MSc in Food Biotechnology

Awarding Institution: The University of Reading
Teaching Institution: The University of Reading
Faculty of Life Sciences Programme length: 12 months
For students entering in 2004 Date of specification: January 2002
Programme Director: Professor D L Pyle
Board of Studies: MSc Courses in Food Biotechnology and Plant Biotechnology.

Summary of programme aims

The purpose of the course is to develop specialised knowledge of Food Biotechnology and the skills applicable in either industrial or university research environment**.**

The expected outcomes are that students should acquire and demonstrate:

◊ An understanding of the science base in those aspects of biotechnology relevant to the food sector – including molecular biology, bioprocess engineering and microbiological aspects of food biotechnology.

◊ Practical experience in a range of molecular biology techniques.

◊ An understanding of how the biological sciences and biochemical engineering are applied to produce novel food components and food processing systems.

◊ A Capacity to undertake research in the area of food biotechnology.

Transferable skills
As part of this programme students are expected to gain or enhance their experience and competences in the following skills: IT (word-processing, use of spreadsheets and databases, use of Web resources), scientific writing, oral presentations, team working, problem solving, use of library resources and time management.

Programme content

Mod Code	*Module Title*	*Credits*	*Level*
FBMB01	Process Engineering	10	M
FBMB06	Separation Processes	10	M
FBMB03	Protein Structure and Function	10	M
FBMB04	Microbial Physiology	10	M
FBMB05	Introduction to Genetic Engineering	10	M
PSMAA7	Plant Biotechnology for Post-harvest Quality	10	M
FBMB02	Case Studies in Biotechnology	10	M
PSMHB8	SYNGENTA Module in Plant Biotechnology	10	M
FBMB07	Biotechnology Challenge	10	M
FBMB08	Bioreactor Design	10	M
FBMB09	Food Biotechnology	10	M
FBMB10	Pilot Plant Practical	10	M
FBMBP0	Project	60	M

Part-time/Modular arrangements
The modules may be taken on a part-time basis over two years. In Year 1 three modules will normally be taken during the Autumn term and three modules during the Spring term. The modules selected is to be agreed with the Head of School. In Year 2 the remaining modules will be taken. The dissertation or project is started in the Summer Term of Year 1 and completed during the summer of Year 2 for submission by 14th September.

Progression requirements

See appended progression requirements for students following a post-experience certificate.

Summary of teaching and assessment
The teaching is organised in modules (totalling 180 credits) that involve a combination of lectures, tutorials, workshops, seminars, and practical sessions. Modules taken during the autumn and spring term (120 credits) will be assessed by a mixture of course work and formal examinations. The assessment of the remaining 60 credits, which will be based on a practical project or dissertation, will be based on a written report of the work undertaken.

A cumulative average of at least 50% is required for the 120 credits taken during the autumn and spring terms, with no more than 40 credits below 50 %, and none below 40%. A mark of at least 50% is required for the project module. No more than a pass mark of 50% can be obtained on resitting a module.

Marks should be interpreted within the following framework.

Mark (%)	Interpretation
70 - 100	Distinction
60 - 69	Merit
50 - 59	Pass
<50	Fail

MSc Merit: marks in excess of 60% being awarded to modules whose cumulative credit weighting represents at least two thirds of the total weighting for the course.

MSc Distinction: marks in excess of 70% being awarded to modules whose cumulative credit weighting represents at least two thirds of the total weighting for the course

Admission requirements
Entrants to this programme are normally required to have obtained a honours degree in a Pure or Applied Science or an equivalent qualification. Applicants whose academic qualifications do not meet these requirements may in the first instant be admitted to a post-experience course; they may then transfer to MSc status if their performance during the first term is satisfactory.

Admissions Tutor: Dr R D King,

Support for students and their learning
University support for students and their learning falls into two categories. Learning support includes IT Services, which has several hundred computers and the University Library, which across its three sites holds over a million volumes, subscribes to around 4,000 current periodicals, has a range of electronic sources of information and houses the Student Access to Independent Learning (S@IL) computer-based teaching and learning facilities. There are language laboratory facilities both for those students studying on a language degree and for those taking modules offered by the Institution-wide Language Programme. Student guidance and welfare support is

provided by Programme Directors, the Careers Advisory Service, the University's Special Needs Advisor, Study Advisors, Hall Wardens and the Students' Union.

Career prospects
A MSc degree in Food Biotechnology provides a strong platform from which to undertake a wide range of careers, particularly relating to the application of biotechnology to food in industry, government and education. Food Biotechnologists are highly valued for their problem solving skills and their ability to apply their technical knowledge to develop new food products or processes. Some students choose to apply their research skills by pursuing a higher degree through research or through research and development in industry.

