Imperial College London

Department of Life Sciences

Biochemistry/Biotechnology 2nd Year Guidebook

2018-19

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2nd Year Aims and Objectives

The second year of study for the Biochemistry and Biotechnology degrees is designed to consolidate and build upon knowledge gained in the first year. By the end of the second year you should have achieved a good grounding in what we consider to be core Biochemistry. This will prepare and inform you for the optional courses to be taken in the final year, or for the placement year. The second year courses cover subjects of great significance to present day biochemists and biotechnologists and the practicals provide training in techniques that are commonly used in research laboratories. Besides achieving an understanding in depth of fundamental biochemical concepts, students will be expected to develop a critical approach to the experimental basis of biochemical knowledge. Furthermore, through coursework, students will be expected to enhance their personal skills. Independent study forms a key component of learning in the second year. You will be expected to read more widely around the lecture material and this should be reflected in the work you submit for assessment. To facilitate independent study skills you will also be undertaking a tutored dissertation during the Autumn and Spring terms. This will provide experience of researching literature and also preparing a detailed report in preparation for completing the final year project report.

Students take 5 courses in Biochemistry/Biotechnology, the Tutored Dissertation and the supplementary course. Biotechnology degree students must study the Topics in Biotechnology course option as it is a compulsory component of their degree.

Your performance in the final year will depend on knowledge gained in your first and second years. Also, you should note that the overall mark for your first and second year assessments will be used directly to calculate a mark for your overall degree.

Qualification for Entry into the Final Year

All courses must be passed for a student to proceed to the final year. Students who fail will be allowed to take re-sit examinations in September. Please remember that students must pass both the coursework and the examination to pass any particular course.

Tutored Dissertation

The aim of the tutored dissertation is to provide you with experience of evaluating primary research literature sources. You will be provided with a list of subject options to choose from and when the topic has been allocated you will have a series of tutorial sessions with a tutor. These will provide an opportunity for discussion and guidance from the tutor to enable you to develop your dissertation. The tutored dissertation will provide important transferable skills in literature research and writing reviews. It will expand the detailed knowledge of a cutting edge area of biochemistry or biotechnology and enable you to become familiar with a more research-focused style of teaching and learning ready for the final year courses. It will help you to develop confidence in reading and interpreting the primary research literature and the skills to make full use of appropriate reference. It will improve your critical analysis and science communication skills as well as your ability to work effectively individually and in teams.

Term	Wk	Second Year BIOCHEM/BIOTECH Grid			
Autumn	1	Genes & Genomics. Derek Huntley	Fundamentals of Molecular Biochemistry Alfonso De Simone		01/10/2018
	2				08/10/2018
	3				15/10/2018
	4				22/10/2018
	5				29/10/2018
	6				05/11/2018
	7				12/11/2018
	8				19/11/2018
	9				26/11/2018
	10				03/12/2018
	11				10/12/2018
		Christmas Vacation			17/12/2018
	14	Revision			07/01/2019
Spring	15	Exams (G&G, FMB)			14/01/2019
	16	Integrative Cell Biology. Anita Hall	Protein Science. Stuart Haslam	TUTORED DISSERTATION	21/01/2019
	17				28/01/2019
	18				04/02/2019
	19				11/02/2019
	20			4 TD Meetings over term	18/02/2019
	21				25/02/2019
	22				04/03/2019
	23			Submit start of Summer Term	11/03/2019
	24				18/03/2019
		Easter Vacation			25/03/2019
Summer	30	Challenges in Cell Biology. Gerald Larrouy-Maumus	Applied Molecular Biochemistry. Thomas Meier	Topics in Biotechnology. John Heap	29/04/2019
	31				06/05/2019
	32				13/05/2019
	33				20/05/2019
	34	REVISION			27/05/2019
	35	REVISION			03/06/2019
	36	REVISION/EXAMS			10/06/2019
	37	EXAMS (ICB, PS, Option)			17/06/2019
	38				24/06/2019

Supplementary Course

All second year students must take a mandatory supplementary course. This can either be a Horizons course or a BPES course. Students will decide which course they wish to take, and apply via the relevant departments. We strongly advise that you apply for courses that suit your timetable.

Horizons Programme

The Centre for Co-Curricular Studies provides Horizons/Humanities courses that offer you the opportunity to study subjects, which can make important contributions to your general education. The courses aim to give you practice in ways of thinking about human affairs and creative activity that are not always amenable to the quantitative techniques of science and technology.

