strategic importance of this network, CPSL aims to create and host a network of leaders that becomes the pre-eminent international business movement in support of sustainability leadership.

b) Research:

Some Research Initiatives in the Department of Engineering are fed directly into helping the University improve its carbon emissions. For example, two faculties are doing a study of a 'smart façade' for the Department of Engineering Inglis Building as part of the Energy and Carbon Reduction project. A PhD student has studied the energy use within the Engineering Department and another has contributed to a study of the Raised Faculty Building.

In the Computer Laboratory, Professor Ian Leslie is leading a research project to raise user awareness of personal energy consumption, to reduce energy consumption in the William Gates Building, and to record the methodology in sufficient detail so as to be able to tell other people how it was achieved. There is information on energy use in the WGB at   www.cl.cam.ac.uk/meters.

He is also planning a new power distribution network for lighting and investigating lower energy lighting options.

c) **Significant Initiatives:**

The Department of Engineering is taking a lead in the University's Carbon Reduction Project. A detailed report is included in Appendix A. This has implications for IT both as an energy consumer and as an enabling technology for the monitoring and control of energy use. One of their Computer Rooms has already been converted to use evaporative water cooling rather than conventional air conditioning with very significant savings in energy use: under 10% of the power used by the computers compared to over 60%. The other main Computer Room is now also being converted. The project has led to very significant savings in the energy used for cooling and has been shortlisted for a Green Gown Award 2011 in the category of 'Carbon Reduction'.

The Department has an active recycling policy and for example 9.4 tons of paper were recycled in 2011 with an estimated CO_2 saving of 5.6 tons. A recent upgrade in the centralisation of the compressed air plant has led to a saving of 87,000 kW hours, 38 tons of CO_2 per annum and the upgrade of the heating boilers has resulted in a saving of 623,000 kW hours, 115.3 tons of CO_2 per annum.

International Strategy:

(Planning Guidance, Page 5, Paragraph 24)

The General Board has agreed that Schools should be asked about intentions for international engagement and for projects involving lifelong learning and/or community outreach. In particular, if International programmes or partnerships are being developed over the next five years and what policy, including ethical considerations are in place to determine International collaboration.

The Departments within the School have a myriad of international collaborations at the level of individual research groups and academics, and we actively encourage and support these. Many involve joint research, exchange of students, junior visitors and sometimes co-funded research work. Some are supported by Memoranda of Understanding. In addition, the School is also a key provider of executive and professional education in the international arena, involving countries from the Far East, the Middle East, South America and Australia. It is clear that this area of activities will be growing rapidly in the foreseeable future.

The Judge Business School (JBS), under the leadership of the new Director, will develop a strategy that allows it to focus on regions that are of clear importance, rather than being opportunistic (as in the past). The intention, in close coordination with the International Strategy Office as well as the Development Office, is to develop an integrated strategy that is much broader than just fundraising.

The spirit of the emerging strategy is to develop "hubs". A "hub" refers to a presence in the chosen geographical region, a presence that addresses simultaneously four dimensions of interest for JBS:

1. executive education (several clients that would give a solid economic basis of activity and the possibility of engaging with the clients on case studies and/ or research)
2. research: data gathering, or case studies, or policy issues, something that develops capabilities and knowledge at JBS
3. donations (scholarships, buildings, chairs, or financing of research projects)
4. a representation that allows JBS to be presented to prospective students of all kinds, PR, plus the possibility of inviting people from other parts of the university to come and build contacts or to work with JBS collaboratively.

A hub would, in this integrated way, build a solid presence in this region, in a way that addresses our capability building as well as financing, and allow integration with wider university activities.

Four hubs are being considered: China, Abu Dhabi, India, and then (subject to further scrutiny and review) Brazil, where the University does not yet have strong ties, but for JBS there may be the potential of a hub that indeed contributes on all four dimensions.

In the following, a short summary of the different international activities by region is included:

China:
JBS is currently negotiating an agreement with ICBC, which is likely to include all four elements mentioned above. In addition, the Judge Business School's executive education company has a number of significant contracts to provide executive education programmes to corporate companies in China, as well as links with the universities in Hong Kong.

The Department of Engineering is a leading participant in the Low Carbon Energy University Alliance with Tsinghua University and MIT. The Director of this initiative and a number of Engineering Department staff are PIs or Co-Is on projects funded through this Alliance. It is hoped that this alliance will expand further. In addition, plans are being developed for a Design Centre for Photonic Systems, with a range of academic and industrial partners in China.

The Department of Chemical Engineering and Biotechnology (CEB) held a Summer School for students from Beijing University of Chemical Technology (BUCT) in 2010 and 2011. As a result of this activity BUCT proposed the signing of a Memorandum of Understanding to develop further initiatives. This was signed in summer 2011 and there is evidence that BUCT is seeking funds in China for student exchanges and collaborative research.

India:
Over the next year the Academic Committee of the Engineering Department plans to review the wide variety of research collaborations the Department currently has within India, and to investigate whether it is feasible to adopt a more focused, strategic approach to its collaborations with the IITs.

In the JBS's executive education company, there is a program with the Indian police force (led by Larry Sherman of criminology), and there is currently a contract regarding a programme for senior civil servants. In addition, there are several research projects ongoing in India (for example, on business models for extremely low-cost new products).

Singapore:
CEB is leading a major submission to the Singapore Government's CREATE research funding scheme to develop a major initiative in Reaction Engineering. A decision on the funding request is expected in early 2012.

CPSL is having early conversations with the National University of Singapore on plans to run open executive education programmes.

The Middle East:
Engineering's strategic overseas initiatives include a collaboration with KACST which is funding research in Cambridge and at KACST. The Department is leading this initiative and is very keen to see it expand over the next few years. CEB is one of

the participating Departments. It is understood that the first phase of this initiative has been approved by KACST and is to start in Jan 2012.

The JBS's executive education company has a number of significant contracts to provide executive education programmes in Abu Dhabi and neighbouring countries in the Middle East. In addition, there is an ongoing discussion to possibly provide capability building for the UAE University's business school faculty, and a proposal to start a research-generating senior management programme for one AD company.