Opportunities for study abroad or for placements
Students will be able to undertake the 60 credit project module at an approved institution or an appropriate industrial concern, but this will depend on having the necessary linguistic skills and finding a suitable placement, and appropriate supervisory arrangements being in place.

Educational aims of the programme

Microbial Genetics	Develop an understanding of the mechanisms of gene transfer in bacteria, mutagensis and recombination and use a range of practical techniques. Develop skills in specific molecular techniques of key importance to plant and food biotechnology.
Process Engineering	Qualitatively evaluate the process engineering dimension of food biotechnology.
Protein Chemistry	Appreciate protein structure and function relationships relevant to plant and food biotechnology and identify the concepts and techniques used in modern protein biochemistry and the relationship between protein sequence, structure and function.
Plant Biotechnology	Appreciate the physiology and biochemistry that provides the basis for commercial practice in the maintenance of produce quality post harvest and apply practical techniques in molecular biology essential for plant biotechnology, plus also the constraints and pressures associated with goal orientated research to develop novel and improved crops.
Microbial Biotechnology	Identify strategies to enhance the yield of microbial metabolites in commercial fermentations.
Bioreactor Design	Design bioreactors for food and enzyme production. Select, specify and establish an overall design and operating schedule for operations for downstream processing, including product separation and purification.
Food Biotechnology	Appreciate the role of biotechnology, traditional and modern, in the food industry, including the interrelationships between the starting materials, basic science issues, process technology and the final product. Develop and insight into the considerations required when designing a process for the production of foods.
Pilot Plant	Develop skills in setting up and operating pilot plant scale fermenter and separation equipment.
Research Techniques	Develop skills to undertake research in the area of food biotechnology

Programme Outcomes

Knowledge and Understanding

A. Knowledge and understanding of: 1. the concepts and techniques of food biotechnology and their application to products and processes. 2. a background knowledge in molecular; biochemical, and microbial science, together with a knowledge of the unit operations required for food biotechnology.	**Teaching/learning methods and strategies** The knowledge required is provided in formal lectures supported by practical work, seminars and presentations. Feed back on student work is provided by the discussion and return of work in tutorials and seminars. All practical work is marked and returned to the student. *Assessment* Most knowledge is tested through a combination of coursework, including oral presentations, and formal examinations, plus a written report of a practical based project.

Skills and other attributes

B. Intellectual skills – able to: 1. think logically and evaluate critically research and advance scholarship in the discipline 2. plan and implement tasks at a professional level to solve problems related to the discipline 3. evaluate methodologies and where appropriate propose new hypotheses 4. plan, conduct and write a report on an independent practical project.	**Teaching/learning methods and strategies** Logical application of science and the critical appraisal of methodology are essential parts of the role of a Food Scientist in the food industry. These skills will underpin the lectures, practical and project work. *Assessment* 1-3 are assessed directly and indirectly in most parts of the course 1-4 are assessed in the final project report.
C. Practical skills – able to: 1 apply, or adapt, practical instructions safely and accurately 2 carry out a variety of experimental procedures in the laboratory or pilot plant. 3 interpret quantitatively the results of experiments undertaken by themselves or others 4 devise experimental methods appropriate for tackling a particular problem	**Teaching/learning methods and strategies** A range of detailed or outline practical instructions are used to allow students to develop a range of practical skills. Staff and postgraduate demonstrators are present during practical sessions to guide and help, to mark their reports and give feedback on their work. Students will work on their project under the guidance of one or more members of staff. *Assessment* 1-4 are assessed to different extents by the practical work associated with the various modules undertaken.

D. Transferable skills – able to: 1 make use of IT (word processing, spreadsheets, web sources) 2 communicate scientific ideas 3 give oral presentations 4 work as part of a team 5 use library resources 6 manage time	**Teaching/learning methods and strategies** The use of IT is embedded throughout the programme, but is particularly addressed in module FBMB08. Team work is essential in the practical and role play sessions associated with modules FBMB10, FBMB02 and FBMB07. Library resources are addressed in the first term modules and during the project and dissertation work. Time management is essential for the timely and effective completion of the programme. *Assessment* 1-5 contribute to assessed coursework during the first two terms.

Please note: This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably expect to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in module and programme handbooks.

Appendix

Progression from Post-experience certificate to MSc course

Candidates admitted to a post-experience course who have followed the MSc programme during the Autumn term may, at the discretion of the Head of School, transfer to the MSc programme if their performance in the December/January School examination is satisfactory. The registration will than be back dated to the beginning of the Academic year.