

**Programme Specification for the MRes in Plant Molecular Biology and Biotechnology**

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 be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. This specification provides a source of information for students and prospective students seeking an understanding of the nature of the programme and may be used by the College for review purposes and sent to external examiners. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in the course handbook or on-line at <http://www3.imperial.ac.uk/lifesciences/postgraduate/courselist/plantbiotech>. The accuracy of the information contained in this document is reviewed by the College and may be checked by the Quality Assurance Agency.

1. **Awarding Institution:** Imperial College London
2. **Teaching Institution:** Imperial College London
3. **External Accreditation by Professional / Statutory Body:** Not applicable
4. **Name of Final Award (BEng / BSc / MEng etc):** MRes
5. **Programme Title (e.g. Biochemistry):** Molecular Plant Biology and Biotechnology
6. **Name of Department / Division:** Biology
7. **Name of Faculty:** Natural Sciences
8. **UCAS Code (or other coding system if relevant):** Not applicable
9. **Relevant QAA Subject Benchmarking Group(s) and/or other external/internal reference points** Biosciences

**10. Level(s) of programme within the Framework for Higher Education Qualifications (FHEQ):**

Bachelor's (BSc, BEng, MBBS)	Level 6
Integrated Master's (MSci, MEng)	Levels 6 and 7
Master's (MSc, MRes)	Level 7

11. **Mode of Study** Full time

12. **Language of Study:** English

13. **Date of production / revision of this programme specification (month/year):** 10/2009

**14. Educational aims/objectives of the programme**

- Enhance basic undergraduate knowledge and provide specialist theory and practical training in plant molecular and biotechnology subjects.
- Provide training in biological research methodology.
- Enable informed decision to be made about future research directions.
- Provide training in the evaluation of scientific data and papers.

1 MRes in Plant molecular Biology and Biotechnology

The programme aims/objectives are to:

- Attract highly motivated students, both from within the UK and from overseas.
- Produce graduates who can compete effectively for employment in research and commerce.

## 15. Programme Learning Outcomes

### 1. Knowledge and Understanding

#### Knowledge and Understanding of

At the conclusion of the programme, students should have experienced research encompassing a range of topics and techniques relevant to pursuing a career in plant science and biotechnology. They should have developed their abilities in experimental design, critical assessment of results and conclusions, written and verbal presentations and the use of relevant software and statistics tools for data analysis and display.

**Teaching /Learning methods:** Each student carries out two separate and independent 23 week research projects based in the research laboratories of the Plant and Microbial Sciences Section within the Division of Biology. Students also attend approximately 60 hours of lectures and seminars (research, methods and journal). In parallel they have weekly meetings with their supervisors providing the students with an opportunity to discuss research and lecture material. Training in research methods and transferable skills will consist of one on one-training and short workshops. Assessment of the knowledge and understanding is through project reports, presentations and a viva voce examination with external examiners.

### 2. Skills and other Attributes

#### Intellectual Skills

- Analyse and solve plant science and biotechnology problems using an integrated multidisciplinary approach.
- Integrate and evaluate information.
- Formulate and test hypotheses using appropriate experimental design and statistical analysis of data where appropriate.
- Plan, conduct and write a programme of original research.
- Critically evaluate scientific publications.

**Teaching /Learning methods:** Intellectual skills are developed through the teaching and learning methods outlined in section 1. Information sifting and sorting, analysis and problem solving skills, experimental design, laboratory and statistical skills are promoted through the execution of the two research projects. Assessment is through seminar presentations, individual research and literature projects and external examinations.

#### Practical Skills:

- 1) Plan and execute safely a series of experiments.
- 2) Use laboratory and information technology based methods to generate data.
- 3) Analyse experimental results and determine their strength and validity.
- 4) Prepare technical reports.
- 5) Give technical presentations.
- 6) Use the scientific literature effectively.
- 7) Use relevant computation tools and packages.

**Teaching /Learning methods:** Practical skills are developed through the teaching and learning programme outlined in 15.1. Practical experimental skills (1-5) are taught and developed through

feedback on reports written and presentations given to both students and staff members. 6 is developed through lectures and research projects. 7 is taught / developed through project work. Practical skills are assessed through project work and the research project dissertation.

