



**Imperial College
London**

MRes in Chemical Biology

The Institute of Chemical Biology and
The Department of Chemistry
Imperial College London

Academic Year: 6th October 2014 – 30th September 2015



Some Important Dates

Monday 6th October 2014

- 09.00 – Onwards MRes postgraduate welcome pack can be collected from Student services centre, Room 258, Level 2, Chemistry building
- 10.00 – 12.00 Welcome & Introduction to the Course (Postgraduate Common Room 231, Level 2, Chemistry)
- 12.00 – 14.00 ICB Informal Lunch (Postgraduate Common Room 231, Level 2, Chemistry)
- 14.00 – 14.45 Welcome Talk by Rector, Director of Graduate School and GSA Chair (Great Hall, Level 2, Sherfield Building)

Tuesday 7th October 2014

- 11.00 – 16.00 Freshers' Fair (Student Union, South Kensington campus)
- 16.00 onwards Fresher's Fair afterparty (Student Union, South Kensington Campus)

Wednesday 8th October 2014

- 09.00 – 17.00 Sports Team Trials (Student Union, South Kensington campus)

Thursday 9th October 2014

- 12.00 – 13.00 Safety Talks - Primary Induction (Pippard Lecture Theatre, Level 5, Sherfield Building)
Attendance Compulsory
- 14.00 – 16.30 Safety Talks – Basic Laboratory Safety (Pippard Lecture Theatre, Level 5, Sherfield Building)
Attendance Compulsory
- 16.30 – 17.00 Hazard Explosion Lecture (Pippard Lecture Theatre, Level 5, Sherfield Building)
Attendance Compulsory

Friday 10th October 2014

- 14.00 – 17.00 Department of Chemistry Welcome Induction for all new MRes Postgraduates (Room 231, Level 2, Chemistry)

Saturday 11th October 2014

- 19.00 – 22.00 Postgraduate Mingle (Student Union, South Kensington campus)

From Monday 13th October 2014

Lecture Courses begin (See timetable for specific times and locations)

November 2014

Group learning seminars (See timetable for specific times and locations)

Thursday 4th November 2014

- 10.00 – 12.00 Graduate School MasterClass: Preparing & Writing a Literature Review (G47A, Flowers Building)
Attendance Compulsory

Friday 7th November 2014

- 13.30 – 16.00 Research Ethics – Transferable Skills Course – Prof Marianne Talbot (Flowers Building, Room G47A)
Attendance Compulsory

Monday 10th November 2014

- 09.30 – 15.30 Bioethics – Transferable Skills Course – Prof Marianne Talbot (Flowers Building, Room G47A)

Attendance Compulsory

Tuesday 11th November 2014

09.00 – 21.00 Creativity Event (170 Queen's Gate)
Attendance Compulsory

Wednesday 10th December 2014

13.00 – 14.30 Graduate School MasterClass: Time Management (Lecture Theatre 2, (ACEX) Chemical Engineering Building)
Attendance Compulsory

Thursday 11th December 2014

12.00 – 14.00 Staff Student Committee Meeting (Room 259, Level 2, Chemistry)

Tuesday 2nd December 2014 – Friday 5th December 2014-09-21

Biochemistry Practical

Thursday 18th December 2014

DEADLINE: 14.00

Submit:

- 1) 1 bound copy of Research Proposal and a signed Plagiarism form to the MRes programme coordinator Dr. Mike Ray (Room 258, Level 2, Chemistry)
- 2) One electronic copy of Research Proposal y email to Dr. Mike Ray by email (michael.ray@imperial.ac.uk)
- 3) One electronic copy of your Research Proposal (as word or pdf format) on **Blackboard Virtual Learning Environment**

Monday 12th – Friday 16th January 2015

Exam Week – Exam dates and times to be confirmed.

W/C Monday 19th Jan 2015

Fab Lab - Exact times to be confirmed.

Monday 19th Jan 2015

Start of Research Project (report to supervisors to arrange bench work start)

Tuesday 27th January 2015

14:00 – 17:00 MRes Project Summary Talks (G47A Flowers Building)

Spring Term 2015

(Journal club; dates and times to be confirmed)

April 2015

Mid-Term Project Progress Review

- Complete Mid-term Progress Report Form with supervisors
- Complete Student Evaluation Form

Friday 1st May 2015

Deadline for returning both Mid-term Progress Report and Student Evaluation Forms to the MRes programme coordinator Dr. Mike Ray (michael.ray@imperial.ac.uk)

25th May to 19th June 2015

Contact supervisors and independent marker to organise the date, time and venue of your MRes Viva.

Wednesday 1st July 2015

Deadline to confirm date/time/location of MRes viva with MRes programme coordinator Dr. Mike Ray (michael.ray@imperial.ac.uk)

Thursday 27th August 2015

Deadline: 14.00 Submit:

- 1) 1 bound copy of MRes Manuscript and a signed Plagiarism form to MRes programme coordinator Dr. Mike Ray (Room 258, Level 2, Chemistry)
- 2) One electronic copy (pdf format) of MRes manuscript by email to the MRes programme coordinator Dr. Mike Ray (michael.ray@imperial.ac.uk)
- 3) One electronic copy of your (in word format) on **Blackboard Virtual Learning Environment**

Mid-September 2015

All day

MRes Conference – project presentations (date and venue to be announced)

Attendance Compulsory

2nd September – 11th September 2015

Viva on Research Project (date, time and venue to be arranged by students)

20th – 30th September 2015

External Examiner's Meeting (date and location to be confirmed)

Attendance Compulsory

Important note: All dates and times can be subject to change at short notice and you are thus well advised to check your college email account regularly (daily), as we will use this to notify you of any changes to the above arrangements. The timetable is also available through the outlook ChemBio calendar.

CONTACTS

Those responsible for the general organisation of the course

Dr. Laura Barter	Flowers Building, Room 6.20	Ext 41885	l.barter@imperial.ac.uk
Dr. Rudiger Woscholski	Flowers Building, Room 6.22	Ext 45305	r.woscholski@imperial.ac.uk
Dr. Mike Ray	Chemistry, Room 258	Ext 42678	michael.ray@imperial.ac.uk
Personal tutor	To be assigned after project allocations		

USEFUL WEBSITES

www.chemicalbiology.ac.uk

www.imperial.ac.uk/chemistry

Course synopsis:

MRes in Chemical Biology

Chemical Biology is the development and application of novel molecular tools and techniques for the study of biology, biomedical understanding and ultimately industrial or clinical benefit. Quantitatively describing and predicting the behaviour of biological processes at the molecular level will impact upon challenges limiting molecular medicine, personal care and the agri-sciences.

The Institute of Chemical Biology (ICB) largely focuses upon developing and applying new molecular tools and technologies to solve problems of known importance in the life sciences, connecting problem-led pull with physical sciences innovation push. These include measuring, modelling or manipulating, protein-protein, lipid-protein, protein-nucleic acid, lipid-drug, lipid-lipid, lipid-nucleic acid and lipid-metabolite interactions as targets for intervention in biological systems.

One of the major activities of the ICB is the training of physical sciences postgraduates towards a career at the interface between the physical and biological sciences, in academia, industry, the public sector and non-governmental organisations.

The ICB oversees the activities carried out in the “Doctoral Training Centre” (DTC), which provides a 1-year standalone course leading to a masters qualification or a 4-year programme leading to masters + PhD. Both options are aimed at producing physical scientists who are able to bridge these disparate fields and have the confidence to engage in multidisciplinary research. For those students registered on the 4 year programme, the MRes in Chemical Biology forms the first part of this training course. The second part consists of a 3-year PhD assignment that will be chaperoned by the Graduate School at Imperial College London leading to a degree from Imperial College London.

The MRes course consists of an 8-month interdisciplinary research project, taught courses in biochemistry, cutting edge physical science tools and technologies, specialist lectures in transferable skills and group discussion sessions. Students will be exposed to multidisciplinary research focussed on assisting and advancing fundamental biology as well as the translation of novel molecular tools and technologies towards industrial and clinical end-users. The latter will provide an opportunity to experience and address the current challenges of the healthcare, agrichemical and personal care sectors within this programme.

Educational aims of the provision

1- Learning outcomes

The programme aims to:

- Produce physical sciences postgraduates equipped to pursue careers at the interface between the physical and life sciences, in academia, industry, the public sector and non-governmental organisations;
- Develop the ability to undertake research in multidisciplinary teams at this interface;
- Develop a knowledge of a range of basic and advanced biomolecular concepts;
- Develop research and analytical skills related to biomolecular research;
- Develop oral and written scientific presentation skills;

Considering the above aims, the main outcome of the programme is to provide opportunities for postgraduate students to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas:

a) Knowledge and understanding of:

- Core concepts in chemical biology – essential cell biology, physical techniques in biology, analytical tools and techniques, theoretical approaches to biology and imaging in chemistry and biology;
- Research techniques, including information retrieval, experimental design and statistics, modelling, sampling, biomolecular techniques, molecular biology, and laboratory safety
- Detailed knowledge and understanding of the essential facts, concepts, principles and theories relevant to the student's project
- Management and communication skills, including problem definition, project design, decision processes, teamwork, written and oral reports, scientific publications

b) Intellectual skills. To be able to:

- Analyse and evaluate biomolecular problems using a multidisciplinary integrated approach
- Integrate and evaluate information
- Formulate and evaluate hypothesis
- Plan, conduct and write up a programme of original research

c) Practical skills

- Plan and execute safely a series of experiments
- Use laboratory-based methods to generate data
- Analyse experimental results and determine their strength and validity
- Prepare technical reports and give technical presentations
- Use the scientific literature effectively
- Use computer packages

d) Transferable skills

- Communicate effectively through oral presentations, computer processing and presentations, written reports and scientific publications
- Management skills: decision processes, objective criteria, problem definition, project design and evaluation, risk management, teamwork and coordination
- Integrate and evaluate information from a variety of sources
- Transfer techniques and solutions from one discipline to another
- Use information and communications technology
- Manage resources and time
- Learn effectively for the purpose of continuing professional development

2 - Curricula and assessment

Course Duration:

This course is a full-time, one year Masters in Research, consisting of an 8-month long multidisciplinary research project, taught courses in physical and chemical technologies, training in biological research, advanced biochemistry, specialist lectures in transferable & professional skills and group discussion sessions.

2.1 Taught Component of Course (assessed):

The course begins in the first term (October-December) with a fixed lecture programme of core courses. Each core lecture module is compulsory and the material covered is examined in January. The core courses (outlined in the booklet) address the demand for the breadth of knowledge that we aim to cover by the course. The core lecture courses will be complemented by Group learning seminars, a biochemistry practical and a journal club, which together form the taught component of this course (see later for further details of the weighting of these elements).

Lecture courses (October to December)

The lectures modules (see page 16 for details on the content of the individual lectures) provide students with the opportunity to familiarise themselves with:

- (i) Basic biology as well as specific scientific themes focussed on the agri-sciences, personal care and health & disease via a set of platform knowledge lectures,
- (ii) a selection of tools and technologies that can be applied to chemical biology research

The knowledge gained through the lectures will be assessed by a written examination (see page 13 for details on the weighting of the exams on the overall degree marks).

