GUIDANCE DOCUMENT ON APPLICATION FOR ASSESSMENT OF NON-IBMS ACCREDITED DEGREE

Version 6.4

Contents

1. INTRODUCTION

1.1 This document provides guidance notes for the application process for assessment of academic qualifications that have already been awarded but are not from an academic programme which has been formally accredited by the Institute of Biomedical Science (IBMS/the Institute). This process is essential for candidates wishing to become eligible for HCPC registration as a biomedical scientist by undertaking the non-accredited degree followed by the Certificate of Competence route which has been approved by the Health and Care Professional Council (HCPC).

1.2 Included in this document are details of the requirements for the IBMS to be able to undertake the assessment, a description of the components of an accredited course, and information on the assessment process used to scrutinise all non- accredited academic qualifications in order to identify any deficiency against the requirements for the HCPC standards of education and training and the most recent QAA Subject Benchmark Statement for Biomedical Science.

1.3 Candidates submitting qualifications for assessment must be able to evidence they have attained a minimum level of qualification in core subjects relevant to biomedical science (see Appendix 1 Section A) that is equivalent to a UK degree at BSc (Hons) level. Only degrees completed within 10 years of application can be considered for a non-accredited degree assessment. Higher level qualifications can also be submitted and may be from within the United Kingdom or acquired internationally. (Please note that all overseas qualification applications must include an assessment against UK ENIC[1] - the UK National Information Centre for global qualifications and skills - to provide a comparison to UK qualifications. See Statement of Comparability (enic.org.uk) for further information).

1.4 Applications from individuals that have not achieved an academic level of attainment equivalent to an undergraduate honours degree (in a relevant subject and within 10 years of application) will be advised to complete an IBMS accredited undergraduate degree. Recognition of any prior learning would then be at the discretion of the university offering the individual entry to their accredited programme.

1.5 All applications are assessed on the basis of the taught academic subject content relevant to biomedical science subjects that contribute to an academic award at a minimum of honours degree level. Applicants may include individuals who hold non-accredited degrees in biomedical science(s), healthcare science, or other degrees with scientific content.

1.7 Qualification(s) are initially screened for the presence of core subjects that provide an essential foundation for studying the key biomedical science disciplines. Core subjects include: Human Anatomy and Physiology, Biochemistry, Cell Biology, Molecular Biology and Genetics, Microbiology, and Immunology.

[1] Following the UK's leaving the EU, the former UK NARIC recognition agency function changes from a NARIC (which is an EU-only title) to an ENIC (the wider European title for national recognition agencies) in order to meet the UK's continuing treaty obligations under the Lisbon Recognition Convention.

1.8 If very few or none of the core subjects are included, then the degree assessment application will be returned to the applicant and no fee taken.
Applicants will be advised that the most efficient route to pursue HCPC registration is to request accreditation for prior learning (APL) from the university for enrolment onto an IBMS accredited undergraduate degree.

1.9 If insufficient information is provided a request for additional information is emailed to the applicant and the application held for initial screening pending receipt of the information.

1.10 Qualifications that are accepted after initial screening are assessed against the academic components described in the QAA Subject benchmark statement for biomedical sciences (current edition published October 2019) which are the basis of the taught elements on an IBMS accredited degree.
The majority of degree assessments are completed within 12 weeks, from the point at which the application has been approved to be assessed and the payment has been received.

1.11 Degree assessments are carried out by assessors who, as academic staff closely associated with IBMS accredited biomedical science undergraduate degrees (e.g. programme leaders), are familiar with the academic requirements for HCPC registered biomedical scientists.

1.12 There are two possible outcomes of the full assessment:

a) application acceptable: supplementary education <u>not</u> required

A letter will be sent to the candidate confirming that their qualification is accepted as equivalent to an IBMS accredited degree.

b) application partially acceptable: supplementary education required

A letter will be sent to the candidate confirming that their qualification is partially accepted. The assessment outcome will identify areas where supplementary education is required. They will be advised that in order to be eligible for HCPC registration as a biomedical scientist they will need to complete the supplementary education from IBMS accredited undergraduate degree modules. Candidates will be required to make their own arrangements for this directly with the programme leader at a university offering an IBMS accredited undergraduate degree, who will advise them which modules will be required to address the shortfall. This will vary between universities depending on the structure of the degree, or if a designated suite of modules is offered, mapping to required subjects. If a large amount of supplementary education is required, the candidate may be advised to consider recognition of prior learning to enable them to enrol on an accredited undergraduate degree programme.