South Africa:

CPSL has a wholly owned subsidiary company and an office in Cape Town, but has no immediate plans for further office expansion. CPSL runs a number of customised programmes for clients in South Africa and a possibility exists for a customised leadership programme to be offered to other Commonwealth countries, but this is still at discussion stage. In addition to work with corporate clients, CPSL's international collaboration in South Africa is limited at present to work with Universities, such as the University of Cape Town (UCT).

CEB and UCT have agreed an informal collaboration in the teaching of Design. The CEB Lecturer in Design visited UCT during the summer to participate in the teaching of their Design Project. This has highlighted a number of areas for further development. Additionally, CEB/UCT have discussed collaboration in research in Reaction Engineering, and this is strategically attractive as UCT has very considerable expertise in the field of gas-to-liquid fuels conversion.

Europe:

CPSL runs both open executive programmes and a number of customised programmes for clients in Europe and has an office in Brussels.

The rest of the world:

Departments within the School interact and receive research sponsorship from companies around the world. The School's strategy includes increasing the number of applications from very high quality overseas students, both at undergraduate and postgraduate level, and constituent Departments are working to encourage this in several ways. The Department of Engineering is an active member of the Sterling Group http://www.sterlinggroup.org.uk/ and during the academic year 2010-11 members of that Department have taken part in tours of India and Vietnam. Members of the Department are also active in interviewing overseas candidates in their home countries as part of the Cambridge Collegiate admissions processes. The Department has seen year-by-year increases in the number of overseas graduate students and continues to encourage these through collaborations with overseas institutions.

CPSL attracts delegates from around the world to its open executive programmes, currently run in Sydney and Atlanta, and plans to continue doing so. CPSL runs a number of customised programmes for clients in various locations around the world including North and South America and Australia. CPSL has a wholly owned subsidiary company in Australia and an office in Melbourne, but has no immediate plans for further office expansion. The International collaboration is mostly with a university such as University of Queensland. None of these international alliances is deemed to be a risk in ethical or reputational terms.

Information Technology, Systems and Strategy

(Planning Guidance, Page 5, Paragraph 23)

The Information Strategy and Services Syndicate have asked for early notice of proposals for new IT/IS projects and would be interested to hear of any IT/IS developments in Schools. In particular they wish to identify examples of good practice, and systems which would benefit from integration with- or place high demands on – central systems.

The School's IT investment strategy has been to allocate resources to the Departments so that they can make the most efficient use of the resources to cater for the local needs of the Departments. Application systems used within the School are a mix of University-wide systems (CUFS, CamSIS, Hermes, Camtools etc) and locally developed systems. The latter arise when it is felt that either the University has no appropriate solution (or its solutions do not fit our specification), or we need functionality in addition to, rather than in replacement of, that provided by the central systems.

The Departments initiate reviews of their IT infrastructure and support on a regular basis. The Department of Engineering and the Computer Laboratory are due to start theirs, with the expectation that the review panels would report on its findings within the current academic year. In addition, the School has recently established an IT Advisory Group, consisting of senior computer officers, to disseminate best practice within the School.

In this spirit, what follows is an overview of the local IT systems in the Departments and how they interact with centrally provided systems.

Teaching

The Engineering Department has run its own teaching systems since before there were any significant central resources for teaching and continues to do so, but we now aim to maintain as much compatibility as possible with the PWF (Linux and Windows) and also make significant use of CamTools. Most of the incompatibility with the PWF stems from the specialist software, mainly commercial engineering packages, which must necessarily be licensed by the Department. Where possible, remote access to these packages running on servers is provided for members of the Department working in college or at home.

The Department makes significant use of Matlab and Octave, an Open Source product providing similar functionality. It has therefore supported the initiative to obtain a University-wide Matlab licence by contributing its budgeted expenditure on Matlab for the next three years towards the initial purchase. For this licence to be useful in the longer term, it must be truly University-wide, any solution involving the charging on of costs on a usage (or surrogate usage) basis will simply add to administrative costs and deter take-up, thus negating the cost benefits and the compatibility of provision

between courses. Similar provision might be considered for other licensed software which is widely used across the University, e.g. by a majority of the Schools.

JBS is working on a Sharepoint, initially to replace its intranet and to provide a single portal for MBA students.

Administration

Within the Department of Engineering, the greatest use of central IT systems is of the various central administrative systems since this is where most information and processes are shared. However, there is a need to integrate this data with a range of in-house IT systems which support our business processes. These processes and systems are centred around a database of members of the Department (EDDA) which we synchronise to daily updates from various central systems, e.g. CamSIS, CUFS, CRSids from the UCS, and University Card data (but unfortunately not CHRIS). This unified source of data is used by our other in-house IT systems: COMET course and exam management system (in-house developed for data and processes not supported by CamSIS), EPOS (using a commercial system also used by many colleges), print and copying accounting (Uniflow from Canon), building access control (ADT), Centaur time-sheet system (a recent in-house development replacing a paper-based system), on-line room booking system, data for web pages, etc. In general the approach has been to provide functionality in addition to, rather than in replacement of, that provided by the central systems. This relies on the ability to exchange data with the central systems: functionality not as widely or as routinely provided as it might be. It is hoped that the University's new Identity Management System, IBIS, will provide significant improvements in this area.

Engineering has been making increasing use of the University Card as a means of identifying members of the Department, e.g. for buildings access; use of the EPOS system for canteen purchases; and use of printers/copiers. Whilst in general this works well and data from the Card Office is good, there is a problem synchronising the data so that it reflects the new card only when the user has started using it.

However, the Department is having to embark on a project to re-introduce its web-based purchase requisitioning system The University's iProcurement system (which had replaced it) has proved time-consuming and is very unpopular with the majority of the Department's staff. Whilst to some extent this runs counter to the policy of only providing in-house functionality not available centrally, the facilities in iProcurement have proved to be a sufficiently poor match to the Department's needs to justify the recommissioning of the in-house system. The new system is being introduced in collaboration with the Finance Division and MISD, and will interface with the Marketplace and CUFS Purchase Orders.

JBS is presently working on the following IT initiatives:

1. A Business Management system for Executive Education (CRM, programme management and financials). This will be rolled out across other educational programmes in JBS in due course (but excluding financials).
2. JBS will be an early adopter of the new University Alumni database project.

3. Future projects may include a replacement for the meeting room booking system and an automated timetabling package. We have held discussions with CARET on the latter but it seems that there will be no University-wide solution in the near future.