Biochemistry Practical – Protein purification and characterisation (2nd to 5th of December)

The practical will introduce students to protein production in bacteria, affinity purification from bacterial lysates and characterisation of the functionality of the purified protein. Students will perform individual experiments featuring colorimetric enzyme assays, which will be used to test inhibitors. The experimental skills acquired in this practical will be assessed.

Group Learning Seminars

This is an assessed interactive module, which will facilitate student's understanding of key/fundamental biochemistry topics.

Each student will be assigned to a group (minimum of 2 students per group) and will be tasked to present a particular topic to the remainder of the student cohort. Students will be given guidance about the material to be covered, and in particular a textbook chapter which they will build their presentation around. Groups will be mentored by a member of academic staff who will have expertise in the subject area. There will be two group presentations during each seminar, followed by time for questions and discussions between the audience, speakers and academics present. Each presentation will be assessed by two members of academic staff (the mentor and an independent assessor).

The subject areas, which will be covered, include metabolism, molecular biology, protein structure, cellular signalling and organelle biology.

Journal Club

Journal club meetings take place in the spring term. This is an assessed transferable skills course, which aims to develop presentation skills, whilst encouraging scientific debate, and providing the opportunity to broaden scientific knowledge. Students will work together in groups and make a presentation about a seminal high impact paper. This will be followed by a chaired discussion/debate about the paper. Students are assessed on their ability to organise the presentation in a logical manner, the use of clear power-point slides, the clarity of the presentation and its scientific content.

2.2 Research Component of Course (assessed):

The major element of the research component of this course is an 8-month long multidisciplinary research project. A research proposal on the research topic will be submitted in December, a final research report/research manuscript in early September and a research talk at the MRes conference will be given shortly after this submission date this will be followed by an oral examination of the manuscript. All these assessed elements make up the research component of the course (see below for further details of the weighting of these elements)

Research Proposal (submission deadline: 2pm, Thursday 18th December 2014)

A proposal will be written on your chosen research project outlining the aims, background, objectives, impact and work plan for research that you will undertake from January 2015.

The proposal is based upon the format of an EPSRC research grant proposal, and is to be written throughout the first term of the course. It is expected to include a critical review of the literature on the subject matter chosen for the research project.

Proposal will be marked by both supervisors as well as by one other independent marker. The purpose of the project proposal is to test independent work. The written style, standard of presentation, completeness and analysis of the literature survey, and rationale for the proposed research will be assessed, to ensure an understanding of the aims and objectives of the proposed research.

The Department and College take plagiarism very seriously. Do not plagiarise. You must read and comply with the Chemistry Department Policy on Plagiarism:

<http://www3.imperial.ac.uk/chemistry/teaching/undergraduateteaching/materials/plagiarism>

A copy of the Plagiarism Form (included at the end of this booklet) should be submitted with your Research Proposal.

Students are required to submit the following by the specified deadline:

- 1) 1 bound copy of Research Proposal and a signed Plagiarism form (see later section in this booklet for more details) to MRes programme coordinator Dr. Mike Ray (Room 258, Level 2, Chemistry)
- 2) One electronic copy (pdf) of Research Proposal by email to the MRes programme coordinator Dr. Mike Ray (michael.ray@imperial.ac.uk)
- 3) One electronic copy of your Literature Report (as word document format) on **Blackboard Virtual Learning Environment**

Failure to do so will result in a penalty. 5% of the awarded mark will be deducted for each day of delay.

Research manuscript (submission deadline: 2pm, Thursday 27th August 2015)

The research project will be written up in the form of a research article, using guidelines that can be found below. It should include a covering letter (explaining the impact of the research), a title, an abstract, introduction, methods, results, discussion and list of the cited literature. Each manuscript will be marked by three members of staff (two supervisors and an independent marker), who will take up the role of referees. Guidelines for marking the written work can be found in this booklet.

Students are required to submit the following by the specified deadline:

- 1) 1 bound copy of the manuscript and a signed Plagiarism form (see later section in this booklet for more details) to MRes programme coordinator Dr. Mike Ray (Room 258, Level 2, Chemistry)
- 2) One electronic copy (pdf) of manuscript by email to the MRes programme coordinator Dr. Mike Ray (michael.ray@imperial.ac.uk)
- 3) One electronic copy of your manuscript (word format) on **Blackboard Virtual Learning Environment** (instructions on how to upload are given at the end of this booklet)

Failure to do so will result in a penalty. 5% of the awarded mark will be deducted for each day of delay.

Viva (2nd September – 11th September 2015)

The oral examination will further test understanding of the research undertaken. Each student will be examined by an independent marker and at least one (but preferably two) of their supervisors.

It is the student's responsibility to organise the viva date, time and venue with the supervisors and independent marker, and to inform the MRes programme coordinator Dr. Mike Ray (michael.ray@imperial.ac.uk).

MRes Conference (Mid-September 2015, TBC)

The MRes conference is a meeting for all students attending the MRes in Chemical Biology, MRes in Bioimaging Sciences, MRes in Plant Chemical Biology and MRes in Drug Discovery and Development courses. It provides an opportunity to showcase the work carried out during your research project (in the form of a short presentation followed by questions), and also the opportunity to hear about research carried out by your fellow cohort. This is an assessed component of the course and will be marked by an external examiner as well as Imperial College academics.

2.3 Additional compulsory non-assessed components of the course:

MRes Project Summary Talks (14-17:00 Tuesday 27th January 2015)

This seminar is for all MRes students to give a brief 3 minute summary of their project to each other. This is not assessed, but attendance is compulsory.

Teamwork training and Creativity Event (Tuesday 11th November 2014 – 170 Queen's Gate)

Creativity sandpit events are becoming common mechanisms chosen by research councils to create, select and award large research grants for multidisciplinary high impact science. This course is designed to simulate a mini "sandpit" event, and ideas generation workshop. Groups of students will work together to drive lateral thinking to address particular research challenges. The course will finish with groups pitching their ideas to a panel.

Fab Lab (Monday 19th January – Friday 23rd January 2015)

You will gain hands on experience with technology development on the Fab (Fabrication-Prototyping) Lab. Working in teams you will be tasked with designing and constructing devices to solve particular technology problems. The exact times and dates will be confirmed later.

Research seminars and colloquia (TBC)

Regular research seminars given by leaders in particular fields are organised by the Chemistry department, and attendance is expected. Details will be sent via email. The ICB also organises colloquia each year. These are afternoon meetings in which invited speakers give a variety of talks within the research area of the ICB remit.

Industry Innovation Workshops (TBC)

The workshops will provide insights into the process of product and technology development in different industrial sectors, pharma (eg. AZ), the agri-sciences (Syngenta) and personal care sectors (P&G) and the impact of chemical biology. Site visits to industrial partners will be a part of these workshops.

Professional Skills Courses

Students are encouraged to take transferable skills courses given by the Graduate School at Imperial College London. For more information on the courses available please see: <http://www3.imperial.ac.uk/graduateschool/currentstudents/professionalskillsmasters>

The following three transferable skills courses have been organised for all ICB MRes students. **Attendance is compulsory** however the courses are not examinable.

1. **Professional Skills Programme – Preparing and Writing a Literature Review**
(Tuesday 4th November 10-12.00, G47A, Flowers Building)

Course Introduction:

The literature review is a key section of your dissertation, and it is important you understand what should and should not be included in a literature review. This session will provide advice on how to prepare for a literature review and how to write a literature review.

Course Description:

This session will include the advice on the following;

- Effective reading strategies
- Critical selection and evaluation of sources
- Organising your literature review
- Avoiding plagiarism in your literature review

This session will give a general introduction: it is advised that subject-specific advice for your particular dissertation/literature review should be sought from your supervisors.

2. **Professional Skills Programme – Time Management Course** (Wednesday 10th December 13-14:30, Lecture Theatre 2, (ACEX) Chemical Engineering Building)

Managing time successfully will enable you to become more effective in completing tasks and reduce stress and anxiety. It will also allow you to have greater control over life, both at home and at work.

As part of this course you will need to bring with you a to-do list and then you will use different techniques on how you can accomplish these tasks by managing time effectively through prioritisation and making the correct decisions. You will also learn how to overcome procrastination and manage disruptions with an opportunity for you to share with others on how to manage time.

A hands-on-approach in managing time effectively through prioritising tasks and making the right decisions.

3. **ICB Research Ethics Courses** (Tuesday 5th November 09.30-12.00, room G47A, Flowers Building) **and Bioethics** (Friday 8th November 09.30-3.30pm, room G47A, Flowers Building) **by Professor Marianne Talbot, Director of Studies in Philosophy, University of Oxford**

This course covers topics such as “Professional and Personal Integrity”, and Plagiarism and Collusion”. It will also introduce you to philosophical ethics, and enable you to defend your own positions on various ethical issues. You will have the opportunity to discuss topics such as “Do you think reproductive cloning is morally permissible?”; “Do you check food labels to exclude any with GM ingredients?”; “Would you worry if the government introduced compulsory depositing of DNA in the national DNA bank?”.

Careers Day (TBC)

A day of careers talks from a range of professions to take place in spring 2015. This is a good opportunity to seek careers advice from the speakers on the day and to explore various career opportunities available. Further details of the programme will be sent via email.

Safety

The department, in conjunction with the Graduate School runs induction activities for all new MRes students in October each year. These include the mandatory Primary Induction session and the Basic Lab Safety Lecture (which details the department’s requirements for safe practice in your research). Details of this induction programme will be given to you by the MRes Programme Coordinator, Dr Mike Ray.

Further details of departmental safety procedures and waste disposal can be found on our website at <http://www3.imperial.ac.uk/chemistry/safety> or by contacting the faculty safety manager, Stefan Hoyle (s.hoyle@imperial.ac.uk).

There are 2 other safety courses that are mandatory for all new PG students;

1. **Risk Assessment Foundation Training (RAFT)** - This is run as a Blackboard course and test for PG students. RAFT is a realistic and practical way to learn about the College's risk assessment process via video scenarios based on one's own work environment. After an introduction on why risk assessments are required, the learner is taken through the process of risk assessment before engaging with a series of video scenarios representative of their own work environments.
2. **Fire Prevention and Fire Safety at Work** – This course will be organised for you and should be completed in the first term prior to you starting in the lab for your research projects. The course is aimed at reducing the likelihood of fires starting and what action to take in the event of a fire. The course covers; How fires start and spread, Steps to take to prevent fires, Methods of extinguishing fires, Types of fire fighting equipment and their uses, Smoke and gas hazards produced by fires, What to do in the event of discovering a fire and When not to tackle a fire.

You must undertake your research in accordance with safety regulations and procedures, as agreed with your supervisor (who is responsible for your health and safety). If you have any doubts about any safety aspects of your work or work environment, you should discuss these with your supervisor.

Disclosure of vulnerability

If you have any health condition or are taking treatment that could cause you to lose consciousness, affect your alertness or for which you might require emergency assistance, you must let the course directors and your supervisor know so that they can be in a position to organise help for you, if ever needed and ensure appropriate precautions are put in place if necessary to ensure your safety.

For health conditions for which you might require emergency help it is also worth letting a couple of friends know as well, so they can know what to do if you needed help away from the Department.

All students should register with a doctor in London as soon as possible. This is particularly important if you have any health problems that require regular treatment. All students living in central London Halls can and should register with the College Health Centre. Students living outside halls may also be able to register. Check the Health Centre website for information www.imperialcollegehealthcentre.co.uk.

