BSc (Hons) Biotechnology
Degree Programme Guide 2014-15
BSc (Hons) Biotechnology

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Introduction

Biotechnology is the use of organisms to perform useful chemical reactions for industrial purposes. Brewing, in which yeast makes alcohol and carbon dioxide from sugar, is probably the easiest example which springs to mind. Modern biotechnology frequently involves genetic engineering of those organisms to improve an industrial process. The study of biotechnology at University involves study of microbiology, biochemistry and genetics. Knowledge of all three subjects is crucial in an area where microorganisms are frequently being genetically engineered to perform novel or enhanced biochemical reactions. The new and emerging field of synthetic biology is a perfect example of modern biotechnology, incorporating new gene circuitry into microorganisms to produce new solutions to complex problems such as the manufacture of bio-fuels and palm-oil substitutes.

Biotechnology is not a new science, and originated from the day man first brewed beer and baked bread. Traditional uses of biotech will continue and are crucially important to society. However, with the recent advances in DNA sequencing of genomes, particularly the human genome, biotech science is well placed to make rapid advances. The potential of biotechnology to provide new health products, new fuels such as hydrogen, advances in agriculture and management of the environment (e.g. oil spill clean-up) is immense but at present only partly tapped. Biotechnology is well-placed to contribute significantly to future sustainable technology development.

Aims and Outcomes

This degree course aims to instill a broad base of knowledge regarding biotechnology at the molecular and cellular levels. Additionally, students will gain an in depth understanding of selected aspects of Biotechnology which will reflect the research expertise and strengths within the School, and will be instructed in the many applications of this subject. A thorough understanding of the scientific method and the development of a critical approach to problem solving and research literature also will be gained. In carrying out a research-based project and the presentation of the project findings as a thesis, students will gain expertise in time management, data handling, and in the transferable skills associated with mastering statistics, graphics and word processing software packages.

General Enquiries

The Degree Programme Co-ordinator is Prof Ian Stansfield (i.stansfield@abdn.ac.uk, tel. 437318) and any query concerning the degree programme should be addressed to him. Enquiries concerning a specific course should be made to the course co-ordinator for that course (See University Catalogue of Courses or SMS World Wide Web Pages for names). The Head of School of Medical Sciences is always available for advice regarding any of the degree schemes run by his School as well as matters such as careers advice. In the first instance appointments to see
any of the above staff should be made with the School Office, Room 2:62:3 sited on level 2, Phase 2, Institute of Medical Sciences (01224-437471 internal 7471).

**General Requirements**

In order to complete the degree scheme the student’s programme of studies must comply with the Supplementary Regulations for the Degree of Bachelor of Science in Pure Science (BSc) supplied to the student in the extract from the University Calendar "Degrees in Science". This will involve taking a number of modules outwith the School of Medical Sciences during years 1 and 2.

**Industrial Placements**

There is scope within the degree schemes for students with very good academic records to undertake a 1 year, paid, industrial placement as part of their degree. The placement is undertaken in year 4 of the degree scheme and students return to the University to complete their honours year in year 5. This work experience is co-ordinated by the School although placements are in companies outside the University.

Students interested in industrial placements are encouraged to contact Dr Allison Carrington in the first instance to discuss their plans.

Students must also register for, and complete, the pre-placement course, BT3006, in the first half of their third year. On successful completion of a placement and their honours year students will graduate with an MSci. Further details of this initiative can be obtained from Dr Allison Carrington (a.carrington@abdn.ac.uk).

**Looking Forward to the Honours Year**

Many of you will be intending to continue for a 4th year and to complete an Honours degree in the School of Medical Sciences. There are a few points you should bear in mind if this is your intention.

**1. Standard of entry**

We try to welcome as many students as possible into the Honours year, but it must be recognised that it will only benefit the more able students. If 3rd year is a real struggle, then it may be too much for you to take on. As a general rule, we think grades at lower second class level or better in each 3rd year module is a reasonable sign that you have reached the appropriate standard. Exceptions can be made if there is good reason, and a mixture of excellent results and one or two slightly poorer ones may sometimes be acceptable. Do let us know if there is an explanation for any poor performance, so that we can do our best to take it into account.

**2. Know what’s involved**

The teaching in the Honours year in general involves fewer lectures and more input from you than in previous years. You will take the modules specified for your particular degree scheme, these amounting to 120 credits of study. You are required to include three compulsory courses and an Honours Project in your study programme. You will write a thesis and give a short presentation on your project. For all students taking an Honours project, the final degree assessment will comprise contributions from set essays and a research thesis, with the remainder coming from the papers associated with the taught modules taken in the Honours year, a paper on data analysis and interpretation, and a general essay paper.

**3. Prerequisites**

Check that the courses you plan for 3rd year provide the foundation for the Honours degree you hope to take. Please refer to the appropriate Degree Programme Guide (Available from the www SMS home page or from the School Office, IMS Building). If in doubt, consult your Degree Programme Co-ordinator (Professor Ian Stansfield, 437318). Please do this in plenty of time.