CPSL is currently implementing a Document Management System to process and approve all Accounts Payable (AP) transactions using Serengeti Systems, e.g. supplier invoices and expense claims. This project will place modest demands on central storage as the documents need to be stored in the University's Oracle database system. The system would benefit greatly from integration with the University Finance System (UFS).

In addition, CPSL is investigating the option to back-up its Citrix XenServers VM's using PHD Virtual Backup onto a mini SAN as it would be good operational practice.

CPSL also wishes to implement offsite backup of Citrix XenServers to the University Data Centre using mini-SAN-to-mini-SAN replication. If this project is approved, data will be copied offsite, which although highly desirable may place demands on the network. Lastly, CPSL plans to carry out Microsoft TMG 2010 firewall implementation in the next six months.

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Work Plan 2010 - 11	Annual Report

1. Education

1.1 Undergraduate Education	
The School will build on the success of its admission and outreach programme to increase its student numbers still further.	The School has benefited from past investments made in its admission and outreach programme, as evidenced by the Department of Engineering having admitted a record number of 347 undergraduates in October 2011.
Following the advice of their Part I review, the Engineering Department will develop a major new practical activity to be offered at the start of the Michaelmas term of Part IA, for introduction in October 2011.	The Lego initiation project ran for the first time in October 2010 and is running for the second time in October 2011. This has proved to be a great success as it teaches Matlab/Octave programming, three-dimensional thinking, teamwork, working to deadlines, presentation skills and creativity all within a highly motivating and enjoyable framework.
In the academic year 2010-2011, the Engineering Department will offer a third-year undergraduate exchange with the National University of Singapore.	The exchange with the National University of Singapore ran for the first time in 2010-2011. It was a success and will run again in 2011-2012. In addition, a similar exchange arrangement with the Technical University of Munich has recently been agreed to start in 2012. This means that Engineering will now offer four exchange options in the third year of the course: MIT, NUS, Munich and Ecole Centrale Paris.
The Engineering Department and the Computer Laboratory will explore the possibilities for sharing modules between the MPhil in Advanced Computer Science and Part IIB Engineering.	In 2011-2012 the Computer Laboratory's course on *Low power embedded systems programming* will be offered in Engineering Part IIB and the Engineering Department's course on *Image processing and image coding* will be offered in the MPhil in Advanced Computer Science.
In 2008-09 the Computer Laboratory introduced a programme of studio-based classes in Part IA of the Computer Science Tripos. During 2009-10 the programme will be consolidated and in 2010-11 will be expanded into Part IB.	After revamping our course over the last three years, the Computer Laboratory now has a solid programme of studio-based teaching in both Part 1A and Part 1B of the Computer Science Tripos. We plan to expand studio-based teaching to one additional Part 1A course in 2011-12.

The Computer Laboratory is developing plans for the introduction of a Part III of its Tripos Course with the aim of admitting candidates in 2011-12.	The Computer Laboratory introduced a Part III to the Computer Science Tripos in 2011-12 and plans to increase intake in 2012-13.
The Department of Chemical Engineering and Biotechnology will complete its re-organization of bio-teaching, addressing Parts I and IIA of the Tripos. A new course on biosensors has already been introduced as an option in CET IIB, and from 2009-10 CEB is participating at the CET IIB level in a Synthetic Biology course which is being delivered jointly to CEB, the Department of Engineering and the Department of Plant Sciences.	This has been done, resulting in a re-focusing of our Pt IIA lectures and the involvement of new lecturers in Pt's I and IIA. CEB participated in Synthetic Biology in CET IIB in 2009-10 and 2010-11. However, it will not participate in 2011-12 as the course is difficult to timetable and attracted limited interest from chemical engineering students.
The School Undergraduate Education Committee will continue to monitor gender balance in terms of performance at Tripos.	During the Easter Term 2011, the Chair of the School's Undergraduate Education Committee, Professor Prager, served on Professor Gelsthorpe's university-wide working group on *Gender and Tripos Performance*. This group has now reported to the Education Committee of the General Board. The School Office will collect data on exam performance across the School as a function of gender, starting from the exams in the Easter Term 2011. This can then be interpreted using the information from Professor Gelsthorpe's report.

1.2 Postgraduate Education

The School will increase the percentage of PhD theses submitted within 4 years of the start of research by increasing awareness within the student and supervisor communities.	The School's submission rate for PhD theses within four years has increased to 72.2%. For Engineering, the submission is 65%, an increase from 51% last year. This was achieved by a coordinated exercise between the Graduate Office and Engineering Heads of Division. In JBS, there were currently no students who failed to submit within 4 years in the period 2010-11.

The School will continue to develop its taught MPhil and MRes courses according to the Bologna process.	All of the School's MPhil and MRes programmes meet the appropriate duration target required under the Bologna Agreement with UK universities and are worth 90ECTS credits. Engineering started two new taught MPhils in October 2011; Nuclear Energy and Energy Technologies. The industrial club supporting the Nuclear energy MPhil has recruited more rapidly than planned and there are 9 companies paying membership fees. The Nuclear Energy MPhil has attracted outstanding students some of whom are keen to continue as research students. However, the University's cap on the number of graduate student places for taught MPhils has had a detrimental effect. Current successful MPhils have had to be cut back in order to give places to the two new MPhils whose existence had already been advertised before the cap was introduced.
CEB will review its MPhil courses with a view to identifying their contribution to the academic reputation and vitality of the Department, their income streams and resource implications. A further MRes in Bio-pharmaceuticals has been proposed and the case for this will be reviewed alongside MBE and ACE.	The introduction of the cap on MPhil numbers had the direct effect of reducing admissions to the CEB MPhil in Advanced Chemical Engineering to half that immediately prior to the cap. The effect is that what had previously been an income generating activity for CEB is now a marginal or even loss-making activity. The introduction of an MRes in Bio-pharmaceuticals would present a significant additional risk of financial loss (at least during the early developmental years) and the department is reluctant to take on this risk until the cap in admissions to the MPhil in Advanced Chemical Engineering is removed and the financial burden of that programme is relieved. CEB will re-assess the financial viability of an MRes in Bio-pharmaceuticals when the cap is removed and the MPhil in Advanced Chemical Engineering is again financially viable.