2.4 Assessment Methods

The different teaching outcomes will be assessed in the following way:

- The knowledge base will be assessed through a combination of unseen written examinations for the taught component of the course, (i.e. the compulsory core courses given during the first term) and assessed project work (the project proposal, research project manuscript, MRes conference presentation and viva).
- The intellectual (thinking) skills will be evaluated through the project proposal, unseen written examinations, individual research projects, group learning seminars and journal club.
- Practical skills will be assessed through the biochemistry practical, research project (both the written component and the ability of the student to carry out the research, i.e. experimental work, learning specific techniques, etc.) manuscript, MRes conference presentation and oral examination.
- Transferable skills are assessed in the student's research project, literature survey and during journal club and the group learning seminars. Students' ability to

communicate their research will also be assessed during the oral examination and the MRes conference presentation.

The assessment rules & degree classification for the programme will be:

- Minimum standards **in each element and assessed component** will be required with an overall pass mark of 50%.
- To qualify for the award of MRes, students will have to complete all the course requirements and must achieve an overall pass mark in each assessed component. This includes the combined taught element (written examinations, group learning seminars and journal club) and research element (literature report, MRes manuscript, MRes conference presentation and oral viva) of the course.
- The percentage weighting of marks contributing to the degree are given in the following table:

	Taught Element (25 %)	Percentage weighting of marks contributing to degree	Research Element (75%)	Percentage weighting of marks contributing to degree
Assessed Component	Written Examinations	10 %	Literature Report	10 %
	Group Learning Seminars	5 %	MRes manuscript	50 %
	Biochemistry Practical	5 %	MRes conference Presentation	5 %
	Journal Club	5 %	Oral Viva	10 %

Summary of grades, marks and their interpretation for the MRes degree classification:

<u>GRADE</u>	<u>MARKS</u>	<u>INTERPRETATION</u>
Distinction	70% - 100%	Marks represent a distinction performance
Merit	60% - 69.9	Marks represent a merit performance
Pass	50% - 59.5%	Marks represent a pass
Fail	0% - 49.9%	Marks represent a fail performance at MRes level

- **Distinction:** to be awarded where a candidate has achieved:
either: an aggregate mark of 70 per cent or greater across the programme as a whole, comprising a mark of 70 per cent or greater in each element;
or a mark of 70 per cent or greater across the programme as a whole, with a mark of 70 per cent or greater in each element with the exception of one element, for which a mark of 60 per cent or greater must have been obtained.
- **Merit:** to be awarded where a candidate has achieved:
either: an aggregate mark of 60 per cent or greater across a programme as a whole, comprising a mark of 60 per cent or greater in each element;
or: has obtained a mark of 60 per cent or greater across a programme as a whole, with a mark of 60 per cent or greater in each element with the exception of one element, for which a mark of 50 per cent or greater has been obtained.
- **Pass:** to be awarded where a candidate has achieved an aggregate mark of 50 per cent or greater across a programme as a whole, comprising a mark of 50 per cent or greater in each element.

- **Fail:** to be awarded where a candidate has achieved an aggregate mark of 49.9 per cent or less across a programme as a whole, comprising a mark of 49.9 per cent or less in each element.

At the end of the course an external examiner will assess the examination process. The date of this meeting is TBC, but **all students must be present for this day**. Students that are either at boundaries between grades (i.e. pass/failure or merit/distinction) or have failed one or more components of the course are likely to get an additional oral examination (viva).

2.5 Student Surveys

Your feedback is important to your department, the College and Imperial College Union. Whilst, there are a variety of means to give your feedback on your Imperial experience, the following College-wide surveys give you regular opportunities to make your voice heard:

- **PG SOLE lecturer/module**
- **Student Experience Survey (SES)**
- **Postgraduate Taught Student Experience (PTES)**

The **PG SOLE lecturer/module survey** runs at the end of the Autumn Term. This survey is your chance to tell us about the modules you have attended and the lecturers who taught them. Run at the same time as the Autumn Term PG SOLE is the Union's **Student Experience Survey (SES)**. This survey will cover your induction, welfare, pastoral and support services experience. During December you will receive an email in your Imperial College account with a link to the survey.

The **Postgraduate Taught Experience Survey (PTES)** is the only national survey of Master's level (MSc, MRes, MBA and MPH) students we do and so the only way for us to compare how we are doing against the national average and to make changes that will improve our Master's students' experience in future. PTES covers topics such as motivations for taking the programme, depth of learning, organisation, dissertation and professional development. During the spring term you will receive an email in your Imperial College account with a link to the survey.

All these surveys are anonymous and the more students that take part the more representative the results so please take a few minutes to give your views

If you would like to know more about any of these surveys or see the results from previous surveys, please visit: <http://www3.imperial.ac.uk/registry/proceduresandregulations/surveys>

For further information on surveys please contact the Registry's Surveys Team on surveys.registrysupport@imperial.ac.uk.

Student responsibilities

The MRes course is a postgraduate assignment and as such is not following undergraduate timing. There is no term-free time in this course. Students should be aware that their bursary is for a full-time employment up to the end of September 2014. **Any holidays or sick-leave will have to be taken at the discretion of the supervisors, but should under no circumstances be taken in the examination periods of January 2015 and September 2015.**

It is mandatory to attend all scheduled lectures, seminars, courses and exams. Missing an exam without any support by a doctor's notice for the day of the exam will count as failure. It is the responsibility of the student to ensure that sufficient time is allocated for the exam and write-up preparation.

Students will be assigned to a personal tutor, who should be the first contact in all matters concerning problems with the supervision of the projects or other pastoral difficulties. The administrator of the MRes course, Dr. Mike Ray, will be the point of contact for all administrative or logistic issues. Once these channels have been exhausted matters should be raised with the MRes course directors, Drs. Rudiger Woscholski and Laura Barter.

Students are expected to organise, conduct and present their research project in an independent fashion. The supervisory role is to guide and advise the student intellectually as well as technically, but it is not the supervisor's responsibility to do the thinking or the work for the student. All projects will have at least two supervisors, one with biological and one with physical/chemical/mathematical expertise. Both supervisors should be approached for guidance. It is the students' responsibility to make an effort and seek contact with their supervisors on a regular basis.

In order to pass the course successfully students have to pass all assessed components of the course. This includes the written exams, the grant proposal, the final report and the viva. Failing in one of the components could lead to a failure of the whole course.

At the end of the course an external examiner will assess the examination process. All students have to be present for this day. Students that are either at boundaries between marks (i.e. pass/failure or merit/distinction) or have failed one or more components of the course are likely to get an additional oral examination (*viva*) that will determine their final mark.

Students should seek guidance with respect to their write-up and literature report from their corresponding supervisors, since they will be involved in the marking. After completion of the literature report students should seek feedback from their corresponding supervisors (biological and physical) to foster the improvement of their final report.

Students are required to submit an electronic version of the final report to their supervisors. Additionally, they must hand over all notes, lab-books, results, computer programmes etc to their supervisors.

Final manuscript/Research Proposal

This must be submitted as one bound and typewritten copy by the specified deadlines. An electronic version must also be submitted. Failure to do so will result in a penalty. 5% of the awarded mark will be deducted for each day of delay.

Viva

Students are responsible for contacting their supervisors and independent marker to arrange a *viva* date. The MRes programme coordinator will send further details nearer the time.

Lecture Courses

Core Bio lectures

Introduction to Cell Biology:

Prof. Keith Willison (k.willison@imperial.ac.uk)

Lectures: (4 hrs)

This 4-hour lecture course provides a brief overview of the basic concepts and facts of cell biology, with particular emphasis on the morphology and compartmentalisation of the cell; the difference between prokaryotic and eukaryotic cells, key metabolic pathways and their control by 2nd messengers. Cellular signalling and hormonal control towards cellular destiny, shape and fate will be introduced.

Learning Outcomes

- Description of cell compartments
- Difference between prokaryotic and eukaryotic cells
- Basic facts of cell biology morphology.
- Basic principles and facts on key metabolic pathways.
- Sketch of important signalling cascades.
- Overview of cellular transport mechanisms
- Understanding of cellular function in space and time.

Biomolecular assays

Prof. Tony Cass (t.cass@imperial.ac.uk)

Lectures: (4 hrs)

Synopsis: In these 4 lectures you will learn to design, implement and analyze assays using biomolecules as reagents.

Detailed Content:

Lecture 1: General Principles of Assay Design: Acquisition, presentation and analysis of assay data.

Lecture 2: Catalytic and Affinity Assays: Reagent selection, mechanism of action and instrumentation.

Lecture 3: Catalytic Assays: Selected examples from the biomedical and agricultural fields.

Lecture 4: Affinity Assays: Selected examples from the biomedical and agricultural fields.

Learning Objectives:

1. An understanding of the principles behind the design and execution of biomolecular assays.
2. The ability to design a bioassay to meet a particular research or application need.
3. The ability to analyze, quantitatively, bioassay data

Molecular Biology

Dr Geoff Baldwin (g.baldwin@imperial.ac.uk)

Lectures: (4 hrs)

These are introductory lectures to introduce the central dogma of biology to students who do not have a biological background. They will cover the principles of DNA replication, transcription and translation. The sessions will be a mixture of lectures and tutorials that will provide an opportunity for students to think about some of the issues and practicalities of working with DNA and designing primers.

Platform Knowledge - Theme Specific Applied Lectures

Signalling – Health & Disease

Dr. David Mann (d.mann@imperial.ac.uk)

Lectures: (4 hrs)

This lecture series will dissect the molecular causes of cancer and the physiological consequences resulting. We will consider the key characteristics underlying all cancers and the heterogeneity in the disease. We will discuss genetic change and the cellular response to DNA damage and the regulation of the cell cycle with respect to cancer. The interplay between the cancer phenotype and therapeutics will also be discussed.

Learning Outcome

Students will be able to compare and contrast the characteristics of normal and cancerous cells. They will have a basic understanding of cell cycle control and DNA repair and its relevance to cancer. They will understand some basic principles of cancer therapeutics and associated problems.

Signalling – Plant

Dr. Colin Turnbull (c.turnbull@imperial.ac.uk)

Lectures: (4 hrs)

We will examine two major concepts in plant signalling. First, we discuss how plants sense and respond to a diverse array of environmental signals such as light, nutrient starvation, salinity and drought. Second, we analyse the internal molecular signalling mechanisms that plants use to convert these environmental inputs into altered growth, development and defence. In a final workshop exercise, we will integrate this knowledge using climate change scenarios to consider how modern agriculture and biotechnology might generate the necessary increases in sustainable crop production to meet global food security targets.

Learning Outcome

Students will be able to predict likely plant molecular responses to environmental inputs and stresses. They will have a basic understanding of some classes of plant receptors and downstream signalling events. They will be able to discuss how knowledge of plant signalling might be applied to address global problems.

Surfactants – Phase Behaviour

Dr. Eric Robles, Procter & Gamble (robles.es@pg.com)

Lectures: (4 hrs)

This 4-hour lecture provides an introduction to the complex aggregation behaviour of surfactant systems. It will give students a peek of the invisible world of nano-sized surfactant aggregates that are ubiquitous in consumer products that defines their properties like appearance, product feel during application, dispersing properties (emulsions, encapsulation of actives), stability on storage and flow (processability). It will provide basic knowledge on how consumer products are assembled and formulated.

