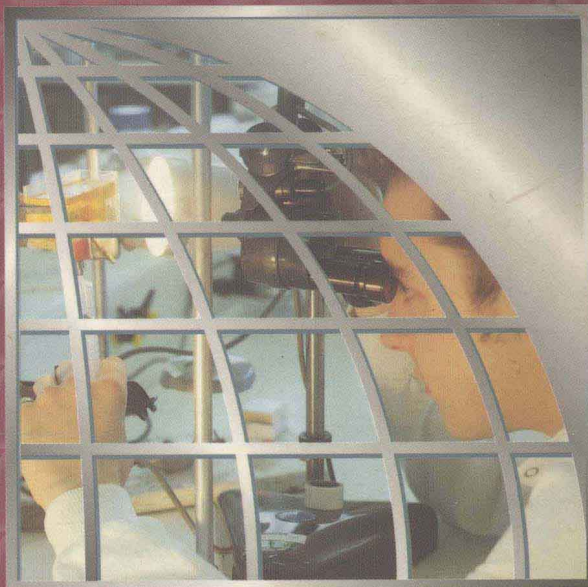




# UNIVERSITY OF BRADFORD

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MAKING KNOWLEDGE WORK



## POSTGRADUATE PROSPECTUS

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1997/98

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Senior Assistant Registrar  
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postgraduate research student*

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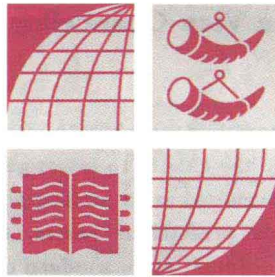
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# UNIVERSITY OF BRADFORD

POSTGRADUATE PROSPECTUS

1997/98

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MAKING  
KNOWLEDGE  
WORK



# FOREWORD

by the Vice-Chancellor and Principal

**P**ostgraduate work is an exciting and challenging opportunity. It can offer you the chance to investigate in detail some of the ideas or interests you have developed as an undergraduate. Or it can help prepare you for a particular professional career. Or it can provide a mid-career break to give you additional, more modern or different skills to improve your promotion prospects or offer you a new career direction.



This Prospectus will give you information on all the advanced courses and research programmes available at the University of Bradford. The range is very broad. We cannot go into the full details of the research activities of every department, but every department has someone who you can contact for more detailed information.

The Prospectus also tells you about our University, and what it is like to be a postgraduate student here. We have tried to create a university which is relevant to the needs of modern society, and responsive to the requirements of a changing world. This is reflected in the content of our courses and the nature of our research, and has been recognised nationally by the award of several top (grade 5) research ratings.

Finally, we have included something about our city. Bradford is a friendly, cosmopolitan and culturally diverse city, with the advantage of being one of the most inexpensive places to study in the

United Kingdom. Obviously your choice of where to study will mostly depend on academic considerations. But you will find it much easier to study in a place where you are happy, settled and not short of money.

I believe the University of Bradford is such a place. But you must judge for yourself. If possible, come and visit us, and talk to academic staff and existing students. At the very least, do contact us for further information. I look forward to hearing from you and welcoming you to Bradford. ■

A handwritten signature in blue ink that reads "David Johns". The signature is fluid and cursive, with a long, sweeping underline.

Professor David Johns  
Vice-Chancellor

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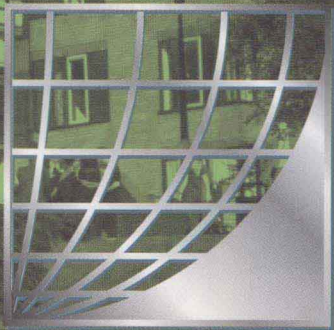
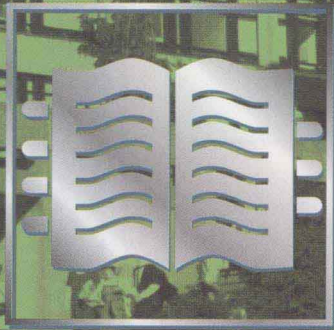
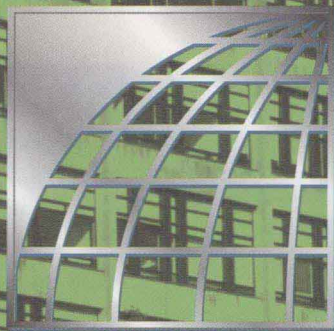
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# INTRODUCTION