Language courses are designed to enable you to understand, speak, read and write in a foreign language (either extending your ability in a language you have learnt before, or introducing you to a new language). In the more advanced courses you will be introduced to scientific and technical forms of the language, and there is also some study of the modern culture, history and institutions of the country or countries involved.

http://www.imperial.ac.uk/horizons/course-options/second-year-undergraduates/

Business School Programme

As an alternative to the above, the Imperial College Business School's Business for Professional Engineers and Scientists (BPES) Programme provides engineering and science undergraduate students with the opportunity to learn about business and management. A number of these courses are available to you. However, the timetable for each course below differs and can only be undertaken if they are scheduled between 1200h and 1400h to fit in with Biochemistry teaching. Entry is in competition with all college students and you should have superior quantitative skills before considering an application.

http://wwwf.imperial.ac.uk/business-school/programmes/undergraduate-study/bpes-programme/

Genes and Genomics

Convenor: Dr Derek Huntley
Course Aims:
The course aims to achieve the objectives by providing a detailed explanation of each topic with suitable examples. Knowledge of the latest understanding of gene and genome structure and developments in genome manipulation and genomics is key to understanding how the genome is maintained and controlled. The course aims to provide this knowledge, which can then be built on in later courses, to provide deeper insight or to guide experimental manipulation of the whole genome or individual genes. The course will also include an introduction to statistics, with lectures and practicals, to provide the skills to determine the significance of genome manipulation experiments
The lectures aim to present the fundamental areas of each topic and include the incorporation of important new ideas that aim to expand your experience of molecular biology.

Course Objectives:
The course will build upon the fundamental molecular biology taught on the first year Molecular Biology (MB) course. The course will build on this knowledge whilst drawing upon advances in genomic technology and also reinforcing key concepts. The course will introduce some new areas that aims to both develop your interests and prime you for the final year where some of you may want to pursue molecular biology-related topics in more depth. On completing the course students should have an understanding of DNA and gene structure and the increasing complexity of gene structure from prokaryotes to eukaryotes. Students should also be able to explain, in relation to this, how genes are transcribed and translated. Students will also have an understanding of the practical applications of genome manipulation and theoretical knowledge of how a genome can be exploited to functionally dissect the role of each gene, even in a complex organism. Finally, students will have knowledge of the current techniques and understanding of the field of genomics, including sequencing and its applications.

Course Content:
Lectures on the course will cover the structure of DNA the genome and genes and expand on previous knowledge of transcription. There will also be lectures on manipulating genes and genomes experimentally and finally the field of genomics will be presented. The practicals will provide experience of analysing clone genes as well as interrogating and searching online genomic resources. There will also be an introduction to statistics, including practicals to gain experience of using R. The tutorial sessions will include a problem based learning task where a topic is researched and presented to the rest of the group. This will develop communication skills, particularly in presenting material concisely both orally and in presentation slides.

Lectures 29
Practicals
2 statistics (unassessed)
1 wet lab (assessed)
1 computer lab bioinformatics (assessed)

Assessment:
A) Coursework 25%
2 practical reports
1 essay
1 statistics
B) Examination 75%.
MCQ and 3 out of 5 essay questions in three hours.

Key skills acquired:
The course will provide the ability to understand the complexity of the genome environment and how it can be investigated and manipulated. Effective writing and presentation skills will acquired with the practical reports and the problem based learning tutorial.
The practical sessions will provide key wet lab skills, knowledge of statistics and their practical application in R and the use of online resources and tools.

INTEGRATIVE CELL BIOLOGY

Course Aims
ICB will give students an understanding of how molecules, cells and organs are integrated into functional systems. Students should aim to develop a critical, research-based appreciation of the principles of: cell communication (cell-surface receptor proteins and intracellular pathways), neuronal communication and the brain, the key concepts in the cell biology of stem cells, and the constituent components and regulation of physiological processes within the immune system. ICB will build on first year cell biology teaching and complement the other second year courses. It will encourage you to develop your questioning, research, study and communication skills in preparation for final year courses and beyond.