Learning Outcome

Students will be able to:

1. Learn the different types and application of surfactants used in industry.
2. Learn what happens to a surfactant as it dissolves in a solvent and the different phases it forms as it aggregates.
3. Predict the type of aggregate simply by looking at the molecular structure of the surfactant.

4. Predict the impact of formulation (electrolyte, co-surfactant, organic solvents, perfume) on the shape and size of such aggregates.
5. Understand how typical consumer products (shampoo, liquid detergents, hair/fabric conditioner, etc) are formulated and their basic underlying microstructure

Tools & Technologies in the Physical Sciences

Surfactants

Dr. Eric Robles, Procter & Gamble (robles.es@pg.com)

Lectures: (2 hrs)

Surfactants play a variety of functions in consumer products like soil removal, emulsification/dispersion, viscosity modification, triggered-release, encapsulation and surface modification. These attributes require a suite of tools to fully characterise how surfactants can deliver these. This lecture highlights a few of these techniques that measure how surfactants lower the interfacial tension (L/L for emulsions, L/G for foams, L/S for deposition), determine the size and shape of micelles, identify the different types of liquid crystals and the physical and thermal properties of such aggregates. This includes tensiometry, scattering, microscopy, rheology, calorimetry and spectroscopy.

Optical molecular imaging

Prof. Mark Neil

Lectures: (2 hrs)

The key processes of life occur in the noisy, far from equilibrium cellular environment, which is characterised by heterogeneity and stochastic fluctuation. To unravel this complexity, biology requires new physical concepts and methodologies. Studying biological processes at the single molecule level can offer us an improved understanding of the not only physical structures within the cell but also underlying molecular mechanisms.

This course will concentrate on optical methods for imaging at the molecular level using fluorescence as its main contrast mechanism. Fluorescence is in many ways the ultimate single molecule process as it is directly dependant on molecular level electronic transitions. Techniques such as spectral, polarisation or lifetime contrast imaging can elucidate molecular environment such as viscosity, pH, temperature and refractive index, or the interaction between molecules via FRET (Forster Resonant Energy Transfer). Measurement of the diffusion and movement of molecules can be visualised by FRAP (fluorescence recovery after photo-bleaching) and FCS (fluorescence correlation spectroscopy). Direct visualisation of intracellular structures at resolutions beyond the classical diffraction limit can be achieved using either single molecule localisation techniques such as PALM (photo-activated localisation microscopy) and STORM (stochastic optical reconstruction microscopy), or by STED (stimulated emission depletion microscopy).

Learning outcomes

At the end of this course students will have developed and understanding of both the underlying physical principles behind the processes in and the technology required for a range of optical molecular imaging techniques.

Fundamentals and Applications of Micro & Nanofluidics

Dr. Joshua Edel (joshua.edel@imperial.ac.uk)

Lectures: (2 hrs)

Analytical Sensors plays a crucial role in today's highly demanding exploration and development of new detection strategies. Whether it be medicine, biochemistry, bioengineering, or analytical chemistry the goals are essentially the same: 1) improve sensitivity, 2) maximize throughput, 3) and reduce the instrumental footprint. In order to

address these key challenges, the analytical community has borrowed technologies and design philosophies which has been used by the semiconductor industry over the past 20 years. By doing so, key technological advances have been made which include the miniaturization of sensors and signal processing components which allows for the efficient detection of nanoscale object. One can imagine that by decreasing the dimensions of a sensor to a scale similar to that of a nanoscale object, the ultimate in sensitivity can potentially be achieved - the detection of single molecules. This talk highlights novel strategies for the detection of single molecules using nanoporous membranes.

Dr. Marina Kuimova (m.kuimova@imperial.ac.uk)

Lectures (2 hrs)

Title: New tools to measure microscopic viscosity

Measurements of microscopic viscosity are extremely important in materials- and bio-sciences, as viscosity is one of the main factors which influence diffusion in condensed media. In a cell viscosity can play a role in several diffusion mediated processes, such as drug delivery, signalling and mass transport. However, mapping viscosity on a microscopic scale and especially in live matter (e.g. on a single-cell level) remains a challenge.

Dr Kuimova will talk about several methods actively used in my group to measure microscopic viscosity:

1. Fluorescence imaging using novel fluorescent probes, called molecular rotors. In molecular rotors the speed of rotation about a sterically hindered bond is viscosity-dependent.
2. Time resolved fluorescence anisotropy
3. Time resolved detection of singlet oxygen.

Dr Kuimova will give examples of the use of these techniques in lipid mono- and bi-layers, in live cells and in atmospheric aerosol particles.

Prof. Nick Long (n.long@imperial.ac.uk)

Lectures (2 hrs)

New Methodologies in Positron Emission Tomography (PET) Radiolabelling: the lecture will examine some recent advances in the radiolabelling of biomedically-relevant molecules, with ¹¹C and ¹⁸F radionuclides. Specific examples will include the use of microfluidic reactors, trapping/release of ¹¹CO by transition metals and new metal-mediated ¹⁸F electrophilic and aromatic fluorinations.

Dr Matt Fuchter (m.fuchter@imperial.ac.uk)

Lectures (2 hrs)

Chemical genetics

- Introduction: What is it? Why chemicals? Complementary relationship to classical genetics, relative advantages and disadvantages; forward/reverse and protein-ligand engineering
- Forward chemical genetics (obtain library, screen, identify target)
 - i. Chemical libraries: target-oriented synthesis vs diversity oriented synthesis
 - ii. Screening - high content/phenotype screens
 - iii. Target identification: biochemical approaches; 3-hybrid screens. Chemical approaches (labelling of small molecules, pull-down and cross-linking)
- Reverse chemical genetics: Relationship to "classical" drug discovery. Lead discovery; fragment based approaches. Diversity oriented synthesis.
- Protein-ligand engineering: bump-hole approach
- Case study of Dr Fuchter's research.

Chemical biology: a multifaceted tool in drug discovery

Dr. Ed Tate (e.tate@imperial.ac.uk)

Lectures: (2 hrs)

My group works in the emerging multidisciplinary fields of chemical proteomics and chemical biology, where we design and apply chemistry-driven approaches to explore posttranslational modification (PTM) and protein-protein interactions (PPIs) in living systems. A constant theme in our work is the exploration of biological pathways as potential drug targets, and discovery of novel PTM and PPI inhibitors using tools including peptide and protein synthesis, fragment-based inhibitor design, activity-based enzyme profiling, and proteomics. In this lecture I will highlight some of our recent progress in probing and inhibiting PTM and PPIs using chemical biology approaches, and describe how we have applied this technology to understand and exploit novel drug targets in infectious diseases and cancer.

Utility of Molecular Mechanics and Dynamics in investigating biological systems

Dr Ian Gould (i.gould@imperial.ac.uk)

Lectures: (2 hrs)

The lecture will use a series of exemplars to demonstrate how "molecular modelling" can be used to aid in understanding of proteins, nucleic acids, lipids and drug interactions. Techniques which will be discussed will include docking, minimisation, Molecular Dynamics (MD) and free energy calculations.

Protein NMR - Structural Elucidation of Protein by NMR Spectroscopy

Dr. Rob Law (r.law@imperial.ac.uk)

Lectures: (2 hrs)

Nuclear magnetic resonance spectroscopy is an extremely powerful technique that enables the structural determination of a vast variety of different molecules. A variant of this is solid state NMR spectroscopy that deals with anisotropic or solid state materials. In biology, examples of these are transmembrane proteins e.g. bacteriorhodopsin or inorganic matrices e.g. apatites. This course will focus on an introduction to this area.

X-Ray Diffraction Studies of Biological Systems

Dr. Nick Brooks (n.brooks@imperial.ac.uk)

Lectures: (2 hrs)

This section of the course will begin by covering the principles and practicalities of small angle X-ray diffraction (SAXS), and its application to soft-materials and biological lipid assemblies. We will then give an introduction to synchrotron based SAXS and time resolved experiments, this will include the use of temperature changes, rapid mixing and pressure-jump technology to trigger structural transitions in lipid systems.

Industry Innovation Workshop - Plant & Agriscience background lectures.

Structural Biology of Photosynthesis (not assessed)

Dr. James Murray (j.w.murray@imperial.ac.uk)

Lectures: 3 hours

This short course introduces two main techniques of structural biology; X-ray crystallography and electron microscopy. The application on these techniques to plant proteins is shown,

particularly the carbon-fixing enzyme Rubisco, and the photosynthetic complexes.

Learning Outcomes

X-ray Crystallography:

Protein Expression & Purification

Crystallization

X-ray data collection

Structure solution

Electron Microscopy:

The Electron microscope

Sample preparation for electron microscopy

Data processing and 3D reconstruction

Structures of Photosynthetic enzymes and Complexes:

RubisCO structure, assembly & mechanism

Photosystem I structure

Photosystem II structure

Other plant proteins of interest

Chemical and biological properties of pesticides (not assessed)

Prof. Denis Wright (d.wright@imperial.ac.uk)

Seminars: 6 hours including Q&A sessions

Interactive seminars which aim to provide an overview of some of the key properties to be considered during the development of new compounds, excluding mammalian toxicology. Insecticides and nematicides will be used as examples. The development of new compounds for plant nematodes has proved particularly challenging for various reasons, including environmental factors and the biology of the target organisms.

Learning Outcomes - a basic understanding of:

- target sites in relation to selectivity and speed of action
- mode of uptake and pharmacokinetics
- resistance mechanisms, including cross-resistance
- intrinsic toxicity vs bioavailability (movement and persistence in plants and soil in relation to chemical properties, including Log P and VP, detoxification due to abiotic/biotic factors)
- side effects on non-target organisms, including natural enemies of pests

Plant disease and immunity (not assessed)

Dr. Pietro Spanu (p.spanu@imperial.ac.uk)

Lectures: (1 hr introduction + 3 hrs tutorial)

These sessions will examine aspects of plant disease and how plants defend themselves against microbial pathogens. I will introduce basic aspects of plant pathology and immunology in the first one hour session. You will then be assigned a specific topic to prepare as a presentation to the group which we will discuss extensively in a half-day round table tutorial style session.

Learning Outcomes

- Description of main plant diseases and their impact on food security

- Understanding principles of plant defence and immunity
- Knowledge of how plant immunity is exploited in agriculture
- Appreciation of the challenges and aims of agricultural biotechnology with regard to pathogen control and crop protection

MRes in Chemical Biology 2014/15

Criteria for Assessment of Exam answers

The assessment will take into consideration the teaching of the subject and the type of problems and tasks set. Allowance is made for what is reasonably achievable under examination conditions.