# HOW TO USE THIS PROSPECTUS

If you are considering postgraduate work, your main concern will naturally be the courses and research programmes we offer. This information therefore takes up most of the space in this Prospectus. But there is more to postgraduate life than academic work. It is important for your studies that you are happy, settled, and can enjoy the surroundings in which you may be spending up to three years. So do look at the other sections of the Prospectus too, to assure yourself that Bradford is the right place for you to study.

This Prospectus will help you answer the following questions:

- What does postgraduate work involve? Should I follow a taught course or do research?
- Does the University have a course or a research programme in an area that interests me?
- What is the University like for postgraduate students?
- Would I enjoy living in Bradford?

## WHAT DOES POSTGRADUATE WORK INVOLVE?

An introduction to postgraduate work and the difference between taught courses and research is set out between pages 6 and 13.

## WHAT DO OUR DEPARTMENTS OFFER?

Our academic departments are listed on the contents page, and details of their programmes are set out between pages 15 and 121. Every department offers the opportunity for research, and most also offer specialised Master's courses. Start by finding out whether we are able to provide a taught course or research supervision in the area that interests you.

## WHAT DOES THE UNIVERSITY OFFER?

Our campus is situated close to Bradford city centre, and also close to relatively cheap accommodation. Library, computing, sports and leisure facilities are central to the campus. Details of all our facilities are set out between pages 123 and 131.

## WHAT DOES BRADFORD OFFER?

The City of Bradford has a long tradition of welcoming visitors. It will welcome you, too. Bradford is a satisfying city in which to live. A little more about the city is set out on pages 132 to 137.

## APPLYING FROM OVERSEAS?

We extend a special welcome to international students, who make up almost one-third of our postgraduate community. On pages 138 to 143 we have set out some of the information you will need before you take the very big decision to study in the UK. This section also tells you how we will try to make sure that you can make the most of your studies when you come to Bradford.

## WANT TO KNOW MORE?

Pages 144 to 156 cover useful topics such as grants, regulations, how to apply, and so on. But if you still want to know more – about a department and its courses, or about the city, or about study in the UK – write to us! A list of people you can contact is given on page 156, and at the end of the section on each department. ■

# WHY UNDERTAKE POSTGRADUATE STUDY?

**P**ostgraduate work enables you to develop your skills and interests in a highly specialised area. The range of opportunity is vast: from one-year taught courses with a group of other students who share your interests, to three or more years' independent study for a doctorate that will mark your own distinct contribution to knowledge.

Postgraduate work develops your skills of analysis and independent thought, and gives you access to the most up-to-date information in your chosen subject. As such, it can only enhance your prospects, whatever your intended career.

## TAUGHT COURSES

Taught courses cover a broad spectrum of specialist topics, leading to a variety of qualifications up to Master's degree. They provide you with the opportunity to gain a high level of knowledge in and understanding of the subject concerned.

Typically, a taught Master's course lasts for twelve months of full-time study. A diagram showing a typical course structure is set out on page 11. Three terms (or two semesters) of instruction are followed by a dissertation written over the summer. However, many courses may be studied part-time (one or two days per week) over two or more years.