Course Objectives
To show students essential biochemistry in the context of biological systems
To introduce the students to new research areas that they have only had glimpses of in the first year: Cell signalling, Neuroscience, Stem cell biology and Immunology. This will broaden and deepen their Biochemical knowledge and inform their third year course choices.
To teach the students how to work effectively in teams and individually to design, maintain, analyse and report a novel cell biological experiment as well as to give effective oral and poster presentations of Biochemical research material.
To stimulate more engaged and active learning by students and develop critical analysis, reflective learning and self-assessment skills. In summary, if you engage in this course, you'll become more like a researcher (very useful in whatever careers you choose)

Integrative Cell Biology Part 1. Cell to cell communication
The general principles of eukaryotic cell communication and receptor mediated signalling including G-protein-linked signalling, enzyme-linked receptor signalling and cytokine receptor signalling. This section will end with a research-based Lecture on a selected receptor tyrosine kinase, (discoidin domain receptor); this will reinforce taught concepts and allow the students to appreciate the importance of good primary data including appropriate controls.

Integrative Cell Biology Part 2. Neurobiology
Students should understand neuronal communication and the basis of the membrane potential, how sensory information is relayed to the brain (action potentials), and how the brain in turn generates behaviour (e.g. action potentials, movement). They should become familiar with the proteins and molecules involved (e.g. voltage-gated ion channels, ligand-gated ion channels, G-protein coupled receptors, neurotransmitters – acetylcholine, GABA, glutamate, dopamine) and neurotransmission (synapses), and the cellular structures of neurons and their supporting glial cells. Students will learn about long term potentiation as a potential substrate for memory, plasticity and neuromodulation.

Integrative Cell Biology Part 3. Stem cell biology
The principles of cell commitment, lineage and fate. The different types of stem cells and their varying potency. The cell biology of stem cell niches (students choose which stem cell niches we study). The relevance of stem cell biology to regenerative medicine will be introduced.

Integrative Cell Biology Part 4. Immunology
The gross anatomical organisation of the immune system and its constituent components. Receptor-ligand interactions in the immune system and the basis of binding specificities. How immune cells utilise membrane-bound and soluble mediators to communicate with each other, and how events at the cell surface can be transduced to regulate proliferation, differentiation and effector functions.

Course Structure
'4-6 (11 for immunology) Lectures on the themes listed above
3 academic tutorials discussing pre-assigned questions that test and expand material covered in the Cell to cell communication, Neuroscience and Immunology Lectures
1 student-centred 'Journal Club' to discuss recent primary research in Stem cell biology
1 week long laboratory-based cell culture practical involving student team design, analysis and individual reporting of a novel experiment
1 assessed team presentation to develop effective team-working and reinforce understanding of the cell signalling and neuroscience course material
1 assessed team research poster preparation mimicking an Immunology research conference session
Online discussion and learning via a supported ICB course blog
Other optional sessions as appropriate

Assessment
A) Coursework 25% (Individual practical write-up, Research poster preparation and Team presentation, equally weighted)
B) Examination in June 75%
4 essay style answers from 8 questions in a three hour examination. Excellent answers include some or all of the following: clarity of explanation, synthesis across the course/s, analysis, critique, relevant independent outside reading, your own reasoned suggestions.

Key Skills Acquired
Understanding new molecular and cellular biological information from several sources, combining this with what you know already and applying it to new research-based problems.
Further laboratory skills such as making very accurate measurements, sterile technique, aspects of experimental design and the appropriate analysis and recording of results
Successful team working skills and reflective self-assessment
Improved oral communication skills
Improved writing skills and the ability to read primary research material critically

Fundamentals of Molecular Biochemistry

Course Aims - The aim is to provide an understanding by second year undergraduates of the fundamental elements of molecular biochemistry, with particular focus on the structure-function relationship in macromolecules and in sufficient detail to place this knowledge in the context of earlier courses in biochemistry with an outlook to the more advanced topics to be learned in the final year courses.
In particular the course will give students insight into the theory and practice of how protein samples can be expressed, purified and engineered for structural and functional analysis, including how detailed structural information is obtained and how this can be used to facilitate investigation of function at the molecular level.
A central learning objective of the course is to generate the fundamental background elements of mathematics and physics that will play a key role for the learning objectives of FMB and other courses of the second and third year.