Percentage Grade	Criteria
85-100	Exceptional. Originality, critical/analytical ability ** and evidence of outside reading is expected. The presentation of the subject combines conciseness and exemplary understanding of all relevant concepts and facts.
70-84	Excellent. As for Exceptional, but not fully achieving one of them.
60-69	Very Good. Provides a clear and accurate account of the relevant knowledge, concepts and facts. Evidence of some outside reading and critical/analytical ability **.
55-59	Good. Provides a mainly accurate account of the basic concepts covering at least half of the relevant taught material, but is marred by significant errors.
50-54	Adequate. Provides only a minimal account of the basic concepts covering at least a third of the relevant taught material, but is marred by major errors.
35-49	Unsatisfactory. Provides only a vague account covering less than a third of the relevant taught material and indicates a confused understanding of the subject.
20-34	Provides only a vague understanding of some concepts and facts covering about a quarter of the expected material. Presentation is dominated by inaccurate or irrelevant material.
10-19	A maximum of three relevant facts (sentences) are presented.
1-9	Answer includes at most one relevant fact (sentence)
0	Answer contains nothing correct that is relevant to question. Mark to be given where the work is discovered not to be that of the candidate (plagiarised). Further disciplinary action is usually taken in cases of plagiarism.

** *Analytical* = assessing a hypothesis or statement by breaking it down into its elements and examining their inter-relationships and contribution to the whole; cf. *Critical* = judging a hypothesis or conclusion by examining the validity of the evidence adduced for it.

Guidelines for Marking MRes Research Proposal

The following should be submitted on or before 14.00 Thursday 18th December 2014:

- 1) One electronic copy (pdf) of MRes proposal by email to the MRes administrator (michael.ray@imperial.ac.uk)
- 2) One electronic copy of your Literature MRes proposal (as word document format) on **Blackboard Virtual Learning Environment** (instructions on how to upload are given later in this booklet)

The purpose of the project proposal is largely to test the student's ability to conceive and design the necessary steps for the research programme undertaken throughout the second half of the MRes course. In order to do this a good understanding of the state-of-the-art research is essential, which will be summarised and used to define the objectives of the research programme.

Your MRes proposal (**maximum 8 pages including figures, references, etc**). has to adhere to the following format:

Background (maximum 5 pages): Introduce the topic of research and explain its academic and industrial context; review the literature necessary for the understanding of the project aims and methodology employed. Demonstrate a knowledge and understanding of past and current work in the subject area in the UK and abroad. Include any preliminary work here, if it is necessary for formulating the aims and objectives of the programme of work covered in the following section

Programme and Methodology (2 pages maximum): State the overall aims of the project and the individual measurable objectives against which you would wish the outcome of the work to be assessed. Detail the methodology to be used in pursuit of the research and justify the choice. Explain why the proposed project is of timeliness and novelty. Describe the programme of work, indicating the research to be undertaken and the milestones that can be used to measure its progress (relate to diagrammatic workplan).

Relevance to Beneficiaries; potential impact (0.5 page maximum): Identify the potential impact of the proposed work. Indicate who is likely to benefit from the proposed research. If the benefits do not directly relate to wealth creation and/or to improving the quality of life, give details of other beneficiaries and explain their importance; other research workers are legitimate beneficiaries.

Diagrammatic work plan (maximum 0.5 page). This should be a diagrammatic indication of the project plan, for example, a PERT or Gantt chart.

Proposals should have a minimum of 2,000 words and not exceed 8 word-processed pages including figures and references. The proposal has to be written using the font Arial (11pt), 1.5 lines spaced, with document margins of 1.5 cm for top, bottom, left and right. The report should include the title, your name and your supervisors name in the header of the word document. It is advisable to maximise the use of space by being selective about the figures needed for the proposal as well as listing publications as footnotes. The font size for header and footer can be 10pt.

Assessment of MRes proposals

Proposals will be marked independently by the biological supervisor, the physical supervisor and the independent marker. The proposal will then be moderated.

When writing the following marking criteria should be borne in mind.

Written style/Presentation

- Is the proposal well written and presented (typewritten, bound, organisational figures, formatting etc) and clearly explained?
- The proposal should be concise and complete (thorough and informative)
- Are the references listed actually referred to or discussed in the text? Is the project the candidate's own work, written in their own words?
- Is the format up to the standards expected from grant proposals to research councils?

Background information

- Is the literature survey thorough and complete?
- Are important references missing?
- Are all relevant subjects (biological context & physical/technical aspects) sufficiently covered?
- A mechanical copy of existing material is not acceptable.

Programme and methodology.

- The programme should be concise and logical.
- Is the proposed work's relationship to other work in the literature clear?
- Aims and methodology should be clearly justified.
- Is the choice of methodology clear and is it justified?
- Is the diagrammatic workplan aligned with the text, and is it showing realistic timelines.

Relevance to Beneficiaries

- Are the main beneficiaries of the proposed work being identified?
- Are the mechanisms and pathways to create impact appropriate?

The Department and College take plagiarism very seriously. Do not plagiarise. You must read and comply with the Chemistry Department Policy on Plagiarism:

<http://www3.imperial.ac.uk/chemistry/teaching/undergraduateteaching/materials/plagiarism>

A copy of the Plagiarism Form should be submitted with your Literature Report.

Any evidence of plagiarism will have serious consequences according to College rules.

MRes Proposal Assessment Form

Imperial College London – The Institute of Chemical Biology

MRes in Chemical Biology 2014/15

Student:

Supervisors:

Title :

Marker:

		Supervisor (Bio)	Supervisor (Phys)	Independent
Written style and Presentation Presentation Conciseness Clarity	/30			
Background information Command/completeness of literature Critical evaluation	/30			
Programme and methodology Choice of methods Justified objectives Realistic time lines	/25			
Relevance to Beneficiaries Appropriate mechanism Realistic impacts	/15			
Total	/100			

Comments on project report (justify your mark taking into account the attached marking criteria):

MRes in Chemical Biology

Criteria for Assessment of MRes Research Proposal

Account is taken of the nature of the work proposed, critical analysis of the relevant literature, the proposed work and what is reasonably achievable in the timescale of the course.

Percentage Grade	Criteria
85-100	Exceptional. Outstanding analysis of the relevant literature and methodology showing a standard equal to successful research council grants in depth and content. Evidence of originality, high critical/analytical ability.** Competent assessment of the limitations of the proposed research and the relevance and impact of the proposed research (putting the work in context).
70-84	Excellent. As for Exceptional, but not fully achieving one of them.
60-69	Very Good. Complete and accurate presentation of the literature, experimental procedures and proposed work, showing a clear understanding of the methodology. Demonstrates critical/analytical ability** including an assessment of the limitations of the proposed work and the relevance of the research.
55-59	Good. Accurate account and presentation of most of the background, experimental procedures and proposed work. Demonstrates critical/analytical ability** including an assessment of the potential limitations of the proposed work and the relevance of the research, but has significant errors of interpretation.
50-54	Adequate. Basic account and presentation of the background, experimental procedures and proposed research. Demonstrates some critical/analytical ability** including an assessment of the significance of the research, but has major errors or omissions.
35-49	Unsatisfactory. Confused and incomplete account of the background, experimental procedures and proposed work. Presence of errors of interpretation or factual mistakes.
20-34	Vague and seriously inadequate account and presentation of the proposed work with substantial omissions and errors. Very poor review of relevant literature.
10-19	Mainly incorrect and incompetent background information and research proposal demonstrating only few relevant thoughts.
1-9	Incorrect and incompetent literature survey and research proposal containing nothing of relevance.
0	Work not handed in. Mark given where the work presented is discovered not to be that of the candidate (plagiarised). Further disciplinary action is usually taken in cases of plagiarism.

** *Analytical* = assessing a hypothesis or statement by breaking it down into its elements and examining their inter-relationships and contribution to the whole; cf. *Critical* = judging a hypothesis or conclusion by examining the validity of the evidence adduced for it.

**Imperial College London – The Institute of Chemical Biology
Research Student Assessment: MRes Mid-Project Progress Report Form
MRes in Chemical Biology 2014/15**

Student name:
Project Title:
Supervisors:
Date:

Evaluation to be completed by the Supervisor (*please circle as appropriate, if starred response please give details/agreed action in space provided*)

Attendance:	Excellent / good / satisfactory / unsatisfactory*
Commitment:	Excellent / good / satisfactory / unsatisfactory*
Awareness of Literature:	Excellent / good / satisfactory / unsatisfactory*
Presentation skills (written and oral):	Excellent / good / satisfactory / unsatisfactory*
Overall Progress:	Excellent / good / satisfactory / unsatisfactory*

Supervisor's comments on project progress to date. Please highlight any successes and problems and comment on the agreed targets for the second half of the project (please continue overleaf if required).

Student's General Comments, including identification of any issues which need to be addressed (please continue overleaf if required).

Student's signature

Date

Supervisor's signature

Date

**Please return completed form to Dr. Mike Ray, Rm 258, Chemistry, South Kensington campus,
Imperial College London**

**Imperial College London – The Institute of Chemical Biology
MRes Mid-Project Progress Report Form - Student Evaluation
(To be completed with Personal Tutor)
MRes in Chemical Biology 2014/15**

Name:
Project Title:
Supervisors:
Personal Tutor:
Date:

Evaluation to be completed by the Student (*please circle as appropriate, if starred response please give details/agreed action in space provided*)

Quality of Supervision: Excellent / good / satisfactory / unsatisfactory*
Overall Project Progress to date: Excellent / good / satisfactory / unsatisfactory*

Please highlight successes/problems encountered during the project to date, and detail any changes made to the research plan in light of these. Use this opportunity to identify any issues which need to be addressed in the coming weeks/months.

Student's signature Date

Personal Tutor's signature Date

**Please return completed form to Dr. Mike Ray, Rm 258, Chemistry, South Kensington campus,
Imperial College London**

MRes in Chemical Biology

Research Manuscript Guidelines

Please read all the following guidelines carefully.

The following should be submitted on or before 14:00 Monday 30th August 2015.

- One bound copy of your MRes Manuscript (Including the supplementary information). Graphics should be included within the text.
- A covering letter, including a justification of the importance of the work.
- One signed Plagiarism Form.
- An electronic copy of your manuscript (PDF) sent via email to the MRes programme coordinator.
- An electronic copy of your manuscript (in Word format) uploaded onto Blackboard virtual learning environment.

Manuscript format

The manuscript should report your MRes project research achievements (both positive and negative). It should be written using a template that will be emailed to you separately. The template defines the font sizes and styles as well as the line spacing. Please do not alter this.

The manuscript should have a minimum word count of 6000 words and should not exceed 12000. Supplementary information may be included, and should not exceed a word count of 6000 words. Supplementary information may be provided in a free form format that you consider best suited to the data presented.

You should include a covering letter that gives a justification of the importance and impact of the work. This should not exceed one page in length.

Note that you are expected to consult your supervisors for advice on preparing your research manuscript; your supervisors and their groups have long experience of preparing papers for publication, so take advantage of their expertise early in the process. You have read many papers during your MRes to date, so you should be very familiar with the overall format and style expected in a good paper.

The manuscript should include the following sections (further divided into subheadings wherever needed to enhance readability):

Title

The manuscript should have a concise title directed at the general reader. Please note that abbreviations in the title should be avoided.

Author names

As author of this manuscript, you should be the first author listed. Full names should be given. Please also list your supervisors as the co-authors.

Abstract

The paper must include an abstract which is a summary (50-350 words) setting out briefly and clearly the main objects and results of the work; it should give the reader a clear idea of what has been achieved. The summary should be essentially independent of the main text; however, names, partial names or linear formulae of compounds may be accompanied by the numbers referring to the corresponding displayed formulae in the body of the text. Please do not cite references in the abstract.