Applicants for most taught Master's courses will be expected to have a first degree in a

relevant subject. However, many Master's courses run in parallel with Postgraduate Diploma (PGDip) courses, to which students can be admitted with, say, relevant practical experience instead of formal qualifications. Some even offer a Postgraduate Certificate (PGCert), which usually comprises the first semester of the course. In almost all cases, a good performance on the PGDip course will permit you to transfer your registration to the degree of Master without loss of time.



A full table of all postgraduate taught courses is set out on pages 8 and 9, enabling you to see at a glance the form in which each course is available. Fuller details of each course are set out in the sections on each department.

## RESEARCH DEGREES

A research degree gives you the opportunity to determine your own field of study. Of course, you will only be admitted if the University is able to provide a supervisor with experience in your proposed area of study. Your supervisor will help and guide you in formulating your research topic, ensuring that it is neither too trivial nor too extensive for an individual research programme. And your supervisor will ensure that you are making proper progress towards completing your research on time. If your home department belongs to a Graduate School, you will also have the opportunity for formal instruction in research techniques.

But most of the initiative, ideas, techniques and execution will have to come from you. You may well be working at the frontiers of knowledge. Your finished thesis will present your own research and the conclusions you have drawn from that. It must contain an original and unique



contribution to the knowledge or understanding of your chosen subject area. This is a big challenge, but by meeting it, you will have proven that you can work independently and successfully towards the completion of an important piece of work. And this is a skill that will be valuable whatever your future career intentions.

Areas of research specialisation are set out in detail under each departmental heading. The University should be able to offer supervision in any of the subject areas listed, and even in some that are not. If you have a research proposal, do not hesitate to write to the department concerned: see also page 144.

Candidates for research degrees normally register initially for the degree of MPhil. If, after a year, you are making adequate progress, then your registration can, if you wish, be transferred without loss of time to PhD. The total period of time involved in completing a PhD research programme is normally at least three years (including the period of MPhil registration).

An MPhil is a less substantial piece of work. If, for whatever reason, you decide to submit for an MPhil, then you should complete within two years.



## LINKS WITH THE OUTSIDE WORLD

It is the function of every university to advance knowledge through scholarship and research. At Bradford, we make a real effort to undertake research and organise postgraduate courses which are relevant to the needs of industry and society today.

Thus a considerable amount of research work is carried out in collaboration with industry and the professions. Distinguished industrialists and professionals hold honorary appointments in many of our departments, contributing to courses and seminars.

In addition to its courses and research programmes, every department organises short courses, conferences and symposia for industry, the professions and individuals from outside the University. Postgraduate students have a very important role to play in these; as contributors and as participants.

These links between the University and the outside world are thus of mutual benefit. They help to ensure that, if you undertake postgraduate work with us, you will not only develop your individual skills and knowledge, but will also be in a position to make that skill and knowledge work for society at large. ■

# POSTGRADUATE TAUGHT COURSES

Course title

Qualification awarded

available

full-time part-time see page

## MASTER'S COURSES

### ENGINEERING / PHYSICAL SCIENCE

Chemical Engineering	MSc	PGDip	*		17
Process Engineering and Control	MSc	PGDip	*		18
Structural Engineering	MSc	PGDip	*		25
Engineering Informatics ( <i>provisional</i> )	MSc		*		26
Environmental Management ( <i>provisional</i> )	MSc		*		26
Computing	MSc	PGDip	*	*	31
Intelligent Knowledge-Based Systems	MSc		*		31
Software Engineering	MSc		*		30
Radio Frequency and Microwave Engineering	MSc	PGDip	*		37
Radio Frequency Communications Engineering	MSc	PGDip	*		37
Real-Time Electronic Systems	MSc	PGDip	*		38
Communications and Real-Time Electronic Systems	MSc	PGDip	*		38
Real-Time Power Electronics and Control Systems	MSc	PGDip	*		38
Media, Marketing and Management ( <i>provisional</i> )	MSc	PGDip	*		41
Manufacturing Systems Engineering and Management	MSc	PGDip	*		50
Manufacturing Management	MSc		*		44
Safety and Reliability	MSc			*B	44