Course Objectives - The learning objectives include the understanding of how macromolecular structures (as primary, secondary, tertiary and quaternary level) are generated and exploited, including sample preparation and experimental design to reveal the molecular basis of function.
The course includes an initial learning session of key elements of mathematics and physics, which are essential components of the required background of FMB and other courses in the second and third year.
The course subsequently provides insights into the tools of recombinant protein expression and engineering in different expression system to enable students familiarising with the major techniques for protein purification (including methods for purity analysis) and the major techniques for three-dimensional structure determination: X-ray crystallography, nuclear magnetic resonance spectroscopy and electron microscopy. This structural understanding will be enhanced by instruction on the mechanisms of protein folding in the cell.
Throughout the course the students' understanding of core principles and techniques will be buttressed by examples drawn from current research, which will give insights into their application at the cutting edge of macromolecular science.

Course Content - Building on topics covered in the first year, the course will adopt a combined theoretical (lectures and tutorials) and practical (laboratory and computer practical sessions) approach to the methods and insights of structure and functional analysis of macromolecules, primarily proteins.
Lectures: 39 in total (not including revision and feedback lectures). The lecture material offered on the course is divided into four complementary sections: (1) Fundamentals of mathematics and physics, (2) protein purification and analysis, (3) macromolecular structure determination, (4) protein folding in the cell.
Tutorials: Three teaching sessions in small groups that are aimed at in-depth discussions with tutors.
Practical sessions: five in total, including two computer-based (P1 and P3), two lab-based (P2 and P4) and one interactive problem class with the lecturers (P5).

Assessment:
A) Coursework 25%
6% Mathematics coursework assigned at the lecure L8
7% Protein purification and NMR analysis practical assessment
6% Web-page summarising a structural paper from the literature
6% Protein folding practical assessment
B) Examination 75%. - One three-hour exam paper. Section A contains 25 compulsory MCQs. Section B contains two questions of analytical type problems and section C contains four questions that are more likely to be essay based. Students will answer to the **25 MCQs** from section A, **1 question** from section B and **2 questions** from section C.

Key skills acquired:
The course builds on learning objectives achieved in the first year, including a general understanding of protein structure (primary, secondary, tertiary and quaternary), ability to appreciate the limitations of experimental systems and critically assess data.
The ability to comprehensively present scientific literature is assessed through the web page exercise as well as in written reports of practical sessions P2 and P4.

Protein Science

Convenor: Dr Stuart Haslam
Course Synopses:

Underpinned by knowledge from the 1st year but also building on and expanding on the earlier Fundamentals of Molecular Biochemistry course will allow students to gain a deeper understanding of the structure function relationship of proteins. Students will gain insight of the principles of mass spectrometry, experimental techniques and how it is utilized in defining structure function relationships. They should be able to describe applications of this techniques to biochemical problems, including giving specific examples, and be able to determine which technique is most appropriate to a specific problem. They should be able to conduct analyses of mass spectrometric experimental data. Students should also understand structure-function relationships of specific groups of proteins including enzymes, and those that bind specific ligands. This structural understanding will be enhanced by instruction on protein bioinformatics and protein dynamics.

Course Aims:

The aim of this course is to provide an understanding by second year undergraduates of the relationship between protein structure and function in sufficient detail to place this knowledge in the context of earlier courses in biochemistry and to provide the foundation for the treatment of more advanced topics in the final year. In particular the course aims to give the students insight into how the utilization of advanced analytical techniques can be used to define protein and other biomolecule structure and how this structural insight is used in modern advances in enzymology, protein-ligand interactions and protein dynamics.

Course Assessment:
Including breakdowns in the weightings of assessments
Coursework (25%): MS practical report (15%), Flash presentation (5%), Bioinformatics exercise (5%)
Examination (75%) One 3 hour paper. 25 MCQs; Section A 2 more analytical problem based questions and Section B 2 more essay questions to be answered.

Introductory /Further Reading:
Some indication of Introductory /further course reading helpful – accepting that more will probably be provided by individual lecturers during the course.