1.13 The letters will also advise candidates that they must complete the IBMS Registration Training Portfolio for the award of the IBMS Certificate of Competence. Training for this must take place in a laboratory that has been approved by the IBMS for pre-registration training. Further details regarding this are available on the IBMS website.

Please note:

There is a requirement by the HCPC for potential registrants to have had a Disclosure and Barring Service check prior to acceptance onto the register. In laboratories training individuals towards the IBMS Certificate of Competence Registration Training Portfolio, a senior member of staff (usually laboratory manager) must ensure that potential HCPC registrants are able to meet the requirements for registration with regard to health and Criminal Conviction/ Disclosure and Barring Service checks. Checks must be carried out on each trainee and a declaration must be made by them at the point of application for the Registration Training Portfolio. If this check raises an issue which may affect the trainee's eligibility to become registered, the senior member of staff should formally discuss this with the trainee, document the discussion and guide the trainee to seek advice from the HCPC *at that point*. A portfolio will not be released unless the IBMS receive a declaration to say that this process has been followed. A declaration from the trainee will be required at the end point, following verification, which states that there have been no changes to their health or DBS check during the training period and that they do not know of any reason which might affect their eligibility to apply to become registered.

2. APPLICATION PROCESS FOR DEGREE ASSESSMENT

Only applicants who have completed their degree should apply for assessment.

2.1 The application is split into two distinct parts so that for reasons of confidentiality and data protection, personal information of the applicant is not made available to external assessors.

- **Part A** must contain the personal information of the applicant and any documentation containing the applicant's personal information. This will remain within the IBMS database.
  Part A must be completed electronically and submitted as a single document.

- **Part B** must contain:
  a) A copy of the degree transcript detailing which modules have been passed, failed, and compensated. All applicant's details are to be redacted on this copy of the transcript.
  b) Module descriptors: details of the module content of the applicant's qualification(s) for assessment of equivalence to a biomedical science degree.
  The pages of Part B should be in the order in which they appear in the transcript, correctly orientated for easy viewing and legible.

  Part B should be included as a separate single document (usually PDF).

Note: Submissions not meeting these requirements will be rejected.

22 Completing Part A

Applicants are required to provide:

- Completed application form (please refer to this for current requirements).
- Documentary evidence which certifies that you have received academic level of attainment in subjects relevant to biomedical science equivalent to a UK undergraduate honours degree within 10 years of application and confirms the name and classification of the award. This academic certificate could be a university degree, a diploma received from an education body or any other higher education certificate. If applicants have passed their degree but not received the degree certificate, we will require confirmation of the degree award from the education provider on headed paper.
- Copy of UK ENIC Statement of Comparability for all non-UK qualification(s). Please see Statement of Comparability (enic.org.uk) for further information. **This should equate to a UK undergraduate honours degree. (Note: some statements designate the comparability to Ordinary degree standard only, which will NOT be accepted. If the statement designates comparability to a UK Bachelor degree, with no mention of honours, then please enquire about this with us first and provide the relevant degree information).**
- Photocopy of either birth certificate or the personal details section of applicant's passport.
- Photocopy of any change of name (if certificates list any previous names, e.g. maiden name).
- Cheque, postal order, or purchase orders made payable to the IBMS or
- Indicated preference to pay by debit or credit card (for the data protection of the applicant we do not accept card details submitted on the application form or by email. After the application has been screened, we will contact the applicant to obtain the necessary card details to enable us to take payment).

23 Completing Part B

Applicants are required to provide:

- Copy of Academic transcript:
  Also known as an academic record or a statement of learning, this is a document which clearly records all of the modules and subjects you studied as part of your course. It should also show the grades achieved for each module, how many credits were accrued and any relevant exemptions. If you don't have an academic transcript, you will need to get in touch with your previous education institution and request one.
- Module descriptors / definition forms:
  These are education provider documents that contain details of the curriculum and learning outcomes such as the information described in **Appendix 2**.
  They need to be identifiable as official documents by the presence of name and logo of the educational institution that made the award or authenticated with the official stamp of the institution to verify the accuracy of the information provided. If insufficient detail of what has been studied is provided, then the application for assessment will be rejected.