### HEALTH / ENVIRONMENTAL SCIENCE

Archaeological Materials Science	MSc	PGDip	*	*	58
Archaeological Prospection	MSc	PGDip	*		59
Osteology, Palaeopathology and Funerary Archaeology	MSc	PGDip	*		59
Scientific Methods in Archaeology	MA	PGDip	*		58
Biomedical Sciences	MSc	PGDip	*		62
Business Strategy and Environmental Management	MSc	PGDip	*		68
Environmental Monitoring	MSc	PGDip	*	*	68
Contaminated Land: Monitoring, Assessment and Remediation	MSc	PGDip	*		68
Medical Imaging	MSc	PGDip	*	*	70
Computerised Tomography		PGCert			71
Image Interpretation		PGCert			70
Health Care Practice	MSc	PGDip	*	*	71
Health Care Practice		PGCert		*	72
Adult Neurology		PGCert		*	72
Respiratory Care		PGCert		*	73
Health Services Management	MSc			*	73
Health and Social Services Management		PGDip		*	73
Managing Health Services		PGCert		*	73



Course title	Qualification awarded		available		see page
			full-time	part-time	
Optometry	MSc		*	*B	75
Clinical Pharmacy (Hospital or Community)	MPharm	PGDip	*	*	82
Pharmaceutical Services and Medicines Control	MSc		*		85
Pharmacology	MSc	PGDip	*		84

## SOCIAL SCIENCES / HUMANITIES

Social Work and Social Care	MA		*	*	89
Agricultural Development and Rural Finance	MSc		*		93
International Development Studies	MA		*		94
Macro-Economic Policy and Planning in Developing Countries	MSc		*		92
National Development and Project Planning	MSc		*		92
Education		PGCE-HE		*	97
European Integration	MA	PGDip	*	*	99
East European Studies	MA	PGDip	*	*	99
European/Latin American Relations	MA	PGDip	*	*	99
Philosophy of the Social and Natural Sciences ( <i>provisional</i> )	MA	PGDip	*	*	102
Society, Economy and Polity ( <i>provisional</i> )	MSc	PGDip	*	*	102
Business Administration	MBA		*	*	105
International Management	MA		*		107
European Languages and Cultural Studies	MA	PGDip	*		111
European Media Studies ( <i>provisional</i> )	MA	PGDip	*		111
Interpreting and Translating for International Business ( <i>provisional</i> )	MA	PGDip	*		110
Peace Studies	MA	PGDip	*	*	113
Conflict Resolution	MA	PGDip	*	*	113
International Politics and Security Studies	MA	PGDip	*	*	113
Race, Difference and Social Policy	MSc	PGDip	*	*	118
Research Methods	MSc/MA	PGDip		*	87
Women's Studies (Applied)	MA	PGDip	*	*	120

## DIPLOMA COURSES

(designed to qualify applicants for admission to Master's courses in subsequent years)

Chemical Engineering	Diploma	*		18
Manufacturing Systems Engineering	Diploma	*		51
Development Economics	Diploma	*		95
Economics	Diploma	*		117

B = Block modular course

# TAUGHT COURSE STRUCTURE

**All our postgraduate courses follow a similar pattern. All courses have two stages: the taught course stage (which takes up most of the first two semesters) and the project/dissertation stage.**

Many courses are available at two levels: the Master's degree (MA, MSc or MPharm), and the Postgraduate Diploma (PGDip). Some even have a third level; the Postgraduate Certificate (PGCert), which usually consists of the first half of the PGDip course. Most students are admitted at Master's level, but if the University is unsure about your qualifications, you may be admitted at PGDip level. However, the two levels always run in parallel for the taught course stage, so even if you are admitted at PGDip level you can transfer to the Master's course without loss of time if you perform well enough in the taught course assessment.

