MSc/Diploma in Plant 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 2003 Date of specification: January 2004
Programme Director: Dr A C Wetten
Board of Studies: MSc in Plant Biotechnology and Food Biotechnology

Summary of programme aims
The purpose of the course is to provide training in the science behind plant biotechnology, an appreciation of the current scope and limits to its industrial application, and the implications of modern methods of genetic modification for plant industries. The course runs in parallel to the MSc in Food Biotechnology and the common elements are designed to emphasise the continuity in the food chain from raw plant material to food products.
The expected outcomes are that students should acquire and demonstrate:

- An understanding of the theoretical background knowledge in molecular, biochemical and plant sciences needed for an understanding of plant biotechnology.
- A working knowledge of laboratory techniques used in plant biotechnology.
- An appreciation of the issues associated with growing and using transgenic plants as food crops.
- An understanding of the aims and needs of industrial enterprises using plant biotechnology techniques to develop new products.
- A capacity to undertake research in plant 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*
Compulsory modules (160 credits)			
PSMAA7	Plant Biotechnology for Post-Harvest Quality	10	M
PSMH1A	Techniques for Plant Biotechnology 1	20	M
PSMAC7	Genetic Variation for Plant Breeding	10	M
FBMB03	Protein Structure and Function	10	M
PSMH2A	Molecular Plant Pathology	10	M
PSMH1B	Techniques in Plant Biotechnology 2	10	M
PSMHB8	SYNGENTA Module in Plant Biotechnology	10	M
FBMB02	Case Studies in Biotechnology	10	M
FBMB07	Biotechnology Challenge	10	M
PSMH2C	Research Project	60	M

Optional modules (20 credits - choose two from):-

PSMHH8	Plant Developmental Genetics and Physiology	10	M
PSMAA8	Biosynthesis of Major Crop Products	10	M
PSMAF8	Tissue Culture	10	M

Part-time/Modular arrangements
The course may be taken part-time over two or more years. Modules PSMH1A and PSMAA7 should be taken in the first term. The other modules and the dissertation must be completed in the agreed period.

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 remaining 60 credits are allocated to a practical project or dissertation.

The University's taught postgraduate marks classification is as follows:

Mark	Interpretation
70 – 100%	Distinction
60 – 69%	Merit
50 – 59%	Good standard (Pass)
Failing categories:	
40 – 49%	Work below threshold standard
0 – 39%	Unsatisfactory Work

For Masters Degrees
To pass the MSc students must gain an average mark of 50 or more overall including a mark of 50 or more for the dissertation. In addition the total credit value of all modules marked below 40 must not exceed 30 credits and for all modules marked below 50 must be less than 60 credits.*

Students who gain an average mark of 70 or more overall including a mark of 70 or more for the dissertation and have no mark below 40 will be eligible for a Distinction. Those gaining an average mark of 60 or more overall including a mark of 60 or more for the dissertation and have no mark below 40 will be awarded eligible for a Merit.

For PG Diplomas
To pass the Postgraduate Diploma students must gain an average mark of 50 or more. In addition the total credit value of all modules marked below 40 must not exceed 30 credits and for all modules marked below 50 must be less than 60 credits.*

Students who gain an average mark of 70 or more and have no mark below 40 will be eligible for the award of a Distinction. Those gaining an average mark of 60 or more and have no mark below 40 will be awarded eligible for a Merit.

*The provision to permit a candidate to be passed overall with a profile containing marks below 40 is made subject to the condition that there is evidence that the candidate applied his or herself to the work of those modules with reasonable diligence and has not been absent from the examination without reasonable cause.

Admission requirements
Entrants to this programme are normally required to have obtained an honours degree in a biological science subject, agriculture, horticulture, or environmental science, and to be able to show competence in areas of plant biochemistry, plant molecular biology, plant genetics and plant physiology necessary for effective progression. Applicants whose academic qualifications do not meet these requirements may in the first instance 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 A C Wetten

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
Graduates from the course are likely to find opportunities with industrial enterprises and institutions in the area of plant biotechnology, universities seeking graduates with pre-training for research to PhD level, and governmental, media and other organisations involved with biotechnology.

Opportunities for study abroad or for placements
Students will be able to undertake the 50 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
The purpose of the course is to provide training in the science behind plant biotechnology, an appreciation of the current scope and limits to its industrial application, and the implications of modern methods of genetic modification for plant industries. Participants will develop the analytical and practical skills needed for a career in research and development in plant biotechnology and related areas.

The expected course outcomes are that students should acquire and demonstrate:

- An understanding of the theoretical background knowledge in molecular, biochemical and plant sciences needed for an understanding of plant biotechnology.

- A working knowledge of laboratory techniques used in plant biotechnology.

- An appreciation of the issues associated with growing and using transgenic plants as food crops.

- An understanding of the aims and needs of industrial enterprises using plant biotechnology techniques to develop new products.

- A capacity to undertake research in plant biotechnology and related topics.

Programme Outcomes

Knowledge and Understanding

A. Knowledge and understanding of: 1. the concepts and techniques of plant biotechnology and their application to crop plants. 2. theoretical background knowledge in molecular, biochemical and plant science for an understanding of plant 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 plant biotechnologist. 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 research project report.

C. Practical skills – able to:	**Teaching/learning methods and strategies**
1 apply, or adapt, practical instructions safely and accurately 2 carry out a variety of experimental procedures in the laboratory. 3 interpret quantitatively the results of experiments undertaken by themselves or others 4 devise experimental methods appropriate for tackling a particular problem	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:	**Teaching/learning methods and strategies**
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	The use of IT is made throughout the programme. Team work is essential in the practical and role play sessions associated with modules PSMH1A, PSMH1B, PSMHB8, and FS 946. Library resources are addressed in all the modules and during the project 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 (achievement of an average of 50%), the registration being back dated to the beginning of the Academic year.