2.5 There are three possible outcomes of this stage of the process:

a. The application is rejected and there is no charge.
The minimum level of qualification does not meet the requirement for equivalence to UK honours degree level in core subjects relevant to biomedical science (See Appendix 1 Section A) due to a significant lack of core and key subject areas, rendering the majority of the degree not relevant to biomedical science.

b. Further information is required for assessment.
The candidate is contacted by email with a request to provide additional information. This may be because the information provided is insufficient to decide whether or not a subject area has been studied in sufficient detail.

c. The application is accepted for full assessment and payment is processed.

3. DEGREE ASSESSMENT PROCESS

3.1 Initial screening of applications is carried out within the Education Team. If the application is incomplete or requires further information, the applicant will be contacted to complete their application before any payment is processed.

3.2 The Education Team will check the following:

- All required documents are present (refer to section 2 of this document).
- Award information including title of award, awarding institution, date of award, level of award, module titles and module identification codes are consistent and accurate across the documentation provided.
- UK ENIC assessment of comparability to UK award (if applicable).
- Applicant can be identified by the scanned copies of identification documents submitted.
- Module specific content contains sufficient detail of the curriculum and learning outcomes (refer to section 2 of this document).

3.3 The academic assessment will be carried out electronically by a trained assessor.

3.4 The assessment will determine whether or not the academic profile has sufficient depth and breadth of the subject areas or whether there are deficiencies that require further academic study. Subject areas are based on Appendix 1 The QAA subject benchmark statement for biomedical sciences (2019) and Appendix 2 which describes examples of an indicative curriculum in more detail.

3.5 The assessor will make a reasoned judgement to determine whether or not the taught curriculum content of the qualification(s) is sufficient to match the QAA subject benchmark statement for biomedical sciences (2019) based on the information provided.

3.6 Outcomes of the full assessment process:

a) Acceptance of the qualification(s) without the requirements for further academic study. If the assessor does not identify any areas where supplementary education is required, the qualification is accepted.

b) Acceptance of the qualification(s) subject to supplementary education being undertaken to make up for a deficit in subject knowledge.

3.7 Applicants are informed of the outcome of the assessment process (with identification of shortfall where necessary) by letter. They will be made aware of the requirement to complete the IBMS Registration Training Portfolio as a record of training for the award of the Certificate of Competence, in order to become eligible to apply to the HCPC for registration.

3.8 All applicants have the right of appeal. Appeals will be considered on the basis of additional information being provided or evidence-based challenges to the decision-making process. If the appeal is an evidence-based challenge to the assessment applicants must re-submit specific documentation from the original submission highlighting where the information is present in the documentation.

3.9 In the case of an appeal this will be reviewed by a second assessor. All appeals must be made in writing to the IBMS within 8 weeks clearly stating the academic topics for appeal and reasons why, with evidence to support the appeal attached.

4. SUPPLEMENTARY STUDY

4.1 If the applicant is required to undertake supplementary study (top-up modules) in order to meet the academic requirements for HCPC registration as a biomedical scientist then these requirements can be achieved through studying appropriate modules from an IBMS accredited undergraduate programme, listed as follows: Top-up modules in the UK - Institute of Biomedical Science Careers (ibms.org) Undergraduate UK courses - Institute of Biomedical Science Careers (ibms.org) The IBMS will not provide advice on which university provides the opportunity to undertake top-up modules. Applicants will need to approach a university programme leader of an accredited degree to discuss their options.

4.2 Upon completion of the identified supplementary education, the university will need to provide the applicant with a letter which states that they have successfully completed the supplementary education to the required level for registration with the Health and Care Professions Council (HCPC) as a biomedical scientist. The applicant will need to provide this letter when their training officer applies for the verification of their IBMS Registration Training Portfolio.

4.3 The IBMS does not provide any form of funding for supplementary education and applicants will need to speak with the university with regards to the duration and costs of the modules. In order to determine the appropriate modules, the university may wish to map the qualification against the IBMS accredited programme, and this may incur a further fee.

APPENDIX 1: QAA SUBJECT BENCHMARK STATEMENT FOR BIOMEDICAL SCIENCES

The following has been adapted from section 4, 5, and 6 of the 2019 benchmark statements.