Keywords

You should list three to ten keywords representing the main content of the article.

Introduction

This should give clearly and briefly, with relevant references, both the nature of the problem under investigation and its background.

Results and Discussion

It is usual for the results to be presented first, followed by a discussion of their significance. You are marked both on the clarity and conciseness of your report. Therefore only relevant results should be presented and figures, tables, and equations should be used for purposes of clarity. This can include the use of flow diagrams and reaction schemes. Supporting information and data should be included in the supplementary section of your submission.

Conclusion

This section should state the main conclusions of your research project, and give a clear explanation of their importance and relevance. It should be used to highlight the novelty and significance of the work and how it sits relative to the state of the art in the field.

Experimental

Descriptions of experiments should be given in detail sufficient to enable experienced experimental workers to repeat them.

Descriptions of established procedures are unnecessary. Standard techniques and methods used throughout the work should be stated at the beginning of the section. Apparatus should be described only if it is non-standard; commercially available instruments are referred to by their stock numbers (e.g. Perkin-Elmer 457 or Varian HA-100 spectrometers). The accuracy of primary measurements should be stated.

Acknowledgements

Contributors other than co-authors (i.e. supervisors) may be acknowledged in a separate paragraph at the end of the paper; acknowledgements should be as brief as possible. All sources of funding should be declared.

Bibliographic references and notes

These should be listed at the end of the manuscript in numerical order.

Details regarding the format of the bibliography are given below. Note that the names of journals or their abbreviations should be written in italics.

Style and presentation

Brevity

Your manuscript should be written clearly and concisely. Repetition or embellishment with unnecessary words or phrases should be avoided. Excessive use of diagrams and duplication of data in text, tables and figures is discouraged.

Grammar and spelling

Standard English or American spelling may be used but consistency should be maintained throughout the document.

Abbreviations

The use of common or standard abbreviations is encouraged. If non-standard abbreviations must be used these should be defined at the first use.

Illustration and figures

Preparation of graphics

Graphics to be embedded in the manuscript should fit within either single column (8.3 cm) or double column (17.1 cm) width, and must be no longer than one page.

- Schemes and structures should be drawn to make best use of single and double column widths. Lettering used in graphics should be legible at the required size (e.g. 7 point Arial font or Helvetica if Arial is unavailable)

- The format of units in graphics should conform to IUPAC convention and be consistent with those used in the paper
- Insets in images should be avoided where possible. However, if insets are used there is no need to shrink down the size of the text, axes labels and symbols in the inset. These should be the same size as in the main graph so that they are readable.

Chemical Structures

Structural formulae should ideally be prepared with chemistry drawing software (e.g. ChemDraw, ChemWindows, ISIS/Draw).

Figure Legends

Figure legends should be included underneath each figure. Each legend should include a figure number (in sequence using Arabic numerals i.e. Figure 1, 2, 3 etc); short title of the figure (maximum 15 words); detailed legend, up to 300 words.

Tables and Table legends

Each table should be numbered and cited in sequence using Arabic numerals (i.e. Table 1, 2, 3 etc). Tables should have a title (above the table) that summarises the whole table; it should be no longer than 15 words). Detailed legends may then follow, but should be concise.

Bibliographic references

You are assessed on your command of the literature. Therefore you should ensure that you adequately cite the relevant literature throughout your manuscript. Around 50 references might be expected for a manuscript of this length, with further references included in the supplemental data.

You are required to make use of reference managing software (e.g. EndNote) to standardise your bibliography. All references must be numbered consecutively, in brackets, in the order in which they are cited in the text (including those in tables and figure captions, which should be numbered according to where the table or figure is designated to appear).

The references themselves should be listed at the end of the text, as indicated in the template. The names and initials of all authors are always given in the reference; they must not be replaced by the phrase *et al.* Examples of the manuscript reference style are given below, and must be adhered to.

Journals

The style of journal abbreviations to be used here is as defined in Chemical Abstracts Service Source Index (CASSI). See <http://www.cas.org/expertise/cascontent/caplus/corejournals.html>

If you cannot locate an authoritative abbreviation for a journal, and if it is not obvious how the title should be abbreviated, please cite the full title.

Bibliographic details should be cited in the order: year, volume, page. Where page numbers are not yet known, articles should be cited by DOI (Digital Object Identifier), e.g. A. R.

Jones, *Dalton Trans.*, 2005, DOI: 10.1039/B503459J.

Article within a journal

Koonin EV, Altschul SF, Bork P., *Nat Genet* 1996, 13: 266-267

Books

J. Barker, in *Catalyst Deactivation*, ed. B. Delmon and C. Froment, Elsevier, Amsterdam, 2nd edn., 1987, vol. 1, ch. 4, pp. 253-255.

Patents

Br. Pat., 357 450, 1986. *US Pat.*, 1 171 230, 1990.

Reports and bulletins, etc.

R. A. Allen, D. B. Smith and J. E. Hiscott, *Radioisotope Data*, UKAEA Research Group Report AERE-R 2938, H.M.S.O., London, 1961.

Material presented at meetings

H. C. Freeman, Proceedings of the 21st International Conference on Coordination Chemistry, Toulouse, 1980.

Theses

A. D. Mount, Ph.D. Thesis, University of London, 1977.

Reference to unpublished material

For material presented at a meeting, congress or before a society, etc. but not published, the following form is used: A. R. Jones, presented in part at the 28th Congress of the International Union of Pure and Applied Chemistry, Vancouver, August 2001.

For material accepted for publication, but not yet published, the following form is used: A. R. Jones, *Angew. Chem.*, in press.

For material submitted for publication but not yet accepted the following form is used: A. R. Jones, *Angew. Chem.*, submitted.

For personal communications the following is used: G. B. Ball, personal communication.

Footnotes

Footnotes may be used to present material which, if included in the body of the text, would disrupt the flow of the argument but which is, nevertheless, of importance in qualifying or amplifying the textual material. Footnotes are referred to with the following symbols: †, ‡, §, ¶, || etc.

Please note that any material exceeding the conciseness of a footnote, but which is relevant to the manuscript conclusions should be placed in the supplementary material.

Supplementary Data

The Supplementary Information should be included to enhance and increase the impact of your manuscript. Additional material, such as repetitive experimental details and bulky data, may be included. Note that there is a word limit for this section, which should not exceed 6000 words (this includes text in the figure captions). The supplementary data can be presented using the manuscript style set by the template (two column format) or any other format that is suitable to accommodate the data that you wish to present.

Research Manuscript Assessment Form

Imperial College London – The Institute of Chemical Biology

MRes in Chemical Biology 2014/15

Student:

Supervisors:

Independent Marker:

Title:

Marker:

Mark (% only) for project report:

Comments on project report (justify your mark taking into account the attached marking criteria):

Research Manuscript Assessment Form (cont)

Break down of Marks:

	Supervisor (one)	Supervisor (two)	Independent
Scientific Rigor Experiments support claims Methods are appropriate Methods well explained	/30	/30	/30
Scientific Understanding Command of literature Critical discussion	/30	/30	/30
Written Style Presentation Conciseness Clarity	Not required	Not required	/40
Endeavour and Evidence of independent working	/40	/40	Not required
Total	/100	/100	/100

Signed:

Date:

Imperial College London – The Institute of Chemical Biology

MRes in Chemical Biology

Criteria for Assessment of Research Manuscript

Account is taken of the nature of the work, endeavour in the laboratory, the instructions provided and what is reasonably achievable.

Percentage Grade	Criteria
85-100	Exceptional. Outstanding presentation of results showing publishing standard in quality and quantity. Evidence of originality, high critical/analytical ability **, substantial outside reading and independent work effort. Competent assessment of the limitations of the experimental procedures and the significance of results.
70-84	Excellent. As for Exceptional, but not fully achieving one of them.
60-69	Very Good. Accurate account and presentation of results and experimental procedures showing a clear understanding of the background by providing evidence of sufficient outside reading. Demonstrates critical/analytical ability** including an assessment of the limitations of the experimental procedures and the significance of results. Good effort and some evidence of independent working.
55-59	Good. Accurate account and presentation of most of the background, experimental procedures and results. Demonstrates critical/analytical ability** including an assessment of the limitations of the experimental procedures and the significance of results, but has significant errors of interpretation. Significant work effort.
50-54	Adequate. Basic account and presentation of the background, experimental procedures and results. Demonstrates some critical/analytical ability** including an assessment of the significance of results, but has major errors or omissions.
35-49	Unsatisfactory. Confused and incomplete account of the background, experimental procedures and results marred by substantial errors or omissions.
20-34	Vague and seriously inadequate account of the experiments with substantial omissions and errors.
10-19	Mainly incorrect and incompetent account and presentation of experimental work demonstrating only few relevant thoughts.
1-9	Incorrect and incompetent account of experimental work containing nothing of relevance
0	Experiment not attempted or work not handed in. Mark given where the work presented is discovered not to be that of the candidate (plagiarised). Further disciplinary action is usually taken in cases of plagiarism.

** *Analytical* = assessing a hypothesis or statement by breaking it down into its elements and examining their inter-relationships and contribution to the whole; cf. *Critical* = judging a hypothesis or conclusion by examining the validity of the evidence adduced for it.

**Imperial College London – The Institute of Chemical Biology
MRes in Chemical Biology**

Criteria for Assessment of oral examination performance

Account is taken of the nature of the work, endeavour in the laboratory, the instructions provided and what is reasonably achievable. **The independent marker should take the lead in the oral examination.**

Percentage Grade	Criteria
85-100	Exceptional. Outstanding presentation of results showing publishing standard in quality and quantity. Evidence of originality, high critical/analytical ability ** and substantial outside reading. Competent assessment of the limitations of the experimental procedures and the significance of results.
70-84	Excellent. As for Exceptional, but not fully achieving one of them.
60-69	Very Good. Complete and accurate presentation of results and experimental procedures showing a clear understanding of the background by providing evidence of sufficient outside reading. Demonstrates critical/analytical ability** including an assessment of the limitations of the experimental procedures and the significance of results.
55-59	Good. Accurate account of most of the background, experimental procedures and results. Demonstrates critical/analytical ability** including an assessment of the limitations of the experimental procedures and the significance of results, but has significant errors of interpretation.
50-54	Adequate. Basic account of the background, experimental procedures and results. Demonstrates some critical/analytical ability** including an assessment of the significance of results, but has major errors or omissions.
35-49	Unsatisfactory. Confused and incomplete account of the background, experimental procedures and results marred by substantial errors or omissions.
20-34	Vague and seriously inadequate account of the experiments with substantial omissions and errors.
10-19	Mainly incorrect and incompetent account of experimental work demonstrating only few relevant thoughts.
1-9	Incorrect and incompetent account of experimental work containing nothing of relevance
0	Experiment not attempted or work not handed in. Mark given where the work presented is discovered not to be that of the candidate (plagiarised). Further disciplinary action is usually taken in cases of plagiarism.

** *Analytical* = assessing a hypothesis or statement by breaking it down into its elements and examining their inter-relationships and contribution to the whole; cf. *Critical* = judging a hypothesis or conclusion by examining the validity of the evidence adduced for it.