The Judge Business School will continue to grow its class sizes in premium fee programmes – MBA, EMBA (a second cohort will start in September 2010), MFin and the vocational MPhils – Management and Technology Policy. Marketing activities and Admissions processes will be realigned to reflect the competitive arena in which we operate with a view to maintaining student quality during this growth phase.	MBA numbers increased slightly to 167 and the EMBA recruited a high quality second cohort of 51 students. MFin numbers increased to 33. Student numbers on the MPhils in Management and Technology Policy were below target. Marketing and Admissions processes have progressively been upgraded as planned.
The School will continue to plan for TST provision post-Roberts-funding.	This process is underway, and an appropriate budget has being produced to support a greatly enlarged Transferable skills programme overseen by the Graduate School Committee.
Over the next two years, the Graduate Education Committee will assess the advantages/disadvantages, and feasibility of moving to a graduate school system.	The School of Technology's Graduate School was established in the Easter Term of 2011, and is overseen by the Graduate School Committee which reports to the Council of the School via the Needs Committee.
The School will develop a framework for the delivery of transferable skills within the DTC model of graduate education.	In the Michaelmas Term 2011, the Graduate School Committee will set up a Working Group to prepare the School for how it can maximise its chances of successfully gaining DTCs.

1.3 Continuing Executive Education

IfM will use the opportunities and facilities offered by the new Alan Reece building to expand continuing education at the interface between engineering, management and policy.	In 2010-2011, 70 events comprising short courses, symposia, workshops and conferences were run by IfM ECS on behalf of IfM. These events disseminate the work of IfM and IfM ECS to industry and governments.
CPSL will launch a new Global Leadership Programme following a pilot in 2009-10.	CPSL's focus in 2010-11 was the launch of a new MSt in Sustainability Leadership following a significant period of preparation, and there continues to be strong market interest in CPSL's accredited programmes. Preliminary discussions have been started in 2011-12 with a potential partner to launch a new Global Leadership Programme.

CPSL will develop new climate leadership programmes that respond to the outcomes of UN negotiations and other public policy agreements.	In 2010 CPSL established the Corporate Leaders Network on Climate Change (CLN) with funding from the Foreign & Commonwealth Office. This network has subsequently grown in both size and geographical reach.CPSL continues to deliver its existing Climate Leadership Programme, which receives strong delegate ratings, whilst facing significant marketing challenges.
CPSL will consolidate its work in Europe and the United States, broadening the offering from its Business & the Environment Programme and Corporate Leaders' Groups to include new tailored programmes.	CPSL continues to focus its activities within Europe, the United States and South Africa, with a further strengthening in particular of the Brussels office.The last year has seen significant growth in tailored programmes with many existing clients commissioning more work from CPSL as well as programmes being developed for new clients. CPSL has seen stronger interest for sector-focused programmes rather than issue specific initiatives. This has led to the development of new programmes for the built environment and health sectors.
The Judge Business School will continue to grow its executive education business in both home and overseas markets. Business development for custom programmes will be targeted at larger, repeat programmes, thus increasing the resulting margins.	Executive Education in JBS has continued to develop, with substantial business being contracted with Chinese banks and other new clients this year. Open enrolment programmes have continued to grow. Revenue for 2010-11 reached £11.6m, a 44% increase on the previous year. However margins have not yet improved as intended, and the integration of executive education to research and academic output remains to be developed.

2. Research

Following a strategic review the Department of Engineering will take appropriate action to consolidate its three current cross-cutting strategic themes and establish new initiatives that have the potential to have a major impact and attract significant support. These will be chosen to foster research collaborations between the divisions, with other departments within the University, and with institutions.	Four new themes have been established in Engineering: (1) Energy, Transport and Urban Infrastructure; (2) Engineering for Life Sciences and Healthcare; (3) Uncertainty, Risk and Resilience (4) Inspiring Research through Industrial Collaboration. These, along with others in the School, have fed into the identification of the School's Strategic Themes: (provisionally) • Energy, Climate Change, Sustainability and Resource Security • Life Sciences, Health and Health Management • Technology, Risk and Resilience • Innovation, Entrepreneurship and Knowledge Exchange.
The School will seek to grow its research grant portfolio through encouraging and supporting large grant applications and extending its industrial contacts as a cushion against a decrease in government funding.	The Departments within the School have been engaging more strategically with their industrial contacts, showing them how we, together with other collaborating Departments, can provide complete solutions to their technical challenges. So far this has been very well received and is leading to an expansion in the areas of the funded research. Data are emerging that awards in the region of £1-3m have increased significantly.
In preparation for the REF the School will maintain a database of case studies of successful application of research.	The School has produced example case studies for the University's early trial exercise. We are actively considering ways of optimising its REF submission.
The Computer Laboratory will continue to foster research collaboration locally, nationally and internationally, in topics as diverse as human-computer interaction, internet security and computational biology.	The Computer Laboratory will continue to develop its programme of research collaboration at all levels and in a wide range of topics. The new post of Research Facilitator will expedite this expansion. The Computer Laboratory is developing excellent research initiatives in sustainability, in topics such as *Computing for the Future of the Planet* and *C-Aware: increasing user awareness of personal energy consumption*.

CEB has established its 5 research themes of measurement, modelling, microstructure, processes and biotechnology, each theme mapping on to the academic interests of multiple faculty, and enabling a framework to deliver appropriate, skilled technical support. Across these themes, the Department has established two multi-disciplinary research themes of healthcare and multi-scale, sustainable reaction engineering. These themes bring together large numbers of academic staff to contribute to exciting challenges in chemical engineering and biotechnology, and identify areas in which we expect to be internationally leading. They also position the Department well for submitting large grants in the healthcare and energy initiatives of the funding bodies. The cross-cutting themes also allow faculty with relatively small personal research activities to become more fully involved in well-funded research activities. In RAE 2008, a third cross-cutting theme of Product Design was identified; the future of this theme will be assessed.	Progress has been made on establishing the cross-cutting themes. Two new Lecturers have been appointed to strengthen Healthcare and one to strengthen Sustainable Reaction Engineering. A large grant (ca. $5M) has been secured in Healthcare and a large grant proposal is under evaluation (by CREATE) in Sustainable Reaction Engineering. Product Design is not being pursued as a cross-cutting theme at present.
CEB seeks to expand its contribution to optical imaging research (and magnetic resonance where appropriate) in the multi-imaging initiative led by SBS and the Physics of Medicine activity.	CEB is continuing to apply for research grants in this area in collaboration with the School of Biological Sciences.
CEB will set up a new International Advisory Group comprising industrialists, academics and alumni; the first area to be addressed by this group with be "healthcare" – likely review date Michaelmas 2010. The group will also advise on curriculum content of our taught undergraduate and postgraduate courses.	CEB has not progressed an International Advisory Group review of Healthcare at this stage, preferring to develop this theme further before a worthwhile review can be held.