Section A. Biomedical sciences programmes generally include:

Core Subjects

i) Human anatomy and physiology: the structure, function, neurological and hormonal control of the human body, its component parts and major systems (musculoskeletal, circulatory, respiratory, digestive, renal, urogenital, nervous, endocrine) and their relationship to each other.

ii) Cell biology: the structure and function of prokaryotic and eukaryotic cells; the cell as the fundamental unit of life; cell division, cell cycle, stem cells, cell specialisation and cooperation.

iii) Biochemistry: key chemical principles relevant to biological systems, the structure and function of biological molecules and the biochemistry of processes which support life including cellular metabolism and its control.

iv) Genetics, genomics and human variation: the structure and function of genes, the principles of their inheritance, genetic disorders with particular biomedical significance, evolution and population biology.

v) Molecular biology: the structure and function of biologically important molecules including DNA, RNA and proteins and the molecular events that govern cell function. Molecular biology overlaps with biochemistry, genetics and cell biology.

vi) Bioinformatics and systems biology: the computation of high volumes of biological data and the properties of a network of interacting components in a system, the computation of high volumes of biological data and the properties of a network of interacting components in a system.

vii) Microbiology: the structure, physiology, biochemistry, identification, classification and control of micro-organisms, including the roles of normal flora.

viii) Immunology: acute and chronic inflammation, structure, function and mechanisms of action of the components of the immune system; innate and acquired immunity.

Section B. Subject-specific knowledge, understanding and skills in Biomedical Science:

Within the broader biomedical sciences are clinical laboratory subjects that specifically address the knowledge and understanding of disease processes in the context of the study and investigation of those processes.

Cellular Pathology is the microscopic examination of normal and abnormal cells (cytopathology), and tissues (histopathology) for indicators of disease.
A biomedical science graduate will have a knowledge of:

- the gross structure and ultrastructure of normal cells and tissues and the structural changes which may occur during disease;
- reproductive science, including infertility and embryology;
- the preparation of cells and tissues for microscopic examination;
- the principles and applications of visualisation and imaging techniques, including microscopy, to aid diagnosis and treatment selection.

Clinical Biochemistry is the investigation of the function and dysfunction of systems, organs and tissues by the measurement of biochemical markers. A biomedical science graduate will have knowledge of:

- the range, and methods used for the collection of, clinical samples that may be subjected to biochemical analysis;
- the principles and applications of biochemical investigations used for screening, diagnosis, treatment and monitoring of disease, including near-patient testing;
- therapeutic drug monitoring and investigation of substance abuse.

Clinical Genetics is the identification of genetic mutations and polymorphisms and their influence on disease processes. A biomedical science graduate will have knowledge of:

- genomic, transcriptomic, proteomic methods used to analyse and studyhuman
- chromosomes and DNA;
- the application of molecular biology and Bioinformatics in medicine;
- pharmacogenetics and personalised medicine;
- principles and practice of techniques used for genetic testing for screening, diagnosis, treatment and monitoring of disease and associated ethical issues.

Clinical Immunology is the study of immunopathological conditions and abnormal immune function. A biomedical science graduate will have knowledge of:

- the principles of the function and measurement of effectors of the immune response;
- the causes and consequences of abnormal immune function, neoplastic diseases and transplantation reactions together with their detection, diagnosis, treatment and monitoring;
- principles and practice of immunological techniques used for screening, diagnosis, treatment and monitoring of disease prophylaxis and immunotherapy.

Haematology is the study and investigation of the different elements that constitute blood in normal and diseased states. A biomedical science graduate will have knowledge of:

- the structure, function and production of blood cells;
- the regulation of normal haemostasis;
- nature and diagnosis of anaemias, haematological malignancies, haemorrhagic and thrombotic diseases;
- principles and practice of haematological techniques used for screening, diagnosis, treatment and monitoring of disease.

Transfusion Science is the identification of blood group antigens and antibodies which ensures a safe supply of blood and blood components. A biomedical science graduate will have knowledge of:

- the genetics, inheritance, structure and role of red cell antigens;
- immune mediated destruction of blood cells;
- the preparation, storage and use of blood components;
- the selection of appropriate blood components for transfusion and possible;
- adverse effects.

