



UNIVERSITY OF LINCOLN

Programme Specification

Title:

Clinical Animal Behaviour

Final Award: **Master of Science (MSc)**

With Exit Awards at:

Postgraduate Certificate (PG Cert)

Postgraduate Diploma (PG Dip)

Master of Science (MSc)

To be delivered from:

Level	Date
Masters or Postgraduate Certificate (PG Cert)	2017-18
Masters or Postgraduate Diploma (PG Dip)	2017-18
Masters or Master of Science (MSc)	2017-18

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1. Introduction

This document describes one of the University of Lincoln's programmes using the protocols required by the UK National Qualifications Framework as defined in the publication *QAA guidelines for preparing programme specifications*.

This programme operates under the policy and regulatory frameworks of the University of Lincoln.

2. Basic Programme Data

Final Award:	Master of Science (MSc)
Programme Title:	Clinical Animal Behaviour
Exit Awards and Titles	Postgraduate Certificate (PG Cert) Postgraduate Diploma (PG Dip) Master of Science (MSc)
Subject(s)	Biological Sciences
Mode(s) of delivery	Full Time Part Time
Is there a Placement or Exchange?	No
UCAS code	
Awarding Body	University of Lincoln
Campus(es)	Lincoln Campus
School(s)	School of Life Sciences
Programme Leader	Helen Zulch (hzulch)
Relevant Subject Benchmark Statements	
Professional, Statutory or Regulatory Body Accreditation	
Programme Start Date	2017-18

3. Programme Description

3.1 Overview

3.2 Aims and Objectives

Educational aims of the programme:

The MSc in Clinical Animal Behaviour aims to produce professionals who are practically able, critical and independent thinkers with specialist knowledge of the development, diagnosis and management of behavioural disorders and conflicts in companion animal species, especially dogs and cats. Upon completion of the course graduates should be eligible for accreditation of the academic requirement and have partially completed the level 1 practical requirement for certification as a Clinical Animal Behaviourist by the Association for the Study of Animal Behaviour, the only independent accreditation body for the profession in the UK. Students should recognise the breadth of the discipline and their own role within this newly emerging profession. They should be able to investigate and evaluate behaviour problems using the theories, methodologies and clinical tools that are potentially available to them, and recognise the need for further specialist intervention when and where appropriate. The course will give particular emphasis to the development of relevant skills training and so graduates should be competent in the application of appropriate treatment methodologies which also safeguard the animal's well-being and longer term interests. They should also be able to report about issues within the discipline in an informed and systematic manner at a level that makes it possible to submit their report to a peer reviewed journal. The MSc in Clinical Animal Behaviour is distinctive in that it focuses on clinical skills development. Learners are guided in their reading and theoretical grounding through the widespread use of seminars and discussion groups, with academics playing a key role in the facilitation of learning and deepening the understanding of key concepts so that they can be applied within a clinical setting.

QAA Subject Benchmark Statement(s):

The MSc in Clinical Animal Behaviour as a post graduate award responds to no currently published United Kingdom QAA benchmark statement(s). This programme fundamentally adopts a biosciences perspective to a subject integral to veterinary science, requiring many practical and clinical skills for its successful practice, including the evaluation of the health and welfare of non-human animals, evaluation of a range of treatment modalities, including pharmacological and pheromonal interventions and counselling skills. As such it is very much a multidisciplinary science programme, which seeks to develop a range of post graduate scientific skills in a particular context. Thus the programme is not mapped onto any benchmark, but an appendix is provided illustrating how elements of the programme map onto the skills expected of graduates by the University as illustrated by its current Training Needs Analysis Log. Nonetheless the programme complies with the academic requirements of the Association for the Study of Animal Behaviour for initial approval of the theoretical and parts of the practical components necessary for level one of the certification of a Clinical Animal Behaviourist.