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3. Personnel

The School will seek to continue to appoint outstanding academics to Lectureships and Chairs in line with its strategic objectives.	In view of the budget reductions within the School most of the new positions have been funded mostly through donations or external income. For example, in Engineering, we have recruited three Chairs (or equivalent) and six ULs (or posts at the level of UL), all in strategically important areas. In JBS we have successfully recruited two chairs in the year and also retained 3 high quality junior faculty to start on 1 October 2011. We have filled posts in the Finance & Accounting subject group, a perennially difficult task. But most significantly, Professor Christoph Loch has been engaged to take over as Director of JBS.
The Department of Engineering will review and where appropriate refine its new structured probationary scheme as the first cohort of academic staff complete their probationary period under the scheme.	The Department has reviewed the Probation Scheme. This was viewed to have been a highly successful and rigorous way of not only monitoring staff during their probation period but also giving them appropriate feedback so that their performance continually improved. Minor changes have been proposed for the Probationary Scheme, partly to even out the timing of reviews over the 5 year period.
The Computer Laboratory will seek to establish and recruit to a UL in Algorithms in line with their approved 5-Year Plan.	The Computer Laboratory will seek to establish and recruit to a UL in Algorithms in line with their approved 5-Year Plan.

4. Estates

The Computer Laboratory looks forward to continuing and expanding collaboration with Division B of the Engineering Department, and to this end provides space within the William Gates Building.	The Computer Laboratory looks forward to continuing and expanding collaboration with Division B of the Engineering Department, and to this end provides laboratory and office space within the William Gates Building.
The Department of Chemical Engineering and Biotechnology will seek to explore options for additional space, and also develop further plans for a new building in West Cambridge. The Department, assisted by the School, is actively exploring fund-raising opportunities.	This has been done and the West Cambridge building is now in the University's Green Zone. CUDO are fully engaged in exploring fundraising.

5. Finance

The School will ensure that valid levels of indirect income are gained from research grants, that the time for support and pool staff is charged appropriately, and that where appropriate facilities are set up as Small Research Facilities.	This is being monitored carefully. For example, the Department of Engineering has introduced targets for the level of PI and support staff time to be charged to grants. Permission from the relevant Head of Division is required for grants that go below these targets. A time sheet system Centaur has been introduced to provide an auditable record of the time that research and support staff spends on projects as is required to meet the auditing requirements of EU and now Research Council grants.
The Department of Engineering will expand its fundraising campaign to provide space, staff and research students in support of the Department's strategy of addressing major interdisciplinary challenges around sustainable development, energy, water, health and wealth creation.	The Department of Engineering's fundraising campaign has been successful in terms of providing funds for staff with donations of funding for: • a Professorship from the Kirby Laing Foundation (substitutional); • a new Professorship in Fluid Mechanics from Dyson Ltd; • support for the Royal Academy of Engineering Professorship in Services from IBM and BAE Systems; • support from Laing O'Rourke for a Professorship, two Lectureships and a Course Director in Construction Engineering. Support for students has been obtained from the Norman bequest and from the Lloyds Register Educational Trust. Supacat exercised the right to purchase the shares bequeathed to the Department by David Clayton resulting in a donation of £250,000. However, a fundraising campaign to provide additional space has yet to be started and requires a major initiative of the Department supported by CUDO around the Strategic Research Themes.

6 Administration

The new Department of Chemical Engineering and Biotechnology will formalise the new administrative and management structure, following the appointment of the Academic Secretary and the creation of up to 3 Deputy Head posts (Director of Institute of Biotechnology, Director of Teaching, and Director of Research).	This has been done. A new Director of Research took up the post in October 2010 and a new Director of Teaching has been identified to take up post during Lent 2012. Rationalisation of assistant staff posts has taken place as a result of VSS and other departures.

7. Estates

The Engineering Department will continue the redevelopment of the Scroope Terrace site and seek to use any developments in relation to the Royal Cambridge Hotel to extend the footprint of the Department.	A study by RH Partnerships initially showed the potential for a new building for Engineering over the car park alongside an expansion of the rooms in the hotel as requested by the Judge Business School. The JBS subsequently changed their policy leaving the whole site available to Engineering. This showed the capability of meeting Engineering's expansion needs over the next few years as well as meeting the criteria for the hotel in terms of the number of available car parking spaces. The registration of the project is therefore being changed from JBS to Department of Engineering. Currently the hotel operators are indicating a willingness to give up part of their car park, the informal feedback from the city planners has been positive to this proposed development. Since the lease is due to expire in 2013 this is the Engineering Department's highest priority for new build.
The Engineering Department will address its need for additional space at West Cambridge. Industrial and other funding will be used to extend space at the Whittle Laboratory for turbo-machinery research to meet the growing research funding for this activity. The Department will seek additional long term space for Division B, e.g. the Microsoft building, as the CAPE Building is at full capacity. This new space and projects will be designed to foster research collaborations with other Divisions, the Computer Lab and other parts of the University.	Investigation of building on an extra floor on the roof of the CAPE building has shown that there is limited capacity for additional space in this way. Currently Division B is being more rigorous in the allocation of space and also achieving efficiencies in space requirements through better amalgamation of the Nanoscience and CAPE buildings, and will achieve expansion by these mechanisms.

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The Judge Business School will continue with its plans to expand the space available at or near its main building on Trumpington Street. This includes the Tennis Court Road hostels, Keynes House and the Royal Cambridge Hotel, the last of which would be used for residential accommodation for Executive Education delegates.

Lack of space has become a critical constraint to teaching, research and continuing education at JBS. Resolution of this problem requires three parallel strands of activity – obtaining the backing of the University for these plans, raising the necessary finance and finally negotiating the required planning consents with the City Council.