If you are following the course full-time, then the taught course stage occupies two semesters (late September to mid-February, and mid-February to June). However, in practice the University year is still divided into three ten-week terms, with four-week vacations at Christmas and Easter. Some of the modules in the second semester will

be direct preparation for the research project you will undertake over the summer, and which will form the basis of your Master's dissertation.

Most courses are organised on a modular basis. Teaching is usually concentrated on two or three days in the week during normal term times. Students may be expected to complete coursework and write up projects during the vacations. Modules are usually examined or assessed at the end of the semester in which they are taught. Master's students and PGDip students all follow identical modules, and sit the same examinations.

Whichever level you were admitted at, your performance in the assessment and examinations at the end of the taught course period determines whether you now proceed at Master's or PGDip level. Candidates admitted at PGDip level may transfer to Master's if their performance is good enough, and proceed to the dissertation stage. Conversely, candidates admitted at Master's level may be transferred to the PGDip if they perform poorly.

If you are permitted to proceed at Master's level, you spend the summer vacation writing a dissertation (sometimes described

as a project report, a management project, or a long essay), usually between 10,000 and 15,000 words. The exact length required varies between departments. The dissertation is written on a topic which you have to agree with your Department, and is usually based on a project which you undertake in the second semester or over the summer. It must be submitted within fifteen months of the start of the course; usually at the end of September.

If you have only passed at PGDip level, you may be awarded the Postgraduate Diploma purely on the basis of your performance in the module assessments and examinations. Alternatively, you may be asked to submit a short project report by the end of the summer term (June).

If you only complete half the taught course modules successfully, then you may be awarded a Postgraduate Certificate. This may be because you decide to leave after a single semester, or because you decided at the outset that you only wish to follow half the course.

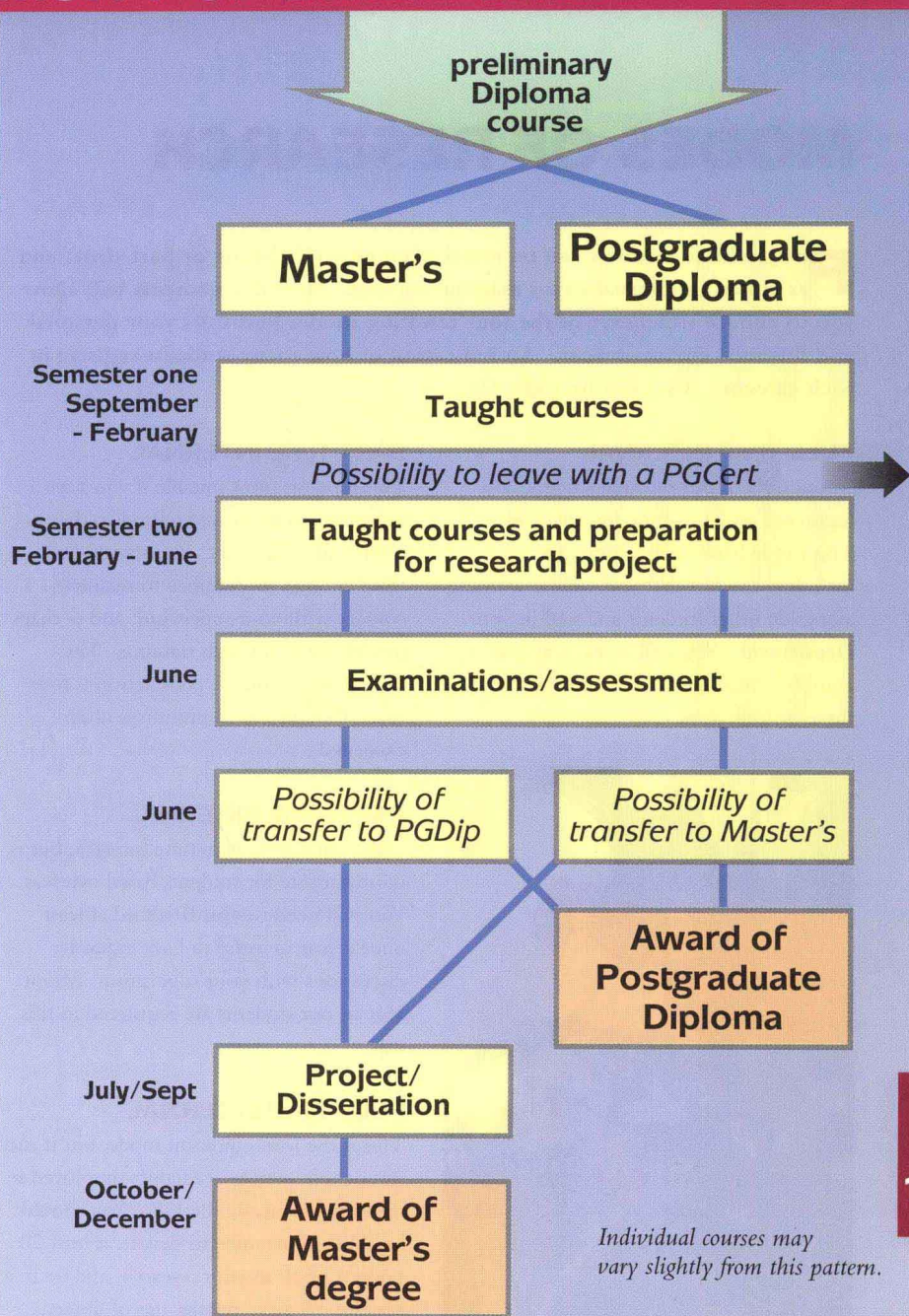
Many courses are available part-time as well as full-time. Departments usually organise teaching so that part-time students need only attend the University on one day per week; or at the very most,



