

**PROGRAMME SPECIFICATION**

for the award of

**BSc (Hons) Biological Sciences (Genetics and Genomics)  
IOG / BSCH IOG**

**Managed by the Faculty of Health and Life Sciences**

**Delivered by Department of Biological and Medical Sciences**

<b>Date approved:</b>	28 <sup>th</sup> September 2018
<b>Applies to students commencing study in:</b>	September 2019

**RECORD OF UPDATES**

<b>Date amended*</b>	<b>Nature of amendment**</b>	<b>Reason for amendment**</b>

## SECTION 1: GENERAL INFORMATION

<b>Awarding body:</b>	Oxford Brookes University
<b>Teaching institution and location:</b>	Oxford Brookes University
<b>Language of study:</b>	English
<b>Final award/s:</b>	BSc (Hons)
<b>Programme title:</b>	Biological Sciences (Genetics and Genomics)
<b>Interim exit awards and award titles available:</b>	BSc Ordinary Biological Sciences (Genetics and Genomics) Named DipHE, CertHE
<b>Brookes course code:</b>	IOG / BSCH IOG
<b>UCAS code:</b>	C000 / IOG
<b>JACS code:</b>	C000 Biological Sciences
<b>HECoS code:</b>	(100345) Biological Sciences
<b>Mode of delivery:</b> (Mode of Study given in brackets)	Full-time (face to face/on-campus) Part-time (face to face/on-campus) *Sandwich mode (face to face/on campus/placement)  * <b>Year 3</b> can be a professional placement in a laboratory concerned with research, clinical work, or professional training.
<b>Duration of study:</b>	The normal duration of a programme leading to the award of a Bachelor's Degree (BSc) with Honours is 3 years for full-time study, or 4 years for sandwich mode (with a year placement). Part-time is normally 6 years duration. To obtain a BSc honours degree a student must pass 120 CATS at Levels 4, 5 and 6..
<b>Subject benchmark statement/s which apply to the programme:</b>	Biosciences 2015
<b>Professional accreditation attached to the programme:</b>	NA
<b>Apprenticeship Standard:</b>	NA
<b>University Regulations:</b>	The programme conforms to the University Regulations for the year of entry as published/archived at: <a href="http://www.brookes.ac.uk/regulations/">http://www.brookes.ac.uk/regulations/</a>

## **SECTION 2: WHY STUDY THIS PROGRAMME?**

The Biological Sciences (Genetics and Genomics) degree provides students with a focused programme of study that blends molecular, genetic, genomic and broader biological studies, to prepare them for a wide range of careers in Biosciences. The secrets of life revolve to a large extent around how hereditary information is stored, used and passed on. When James Watson famously proclaimed that they had discovered the secret of life upon elucidating the structure of DNA, back in 1953, they had merely set in motion a direction in science that would see unprecedented advances made in the fields of developmental biology, biomedical science, evolutionary ecology, and even in conservation. Furthermore, it also stimulated the development of major new lab technologies (e.g. complete genome sequencing and gene expression profiling, down to individual cells), coupled with significant computational advances. More than ever the various disciplines within the Biosciences are integrated, largely as a result of advances in genetics and genomics. This degree is at the forefront in teaching students these advances across the Biosciences and has a strong focus on employability throughout the course (e.g. programme learning outcome 3.3). This breadth, as well as the explicit integration, offers students the opportunity to develop and follow their interests in the Biosciences as they progress through the course.

Oxford Brookes has an international reputation for outstanding research work in Genetics and Genomics in the Biological and Biomedical sciences and the Oxford area is an increasingly important European centre for the Bioscience industry.

Staff profiles for members of the core teaching team for the degree can be found on Department website (<https://www.brookes.ac.uk/bms/about/staff/>).