We are focusing on the rebuilding of Keynes House on a larger footprint. Donor funds and a University loan are available for this project. Development of the hostels site would prove problematic in planning terms as it removes residential accommodation from the City centre in contravention of the City Strategic Planning guidelines. However we may make an application to use one or both buildings as temporary accommodation during the KH rebuilding works and would also wish to reserve an interest in the hostels as a potential second phase of the overall site development.

The KH rebuild is currently being worked on by architects and others, the primary focus being to establish what is feasible in respect of planning and conservation constraints.

JBS is no longer pursuing the Royal Cambridge hotel project. Funds are not available and the change in senior management in both JBSEEL and JBS has relegated the priority of the concept.

School of Technology, 29 November 2011

SECTION 7
APPENDIX A-1

SCHOOL OF TECHNOLOGY
2011 PLANNING ENQUIRY
STUDENTS - STUDENT NUMBERS
Planned/Aspirational UG student numbers (FTE), by Tripos

SECTION 7.1

	TOTAL FTE				2011 Planning Enquiry				
UNDERGRADUATES (FTE LOAD)	Actual 2009-10	Actual 2010-11	*2010 Plans 2011-12*	Estimated arrival 2011-12	Planned 2012-13	Planned 2013-14	Planned 2014-15	Planned 2015-16	Full Capacity
ENGINEERING TRIPOS									
Year 1 ET Part IA	315	332	*335*	347	345	355	360	360	
Year 2 ET Part IB	301	290	*308*	305	318	328	338	335	
Year 3 ET Part IIA + MET Part I + MIT	251	293	*292*	270	302	312	322	324	
Year 4 ET Part IIB + MET Part II	241	250	*292*	292	289	299	309	321	
TOTAL ENGINEERING TRIPOS	**1,108**	**1,165**	***1,227***	**1,214**	**1,254**	**1,294**	**1,329**	**1,340**	**1,440**
Total Overseas students forecast	*275*	*289*	*307*	*301*	*314*	*324*	*332*	*335*	
% forecast to be Overseas students	*25%*	*25%*	*25%*	*25%*	*25%*	*25%*	*25%*	*25%*	
CHEMICAL ENGINEERING TRIPOS									
Year 2 CET Part I	50	70	*60*	61	65	65	65	65	
Year 3 CET Part IIA	73	46	*70*	68	59	63	63	63	
Year 4 CET Part IIB	55	66	*45*	43	65	56	60	60	
TOTAL CHEMICAL ENGINEERING TRIPOS	**178**	**182**	***175***	**172**	**189**	**184**	**188**	**188**	**195**
Total Overseas students forecast	*53*	*55*	*53*	*52*	*57*	*55*	*56*	*56*	
% forecast to be Overseas students	*30%*	*30%*	*30%*	*30%*	*30%*	*30%*	*30%*	*30%*	
COMPUTER SCIENCE TRIPOS									
Year 1 CST Part IA (50% option with NS)	27	28	*28*	27	29	30	30	30	
Year 1 CST Part IA (50% option with Psych)	5	5	*5*	5	5	5	5	5	
Year 1 CST Part IA (50% option with Maths)	5	5	*5*	5	5	5	5	5	
Year 1 NST Part IA (CS option - 25%)	15	14	*13*	14	14	14	14	14	
Year 1 Affliated & PPS Part IA (CS option - 25%)	1								
Subtotal Part IA	51	51	*50*	50	52	54	54	54	
Year 2 CST Part IB + MIT	81	70	*73*	76	77	80	80	80	
Subtotal Part IB	81	70	*73*	76	77	80	80	80	
Year 3 CST Part II	61	72	*70*	66	70	72	72	72	
Subtotal Part II	61	72	*70*	66	70	72	72	72	
Year 4 CST Part III			*10*	2	10	12	12	12	
Subtotal Part III	-	-	*10*	2	10	12	12	12	*note 1*
TOTAL COMPUTER SCIENCE TRIPOS	**193**	**193**	***203***	**194**	**209**	**218**	**218**	**218**	**275**
Total Overseas students forecast	*23*	*23*	*24*	*23*	*25*	*26*	*26*	*26*	
% forecast to be Overseas students	*12%*	*12%*	*12%*	*12%*	*12%*	*12%*	*12%*	*12%*	
MANAGEMENT STUDIES TRIPOS									
MST	89	65	*60*	61	65	65	65	65	
TOTAL MANAGEMENT STUDIES TRIPOS	**89**	**65**	***60***	**61**	**65**	**65**	**65**	**65**	**75**
Total Overseas students forecast	*4*	*3*	*2*	*2*	*3*	*3*	*3*	*3*	
% forecast to be Overseas students : 5%	*4%*	*4%*	*4%*	*4%*	*4%*	*4%*	*4%*	*4%*	
SCHOOL OF TECHNOLOGY - TOTAL									
TOTAL ALL TRIPOS	**1,568**	**1,605**	***1,665***	**1,641**	**1,717**	**1,761**	**1,800**	**1,811**	**1,985**
Total Overseas students forecast	*355*	*369*	*386*	*378*	*398*	*407*	*417*	*420*	
% forecast to be Overseas students	*23%*	*23%*	*23%*	*23%*	*23%*	*23%*	*23%*	*23%*	

STUDENTS - STUDENT NUMBERS
Planned/Aspirational UG student numbers (Headcount), by Tripos