Relevant chapters of Berg, Tymoczko and Stryer: Biochemistry (8th ed. 2015), W.H.Freeman & Co Ltd., New York
Relevant chapters of Voet & Voet: Biochemistry (4th ed. 2016), Wiley
Relevant chapters of Lehninger: Principles of Biochemistry (6th ed. 2013), Macmillan
Selected chapters of Branden & Tooze: Introduction to Protein Structure (2nd ed. 1998)
Selected chapters about membranes, membrane proteins and protein structure of Alberts et al.: Molecular Biology of the Cell (6th ed. 2014)
Lesk: Introduction to Protein Science: Architecture, Function, and Genomics", 3rd ed. 2016), Oxford University Press
Fersht: Structure and Mechanism in Protein Science: Guide to Enzyme Catalysis and Protein Folding (3rd ed. 1999), W.H.Freeman & Co Ltd., New York
Williamson Mike: How Proteins Work (1st ed. 2011), Garland Science

Applied Molecular Biochemistry

Convenor: Prof Thomas Meier

Course Aims:
The course bases on the first year biochemistry course, in which general metabolic pathways and enzyme mechanisms have been presented. The goal of this module in the second year is to focus and enhance the understanding of selected and most important energy converting pathways in plants, animals and bacteria and to put these pathways in the context of bioenergetics. Most of these bioenergetics processes involve large, membrane-embedded multiprotein complexes, therefore particular emphasis is also given on the structure and function of membrane proteins and membrane protein biochemistry. Selected examples of proteins, energy converting rotary ATPases, respiratory chain complexes, photosystems and the biochemical processes and regulation mechanism of the Calvin cycle, are paradigmatic for many other biochemical pathways in the cell and will be tackled during the course module.

Course Objectives:
The students will learn how energy converting processes and their membrane protein complexes involved lead to the formation of adenosine triphosphate (ATP) by means of oxidative phosphorylation and photophosphorylation. They will also have a good understanding of the molecular basis of the light and dark reactions of photosynthesis and how the Calvin cycle is regulated. The students should also be able to describe examples of membrane protein structures and understand and compare functional/mechanistic principles of selected examples, which have been presented in the lectures and tutorials.
During a 2-days practical course the students will get in touch with a contemporary example of applied membrane protein biochemistry and make a first hands-on experience in purifying a membrane proteins, starting from membranes. The objective is to learn how to optimally solubilize the desired membrane protein using an assay to select the best suitable detergent(s) for it, and finally purify the membrane protein by metal affinity purification. The success of the purified protein will be experimentally accessed by fluorescence measurements (of an attached green fluorescent protein, GFP) and by SDS polyacrylamide gel electrophoresis (SDS-PAGE).
Furthermore, the course contains tutorials and a literature review, which will help to further deepen and link the topics and assess contemporary research in the field of membrane protein biochemistry and bioenergetics. The students will be actively involved in problem based tutorials, literature reading and reporting and also peer review reports and provide feedback for their colleagues.

Course Content:
The course contains 20 lectures provided together by Prof. Thomas Meier (7 hours), Prof. Bill Rutherford (7 hours), Dr. James Murray (4 hours) and a guest Lecturer (2 hours), Prof. Ville Kaila (Technical University Munich). The topics presented focus on membrane proteins and their role in bioenergetics processes. A particular emphasis is made on photosynthesis in chloroplasts and the respiratory chain complexes in mitochondria that are involved in oxidative phosphorylation of the cell. The students will also be prepared in the lecture for the practical course work of how to work with membrane proteins by using detergents. The 2 days practical course then deals with solubilisation of membrane proteins from membranes by using detergents, judging the yield and quality of solubilized material by fluorescence spectroscopy and gel electrophoresis and finally purification and concentration of a membrane protein by metal affinity chromatography and protein precipitation. The two days course is framed by 4 hours of tutorials in which a problem based learning approach is adopted. A literature review about selected topics in membrane protein research or bioenergetics, carried out in small groups (usual group size: 3, depending on total amount of students in the course), will contribute to a compendium of reports that is made available to all students for reviewing and further studies.

Lectures: 20 hours
Practical: two full days
Practical course report (1 per group). Each student group writes a practical course report in the format of a small research paper.
Literature report (1 per group). Students will be distributed in small groups and receive a literature review topic that is related with the module content. Every student will have particularly defined tasks and responsibilities. A short literature review with maximally 1000 words plus 1 figure will be submitted. All reports are then distributed among all students, read and anonymously peer review assessed by the other student groups. Feedback of the colleagues will be provided to the authors. The group with the best rated literature review wins a small prize (provided by the course convenor).