Internal contexts:

The MSc in Clinical Animal Behaviour is in line with the move towards developing an increased provision of postgraduate programmes and thus is consistent with the Strategic Plan for the University advocating an increased postgraduate provision and a further development of the research

environment. This particular programme helps specifically to increase the critical mass of expertise in the field which is essential to the consolidation of our international reputation in an increasingly competitive field, but also one in which professionalization and professional standards are beginning to emerge. Students for the MSc potentially have access to the animal behaviour clinic (with video recording facilities), Animal Cognition Laboratories (with a range of specialist equipment) and analytical laboratories (with GCMS and HPLC for the analysis of physiological samples) and potentially access to some of the facilities of the Dept. of Psychology with whom staff currently collaborate on relevant projects. Animal training rooms include an observation room with one-way mirror. As part of the Department's infrastructure there is support from practical instructors and a subject librarian (maintaining the journal-stock, book-stock, and electronic databases).

External contexts:

The MSc Clinical Animal Behaviour will utilise cases presented by the public on referral to the animal behaviour clinic, and utilise a number of other externally interfacing activities, such as the puppy training classes run on campus. The potential exists to also integrate activities with other programmes to the benefit of learners on both programmes. For example it is sometimes possible for drama students to role play distressed clients in set exercises with the MSc students, to provide a unique learning experience in relation to the development of counselling skills for students on the programme. Currently, the department holds a database of owners who are keen to engage in animal related studies with their dog, as well as veterinary practices referring cases and these, together with other partnerships can potentially be exploited by students on the proposed programme who may require access to such external sources. All research and practical work within the programme will be carried out within a clearly defined ethical framework as specified in the ethical standards and guidelines provided by the ASAB and the University of Lincoln.

3.3 Variations to Standard Regulations and Guidance

Yes - see the Approved Variations to the University's Postgraduate Regulations:

<http://secretariat.blogs.lincoln.ac.uk/university-regulations/>

Students who do not meet the ASAB progression requirements or exit the programme early will receive the title of 'Animal Behaviour Management' for their confirmed award.

4. Programme Outcomes

Programme-level learning outcomes are identified below.

Refer to *Appendix I – Curriculum Map* for details of how outcomes are deployed across the programme.

4.1 Knowledge and Understanding

On successful completion of this programme a student will have knowledge and understanding of:

- 1 Demonstrate a scientific understanding of the biology and evaluation of normal and problematic behaviour in a range of companion animal species
- 2 Articulate an understanding of current theories and conflicting scientific perspectives relating to the biology of normal and problematic behaviour in animals.
- 3 Appreciate the range of interactions that occur between companion animals and man.
- 4 Understand ethical, legal and professional standards of conduct for those working with animals
- 5 Appreciate the scientific basis to a range of adjuncts used in the management of problem behaviour, including psychopharmacology, phermonotherapy and dietary interventions.

4.2 Subject Specific Intellectual Skills

On successful completion of this programme a student will be able to:

- 6 Recognise, interpret, evaluate and report upon their observations of the behaviour of animals
- 7 Evaluate the impact of a range of recognised risk factors on the behaviour of animals

4.3 Subject Specific Practical Skills

On successful completion of this programme a student will be able to:

- 8 Design, implement and assess a husbandry plan (including one involving methods for targetted behaviour modification) for a range of companion animal species

4.4 Transferable Skills and Attributes

On successful completion of this programme a student will be able to:

- 9 Critically evaluate the scientific literature
- 10 Systematically evaluate their own observations and experiences
- 11 Evaluate the basis of other peoples' perspectives of a problem
- 12 Logically justify the conclusions they draw from the evidence available in a range of settings
- 13 Undertake evaluations of complex dilemmas and situations (e.g. ethical dilemmas), using a systematic approach

- 14 Design, justify and monitor the implementation of a business plan
- 15 Demonstrate skills relevant to the mediation and resolution of psychological conflicts
- 16 Formulate a research hypothesis and design, implement and report upon a scientific programme of study to investigate this
- 17 Reflect upon constructive feedback relating to their ideas and suggestions
- 18 Communicate constructively with others to help them improve performance

For details of each module contributing to the programme, please consult the module specification document.