Medical Microbiology is the study and investigation of pathogenic microorganisms. A biomedical science graduate will have knowledge of:

- the pathogenic mechanisms of a range of microorganisms;
- public health microbiology;
- principles and practice of techniques for screening, diagnosis, treatment and monitoring of a range of infectious diseases, including isolation and identification of microorganisms;
- prevention and control of infection, including anti-microbial and anti-viral therapy (including drug resistance).

Research Project

The project must be a major piece of assessed work which demonstrates achievement of research skills including:

- research design, methodologies, planning and execution of hypothesis-based research and scientific writing;
- generation, recording, collation and statistical packages for data analysis;
- critical evaluation, problem-solving, use of primary or secondary data to reach a coherent conclusion and presentation of results.

Accreditation documents must provide details of the following:

- acceptable types of project (see Appendix 3);
- arrangements for students to select a project;
- arrangements for student support and supervision;
- assessment weighting for different elements of the project;
- examples of proposed project titles.

APPENDIX 2: EXAMPLES OF INIDICATIVE CURRICULUM

This section is to illustrate the range of topics covered under each subject heading. The list is not exhaustive, and some topics may be covered in more depth/breadth than others.

Human Anatomy and Physiology:

Structure, tissue types and organisation of principal body systems.
Digestive system: gastrointestinal tract and accessory organs, digestive processes.
Cardiovascular system: heart and vessels, conduction system, cardiac cycle, homeostasis control, lymphatic vessels and tissues.
Respiratory system: respiration and its control, gas exchange and transport.
Urinary system: physiological role, regulation and control.
Reproductive system: Male and female reproductive tract, control of reproductive functions.
Sensory system: Receptors, pain, vision, hearing, equilibrium, taste, smell.
Central and peripheral nervous system.
Endocrine system: endocrine glands, hormonal mechanisms of action, physiological role of pituitary, pineal, thyroid, parathyroid, adrenal, pancreas and sex hormones.
Muscular system, muscle contraction.
Integumentary system: skin, accessory organs.
Skeletal system: bone, joints, ligaments.

Biochemistry

Biomolecules: lipids, carbohydrates, proteins, nucleic acids and their structures, properties and function within living organisms. Role of enzymes in catalysis, enzyme deficiency, bioenergetics, catabolism and anabolism.
Carbohydrate metabolism: glycolysis, anaerobic and aerobic metabolism, citric acid cycle. Glucogenesis, glycogenolysis, glycogen synthesis. Mechanics of control of carbohydrate metabolism.
Lipid metabolism: dietary lipids, catabolism of triacylglycerols and fatty acids. Biosynthesis of fatty acids. Control of fatty acid metabolism. Cholesterol synthesis. Lipoprotein metabolism.
Protein metabolism: protein turnover, hydrolysis of proteins, degradation of amino acids, urea cycle.
Integration of metabolic pathways and their regulation.

Cell Biology

Basic structure and function of prokaryotic and eukaryotic cells; membrane structure and support systems, structure and function of the nucleus, ribosomes, endoplasmic reticulum, Golgi body, lysosomes, mitochondria. Stem cells, cell cycle and cell division.
Mitosis and meiosis. Cell specialisation.

Molecular Biology and Genetics

Mendel's laws of inheritance, genotype, phenotype, dominance, sex-linked variation, Genetic inheritance patterns, autosomal and sex-linked genes. Blood group inheritance, population genetics, cytogenetics, chromosomal abnormalities. Genomes, nuclear DNA, mitochondrial DNA. Gene expression, gene structure and regulation in prokaryotes and eukaryotes.
Molecular biology overlaps with biochemistry, genetics and cell biology.
Bioinformatics and systems biology: the computation of high volumes of biological data and the properties of a network of interacting components in a system, as well as the components themselves, including an appreciation of the algorithms to decipher biological relationships.

Microbiology

History and scope of microbiology.
Microbial taxonomy, diversity, structure and function.
Eukaryotic microbes: fungi, protists, helminths etc.
Prokaryotic and eukaryotic viruses
Microbial growth and its control.
Bacterial genetics, pathogenesis and virulence
Aseptic techniques, destruction of microbes (disinfection, sterilisation), antimicrobial agents.
Human microflora. Enumeration, isolation and identification of microorganisms.