UNDERGRADUATES (HEADCOUNT)	TOTAL HEADCOUNT								
					2011 Planning Enquiry				Full Capacity
	Actual	Actual	2010 Plans	Estimated arrival	Planned	Planned	Planned	Planned	
	2009-10	2010-11	2011-12	2011-12	2012-13	2013-14	2014-15	2015-16	
ENGINEERING TRIPOS									
Year 1 ET Part IA	315	332	335	347	345	355	360	360	360
Year 2 ET Part IB	301	290	308	305	318	328	338	335	360
Year 3 ET Part IIA + MET Part I + MIT + EXP + NUS	251	293	292	270	302	312	322	324	360
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Total Overseas students forecast	*275*	*289*	*307*	*301*	*314*	*324*	*332*	*335*	
% forecast to be Overseas students	*25%*	*25%*	*25%*	*25%*	*25%*	*25%*	*25%*	*25%*	
CHEMICAL ENGINEERING TRIPOS									
Year 2 CET Part I	50	70	60	61	65	65	65	65	65
Year 3 CET Part IIA	73	46	70	68	59	63	63	63	65
Year 4 CET Part IIB	55	66	45	43	65	56	60	60	65
TOTAL CHEMICAL ENGINEERING TRIPOS	**178**	**182**	**175**	**172**	**189**	**184**	**188**	**188**	**195**
Total Overseas students forecast	*53*	*55*	*53*	*52*	*57*	*55*	*56*	*56*	
% forecast to be Overseas students	*30%*	*30%*	*30%*	*30%*	*30%*	*30%*	*30%*	*30%*	
COMPUTER SCIENCE TRIPOS									
Year 1 CST Part IA (50% option with NS)	53	56	55	54	57	60	60	60	
Year 1 CST Part IA (50% option with Psych)	9	9	10	9	10	10	10	10	
Year 1 CST Part IA (50% option with Maths)	9	9	10	9	10	10	10	10	
Year 1 NST Part IA (CS option - 25%)	60	54	50	55	55	55	55	55	
Year 1 Affliated & PPS Part IA (CS option - 25%)	3								note 1
Subtotal Part IA	134	128	125	127	132	135	135	135	100
Year 2 CST Part IB + MIT	81	70	73	76	77	80	80	80	
Subtotal Part IB	81	70	73	76	77	80	80	80	100
Year 3 CST Part II	61	72	70	66	70	72	72	72	
Subtotal Part II	61	72	70	66	70	72	72	72	100
Year 4 CST Part III			10	2	10	12	12	12	
Subtotal Part III	-	-	10	2	10	12	12	12	25
TOTAL COMPUTER SCIENCE TRIPOS	**276**	**270**	**278**	**271**	**289**	**299**	**299**	**299**	**325**
Total Overseas students forecast	*33*	*32*	*33*	*33*	*35*	*36*	*36*	*36*	
% forecast to be Overseas students	*12%*	*12%*	*12%*	*12%*	*12%*	*12%*	*12%*	*12%*	
MANAGEMENT STUDIES TRIPOS									
MST	89	65	60	61	65	65	65	65	75
TOTAL MANAGEMENT STUDIES TRIPOS	**89**	**65**	**60**	**61**	**65**	**65**	**65**	**65**	**75**
Total Overseas students forecast	*4*	*3*	*2*	*2*	*3*	*3*	*3*	*3*	
% forecast to be Overseas students : 5%	*4%*	*4%*	*4%*	*4%*	*4%*	*4%*	*4%*	*4%*	
SCHOOL OF TECHNOLOGY - TOTAL									
TOTAL ALL TRIPOS	**1,651**	**1,682**	**1,740**	**1,718**	**1,797**	**1,842**	**1,881**	**1,892**	**2,035**
Total Overseas students forecast	*365*	*379*	*395*	*388*	*407*	*417*	*427*	*430*	
% forecast to be Overseas students	*22%*	*23%*	*23%*	*23%*	*23%*	*23%*	*23%*	*23%*	

ASPIRATIONAL NUMBERS (Headcount)	Full Capacity per year	Aspirational per year	Identified constraints
ENGINEERING TRIPOS	360	add 10 per year	
CHEMICAL ENGINEERING TRIPOS	65	85-120	Limited by leture theatres until new build
COMPUTER SCIENCE TRIPOS (note 1)	100	80	
COMPUTER SCIENCE TRIPOS - Part III only	25	25	
MANAGEMENT STUDIES TRIPOS	75	65	

note 1 : There is an additional capacity of 100 students for those taking CST Part IA as part of another Tripos. This additional 100 capacity is not included in the above "Full Capacity" numbers.

SCHOOL OF TECHNOLOGY
2011 PLANNING ENQUIRY
STUDENT NUMBERS
Planned/Aspirational PG student numbers (FTE) - CAPPED

POSTGRADUATES - CAPPED PROGRAMMES (FTE LOAD)	2010 Plans 2011-12	Estimated arrival 2011-12	Places allowed (Capped) 2011-12	Memo if +2% 2012-13	TOTAL FTE 2011 Planning Enquiry Planned 2012-13	Planned 2013-14	Planned 2014-15	Planned 2015-16	ASPIRATIONAL FTEs 2011 Planning Enquiry Planned 2012-13	Planned 2013-14	Planned 2014-15	Planned 2015-16
ENGINEERING - PG (CAPPED)												
MPhil Ind Sys, Manuf & Mgmt	40	46	39	40	40	40	40	40	40	40	40	40
MPhil Eng for Sust Dvlpment	45	36	41	42	42	42	42	42	45	45	45	45
MPhil Energy Technologies (Premium Fees) **- NEW**	15	13	15	15	17	18	19	19	25	30	35	40
MPhil Nuclear Energy (Premium Fees) **- NEW**	15	14	16	16	17	18	20	20	20	25	30	30
Total Engineering PG Taught	115	109	111	113	116	118	121	121	130	140	150	155
MPhil Engineering	20	12	15	15	12	12	12	12	12	12	13	13
Total Engineering PG Research	20	12	15	15	12	12	12	12	12	12	13	13
TOTAL ENGINEERING POSTGRADUATES (CAPPED)	135	121	126	128	128	130	133	133	142	152	163	168
CEB - PG (CAPPED)												
MPhil Bioscience Enterprise	25	26	24	25	24	25	25	25	25	25	25	25
Total CEB PG Taught	25	26	24	25	24	25	25	25	25	25	25	25
MPhil Chemical Engineering and Biotechnology	-	1	2	2	1	1	1	1	1	1	1	1
MPhil Advanced Chemical Engineering	20	10	13	13	15	15	16	16	20	20	20	25
Total CEB PG Research	20	11	15	15	16	16	17	17	21	21	21	26
TOTAL CEB POSTGRADUATES (CAPPED)	45	37	39	40	40	41	42	42	46	46	46	51
COMPUTER LAB - PG (CAPPED)												
MPhil Advanced Computer Science	50	44	42	43	43	44	45	45	45	50	50	50
Total Computer Lab PG Taught	50	44	42	43	43	44	45	45	45	50	50	50
TOTAL COMPUTER LAB POSTGRADUATES (CAPPED)	50	44	42	43	43	44	45	45	45	50	50	50
JUDGE BUSINESS SCHOOL - PG (CAPPED)												
MPhil Technology Policy (Premium fees)	35	40	34	35	36	37	37	37	40	40	40	40
MPhil Finance (Premium fees)	25	36	28	29	30	30	30	30	30	30	30	30
MPhil Management (Premium fees)	40	44	40	41	44	46	47	47	50	50	55	60
MPhil Innovation, Strategy and Organization **- PGR in PR10**	18	15	18	18	15	18	19	19	18	20	22	24
MPhil Management Science and Operations **- PGR in PR10**	5	1	5	5	3	-	-	-	5	7	10	10
Total Judge BS PG Taught	123	136	125	128	128	131	133	133	143	147	157	164