#### **Transferable Skills:**

- A) Communicate effectively through oral presentations, written reports, scientific publications and electronic publishing.
- B) Devise experimental methodologies for plant science and biotechnology problems.
- C) Use management skills: decision-making processes, objective criteria, problem definition, project design and evaluation, risk management, teamwork and coordination.
- D) Integrate and evaluate critically information from various sources.
- E) Transfer techniques and solutions from one discipline to another.
- F) Use modern information and communications technologies.
- G) Manage resources and time.
- H) Learn independently with open-mindedness and critical enquiry.
- I) Learn effectively for the purpose of continuing professional development.

#### **Teaching /Learning methods:**

Transferable skills are developed through the teaching and learning programme outlined above and in section 14. A) is taught through coursework and developed through feedback on reports and oral presentations. B) is taught through lectures, seminars and individual research projects. C-G) are developed through project work and complemented with courses offered by the Graduate School of Life Sciences and Medicine. H-I) are taught as part of the individual research projects.

#### **16. The following reference points were used in creating this programme specification**

- > Subject benchmarking information for Biosciences
- > Student handbook for course approved by the Senate of Imperial College

#### **17. Programme structure and features, curriculum units (modules), ECTS assignment and award requirements:**

##### **Year One:**

###### **Term one:**

All students attend an induction week and a lecture series by academic members of staff to provide an introduction into the subject areas present in the Plant and Microbial Science section. They then have discussions with members of staff about possible research projects, carry out a literature survey of the prospective research area and write a short outline of the proposed research. Research work commences in term week 3. A mid-term project progress presentation is given to fellow students and members of staff in week 10. Students will in parallel attend courses provided by GSLSM and / or lectures from the course "Advanced topics in Plant Molecular Biology" to obtain additional background knowledge. Students will also attend the Plant and Microbial Sciences seminar series.

###### **Term Two:**

Students hand in the project report (max 8000 words) in week 22 and give a final project presentation in week 23. This is followed by an oral examination with two members of staff. A second project (supervised by a different member of staff) is decided upon, a literature survey is carried out and students write a short summary of the proposed research before starting the research project. Students will attend the Plant and Microbial Sciences seminar series.

###### **Term Three:**

Students continue their respective research projects and give a mid project progress report in the form of a presentation in week 36 to fellow students and members of staff. In week 47 the students hand in the 2<sup>nd</sup> project report (8000 words max), give a final project presentation and have an oral examination with two outside examiners. Students will attend the Plant and Microbial Sciences seminar series.

Each project has been assigned 45 ECTS units. Each project mark represents 50% of the final marks

**18. Support provided to students to assist learning (including collaborative students, where appropriate).**

At the beginning of the autumn term there is an induction week. During that week information about living in London, life on campus, usage of the library, electronic resources (dedicated computer facilities), the student union and sports facilities is provided. Upon start of the research projects the students receive an introduction into the research infrastructure available to them and extensive health and safety training. This official program is complemented by social gatherings introducing the MRes students to the large community of postgraduate research students and postdoctoral researchers who work on plant molecular biology on the South Kensington Campus. In parallel the students have access to both Learning Support services, Language training (if necessary) and student counsellors on the South Kensington campus. The project supervisor will be available to the student to help with academic matters and as a mentor (if required). If difficulties arise that cannot be dealt with by the project supervisor the course convener will provide additional support. If this is not sufficient the postgraduate tutor will be available to the student as well, dealing with both academic and personal matters. Additional help is provided (if necessary) by the Student Union.

**19. Criteria for admission:**

The minimum qualification for admission is normally an Upper Second Class honours degree in a Science-based subject from an UK academic institution or an equivalent overseas qualification. Where an applicant has a lesser degree qualification but has at least 3 years of work experience in biology, agriculture or a related discipline, a special case for admission may be submitted to the Graduate School of Life Sciences and Medicine Postgraduate Quality Committee by the course director.

**20. Processes used to select students:**

All UK applicants (and where possible overseas applicants) are invited for a site tour and interview with the Course Director. Overseas candidates, for which the site visit is not possible, are interviewed by the Course Director and a second member of staff via telephone.

**21. Methods for evaluating and improving the quality and standards of teaching and learning**

**a) Methods for review and evaluation of teaching, learning, assessment, the curriculum and outcome standards:**

The external examiner system and Boards of Examiners are central to the process by which the College monitors the reliability and validity of its assessment procedures and academic standards. Boards of Examiners comment on the assessment procedures within the College and may suggest improvements for action by relevant departmental teaching Committees.

The Faculty Studies Committees and the Graduate Schools' Postgraduate Quality Committees review and consider the reports of external examiners and accrediting bodies and conduct periodic (normally quinquennial) and internal reviews of teaching provision. Regular reviews ensure that there is opportunity to highlight examples of good practice and ensure that recommendations for improvement can be made.