5. Learning, Teaching and Assessment Strategies

5.1. Learning and Teaching Strategy

The teaching and learning strategy adopted within the MSc in Clinical Animal Behaviour aims to ensure that the learning experience empowers students to improve their levels of informed and independent critical analysis, reflective and clinical skills. The strategies adopted to achieve these aims consist of:

- Ensuring that the methods and contexts for teaching and learning are adapted and adaptable to the increasing diversity of learners, with the tutor acting as a facilitator of learning rather than the point source of information
- Ensuring ready access to key information sources in advance of programme delivery and engendering a culture of preparation for study
- Encouraging the use of electronic discussion groups to encourage reflection upon learning and creative thinking in a less intimidating environment (e.g., by using Blackboard)
- Employing a mixture of seminar and practical based - interactive – learning
- Ensuring that students have access to specialist staff at the forefront of their discipline
- Ensuring module and programme quality by monitoring at both module and programme level (e.g., by considering student feedback, and external examiner's comments)

Students are provided with module documents, programme documents and supporting documents (e.g. on the reading requirements for each module).

The most commonly used methods of teaching are:

- Lectures/ seminars: Lectures provide a guide to a topic, highlighting important areas and providing information on matters that may not be readily available from other sources. However greater emphasis is given to seminar delivery in which students are encouraged to reflect upon their reading and preparation in relation to predefined subject themes
- Problem based learning: A number of the modules will use problem based learning in conjunction with other teaching methods to encourage self-directed critical reflection on the learning process
- Practical work: Practical skills development, where students have the opportunity to work while supervised by their tutor on an integral and essential component of the programme and students may work in partnerships to observe and formatively assess each other in turn, in order to develop observational, interpretative, evaluative and interpersonal communication skills.

The importance of careful preparation for all modules is stressed to students throughout, in order to make sure that this aspect of teaching can be employed.

5.2. Assessment Strategy

The assessment strategy adopted within the MSC in Clinical Animal Behaviour has regard for the following factors:

- the workload and the need to avoid undue pressure being placed on students by the coincidence of the assessments
- the development and attainment of programme outcomes, including the attainment of high-level intellectual skills such as critical analysis and evaluation, and the development of the student as an independent researcher, as well as practically competent within a clinical setting and within a range of problem behaviour contexts
- the teaching and learning methods and outcomes
- the clarity with which assessment methods and criteria are expressed
- the level at which skills/abilities are assessed (MSc)
- the differentiation of students in terms of their ability and the extent to which they have achieved the learning outcomes being assessed

To this end there opportunities to obtain peer and lecturer feedback within the programme to support students in preparation for their summative assessment and in the learning outcomes of the programme

The Assessment Map gives a top-level indication of the scheduling and distribution of assessment modes within the programme. Details of module assessment strategy are included with each module specification.

6. Programme Structure

The total number of credit points required for the achievement of Postgraduate Certificate (PG Cert) is 60.

The total number of credit points required for the achievement of Postgraduate Diploma (PG Dip) is 120.

The total number of credit points required for the achievement of Master of Science (MSc) is 180.

Masters

Title	Credit Rating	Core / Optional
Development and Regulation of Behaviour 2017-18	30	Core
Human-Animal Interactions 2017-18	15	Core
Domestic Animal Behavior and Cognition 2017-18	15	Core
Clinical Skills for Animal Behaviour Management 2017-18	30	Core
Animal Welfare 2017-18	15	Core
Research Methods (Clinical Animal Behaviour) 2017-18	15	Core
MSc Thesis (MSc Clinical Animal Behaviour) 2017-18	60	Core

Appendix I - Curriculum Map

This table indicates which modules assume responsibility for delivering and ordering particular programme learning outcomes.