Assessment:
3 hour exam (written) – 75% [25 MCQ questions 45 min plus 3 (out of 6) written questions]
Laboratory experiments write-up (coursework) – 12.5% [1 report per group, author contribution declaration]
1000 words plus 1 figure literature review – 12.5% (group reviews)

Key skills acquired:
Basic understanding of structure and function of membrane proteins in membranes, have an overview about examples of important membrane proteins.
The students should understand the key mechanisms that drive energy conversion in photosynthesis and oxidative phosphorylation.
Practical knowledge how to biochemically handle and purify membrane proteins and detergents in the wet laboratory. Learn time management and team work in the laboratory. Interpret results/data and write a scientific report.
Enhance ability to understand a scientific paper(s) about a chosen topic in the field of membrane proteins, bioenergetics. Write a short and concise literature report and perform anonymous and fair peer review assessments.

Challenges in Cell Biology

Convenor: Dr Gerald Larrouy-Maumus

Course Aims

CCB will give students an understanding of current cell biology research challenges and the approaches being developed to tackle them. It will discuss areas of cell biology that are new to second year Biochemists and so complement their previous cell biology teaching as well as introduce themes that will be developed in several final year courses.

Course Objectives

To introduce the research topics of immunology, bacterial structural cell biology, plant developmental cell biology and virus biochemistry.
To provide you with an understanding of some current research into these four areas of cell biology which will be discussed in the context of the following biological challenges and opportunities facing us: immunology (e.g. cancer and allergy), antibiotic resistance, sustainable food production and evolving viral pathogens.
To equip you with critical insights relevant to cell biology research and help guide your choice of final year course
To continue to develop your skills at carrying out robust laboratory experiments and analysing research results carefully
To further develop your skills at clear and effective communication of scientific research including data analysis

Course Assessment:

25% coursework (2 pieces):
Two concise write-up of the laboratory works including quantitative analysis

75% written exam
A free choice of 3/6 questions on immunology, virus biochemistry, bacterial structural cell biology and plant developmental cell biology.
Essay and/or data analysis-based questions depending on how the material is taught

Topics in Biotechnology

Convenor: Dr John Heap

Course Aims:

This course aims to provide students with a broad introduction to biotechnology through a series of lectures, workshops, and a laboratory practical.

Course Objectives:

Students should understand the advantages of biotechnology over alternative approaches for certain purposes, and be familiar with biotechnology in its historical context. Students should understand why and how natural organisms synthesize certain compounds, their potential usefulness for human needs, and how they are (or could be) exploited using biotechnology. Students should gain an appreciation of the roles of genetic manipulation and process engineering in the development of bioprocesses. Students should understand how to design, construct, validate and test bacterial gene expression plasmids; experience these steps in practice; and learn how to describe key steps to a high standard.

Assessment:

A) Coursework 30%

B) Examination 70%

Key skills acquired:

The ability to understand how certain natural biosynthetic systems function and can be exploited for biotechnological purposes.

The ability to design, construct, validate and test bacterial gene expression plasmids. The ability to describe the construction of a plasmid in writing precisely and unambiguously that would allow the experiment to be reproduced by others, therefore achieving the high standard required for journal publication.

Academic Integrity and Academic Misconduct

As your programme of study continues, you will be taught the concept of academic integrity and how you can ensure that any work that you complete now, or in the future, conforms to these principles. This means that your work acknowledges the ideas and results of others, that it is conducted in an ethical way and that it is free from plagiarism.

Academic misconduct is the attempt to gain an academic advantage, whether intentionally or unintentionally, in any piece of assessment submitted to the College. This includes plagiarism, self-plagiarism, collusion, exam offences (cheating) or dishonest practice. Full details of the policy can be found at:

www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/plagiarism-academic-integrity--exam-offences/

Definitions of the main forms of academic misconduct can be found below:

Plagiarism

Plagiarism is the presentation of another person's thoughts, words, images or diagrams as though they were your own. Another form of plagiarism is self-plagiarism, which involves using your own prior work without acknowledging its reuse. The reuse of previously submitted work, even in parts, is not permitted because a student cannot gain marks for submitting prior work in subsequent assignments. You are reminded that all work you submit must be expressed in your own words and must incorporate your own ideas and judgments.

Plagiarism is considered a cheating offence and must be avoided, with particular care on coursework, essays, reports and projects written in your own time and also in open and closed book written examinations. This includes the use of text available on the internet.

Submission of a copy of another student's work is not acceptable and will be regarded as plagiarism. No mark will be awarded. If you suspect that your work has been copied, you should inform staff in the Education Office.