## **SECTION 3: PROGRAMME LEARNING OUTCOMES**

On successful completion of the programme, graduates will demonstrate the following Brookes Attributes and be able to:

### **3.1 ACADEMIC LITERACY**

- Demonstrate subject specific core knowledge, intellectual rigour and transferable skills
- Communicate effectively using written and oral presentation skills
- Apply the skills, both practical and analytical, developed during specialised, in-depth study in several areas of the course such as the research project to their own independent research
- Explain and evaluate scientific bases underlying the subject using their sound knowledge of Biological Sciences in general and Genetics and Genomics in particular
- Acquire new knowledge and skills from appropriate sources and utilise them in their continuing professional development
- Articulate the integration in the Biosciences, from sub-cellular to cellular, within and between systems, and the role of Genetics and Genomics therein
- Integrate the core processes within plants, animals and microbes from sub-cellular to community levels into an understanding of their function and context;
- Exhibit knowledge of the broader scientific context in which their own subject specialisms are embedded
- Demonstrate an understanding of how the boundaries of knowledge are advanced through research.

### **3.2 RESEARCH LITERACY**

- Evaluate and analyse genetic and genomic data
- Employ the skills acquired in the programme to appreciate and critically apply the scientific method to experimental design
- Evaluate novel developments within the selected subject areas contributing to their degree
- Communicate their ideas and results, both verbally and in writing, with clarity and in a manner appropriate to a given audience (also fits 3.3)

- Design and critically evaluate experimental procedures and take an analytical approach to problem solving
- Critically research, review, synthesise, summarise and analyse subject-specific information from a variety of sources including published research to construct a coherent thesis on Genetics and Genomics within Biological Sciences
- Independently design and conduct studies to investigate biological phenomena using genetics and genomics, whilst taking into account the principles underlying biological processes
- Select and use competently and safely appropriate field and/or laboratory methods and techniques for the study of genetics and genomics in a variety of context within Biological Sciences (also fits 3.3)
- Observe, gather, evaluate, interpret and integrate ideas and evidence in Genetics and Genomics in a variety of contexts within the Biological Sciences to support findings and hypotheses, including retrieval of (meta-)data from online and offline genetics and genomics databases
- Record and report findings using accepted scientific formats (including verbal, textual, numerical and graphical).

### **3.3 CRITICAL SELF-AWARENESS AND PERSONAL LITERACY**

- Apply the skills and intellectual rigour developed during the programme in careers in genetics and genomics within Biological sciences or postgraduate study
- Demonstrate confidence and flexibility as independent learners to enhance employability and knowledge
- Express ideas using appropriate scientific and subject-specific language
- Integrate and apply the qualities, skills and intellectual rigour, developed during study, to situations which require professionalism, independent thought, personal responsibility, critical self-awareness, decision making in complex and unpredictable circumstances, problem solving skills and the ability to work in a range of roles within a team
- Reflect on outcomes in order to evaluate the performance of oneself and others

### **3.4 DIGITAL AND INFORMATION LITERACY**

- Apply information technology for scientific, communication, data analysis and information retrieval (e.g. from large genomic databases)
- Search the scientific literature, extract information, organise and evaluate it
- Select and apply specialised software for subject specific purposes

### **3.5 ACTIVE CITIZENSHIP**

- Articulate the inherent global perspective of science and the universality of its principles and language
- Appraise global perspectives, developed through topics or even modules, that relate to particular international issues or contexts such as in nutrition and epidemiology
- Learn and think independently as part of a commitment to lifelong learning
- Appreciate the interdisciplinary nature of science and the validity of different points of view
- Appreciate ethical, social and legal aspects of obtaining and analysing gene sequences and associated information, and be able to critically evaluate and debate them (also fits 3.3);
- Understand and adhere to legislation regarding health and safety in the laboratory and the field

## **SECTION 4: CURRICULUM CONTENT & STRUCTURE**

### **4.1 PROGRAMME STRUCTURE AND REQUIREMENTS:**

<b>Ecsis Code</b>	<b>Banner code</b>	<b>Module Title</b>	<b>Credits</b>	<b>Level</b>	<b>Status</b>	<b>Coursework: Exam ratio</b>
U14501	BIOL4001	Biodiversity	30	4	Compulsory	50:50
U14502	BIOL4002	Cell Biology and Genetics	30	4	Compulsory	50:50
	BIOS4006	Introduction to Biochemistry A	15	4	Compulsory	100:0