Immunology

Organisation and components of the human immune system;
Structure, function and mechanisms of action. Innate and acquired immunity including acute and chronic inflammation, phagocytosis, complement and wound healing
Memory and specificity, antigens and antibodies, molecular immunology.

Cellular Pathology

Microscopic examination of normal and abnormal cells (cytopathology), and tissues (histopathology). Gross structure and ultrastructure of normal cells and tissues and the structural changes which may occur during disease. Reproductive science, including infertility and embryology.
Preparation of cells and tissues for microscopic examination, including fixation, dehydration, impregnation and embedding. Tissue sectioning (microtomy), basic staining techniques and visualisation techniques including molecular cytological and immunochemistry techniques. Principles and application of microscopy for diagnosis of disease.

Clinical Biochemistry

Use of clinical biochemistry in the laboratory investigation of the function and dysfunction of systems, organs and tissues by the measurement of biochemical markers.
Interpretation of clinical data.
Sample selection, quality assurance, near patient testing, manual and automated methods

of investigation of disorders of:
Plasma lipids and lipoproteins;
Carbohydrate metabolism e.g. diabetes, inherited metabolic disorders;
Liver disorders, liver function tests; biochemistry of liver diseases;
Renal function tests, assessment of renal failure, sodium/potassium measurement;
Gastrointestinal tract disorders, digestion and disorders of absorption, pancreatic disease.
Disorders of calcium, phosphate and magnesium metabolism.
Role of plasma proteins, plasma protein abnormalities, immunoglobulins, tumour markers;
Clinical enzymology, measurement of plasma enzymes in diagnosis;
Endocrinology (clinical biochemistry abnormalities of thyroid, adrenal, hypothalamus, pituitary, gonads;
Clinical biochemistry measurements in nutrition, investigation of vitamin/trace elements deficiencies;
Clinical biochemistry of pregnancy and lactation, pregnancy tests, prenatal diagnosis of birth defects, postnatal screening test.
Inborn errors of metabolism and hereditary diseases (phenylketonuria, glycogen storage disease, cystic fibrosis, genetic and biochemical basis of inherited disease, mass screening;
Therapeutic drug monitoring (TDM), drugs of abuse and toxicology.

Clinical Genetics

Principles and application of DNA sequencing, DMA microarrays relevance to targeted gene expression and function analysis in health and disease;
Genomic, transcriptomic and proteomic methods used to analyse and study human chromosomes and DNA;
Application of molecular biology and bioinformatics in medicine;
Pharmacogenetics and personalised (stratified) medicine;
Phenotypic changes in gene expression (epigenetics) in health and disease;
Genetic testing and associated ethical issues.

Clinical Immunology

Techniques used in the laboratory investigation of immunopathological conditions and abnormal immune function (immunoassays, haemagglutination, ELISA, tissue typing, functional assays.
Lymphocyte activation, control and measurement of soluble immunoregulators (cytokines, interleukins, chemokines).
Investigation of immune dysfunction: hypersensitivity, non-organ and organ specific autoimmunity (MHC, rheumatoid, thyroid, coeliac, pernicious anaemia, diabetes), immunodeficiency: complement, primary (T, B and NK cell, secondary (HIV).
Transplantation, rejection, solid organs, bone marrow;
Cancer: tumour antigens, immunosurveillance, evasion;
Defence against infection, immunotherapy, prophylaxis.

Haematology

Study and laboratory investigation of the different elements that constitute blood in normal and diseased states, manual and automated methods of investigations: cell identification and counting, haemoglobin variants, coagulation tests.

Blood cell formation, haemopoiesis;
Red cell metabolism, disorders of red cells;
Haemoglobin biosynthesis, function, nature and diagnosis of anaemias, haemoglobinopathies, thalassaemias;
Haemostasis, platelet structure and function, coagulation, fibrinolysis, thrombosis, coagulation therapy;
Leucocyte structure and function, haematological malignancies, classification and treatment;

Transfusion Science

Main blood group systems, genetics and inheritance, structure and role of red cell antigens, blood group antibodies;
Effective blood bank practice and component preparation/storage/provision;
Adverse transfusion reactions, immune mediated destruction of blood cells, haemolytic disease of the newborn.