At programme level, the Head of Department/Division has overall responsibility for academic standards and the quality of the educational experience delivered within the department or division.

Most of the College's undergraduate programmes are accredited by professional engineering and science bodies or by the General Medical Council. Accreditation provides the College with additional assurance that its programmes are of an appropriate standard and relevant to the requirement of industry and the professions. Some postgraduate taught courses are also accredited.

Course reviews are performed based on feedback questionnaires and convenor reports. These reviews are complemented by MRes Staff Student Committee meetings and resulting reports sent to the Departmental Teaching Committee. At the end of the year the external examiners provide reports

based on the oral examinations they perform and the confidential interviews they do with the MRes students.

**b) Committees with responsibility for monitoring and evaluating quality and standards:**

The **Senate** oversees the quality assurance and regulation of degrees offered by the College. It is charged with promoting the academic work of the College, both in teaching and research, and with regulating and supervising the education and discipline of the students of the College. It has responsibility for approval of changes to the Academic Regulations, major changes to degree programmes and approval of new programmes.

The **Quality Assurance Advisory Committee (QAAC)** is the main forum for discussion of QA policy and the regulation of degree programmes at College level. QAAC develops and advises the Senate on the implementation of codes of practice and procedures relating to quality assurance and audit of quality and arrangements necessary to ensure compliance with national and international standards. QAAC also considers amendments to the Academic Regulations before making recommendations for change to the Senate. It also maintains an overview of the statistics on completion rates, withdrawals, examination irregularities (including cases of plagiarism), student appeals and disciplinaries.

The **Faculty Studies Committees** and **Graduate School Postgraduate Quality Committees** are the major vehicle for the quality assurance of undergraduate / postgraduate courses respectively. Their remit includes: setting the standards and framework, and overseeing the processes of quality assurance, for the areas within their remit; monitoring the provision and quality of e-learning; undertaking reviews of new and existing courses; noting minor changes in existing programme curricula approved by Departments; approving new modules, changes in module titles, major changes in examination structure and programme specifications for existing programmes; and reviewing proposals for new programmes, and the discontinuation of existing programmes, and making recommendations to Senate as appropriate.

The **Faculty Teaching Committees** maintain and develop teaching strategies and promote inter-departmental and inter-faculty teaching activities to enhance the efficiency of teaching within Faculties. They also identify and disseminate examples of good practice in teaching.

**Departmental Teaching Committees** have responsibility for the approval of minor changes to course curricula and examination structures and approve arrangements for course work. They also consider the details of entrance requirements and determine departmental postgraduate student numbers. The Faculty Studies Committees and the Graduate School Postgraduate Quality Committees receive regular reports from the Departmental Teaching Committees.

**MRes staff – Student Committee** (responsibilities as described above)

**Board of examiners** meets in September to consider awards and provide feedback

**c) Mechanisms for providing prompt feedback to students on their performance in course work and examinations and processes for monitoring that these named processes are effective:**

For immediate feedback, regular meetings (at least weekly) are taking place between the students and their individual supervisors. If necessary, additional meetings with the course convener are arranged at short notice.

**d) Mechanisms for gaining student feedback on the quality of teaching and their learning experience and how students are provided with feedback as to actions taken as a result of their comments:**

- MRes Staff – Student Committee meetings, which provide feedback once a term.
- Individual meetings between students and supervisors or the course convener.
- Anonymous questionnaires at the end of the course.

- The students are interviewed after the oral examination by the external examiners.

**e) Mechanisms for monitoring the effectiveness of the personal tutoring system:**

- MRes Student - Staff committee meetings
- Meetings with the course convener

**f) Mechanisms for recognising and rewarding excellence in teaching and in pastoral care:**

Staff are encouraged to reflect on their teaching, in order to introduce enhancements and develop innovative teaching methods. Each year College awards are presented to academic staff for outstanding contributions to teaching, pastoral care or research supervision. A special award for Teaching Innovation, available each year, is presented to a member of staff who has demonstrated an original and innovative approach to teaching. Nominations for these awards come from across the College and students are invited both to nominate staff and to sit on the deciding panels.