two days a week. This makes it easier for students in full-time work to make day-release arrangements. The taught element of part-time courses generally lasts two years instead of one, with a further year allowed for the completion of the dissertation.

In some departments there is also a Diploma course. This is often based on modules available in the final year of the appropriate undergraduate course, and is designed as a preparation for postgraduate study for students (often from overseas) whose qualifications may not be good enough for immediate registration at Master's or PGDip level. Students who successfully complete such a Diploma course are guaranteed a place on the Master's course the following year. ■

*The structure of a typical Master's/PGDip course is set out diagrammatically alongside.*



*Individual courses may vary slightly from this pattern.*



# MODES OF RESEARCH

**P**ostgraduate research can be undertaken either full-time or part-time, and as either an internal or an external student. Most departments will allow you to choose whichever of the four resulting modes best suits your personal and financial circumstances. An indication of how many students register in each category is set out on page 131.

## FULL-TIME INTERNAL

About 60% of our research students are registered on a full-time internal basis. This mode has several advantages, including the fact that you will be working alongside other students and staff in your Department. You will be expected to complete your research for PhD within three or four years.



## PART-TIME INTERNAL

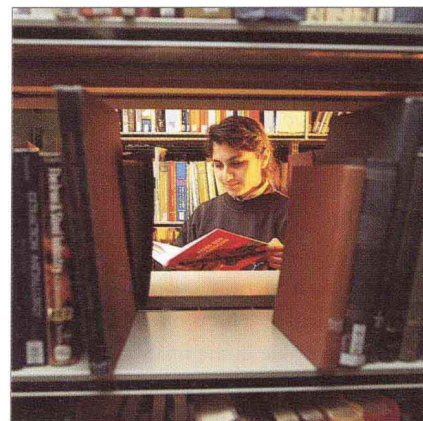
This mode is most suitable if you have a full-time job in an area related to the subject of your study. You should live close enough to Bradford to maintain contact with your supervisor, and perhaps participate in research training. The minimum period for completion is four years, though this minimum is often exceeded.