	BIOS4007	Introduction to Biochemistry B	15	4	Compulsory	50:50
	BIOL4004	The Practising Scientist	30	4	Compulsory	100:0
LEVEL 5						
	BIOL5002	Interrogating Genomes	15	5	Compulsory	100:0
U15535	BIOL5017	Data Carpentry	15	5	Compulsory	100:0
	BIOL5001	Career Development	15	5	Compulsory	100:0
U15531	BIOL5014	Molecular Biology	15	5	Compulsory	50:50
U15532	BIOL5015	Genetics	15	5	Compulsory	50:50
U14533	BIOS5004	Microbiology	15	5	Optional	40:60
U14525	BIOS5003	Biochemistry of Cell Function	30	5	Optional	40:60
U15536	BIOL5018	Cell Biology	15	5	Optional	40:60
U15534	BIOL5016	Animal Developmental Biology	15	5	Optional	50:50
U15552	BIOL5022	Animal Behaviour	15	5	Optional	50:50
U14568	BIOS5008	Special Study in Life Sciences*	15	5	Optional	100:0
Placement Year						
U14565	BIOS5007	Industrial Experience	15	5	Compulsory for Sandwich mode students only	100:0
LEVEL 6						
	BIOL6013	Work Experience	15	6	Optional	100:0
	BIOL6011	Advanced Genetics and Genomics	15	6	Compulsory	100:0
U14699	BIOS6010	Project	30	6	Compulsory	100:0
U14584	BIOL6001	Advanced Topics in Cell Biology and Bio-imaging	15	6	Optional	40:60
U14588	BIOL6009	Independent Study in Life Sciences	15	6	Optional	100:0
	BIOL6010	Professional Skills and Techniques	15	6	Compulsory	100:0
U14591	BIOS6006	Molecular Biology of Cancer	15	6	Optional	50:50
U15570	BIOL6004	Science and Humanity	15	6	Optional	40:60
U14573	BIOS6003	Genomic Medicine	15	6	Optional	50:50
U15571	BIOL6005	Evolution and Animal Development	30	6	Optional	40:60
U15591	BIOL6008	Advanced Topics in Wildlife Conservation	15	6	Optional	50:50

\*A study that is relevant to the student's programme that is offered in exceptional circumstances at the discretion and instigation of the module leader.

## 4.2 PROGRESSION AND AWARD REQUIREMENTS

In order to satisfactorily complete a year of full-time study, a student must:

1. either pass at least 6 module credits during the year, or, if on placement, complete specific requirements set for the placement;
2. by the end of the year, normally be in a position to proceed with a programme which, if passed, would satisfy the requirements for an award within the remaining period of normal full-time study for that award.

In order to satisfactorily graduate with a

- BSc Hons Biological Sciences (Genetics and Genomics) degree, a student must meet the University requirements for number and level of modules completed, to include all necessary requirements for compulsory and optional modules.
- BSc Biological Sciences (Genetics and Genomics): a student must meet the University requirements for number and level of modules completed, to include all necessary requirements for compulsory and optional modules. For the BSc degree, the following modules need to be included: BIOL5015 Genetics and BIOL6011 Advanced Genetics and Genomics.
- Named Dip HE: a student must meet the University requirements for number and level of modules completed, to include all necessary requirements for compulsory and optional modules. For a named Dip HE, one of the following optional modules is compulsory: BIOL5015 Genetics or BIOL6011 Advanced Genetics and Genomics.

Course diagrams are included in the programme handbook.

### **4.3 PROFESSIONAL REQUIREMENTS**

None

## **SECTION 5: TEACHING AND ASSESSMENT**

Teaching focuses on applying theory in practical settings, either in the lab, or out in the field, with a specific focus on developing skills for employment. The latter is reinforced with two dedicated modules (i.e. Career Development and Professional Skills and Techniques). Students have the opportunity to gain a wide range of skills in the field of, but not limited to, genetics and genomics. Such skills include molecular techniques, bioinformatics, advanced light and electron microscopy, and cutting-edge methodologies for the study of evolution and developmental biology. Throughout, there is a focus on the application of fundamental biology to real life issues.

The activities of our research groups underpin our teaching and support the development of student's research literacy. These include our world leading Cell Biology and Evolutionary Developmental Biology research groups and our Centre for Ecology, Environment and Conservation (CEEC).