**g) Staff development priorities for this programme include:**

- Active research programme
- Staff appraisal scheme and institutional staff development courses
- Updating professional and IT / computing developments

## 22. Regulation of Assessment

**a) Assessment Rules and Degree Classification:**

For **undergraduate programmes** classification of degrees will be according to the following range of marks:

First class	70 - 100%
Second class (upper division)	60 - 69.9%
Second class (lower division)	50 - 59.9%
Third class	40 - 49.9%

For **postgraduate taught programmes**: The Pass Mark for postgraduate taught courses is 50%. In order to be awarded a result of merit, a candidate must obtain an aggregate mark of 60% or greater; a result of distinction requires an aggregate mark of 70% or greater.

Where appropriate, a Board of Examiners may award a result of merit where a candidate has achieved an aggregate mark of 60% or greater across the programme as a whole AND has obtained a mark of 60% or greater in each element with the exception of one element AND has obtained a mark of 50% or greater in this latter element.

Where appropriate, a Board of Examiners may award a result of distinction where a candidate has achieved an aggregate mark of 70% or greater across the programme as a whole AND has obtained a mark of 70% or greater in each element with the exception of one element AND has obtained a mark of 60% or greater in this latter element.

**b) Marking Schemes for undergraduate and postgraduate taught programmes:**

The Pass Mark for all **undergraduate** modules is 40%. From October 2008 entry all undergraduates are required to pass all their course units to progress to the next year.

The Pass Mark for all **postgraduate** taught course modules is 50%. Students must pass all elements in order to be awarded a degree.

**c) Processes for dealing with mitigating circumstances:**

**For undergraduate programmes**: Candidates with mitigating circumstances are not subject to the borderline restrictions but should be considered individually. However, as a general principle,

candidates whose marks are more than 5% below the borderline should not normally be raised to the next higher classification. Where the Board of Examiners determines that a higher classification should be awarded extra marks should be applied to bring the final marks into the higher range.

**For postgraduate taught programmes:** A candidate for a Master's degree who is prevented owing to illness or the death of a near relative or other cause judged sufficient by the Graduate Schools from completing at the normal time the examination or Part of the examination for which he/she has entered may, at the discretion of the Examiners,

(a) Enter the examination in those elements in which he/she was not able to be examined on the next occasion when the examination is held in order to complete the examination,

or

(b) be set a special examination in those elements of the examination missed as soon as possible and/or be permitted to submit any work prescribed (e.g. report) at a date specified by the Board of Examiners concerned. The special examination shall be in the same format as specified in the course regulations for the element(s) missed.

Applications, which must be accompanied by a medical certificate or other statement of the grounds on which the application is made, shall be submitted to the Academic Registrar who will submit them to the Board of Examiners.

#### **d) Processes for determining degree classification for borderline candidates:**

**For undergraduate programmes:** Candidates who fall no more than 2.5% below the minimum mark for a higher honours classification shall be eligible for review of their final classification; this review could include an oral examination or practical test or other mechanism appropriate to the discipline. Candidates whose marks are below the 2.5% borderline may be considered for a higher honours classification where certain provisions apply. Where the Board of Examiners determines that a candidate should be awarded a higher honours classification extra marks should be applied to bring their final marks into the higher range. Detailed records of all decisions should be recorded in the minutes of the meeting of the Board.

**For postgraduate taught programmes:** Candidates should only be considered for promotion to pass, merit or distinction if their aggregate mark is within 2.5% of the relevant borderline. Nevertheless, candidates whom the Board deems to have exceptional circumstances may be considered for promotion even if their aggregate mark is more than 2.5% from the borderline. In such cases the necessary extra marks should be credited to bring the candidate's aggregate mark into the higher range.

#### **e) Role of external examiners:**

The primary duty of external examiners is to ensure that the degrees awarded by the College are consistent with that of the national university system. External examiners are also responsible for approval of draft question papers, assessment of examination scripts, projects and coursework (where appropriate) and in some cases will attend *viva voce* and clinical examinations. Although external examiners do not have power of veto their views carry considerable weight and will be treated accordingly. External examiners are required to attend each meeting of the Board of Examiners where recommendations on the results of individual examinations are considered. External examiners are required to write an annual report to the Rector of Imperial College which may include observations on teaching, course structure and course content as well as the examination process as a whole. The College provides feedback to external examiners in response to recommendations made within their reports.

### **23. Indicators of Quality and Standards:**

- Very positive comments by the external examiners
- First destination data for MRes graduates, showing a majority starting a PhD on completion of the course

**24. Key sources of information about the programme can be found in:**

<http://www3.imperial.ac.uk/biology>

<http://www3.imperial.ac.uk/lifesciences/postgraduate/courselist>

<http://www3.imperial.ac.uk/lifesciences/postgraduate/courselist/plantbiotech>