If you prepare a piece of work with other students, for example a practical report, you must write it up using your own words and incorporating your own ideas and judgements. If two or more reports are submitted using substantially the same language, a single mark will be applied and this mark will be divided equally between the two or more students who submitted them.

Similarly, direct quotations from the published or unpublished work of others, from the internet, or from any other source must always be clearly identified as such by being placed inside quotation marks, and a full reference to their source must be provided in the proper form. Remember that a series of short quotations from 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 include the work referred to in a list at the end of your submission. This list should identify published work that has been used for background preparation (General Bibliography) and also separately identify items that are specifically mentioned in the text. Full details of these references should be given: names of authors, title of work, year of publication and where appropriate the volume (mainly scientific journals), page numbers and publisher (mainly books) or Internet URL

Where plagiarism is detected in group work, members of that group may be deemed to have collective responsibility for the integrity of work submitted by that group and may be liable for any penalty imposed, proportionate to their contribution.

Where a first case of plagiarism has occurred and where the Board of Examiners judge that it does not form a significant part of the work and where the student concerned admits that plagiarism has occurred the case will be referred to the Chairman of the Board of Examiners for action. The action in such cases is:

The student concerned be informally reprimanded and:
The mark for the work be reduced, or
Zero mark for module

More serious cases of plagiarism will be reported to the Academic Registrar who will investigate the allegation. Note that repeated cases of "minor" plagiarism will be considered to constitute a serious case of plagiarism. If a student is found guilty of plagiarism the consequences can be severe, including the requirement to leave College.

Where collusion is suspected (i.e. use is made of another student's work with their consent) then both students will be penalised if found guilty.
Students should be aware that regular checks for plagiarism will be made on submitted work.
For further information, please refer the Colleges Plagiarism, Academic Integrity & Exam Offences site:
www.imperial.ac.uk/student-records-and-data/for-current-students/undergraduate-and-taught-postgraduate/exams-assessments-and-regulations/plagiarism-academic-integrity--exam-offences/

Collusion:

This is the term used for work that has been conducted by more than one individual, in contravention of the assessment brief. Where it is alleged that there has been collusion, all parties will be investigated under the Academic Misconduct procedure.

Exam offences

Exam offences include behaviour such as bringing authorised material into an exam, attempting to communicate with others apart from the invigilator, trying to remove examination material without permission, taking an exam for someone else or getting someone else to take an exam for you.

Dishonest practice

Examples of dishonest practice include bribery, contact cheating (buying work from an essay mill or other individual to submit as your own), attempting to access exam papers before the exam, making a false claim for mitigating circumstances or providing fraudulent evidence, falsifying documentation or signatures in relation to assessment.

Absences

Attendance is closely monitored by the Education Office. Registers are taken during classes, practicals and tutorials by the academic teams and students are expected to attend.

Absence of more than one day, or absence from a practical session must be notified to the Education Office. Medical documentation is required when absence due to illness exceeds a week, or illness causes absence from an examination or practical.

Absence from a practical session without good reason will result in the deduction of marks. It is equally important that you attend practical's on time, in order to avoid being excluded from the practical due to missing important safety information at the beginning.

Mitigating Circumstances

If you miss an examination through illness, you must complete a mitigating circumstances form and send it along with a medical certificate to the Life Sciences Education Office within one week of the missed exam. You should email the Education Office before the start of the exam and see a doctor on the same day to get the medical certificate.

If you miss any part of a course, and especially if you can't submit coursework, through illness or other personal issues you must notify the Life Sciences Education Office before the deadline by completing a mitigating circumstances form and emailing it to biochemistry.ug@imperial.ac.uk

This information is required to avoid penalties for late hand in of work and importantly for second and third year moderation in cases of more serious disruption to your work. All information will be kept to the minimum number of people within the Life Sciences staff but you must state if the information is to be kept completely confidential. It is also advisable to keep your personal tutor informed of any issues that may affect your performance.

Please do not contact the course convenor directly regarding extensions or absence from other sessions. Once you have submitted the form it will be sent to the convenor by the Education Office for a suitable extension to be decided upon

For further information on Mitigating Circumstances and Absence please use the below link:

http://www.imperial.ac.uk/physics/students/current-students/student-welfare/mitigating-circumstances/