Continued and regular discussions between programme staff members ensures that the programme is characterised by an appropriate breadth and depth of content that is informed by relevant benchmark statements and the latest research (developing Academic and Research literacy). Apart from dedicated and for the degree compulsory modules (i.e. Career Development and Professional Skills and Techniques), we also ensure across the programme that students gain transferable skills important for employment such as confidence and flexibility as independent learners, the ability to work productively with others, taking leadership and supportive roles and the ability to communicate ideas and findings, both verbally and in writing, with clarity and in a manner appropriate to diverse audiences (developing Critical self-awareness and personal literacy, Active Citizenship and Digital and information literacy).

This is developed through a variety of teaching, learning and assessment methods that are informed by contemporary practice in science teaching in higher education. All modules make use of the Brookes Virtual Learning Environment (typically for locating module resources, for quizzes and coursework submissions and feedback). Assessment methods include essays, reviews, laboratory/field notebooks, scientific reports, posters, professional reports, grant applications and oral presentations. All these activities develop Digital and Information literacy. Reflective learning is encouraged through use of self, peer and staff formative feedback on assignments, group work and project work, and reflective diaries (developing Critical self-awareness and personal literacy).

Assessment is designed to 'shape and develop' learning and not simply measure it (the notion of assessment for learning as well as assessment of learning). The role of formative feedback (i.e., feedback comments that may or may not be associated with a mark/grade) is central to facilitating student learning through assessment. Modules include formative feedback on assignments that includes generic/skills elements (encouraging and facilitating 'feed-forward' and transferability to other possibly different tasks). Modules include at least one assignment where students need to engage with feedback provided on earlier work. Assessment seeks to measure students' progress towards and ultimately their acquisition of programme outcomes and for this reason assessment decisions are co-ordinated at

programme level, while seeking to ensure that assessment methods are well integrated in each module (the notion of constructive alignment – the interdependence of learning outcomes, learning methods (teaching) and assessment), developmental and balanced. Students' understanding of the assessment process (assessment literacy) is promoted through their involvement in assessment (self and peer assessment). We are committed to providing clear assessment criteria, and useful and timely feedback on all student work. The quality of academic provision for students is assessed regularly by programme teams, principally through annual student evaluation of each module, and through critical evaluation of the annual external examiner reports.

Knowledge and understanding in many areas of the Biological Sciences, and Genetics and Genomics in particular, are rapidly advancing. Teaching staff not only include the latest published advances, but also integrate their own latest relevant research findings in their lectures. Articles from primary research journals feature in reading lists, particularly at level 6, and students are encouraged to use primary research journals in preparing assignments. There also have the opportunity to attend weekly research-focused seminars delivered by members of staff or invited speakers. All these activities develop Academic and Research literacy.

The standards that are expected in research are also widely taught and practised. Skills in scientific writing and presentation and numeracy skills are taught in the first year. In the second year there are compulsory modules such as Data Carpentry and Interrogating Genomes, which includes bioinformatics and analysing large datasets in general. Within year three, various modules develop the skills needed for writing grant proposals or carrying out consultancy activity, developing Research literacy. An example is Advanced Genetics and Genomics, in which the students will synthesise information from the lectures and tutorials to address a current and challenging research question in the biological and medical sciences using the latest methodologies in Genetics and Genomics; thereby demonstrating awareness of current research.

Active citizenship is encouraged and nurtured in a number of ways: study abroad opportunities; work experience or industrial placements; and the inclusion of an optional Science and Humanity module at level 6 that is designed to encourage thinking beyond our cultural perspectives. Many topics addressed in the Biological Sciences (Genetics and Genomics) degree emphasise local and global perspectives (e.g. human health and disease; ecology and environment; biodiversity and conservation). Indeed, all of these topics are discussed in the compulsory level 6 Advanced Genetics and Genomics module. The department has internationally recognised experience in science communication and public engagement, students are encouraged to help with activities (offline and online) which further develops active citizenship.

Most of our modules include lectures and laboratory-based practicals. There are on average 20 hours of lectures and 12 hours of practicals per single credit module (150 hours student effort). Assessment weightings for coursework (and any final examination) reflect judgements on the typical study time expected for satisfactory completion of a piece of coursework. For each module, students are required to achieve a pass grade of at least 40% from the aggregate marks of coursework and examination unless otherwise stated in the module description.