Key: Delivered and Assessed Delivered Assessed

Masters

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
Animal Welfare 2017-18	<input checked="" type="checkbox"/>							<input type="checkbox"/>		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Clinical Skills for Animal Behaviour Management 2017-18					<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Development and Regulation of Behaviour 2017-18	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<input type="checkbox"/>	<input checked="" type="checkbox"/>				
Domestic Animal Behavior and Cognition 2017-18	<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Human-Animal Interactions 2017-18			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>								
MSc Thesis (MSc Clinical Animal Behaviour) 2017-18	<input checked="" type="checkbox"/>								<input checked="" type="checkbox"/>			
Research Methods (Clinical Animal Behaviour) 2017-18				<input type="checkbox"/>								

	PO13	PO14	PO15	PO16	PO17	PO18
Animal Welfare 2017-18	<input checked="" type="checkbox"/>					
Clinical Skills for Animal Behaviour Management 2017-18	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
Development and Regulation of Behaviour 2017-18						
Domestic Animal Behavior and Cognition 2017-18						
Human-Animal Interactions 2017-18	<input checked="" type="checkbox"/>		<input type="checkbox"/>			
MSc Thesis (MSc Clinical Animal Behaviour) 2017-18				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Research Methods (Clinical Animal Behaviour) 2017-18	<input type="checkbox"/>	<input checked="" type="checkbox"/>				

Appendix II - Assessment Map

This table indicates the spread of assessment activity across the programme. Percentages indicate assessment weighting.

Masters

	01	02	03	04	05	06	07	08	09	10	11	12
Animal Welfare 2017-18												
Clinical Skills for Animal Behaviour Management 2017-18												
Development and Regulation of Behaviour 2017-18						30						
Domestic Animal Behavior and Cognition 2017-18												
Human-Animal Interactions 2017-18										60		
MSc Thesis (MSc Clinical Animal Behaviour) 2017-18												
Research Methods (Clinical Animal Behaviour) 2017-18												
	13	14	15	16	17	18	19	20	21	22	23	24
Animal Welfare 2017-18										30		
Clinical Skills for Animal Behaviour Management 2017-18							100					
Development and Regulation of Behaviour 2017-18		30										
Domestic Animal Behavior and Cognition 2017-18	100											
Human-Animal Interactions 2017-18				40								
MSc Thesis (MSc Clinical Animal Behaviour) 2017-18												
Research Methods (Clinical Animal Behaviour) 2017-18							20				30	

						34, 35)
Animal Welfare 2017-18						
Clinical Skills for Animal Behaviour Management 2017-18						
Development and Regulation of Behaviour 2017-18					40	
Domestic Animal Behavior and Cognition 2017-18						
Human-Animal Interactions 2017-18						
MSc Thesis (MSc Clinical Animal Behaviour) 2017-18						
Research Methods (Clinical Animal Behaviour) 2017-18						

Appendix III - Benchmark Analysis

This table maps programme learning outcomes to relevant QAA subject benchmark statements or PSRB guidelines.

Knowledge and Understanding

	Biosci01	Biosci02	Biosci03	Biosci04	Biosci05	Biosci06	Biosci07	Biosci08	Biosci09
PO1									
PO2									
PO3									
PO4									
PO5									

	Biosci10	Biosci11	Biosci12	Biosci13	Biosci14	Biosci15	Biosci16	Biosci17	Biosci18
PO1									
PO2									
PO3									
PO4									
PO5									

	Biosci19	Biosci20	Biosci21	Biosci22	Biosci23	Biosci24	Biosci25	Biosci26	Biosci27
PO1									
PO2									
PO3									
PO4									
PO5									

	Biosci28	Biosci29	Biosci30	Biosci31	Biosci32	Biosci33	Biosci34	Biosci35	Biosci36
PO1									
PO2									
PO3									
PO4									

PO5									
	Biosci37	Biosci38	Biosci39	Biosci40	Biosci41	Biosci42	Biosci43	Biosci44	Biosci45
PO1									
PO2									
PO3									
PO4									
PO5									
	Biosci46	Biosci47	Biosci48	Biosci49	Biosci50	Biosci51	Biosci52	Biosci53	Biosci54
PO1									
PO2									
PO3									
PO4									
PO5									
	Biosci55	Biosci56	Biosci57	Biosci58	Biosci59	Biosci60	Biosci61	Biosci62	Biosci63
PO1									
PO2									
PO3									
PO4									
PO5									
									Biosci64
PO1									
PO2									
PO3									
PO4									
PO5									