**4. Summer research projects**

It is possible to apply for funding for summer projects (8-10) weeks between 3rd and 4th year. This is a helpful base for your Honours project, which must be in a different area of research and usually with a different supervisor. Dr Allison Carrington will email members of the class at the
end of November asking for CVs if they wish to be considered for a summer vacation
studentship, and if they have any preferences for staff in whose laboratory they would wish to
undertake the work.

**Assessment**

Throughout your course, assessment takes the form of continuous assessment (based upon
performance in prescribed tasks such as practical reports and essays) and written degree
examinations (multiple choice or essay questions) taken in the examination diets allotted to each
half session. The final year assessment is made up of 5 examination papers, continuous
assessment essays and the submission of a thesis based on your project. Some students may be
required to attend an oral examination (viva) with the external examiner. Details concerning
assessments and course work within each module are provided in the Course Handbooks. These
Course Handbooks are available either from the School Office or on the SMS World Wide Web
Pages. Details concerning the relationship between credits and weightings may be found on
[http://www.abdn.ac.uk/sms](http://www.abdn.ac.uk/sms)

**Academic Appeals**

1. From time to time a student may seek to appeal against a decision involving academic
judgment taken, in terms of the Regulations for the degree or other qualification for which he
or she is studying, among others, by a Head of School refusing an award of a Merit
Certificate, or admission to a higher level course; by Examiners refusing to award a pass or
awarding an unacceptable class of Honours (or making no award); by the Examiners
appointed to examine a thesis for a higher degree; or by the relevant Undergraduate
Programme Committee or Academic Postgraduate Officer in relation to terms of study.
Specific rights of appeal are very limited indeed but the Senate has a general duty to
regulate and superintend the teaching of the University, and the Court has the authority to
review any decision of the Senate which may be appealed against by a member of the
University.

2. Academic appeals must be lodged with the Academic Registrar within 14 days from the date
of the issue of the decision being appealed against, unless the relevant Appeals Committee
constituted under 7 or 8 below is satisfied that the decision had not become known to an
appellant until too late to submit an appeal within that period.

3. Notwithstanding the above time limit, details of illness (which must be certified by a medical
practitioner) and/or other personal circumstances which students believe may have affected
their performance in an element of prescribed degree assessment will be accepted as
grounds for appeal only if the Head of the relevant School has received written notification of
them no later than one week after the date on which a student submitted or appeared for the
assessment concerned. Where good reasons have prevented a student from notifying the
Head of School within this period, the student should write to the Head of School as soon as
is practicable and give details both of the illness (which must be certified by a medical
practitioner) and/or other personal circumstances and of the events which prevented him or
her from notifying the Head of School within the prescribed period. Details reported after
notification of a result will be accepted as grounds of appeal only in exceptional
circumstances.

**Problems with Course Work**

If students have difficulties with any part of the course that they cannot cope with alone they
should notify someone immediately. If the problem relates to the subject matter you may be
best advised to contact the member of staff who is teaching that part of the course. Students
with registered disabilities should contact either the IMS based School Office (Mrs Jenna
Reynolds, Email: j.reynolds@abdn.ac.uk) to ensure that the appropriate facilities have been
made available. Otherwise, you are strongly encouraged to contact any of the following as you
see appropriate:
Course student representatives.
Course co-ordinator.
Convenor of the relevant student-staff liaison committee (Professor Ian Stansfield, email: i.stansfield@abdn.ac.uk).
Personal Tutor.
School Disabilities Co-ordinator, Dr Derryck Shewan d.shewan@abdn.ac.uk)

Staff are based at Foresterhill (IMS & Polwarth Building) and we strongly encourage the use of e-mail or telephone the School office (Mrs Jenna Reynolds) tel: 437471. You may be wasting your time to travel to Foresterhill only to find staff unavailable.

Course Details

All courses run in the School have practical and general skills (enterprise) components as integral parts of the teaching package. For detailed descriptions of the courses that make up the BSc (Hons) Biotechnology Degree consult the University Course Catalogue (http://www.abdn.ac.uk/registry/courses), or in the case of modules taught within the School of Medical Sciences consult the SMS World Wide Web Pages.

This document supplements the regulations in the University Calendar and the descriptions of modules given in the University "Catalogue of Courses". It is correct at the time of going to press but is open to change.

1st Year Biotechnology Course Requirements

There are no courses in Biotechnology in the 1st Year (Level 1). Intending Honours students in Biochemistry require a basic level of general physical and chemical principles and hence are required to take (or gain exemptions from) in the first half session CM1020 Chemistry for Life Sciences 1 and in the second half session CM1512 Chemistry for Life Sciences 2. Pre-requisites for second year biochemistry/molecular biology courses, in addition to chemistry, include in the first half session SM1001 Introduction to Medical Sciences and in the second half session SM1501 The Cell.