MRes Conference Presentation Assessment Form

Imperial College London – The Institute of Chemical Biology

MRes in Chemical Biology 2014/15

Student:
Supervisors:
External Examiner:
Title:

<u>ASSESSMENT CRITERIA</u>	<u>MARKS</u>	<u>COMMENTS</u>
Visual Impact and organisation	/20	
clarity of message	/20	
scientific understanding	/30	
verbal presentation	/30	
Total	/100	

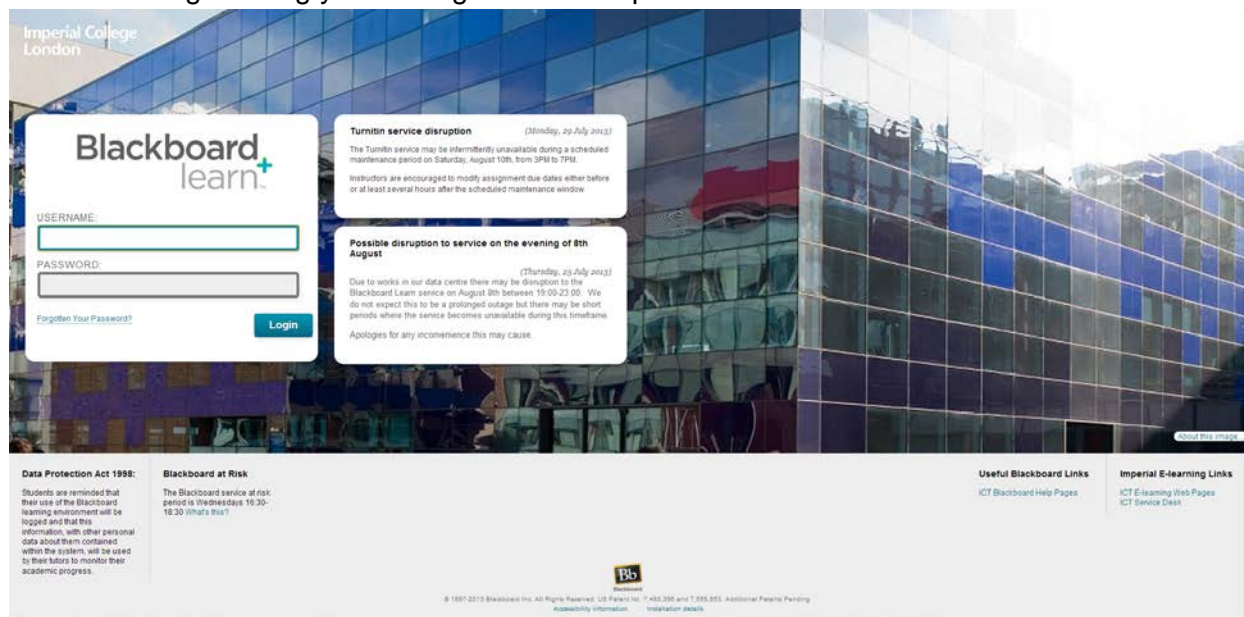
Imperial College London – The Institute of Chemical Biology
MRes in Chemical Biology

Criteria for Assessment of MRes conference presentation performance

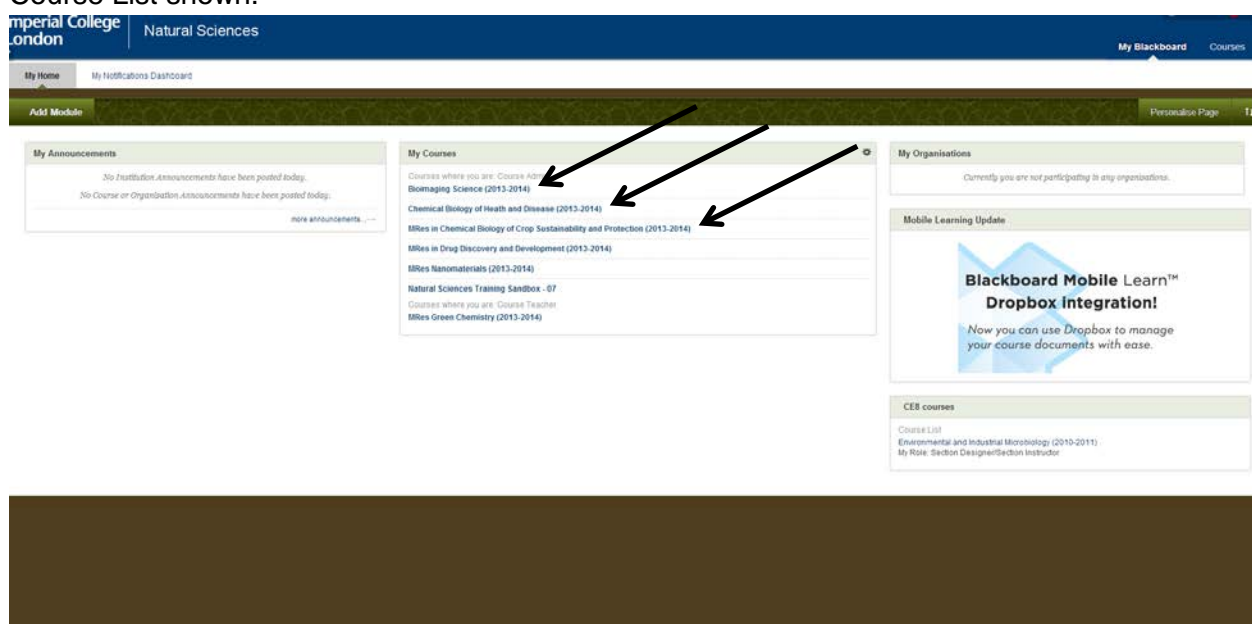
Percentage Grade	Criteria
85-100	Exceptional. Presentation is comprehensive and well structured, displays an excellent understanding of the relevant concepts and facts and contains exceptional detail.
70-84	Excellent. Presentation gives an accurate account of all the main points, displays a clear understanding of the material and includes a high level of detail.
60-69	Very Good. Presentation gives an accurate account of all the main points and displays a clear understanding of the material, but is slightly flawed in organisation or detail.
55-59	Good. Presentation shows a clear grasp of relevant concepts and facts and gives a mainly accurate account of the main points and their significance, but lacks detail.
50-54	Adequate. Presentation shows a grasp of the basic concepts and facts and (ii) includes the major points, but (iii) does not go beyond that, or goes beyond that but is then marred by significant errors or flawed organisation
35-49	Fail. Presentation shows a relatively weak grasp of the subject and (ii) is marred by major errors or brevity, but (iii) by presenting at least a third of the material expected,
20-34	Fail shows a confused understanding of the question, and (ii) presents less than a third of a material expected.
10-19	Fail. Presentation is too inaccurate, too irrelevant, or too brief to indicate more than a vague understanding of the question and (ii) presents, at most, only about a quarter of the material expected
1-9	Fail. Presentation contains only two or three concepts or facts that are correct and relevant.
0	Fail. Presentation contains nothing correct that is relevant. Mark given where the work presented is discovered not to be that of the candidate (plagiarised). Further disciplinary action is usually taken in cases of plagiarism.

Instructions on submitting your Literature Report or MRes Manuscript on Blackboard Learn

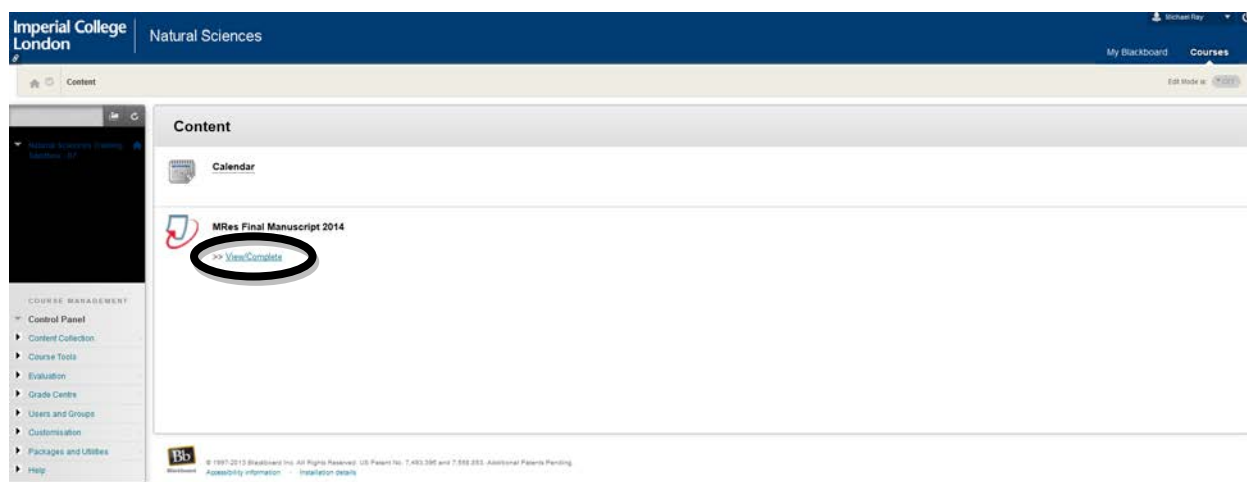
1. Go to Blackboard Virtual Learning Environment homepage <https://bb.imperial.ac.uk> and log in using your College username/password



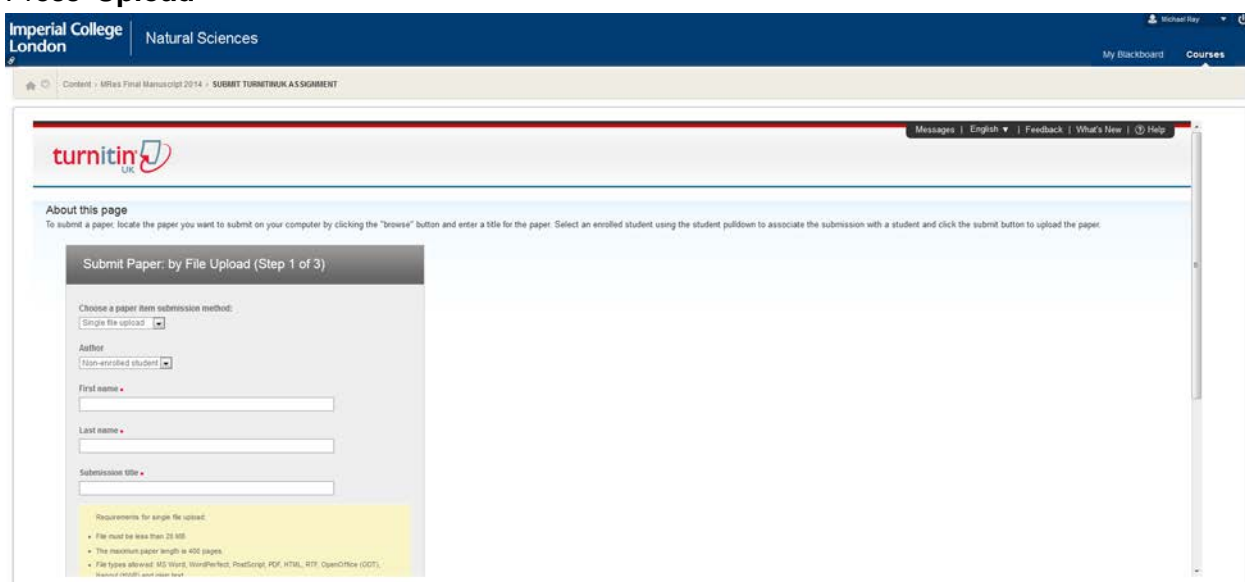
2. Select your MRes course, i.e **Chemical Biology of Heath & Disease** from the Course List shown.