Subject Specific Intellectual Skills

	Biosci01	Biosci02	Biosci03	Biosci04	Biosci05	Biosci06	Biosci07	Biosci08	Biosci09
PO6									
PO7									
	Biosci10	Biosci11	Biosci12	Biosci13	Biosci14	Biosci15	Biosci16	Biosci17	Biosci18
PO6									
PO7									
	Biosci19	Biosci20	Biosci21	Biosci22	Biosci23	Biosci24	Biosci25	Biosci26	Biosci27
PO6									
PO7									
	Biosci28	Biosci29	Biosci30	Biosci31	Biosci32	Biosci33	Biosci34	Biosci35	Biosci36
PO6									
PO7									
	Biosci37	Biosci38	Biosci39	Biosci40	Biosci41	Biosci42	Biosci43	Biosci44	Biosci45
PO6									
PO7									
	Biosci46	Biosci47	Biosci48	Biosci49	Biosci50	Biosci51	Biosci52	Biosci53	Biosci54
PO6									
PO7									
	Biosci55	Biosci56	Biosci57	Biosci58	Biosci59	Biosci60	Biosci61	Biosci62	Biosci63
PO6									
PO7									
									Biosci64
PO6									
PO7									

Subject Specific Practical Skills

	Biosci01	Biosci02	Biosci03	Biosci04	Biosci05	Biosci06	Biosci07	Biosci08	Biosci09
PO8									
	Biosci10	Biosci11	Biosci12	Biosci13	Biosci14	Biosci15	Biosci16	Biosci17	Biosci18
PO8									
	Biosci19	Biosci20	Biosci21	Biosci22	Biosci23	Biosci24	Biosci25	Biosci26	Biosci27
PO8									
	Biosci28	Biosci29	Biosci30	Biosci31	Biosci32	Biosci33	Biosci34	Biosci35	Biosci36
PO8									
	Biosci37	Biosci38	Biosci39	Biosci40	Biosci41	Biosci42	Biosci43	Biosci44	Biosci45
PO8									
	Biosci46	Biosci47	Biosci48	Biosci49	Biosci50	Biosci51	Biosci52	Biosci53	Biosci54
PO8									
	Biosci55	Biosci56	Biosci57	Biosci58	Biosci59	Biosci60	Biosci61	Biosci62	Biosci63
PO8									
									Biosci64
PO8									

Transferable Skills and Attributes

	Biosci01	Biosci02	Biosci03	Biosci04	Biosci05	Biosci06	Biosci07	Biosci08	Biosci09
PO9									
PO10									

PO11									
PO12									
PO13									
PO14									
PO15									
PO16									
PO17									
PO18									

	Biosci10	Biosci11	Biosci12	Biosci13	Biosci14	Biosci15	Biosci16	Biosci17	Biosci18
PO9									
PO10									
PO11									
PO12									
PO13									
PO14									
PO15									
PO16									
PO17									
PO18									

	Biosci19	Biosci20	Biosci21	Biosci22	Biosci23	Biosci24	Biosci25	Biosci26	Biosci27
PO9									
PO10									
PO11									
PO12									
PO13									
PO14									
PO15									
PO16									
PO17									
PO18									

	Biosci28	Biosci29	Biosci30	Biosci31	Biosci32	Biosci33	Biosci34	Biosci35	Biosci36
PO9									
PO10									
PO11									
PO12									
PO13									
PO14									
PO15									
PO16									
PO17									
PO18									

	Biosci37	Biosci38	Biosci39	Biosci40	Biosci41	Biosci42	Biosci43	Biosci44	Biosci45
PO9									
PO10									
PO11									
PO12									
PO13									
PO14									
PO15									
PO16									
PO17									
PO18									

	Biosci46	Biosci47	Biosci48	Biosci49	Biosci50	Biosci51	Biosci52	Biosci53	Biosci54
PO9									
PO10									
PO11									
PO12									
PO13									
PO14									
PO15									
PO16									