Prescribed Level One Courses

**First Half Session**

- Introduction to Medical Sciences (SM1001 15 credit points) and
- Chemistry for Life Sciences 1 (CM1020, 15 credit points)
- Plus TWO other courses of your choice worth 15 credit points each

**Second Half Session**

- The Cell (SM1501, 20 credit points)
- Chemistry for Life Sciences 2 (CM1512, 15 credit points)
- Plus TWO other courses of your choice worth 15 credit points each

**Timetable for Year 1**

<table>
<thead>
<tr>
<th>First Half Session</th>
<th>Second Half Session</th>
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<tbody>
<tr>
<td>SM1001</td>
<td>SM1501</td>
</tr>
<tr>
<td>CM1020</td>
<td>CM1512</td>
</tr>
<tr>
<td>2 other modules</td>
<td>2 other modules</td>
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2nd Year Biotechnology Course Requirements

Four modules covering Biochemistry, Molecular Biology, Genetics and Microbiology are required in the 2nd Year (Level 2). These are: Molecular Biology of the Gene (BI20M3), Genes & Evolution (BI2017), Energy for Life (BI25M7) and Microbes, Infection & Immunity (BI25M5). In addition, students must take 2 compulsory key skills courses which are Foundation Skills for Medical Sciences (SM2001) and Research Skills for Medical Sciences (SM2501).

Prescribed Level Two Courses

First Half Session
- Molecular Biology of the Gene (BI20M3, 15 credit points)
- Foundation Skills for Medical Sciences (SM2001, 15 credit points)
- Genes & Evolution (BI2017, 15 credit points)
- One other 15 credit course of your choice

Second Half Session
- Energy for Life (BI25M7, 15 credit points)
- Research Skills for Medical Sciences (SM2501, 15 credit points)
- Microbes, Infection & Immunity (BI25M5, 15 credit points)
- One other 15 credit course of your choice

Timetable for Year 2

<table>
<thead>
<tr>
<th>First Half Session</th>
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<tbody>
<tr>
<td>BI2017</td>
<td>BI25M7</td>
</tr>
<tr>
<td>SM2001</td>
<td>SM2501</td>
</tr>
<tr>
<td>BI20M3</td>
<td>BI25M5</td>
</tr>
<tr>
<td>1 other module</td>
<td>1 other module</td>
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3rd Year Biotechnology Course Requirements

One hundred and twenty credits in Biotechnology are required in the 3rd Year (Level 3). Modules taken in the first half session of the third year in molecular biology build on the modules taken at Level 2 by enhancing the students’ understanding of the major applications of biotechnology and molecular biology. Modules taken in the second half session will provide detailed insights into specific areas of mainstream cellular biology.

To meet the requirements for Enhanced Study, in addition to the 90 credits prescribed for your Degree Programme, you are required to take another 30 credit level 3 course of your choice. The School of Medical Sciences runs the following three 30 credit Disciplinary Breadth courses at level 3 which may be of interest to students studying Medical Sciences Degree Programmes.

- SM3001 Frontiers of Molecular Medical Sciences
- SM3002 Frontiers of Biomedical Sciences
- SM3003 Frontiers of Applied Medical Sciences

Prescribed Level Three Courses
**First Half Session**

The Molecular Biology of the Cell (MB3006, 30 credit points)

Plus **ONE** other 30 credit course of your choice

**Second Half Session**

The Molecular Control of Cell Function (BC3503, 30 credit points)

Plus **ONE** of the two courses below:

Genetics (GN3502, 30 credit points)

OR

Molecular Microbiology (MC3504, 30 credit points)

**Timetable for Year 3**

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<tr>
<th>First Half Session</th>
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<tbody>
<tr>
<td>MB3006</td>
<td>BC3503</td>
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<tr>
<td>1 other module</td>
<td>Either GN3502 or MC3504</td>
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**4th Year Biotechnology Course Requirements**

One hundred and twenty credits in Biotechnology are required in the 4th Year (Level 4). Modules taken in the first half session will provide detailed insights into specific areas of biotechnology. The second half session is fully occupied with a research project chosen from a list based on the research interests of the staff of the School of Medical Sciences. There are NO examinations at the end of the first half session. Instead the students proceed straight to their research projects and sit a diet of final honours examinations at the end of the second half session. The first half session revision period is combined with that of the second half session to give four clear weeks for revision prior to the final examinations.

**Prescribed Level Four Courses**

**First Half Session**

Honours Biochemistry – Option 1 (BC4014, 15 credit points), or Honours Genetics – Option 1 (GN4010, 15 credit points), or Honours Microbiology – Option 1 (MC4014, 15 credit points)

Honours Biochemistry – Option 2 (BC4314, 15 credit points), or Honours Genetics – Option 2 (GN4310, 15 credit points), or Honours Microbiology – Option 2 (MC4314, 15 credit points)

Honours Advanced Molecular Biology (MB4050, 30 credit points)

**Second Half Session**

Biotechnology Honours Research Project (BT4501, 60 credit points)

**Timetable for Year 4**

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<thead>
<tr>
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<th>Second Half Session</th>
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<tbody>
<tr>
<td>BC4014/GN4010/MC4014</td>
<td>BT4501</td>
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<tr>
<td>BC4314/GN4310/MC4314</td>
<td></td>
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<tr>
<td>MB4050</td>
<td></td>
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<tr>
<td>MB4901 – Honours Data Analysis Exam Paper</td>
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<tr>
<td>MB4902 – Honours General Essay Exam Paper</td>
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