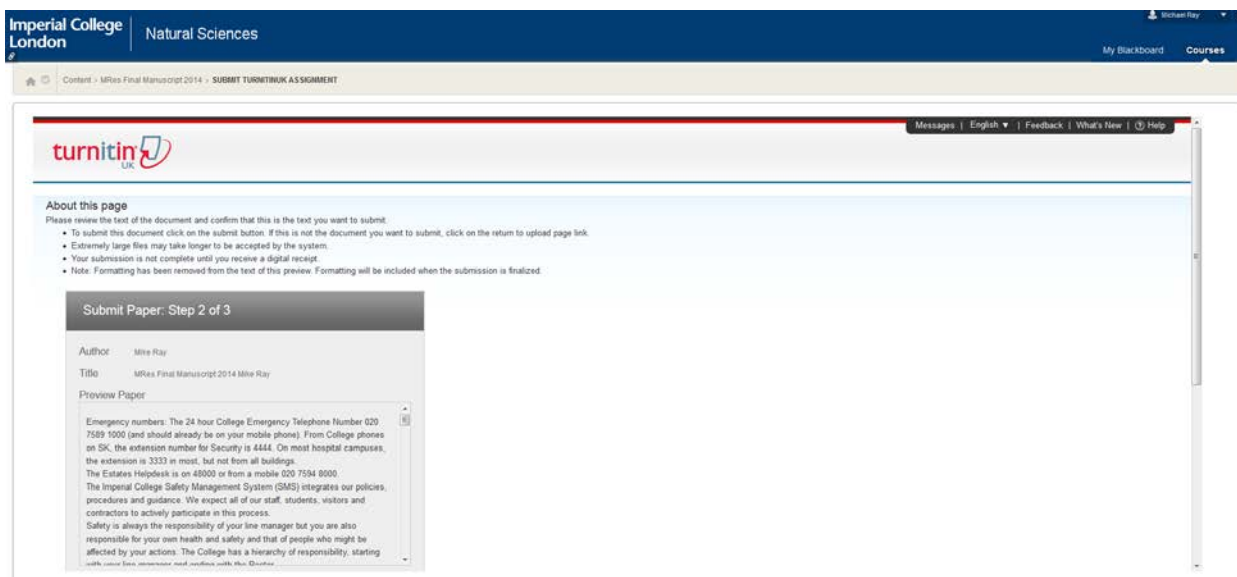
3. Select **Course Content** and left click the **view/complete** link (**circled**) for the report you need to submit, in this example **MRes final manuscript 2014**. This will take you to 'Turnitin UK'.



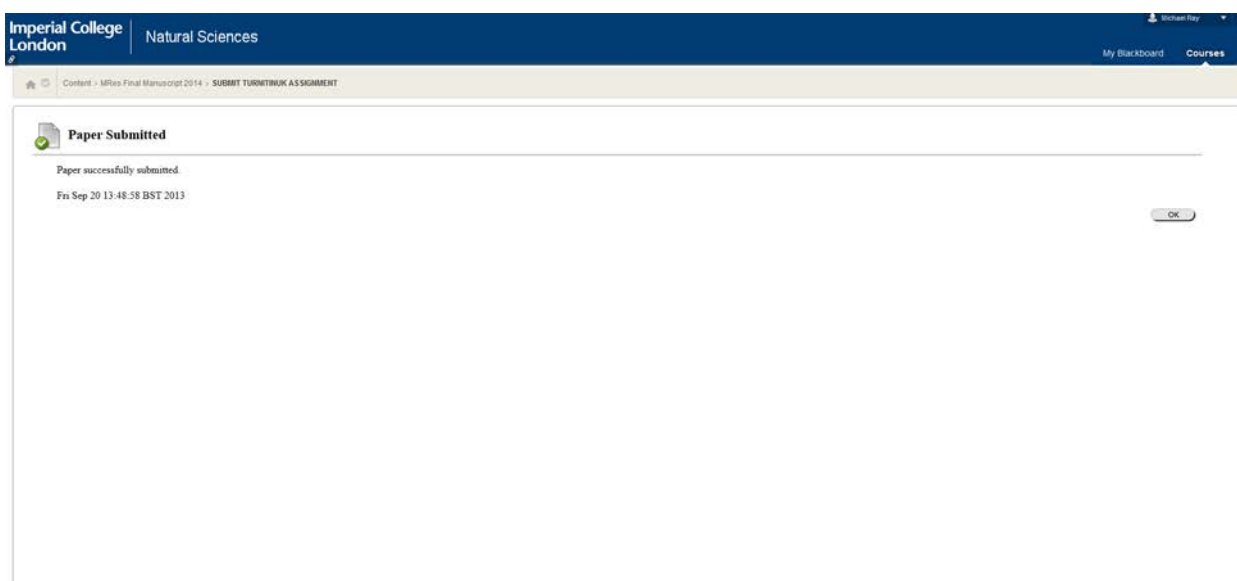
4. Ensure **'single file upload'** is selected under "Choose a paper submission method".
Enter your **'first and last name'**
Enter the **'submission title'** – this is your Literature Report or Manuscript Title
Select **'Browse'** and locate your Manuscript and select it
Press **'Upload'**



5. Press 'submit' once your report has been uploaded onto the system.



6. You will receive a notification if the document has been successfully submitted.



7. You can now log out of Blackboard.

Please read this carefully. You will be required to submit a signed copy of this form along with your Literature report and Manuscript.

The Institute of Chemical Biology, Department of Chemistry, Imperial College – Plagiarism Policy

The institute of Chemical Biology, Department of Chemistry, and College take plagiarism very seriously. All work submitted as part of the requirements for any examination (including coursework) of Imperial College London must be expressed in your own words and incorporate your own ideas and judgments.

Plagiarism is the presentation of another person's thoughts, words or graphics/art work as though they were your own. This includes e.g. copying text, figures, schemes and graphs from another source such as a book, an academic article/paper or the internet without acknowledging it explicitly. Plagiarism must be avoided, with particular care in coursework, essays and reports written in your own time. Note that you are encouraged to read and criticise the work of others as much as possible. You are expected to incorporate this in your thinking and in your coursework and assessments. But you must acknowledge and label/cite your sources.

Direct quotations (*i.e.* anything that is "copy-pasted") from the published or unpublished work of others, from the internet, or from any other source must always be clearly identified as such. A full reference to their source must be provided in the proper form and quotation marks used. This means you must provide the reference directly after information is given and, in the case of figures/schemes/graphs indicate explicitly in the caption that this has been taken from the literature: e.g. "Figure taken from ref. X" or "Scheme adapted from ref. Y". Remember that a series of short quotations from several different sources, if not clearly identified as such, constitutes plagiarism just as much as a single unacknowledged long quotation from a single source. Equally, if you summarise another person's ideas or judgments, figures, diagrams or software, you must refer to that person in your text (and in the case of figures/schemes/graphs in the caption of the corresponding graphic), and include the work referred to in your bibliography/reference list. Please see 'addendum 3' (below, '*How to correctly reference material*') for examples of how to correctly reference material. If in doubt, ask for advice from academic staff in the Department about the appropriate use and correct acknowledgement of other sources in your own work.

The direct and unacknowledged repetition of your own work which has already been submitted for assessment can constitute self-plagiarism (see also 'addendum 1': '*Plagiarism in the context of MRes Research Reports*', below). Where group work is submitted, this should be presented in an approved manner. You should therefore consult the supervisor of the group assignment, your tutor or another member of academic staff if you are in any doubt about what is permissible. You should be aware that you have a collective responsibility for the integrity of group work submitted for assessment.

The use of the work of another student, past or present, constitutes plagiarism. Where work is used without the consent of that student, this will normally be regarded as a major offence of plagiarism.

Plagiarism will not be tolerated in the Department and if it is detected in a student's work presented for assessment, it will be reported, together with the evidence, to the course directors, the Director and Co-directors of the DTC and the Director of Postgraduate Studies who will take appropriate action which may result in an allegation of plagiarism/cheating. Cases of suspected plagiarism/cheating will be dealt with by the College Registry under the College's Examination Offences Policy. The penalty for proven cases can vary from loss of marks to expulsion from the College.

NB. This policy is adapted from the Imperial College Student Handbook:
<http://www3.imperial.ac.uk/studenthandbook/advice/plagiarism/> (accessed 15.07.2010).

ADDENDUM 1: *Plagiarism in the Context of MRes Research Manuscripts:*

We recognise that your *Introduction* and *Aims and Objectives* sections may have substantial overlap in terms of content with your Research Proposal. Consequently, for these sections, a reasonably lenient threshold for self-plagiarism (which will be picked up by the electronic plagiarism scans that we perform on both documents, see later) will be allowed (e.g. some identical sentences and paragraph constructions). However, wholesale verbatim transcription of multiple paragraphs should be avoided. If you think this is necessary then place the relevant text in inverted commas and insert a reference to your Research Proposal. In general, it is expected that your understanding of the project will have matured substantially during the course of the year and that such verbatim transcription will not be appropriate.

ADDENDUM 2: *How to Correctly Reference Material*

In a research publication or reference work you will almost always find a bibliography/reference section included. The aim of this is three fold, to act as a source of background information for the interested reader, to provide original sources for specific pieces of information vital to your scientific case, and to acknowledge the efforts of others on whom you have drawn for ideas and inspiration. The most usual way of referencing a paper, book, figure or quotation in the text is to use a superscript number,¹ or number in parenthesis [1], or an author name in parenthesis (Spivey, 2001), clearly associated with the item you want to reference. The first mentioned convention (*i.e.* using superscripted numbers) is employed in most chemistry journals and is illustrated below, but this varies with academic discipline. If you select 'RSC style' within the reference manager Endnote then the superscripted number style of referencing will be implemented automatically. In the bibliography/reference section you must then give the full source. The source should be completely specified such that it can be located without ambiguity by the reader. Therefore, the bibliography should generally contain static references such as journal papers and books; citing dynamic reference sources such as websites is discouraged as they may disappear.

If you need to cite material from a website and you cannot trace the primary source, then you should quote text directly from the website, using quotation marks around the text in question. The text must then be referenced, in the manner indicated above, to the full website URL with the date on which you viewed it indicated in parenthesis. Similarly, if you copy figures from the web, you must clearly state so in the figure caption and this should also be referenced, in the manner indicated above, to the full website URL with the date on which you viewed it indicated in parenthesis.

Always ensure that you make it clear where your work stops, and copied material starts, and that you give a sufficiently detailed reference to allow the source to be identified clearly and uniquely.

Useful additional College sources of information re-Plagiarism see:

Department of Physics:

<http://www3.imperial.ac.uk/physics/students/ug/info/guidance/>

I have read and understood the above and am willing for the Course Directors to submit any piece of my work to the TurnitinUK Plagiarism Detection Service.

Signed.....Date.....

Print Name.....