## PART-TIME EXTERNAL

This is similar to part-time internal, but is more suitable for students based overseas. You will need to visit Bradford at least once a year in order to have extensive discussions with your supervisor. About 15% of our students are registered in this way.

## FULL-TIME EXTERNAL

This is the least common mode, but it may suit people such as academics employed in institutions outside the UK. You should be able to guarantee to devote at least 20 hours a week to your research, and be in a position to make regular use of library,



computing or necessary equipment resources. Here too you will need to meet your supervisor regularly and make at least one visit each year to Bradford to discuss the progress of your research with your supervisor during a visit of two weeks or perhaps a month.

Almost all our departments have some students registered in each of these four modes, and will be happy to discuss the best way for you to pursue your research programme. Indeed, it may be possible (with the Department's agreement) to combine two or more of these modes, perhaps studying full-time in the University for the first and final year of analysis and writing up, plus two years registered as part-time external, gathering data while overseas.

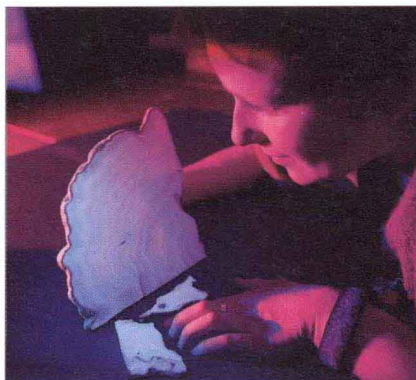


# THE STRUCTURE OF A RESEARCH PROGRAMME

**R**esearch projects are, almost by definition, unique. Therefore it is not easy to provide a meaningful description of a typical research project. However, certain common features apply to all.

The first year of a full-time PhD is spent on an initial registration for MPhil. The year may well be taken up with a review of the existing literature in your proposed area, and the closer definition of your research proposal. This may be combined, especially in the larger departments or in a Graduate School, with formal training in research skills, and the formulation of the methodology to be used in your own particular case. Throughout all three years of your research you will be encouraged to attend specialist seminars and conferences in areas related to your own subject, and there may well be the opportunity for you to prepare a conference paper or even an article for publication on your work. You will almost certainly be required to give an account of your progress to staff and fellow students from time to time, at informal seminars within your department.

If you make good progress in your first year, and your research project appears likely to be successful, then your department can apply for your registration to be transferred from MPhil to PhD. If you opt nevertheless to submit for an



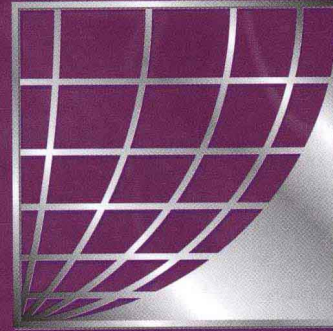
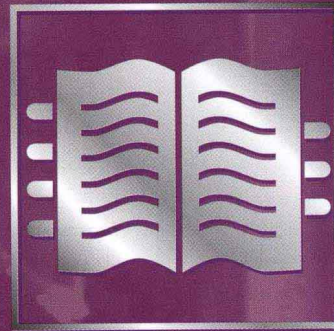
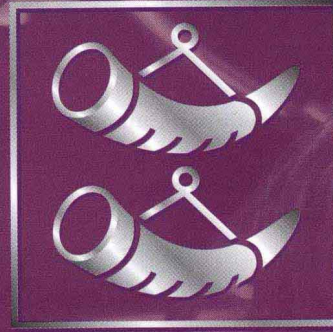
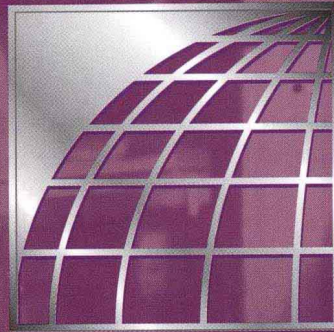
MPhil, then your remaining work should be accomplished in the following year.