PO17									
PO18									
	Biosci55	Biosci56	Biosci57	Biosci58	Biosci59	Biosci60	Biosci61	Biosci62	Biosci63
PO9									
PO10									
PO11									
PO12									
PO13									
PO14									
PO15									
PO16									
PO17									
PO18									

									Biosci64
PO9									
PO10									
PO11									
PO12									
PO13									
PO14									
PO15									
PO16									
PO17									
PO18									

Appendix IV: Benchmark Benchmark Statement(s)

Biosci01 - *Be able to access bioscience information from a variety of sources and to communicate the principles in a manner appropriate to the programme of study.*

Biosci02 - *Have ability in a range of practical bioscience techniques, including data collection, analysis and interpretation of those data, and testing of hypotheses.*

Biosci03 - *Have an understanding of the explanation of biological phenomena at a variety of levels (from molecular to ecological systems) and be able to explain how evolutionary theory is relevant to their area of study.*

Biosci04 - *Be able to plan, execute and present an independent piece of hypothesis-driven work (eg a project) within a supported framework in which qualities such as time management, problem solving, and independence are evident.*

Biosci05 - *Have some understanding of ethical issues and the impact on society of advances in the biosciences.*

Biosci06 - *Be able to record data accurately, and to carry out basic manipulation of data (including qualitative data and some statistical analysis, when appropriate)*

Biosci07 - *Have developed basic strategies to enable them to update their knowledge of the biosciences.*

Biosci08 - *Be able to express relevant biological reactions in chemical terms.*

Biosci09 - *Understand how the chemistry and structure of the major biological macromolecules, including proteins and nucleic acids, determines their biological properties.*

Biosci10 - *Understand how the principles of genetics underlie much of the basis of modern molecular biology.*

Biosci11 - *Understand the main principles of gene expression.*

Biosci12 - *Know and understand the structure and function of various types of cells in unicellular and multicellular organisms, the structure and function of cell membranes, cell differentiation.*

Biosci13 - *Understand a range of appropriate and relevant experimental techniques and how they are used; and be able to perform some of them.*

Biosci14 - *Have a knowledge of cell metabolism, including the main anabolic and catabolic pathways.*

Biosci15 - *Have knowledge of enzyme structure and function and of some of the most important mechanisms controlling the action of enzymes and other proteins.*

Biosci16 - *Describe the structure, diversity and reproduction of the organisms studied.*

Biosci17 - *Describe basic organism structure and diversity.*

Biosci18 - *Describe mechanisms for the life processes and appreciate how the physiology of an organism fits it for its environment.*

Biosci19 - *Show an appreciation of the integration of metabolism.*

Biosci20 - *Show knowledge of the basic genetic principles relating to, and evolution of, the organisms studied.*

Biosci21 - *Describe how organisms are classified and identified.*

Biosci22 - *Appreciate the interactions of organisms with each other and the environment.*

Biosci23 - *Describe the place of the organisms studied in the living world.*

Biosci24 - *Appreciate the importance of the 'behaviour' of the organisms studied.*

Biosci25 - *Demonstrate knowledge of biogeochemical cycles and pathways.*

Biosci26 - *Describe and exemplify nutrient and energy flow through individuals, populations and communities.*

Biosci27 - *Describe the structure, biogeography and diversity of ecosystems in relation to climate, geology, soils, palaeo-historical and evolutionary factors.*

Biosci28 - *Describe and exemplify patterns of distribution of organisms in relation to biotic and abiotic factors.*

Biosci29 - *Demonstrate knowledge of population processes, dynamics and interactions, and associated theoretical models.*

Biosci30 - *Demonstrate knowledge of community structure, development, biodiversity, and associated theoretical models.*

Biosci31 - *Demonstrate awareness of human interactions with natural populations and ecosystems, including habitat modification, pollution, exploitation and conservation.*

Biosci32 - *Demonstrate awareness of the applied significance of species as resources and as damage-causing organisms.*