SCHOOL OF TECHNOLOGY
2011 PLANNING ENQUIRY
STUDENT NUMBERS
Planned/Aspirational PG student numbers (FTE) - CAPPED

POSTGRADUATES - CAPPED PROGRAMMES (FTE LOAD)	TOTAL FTE									ASPIRATIONAL FTEs			
						2011 Planning Enquiry				2011 Planning Enquiry			
	2010 Plans	Estimated arrival	**Places allowed (Capped)**	*Memo if +2%*		Planned	Planned	Planned	Planned	Planned	Planned	Planned	Planned
	2011-12	2011-12	**2011-12**	*2012-13*		2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16
MPhil Financial Research	*4*	-	-	-		-	-	-	-	-	-	-	-
MPhil Innovation, Strategy and Organization **- Now PGT**													
MPhil Management Science and Operations **- Now PGT**													
Total Judge BS PG Research	*4*	-	-	-		-	-	-	-	-	-	-	-
TOTAL JUDGE BS POSTGRADUATES (CAPPED)	*127*	136	**125**	*128*		128	131	133	133	143	147	157	164

SCHOOL OF TECHNOLOGY - TOTAL													
MPhil programmes - Postgraduate Taught (Capped)	*313*	315	302	*309*		311	318	324	324	343	362	382	394
MPhil programmes - Postgraduate Research (Capped)	*44*	23	30	*30*		28	28	29	29	33	33	34	39
TOTAL POSTGRADUATES (CAPPED)	*357*	338	**332**	*339*		339	346	353	353	376	395	416	433

Difference to Cap   *37*   *49*   *63*   *80*

SECTION 7   **SCHOOL OF TECHNOLOGY**   **SECTION 7.1**
APPENDIX B-2   **2011 PLANNING ENQUIRY**
STUDENTS - STUDENT NUMBERS
Planned/Aspirational PG student numbers (FTE) - NOT CAPPED

POSTGRADUATES - NOT CAPPED PROGRAMMES (FTE LOAD)	TOTAL FTE						
			2011 Planning Enquiry				
	2010 Plans	Estimated arrival	Planned	Planned	Planned	Planned	Full Capacity
	2011-12	*2011-12*	*2012-13*	*2013-14*	*2014-15*	*2015-16*	
ENGINEERING							
MSt Construction Engineering (2 years programme)**- NEW**	*8*	7	17	23	28	30	30
Total Engineering PG Taught	*8*	7	17	23	28	30	30
JUDGE BUSINESS SCHOOL							
MBA	*172*	151	160	160	165	165	165
Executive MBA (year 1)	*30*	*24*	*30*	*30*	*30*	*30*	*30*
Executive MBA (year 2)	*30*	*25*	*24*	*30*	*30*	*30*	*30*
Executive MBA (2 years programme)	*60*	49	54	60	60	60	60
Master of Finance	*40*	46	48	52	56	56	60
Total Judge BS PG Taught	*272*	246	262	272	281	281	285
CPSL							
MSt Sustainability Leadership (2 years programme)	*32*	32	32	32	32	32	32
Total CPSL PG Taught	*32*	32	32	32	32	32	32
TOTAL SoT POSTGRADUATES TAUGHT (NOT CAPPED)	*312*	285	311	327	341	343	347
ENGINEERING							
MRes Photonics System Development	*15*	7	7	7	7	8	15
Research students (year 1)		*114*	*146*	*146*	*146*	*146*	
Research students (year 2)	*410*	*144*	*269*	*274*	*274*	*274*	*516*
Research students (year 3)		*154*					
Research students (years 1 to 3)	*410*	412	415	420	420	420	516
Total Engineering PG Research	*425*	419	422	427	427	428	531
CEB							
Research students (year 1)		*35*	*40*	*40*	*40*	*40*	
Research students (year 2)	*125*	*34*	*35*	*40*	*40*	*40*	*135*
Research students (year 3)		*30*	*34*	*35*	*40*	*40*	
Research students (years 1 to 3)	*125*	99	109	115	120	120	135
Total CEB PG Research	*125*	99	109	115	120	120	135
COMPUTER LAB							
Research students (year 1)		*29*	*30*	*30*	*31*	*32*	
Research students (year 2)	*124*	*22*	*29*	*30*	*30*	*31*	*150*
Research students (year 3)		*24*	*22*	*30*	*30*	*30*	
Research students (years 1 to 3)	*124*	75	81	90	91	93	150
Total Engineering PG Research	*124*	75	81	90	91	93	150
JUDGE BUSINESS SCHOOL							
Research students (year 1)		*13*	*15*	*15*	*15*	*15*	
Research students (year 2)	*48*	*14*	*13*	*15*	*15*	*15*	*75*
Research students (year 3)		*14*	*14*	*13*	*15*	*15*	
Research students (years 1 to 3)	*48*	41	42	43	45	45	75
Total Judge BS PG Research	*48*	41	42	43	45	45	75
TOTAL SoT POSTGRADUATES RESEARCH (NOT CAPPED)	*722*	634	654	675	683	686	891
SCHOOL OF TECHNOLOGY - TOTAL							
MSt programmes - Postgraduate Taught	*40*	39	49	55	60	62	62
MRes programmes - Postgraduate Research	*15*	7	7	7	7	8	15
MBA / Executive MBA / Master of Finance	272	246	262	272	281	281	285
Research students (year 1)		*191*	*231*	*231*	*232*	*233*	
Research students (year 2)	*707*	*214*	*416*	*437*	*444*	*445*	*876*
Research students (year 3)		*222*					
Research Students	*707*	627	647	668	676	678	876
TOTAL POSTGRADUATES (NOT CAPPED)	*1,034*	919	965	1,002	1,024	1,029	1,238