The second year of your PhD programme may well be taken up with actual data collection. This will depend entirely on your subject area, but may involve the design of the equipment or computer model from which experimental data will be drawn. Or it may involve fieldwork in the UK or abroad, perhaps using a questionnaire. Or it may require the consultation of highly specialist or scarce statistical or other published material. Towards the end of the year it should be possible to attempt an initial analysis of your results.

In the third year you may conduct detailed collation and analysis of your results, and organise them into a useful form. These results have then to be interpreted, and placed in the context of previous knowledge in your field. Last, but by no means least, the whole has to be organised into a logical and persuasive thesis, which has to be written, checked, referenced, typed and bound. Some students undertake the 'writing up' of their thesis on a part-time basis after the end of the three-year period, but the presentation of results remains a crucial aspect of the research process, and should not be undervalued.

Following submission, your thesis will be read by two examiners, one of whom will be independent, and from outside the University. Your supervisor will also already have read your thesis, and may be consulted by the examiners. The examiners will then require you to attend in person for an oral examination, at which they will expect you to answer questions on your thesis, and make sure that you are able to appreciate the significance of your findings in the overall context of the subject. They may ask you to make minor corrections before the degree can be awarded. The actual award of the degree by the University will probably not take place until three to six months after you submit your thesis. ■





# **FACULTY OF ENGINEERING AND PHYSICAL SCIENCES**



# CHEMICAL ENGINEERING

**T**he Department carries out fundamental and applied research, and maintains interdisciplinary contacts with other groups in the University. Our links with industry are strong.

The Department has excellent facilities for the training of postgraduate students in research methods, writing skills, demonstrating and computing. We have a positive interest in the welfare of all our students. Research laboratories are equipped with a range of analytical instruments.

The Department has on-line access to the University's powerful UNIX-based central computing system (see page 124). Computer-aided design, data analysis, control of experimental rigs, and wordprocessing is done using PCs. Modern computer packages include PRO II, HYSIM, GPROMS, SPEEDUP, FLOWPACK II and FIDAP. The University is networked for information exchange.

## RESEARCH FOR MPhil AND PhD

Research in the Department is organised into six main groups. Applications to conduct research in any of these areas are welcome.

## CATALYSIS AND REACTOR ENGINEERING

80% of all commercial chemical reactions involve catalysts. The research group is actively engaged in the design of heterogeneous catalysts on the meso scale. This involves, for instance, the novel use of impedance analysis to characterise catalyst performance in terms of activity, selectivity and deactivation. Such new catalysts need to be validated in pilot-plant reactors, tubular packed beds and fluidised beds, with a variety of novel heat-transfer processes including the use of direct electromagnetic coupling with catalysts. We have developed particular expertise in hydrocracking of heavy petroleum distillates without forming coke by-products. Selective conversion of olefins and synthesis gas has been achieved, and current targets include BTX production and methane coupling. New programmes are being developed in biochemical conversion with ammonia.

## POWDER TECHNOLOGY

More than 50% of the products of the chemical and pharmaceutical industries are produced in powder form or use powders in their preparation, and this percentage is increasing. This field attracts researchers from a variety of disciplines, including chemical and mechanical engineering,



physics, chemistry, and pharmaceutical chemistry. The research group at Bradford is recognised world-wide as a leader. Current research is concentrated in areas such as the characterisation of aerated/fluidised powders, classification and sorting of particles, effects of humidity on fine powders, circulating fluidised beds, gas cleaning, particle size analysis and characterisation, pneumatic conveying, powder mixing and segregation, solid-liquid separation (such as hydrocyclones or filtration), and storage and flow of powders.

## SEPARATION PROCESSES

Liquid-liquid extraction equipment and process investigations are important research topics. Ion exchange, adsorption,