Biosci33 - *Carry out routine investigations as instructed, using ecological methodologies and data analyses.*

Biosci34 - *Be able to access and evaluate bioscience information from a variety of sources and to communicate the principles both orally and in writing (eg essays, laboratory reports) in a way that is well organised, topical and recognises the limits of...*

Biosci35 - *Have ability in a broad range of appropriate practical techniques and skills relevant to the biosciences...*

Biosci36 - *Be able to plan, execute and present an independent piece of work (eg a project), in which qualities such as time management, problem solving and independence are evident, as well interpretation and critical awareness of the quality of evidence.*

Biosci37 - *Be able to construct reasoned arguments to support their position on the ethical and social impact of advances in the biosciences be able to apply relevant advanced numerical skills (including statistical analysis, where appropriate) to biological...*

Biosci38 - *Have well-developed strategies for updating, maintaining and enhancing their knowledge of the biosciences.*

Biosci39 - *Be able to understand and explain the chemistry that underlies biochemical reactions and the techniques used to investigate them.*

Biosci40 - *Understand the principles that determine the three-dimensional structure of biological macromolecules and be able to explain detailed examples of how structure enables function.*

Biosci41 - *Acquire a critical understanding of the molecular basis of genetics and be able to explain some detailed examples.*

Biosci42 - *Have critical knowledge and understanding of gene expression, with a detailed knowledge of specific examples; the structure, arrangement, expression, and regulation of genes; and relevant experimental methods.*

Biosci43 - *Be familiar with a wide range of cells (both prokaryotic and eukaryotic) and be able to explain critically how their properties suit them for their biological function, and how they could be investigated experimentally.*

Biosci44 - *Be able to devise and evaluate suitable experimental methods for the investigation of relevant areas of biochemistry and molecular biology.*

Biosci45 - *Have a critical understanding of essential features of cell metabolism and its control, including topics such as energy and signal transduction, respiration and photosynthesis...*

Biosci46 - *Understand the chemical and thermodynamic principles underlying biological catalysis and the role of enzymes and other proteins in determining the function and fate of cells and organisms.*

Biosci47 - *Critically analyse the impact of external influences on growth and reproduction, and explain reproductive strategies.*

Biosci48 - *Critically recount the interactions of structure and metabolic function at cellular and organism level.*

Biosci49 - *Describe and critically evaluate the evidence for the mechanisms of life processes.*

Biosci50 - *Interpret the significance of internal and external influences on the integration of metabolism for survival and health.*

Biosci51 - *Describe and analyse patterns of inheritance and complex genetic interactions relating to the lives and evolution of the organisms studied.*

Biosci52 - *Enumerate the methods and principles underlying taxonomy and classification.*

Biosci53 - *Critically describe the principles and processes governing interactions of organisms and their environment.*

Biosci54 - *Critically analyse the contribution of the organisms to the biosphere.*

Biosci55 - *Critically assess the contribution of 'behavioural patterns' to survival and success.*

Biosci56 - *Demonstrate comprehension and intelligent engagement with biogeochemical cycles and pathways.*

Biosci57 - *Discuss and demonstrate comprehension of nutrient and energy flow through individuals, populations and communities.*

Biosci58 - *Demonstrate comprehension of the structure, biogeography and diversity of ecosystems in relation to climate, geology, soils, palaeo-historical and evolutionary factors.*

Biosci59 - *Discuss and critically analyse patterns of distribution of organisms in relation to biotic and abiotic factors.*

Biosci60 - *Demonstrate comprehension and critical analysis of population processes, dynamics and interactions, and associated models.*

Biosci61 - *Demonstrate comprehension and critical analysis of community structure, development, biodiversity, and associated models.*

Biosci62 - *Evaluate and critically analyse the effects of such human interactions on natural populations and ecosystems.*

Biosci63 - *Be capable of evaluating the impacts of harvesting resources, controlling pest/ pathogens and different approaches to species management.*

Biosci64 - *Apply critical understanding of ecological methodologies and data analyses.*