The programme conforms to the University Regulations for the Undergraduate Modular Programme (UMP) (<http://www.brookes.ac.uk/regulations/current/specific/b2/>).

## **SECTION 6: ADMISSION TO THE PROGRAMME**

### **6.1 ENTRY REQUIREMENTS**

Further details and admissions requirements can be found on the Oxford Brookes website.

Students who are studying more than one science subject at A-level may receive a lower offer because of their evident commitment to science. Preferred science subjects include Biology, Chemistry, Mathematics and Physics.

In its mission statement the university has highlighted the need to widen access to higher education to those traditionally underrepresented among students. The department's provision to enable this strategy is to offer a one year foundation in collaboration with Abingdon and Witney College. Students who have



successfully completed the foundation year can progress onto the BSc Biological Sciences (Genetics and Genomics).

Applicants with relevant prior learning are welcome to apply and start the programme with exemption of some modules.

For details of the University's English language requirements see:

<http://www.brookes.ac.uk/international/how-to-apply/english-language-requirements/>

## **6.2 DBS AND OTHER PRE-COURSE CHECKS REQUIRED**

Not applicable

## **6.3 JOB ROLE/EMPLOYER PROFILE (DEGREE AND HIGHER APPRENTICESHIPS)**

Not applicable

## **SECTION 7: PREPARATION FOR EMPLOYMENT**

Biologists are at the heart of the action in today's rapidly changing world, contributing to improvements in health, medicine, conservation and the food industry. Furthermore, each of these increasingly require detailed knowledge on Genetics and Genomics. For example assessing genetic diversity of populations under threat, genome-based medicine, pesticide resistance and genetically modified crops. Our graduates have developed careers in a variety of stimulating roles in biological organisations with recent graduates being employed in the agro-chemical and biotech industries, working as environmental health officers or working in environmental consultancies, the conservation sector and government agencies. With this degree we are preparing our graduates to capitalise on the increasing demand for biologists with a firm knowledge on the latest methodologies and theories in the field of Genetics and Genomics, making them highly employable. In general, our students have a very good record of gaining employment relevant to their degree and employers value the graduate attributes developed at Brookes. Some of our students elect to use their degree to gain degree-level employment in a wide range of contexts including management, journalism and the media. Other students have continued studying and gone on to gain postgraduate qualifications including PhDs or our MSc degree in Conservation Ecology or MSc Medical Genetics and Genomics.

We work closely with senior professional scientists as part of our Bioinnovation Hub who advise us on what they look for in graduates and on employability-related skills within our Programmes. Our partners come from a range of organisations, from larger multinational organisations to smaller and medium sized enterprises; including the Universities spin-out companies (OET, Wildknowledge) and the CEEC.

We know from talking to employers that when they recruit they are looking for self-assured, flexible, independent-minded graduates; problem solvers with the skills and knowledge that will benefit their organisations. Our graduates are desirable to a broad range of scientific employers.

Students will also have opportunities to gain work experience and enhance their professional skills via our links with regional employers. The Department is situated in the middle of one of the 2 largest clusters of life science companies in the UK surrounded by 6 science parks. Academic staff also work with public and private sector conservation organisations such as Natural England and Butterfly Conservation and work with Environmental Consultancies and Final year Projects are often linked to these organisations.

The Work Experience module gives the opportunity to work in a relevant organisation, often during part of a summer vacation, and in the process gain a module credit which counts towards the degree. Many of our students carry out their third year Project with an external organisation. Within the Programme there is also the option of doing a year in Industry (Industrial Experience, minimum 9 months) between Year 2 and Year 3 of the standard programme. The extra year is also covered by The Students Loan Company so there is no need source extra funding for these opportunities. The Career Development module will facilitate gaining work experience.



We have well developed association with many organisations. For example, students have had work experience with Kew Gardens, students have benefitted from guest speakers from Kew and several members of their staff are registering with us for PhDs by publication. Several of the modules include site visits to and visiting speakers from relevant industries/professions.