Medical Microbiology

Biology of pathogenic micro-organisms. Examples of infectious diseases could be tuberculosis, streptococcal disease, influenza, hospital acquired (nosocomial) infections;
Overview of infections: gastrointestinal tract, respiratory tract, sexually transmitted infections, Epidemiology and public health microbiology: water, food and other environmental pathogens, sources of infection, spread of disease, disease control;
Normal internal and external flora of the human body;
Microbiological hazards and risk assessment;

Diagnostic microbiology and virology: collection and preservation of samples, aseptic techniques, enumeration, isolation and identification;
Infection control: antifungals, antivirals, and antibacterial antibiotics, antibiotic resistance.

Research Skills

These should include:

i. research design, methodologies, planning and execution of hypothesis-based research and scientific writing,
ii. generation, recording, collation and statistical packages for data analysis
iii. critical evaluation, problem-solving, use of primary or secondary data to reach a coherent conclusion and presentation of results.

Research Project
This should be an honours level independent project and can be a lab, meta-analysis or bioinformatics type project but not a literature review.

Evidence should be a module descriptor and a copy of the research project in full, which demonstrate the application of the skills gained during the assessed research module studied: experiments, report, interpret and presentation of data using scientific convention, including application of SI units and other units used in biomedical science).

APPENDIX 3: RESEARCH/CAPSTONE PROJECTS

Taken from "*Choosing your Bioscience Final Year research, Honours or Capstone Project*" guide for students.
Available at: https://bit.ly/ChoosingBioCapstone

Laboratory or Fieldwork (possibly undertaken remotely)
BRIEF DESCRIPTION The aim of these capstones is gain research experience, either in the laboratory or field, and to develop research, experimental and technical skills. In the current circumstances of Covid-19, with restricted access to research facilities, some of this research experience may be gained remotely using simulations, virtual reality or pre-existing data or information.
KEY SKILLS DEVELOPED: Research skills, experimental and technical skills, analytical and numerical skills, experimental design, independent and team-working, planning and organisational skills, resilience.
IDEAL FOR: Careers in scientific or medical research. Careers in analytical or similar laboratories. Careers where knowledge or experience of the research process is required e.g. clinical trials, regulatory affairs, academic medicine, scientific writing.

Big Data and Bioinformatics
BRIEF DESCRIPTION The aim of these capstones is for you to use existing very large datasets or other sources of information to address research questions relevant to your degree or discipline using bioinformatics, data mining, analysis and visualisation, or similar tools and approaches. These sources of data/information could include large publicly available datasets or information sources or historical data from research groups within your School or Department
KEY SKILLS DEVELOPED: Research skills, experimental design, data mining, analysis and visualisation, numerical and analytical skills, use of large datasets, digital tools and technological skills, critical thinking, planning and organisational skills. IDEAL FOR: Careers involving the handling, analysis and interpretation of large datasets/information, may be scientific research but could be in other areas e.g. artificial intelligence, policy development, sales and marketing, business development or consultancy. Careers involving the storyboarding or dissemination of information, or the use of digital tools and technologies.

Computer modelling or simulations
BRIEF DESCRIPTION The aim of these capstones is gain research experience investigating the physiological, pharmacological or biochemical modulation of established models or simulations of body systems, organs or tissues (e.g. intact animals, heart, neurones). For models or simulations used in student education, it could include an evaluation of the scientific accuracy, validity and educational benefits of these.
KEY SKILLS DEVELOPED: Research skills, use of computer models and programmes, analytical and numerical skills, experimental design, independent and team-working, planning and organisational skills.
IDEAL FOR: Careers in scientific or medical research, or education. Careers involving the use of digital tools and technologies. Careers where knowledge or experience of the research process is required e.g. clinical trials, regulatory affairs, academic medicine, scientific writing.

Systematic Review with data-analysis

BRIEF DESCRIPTION Systematic reviews are a highly systematic, pre-defined way of undertaking a critical review of the literature or other information. They are used extensively in clinical trials/health care research, and increasingly in other fields. In research, systematic reviews are normally undertaken by a team and therefore they make an ideal team-based capstone, more representative of the real-world.

KEY SKILLS DEVELOPED: Research skills, qualitative & quantitative research methods, large datasets, ICT skills, numerical and analytical skills, planning and organisation, team working, leadership.

IDEAL FOR: Careers involving the collation, critical (including numerical or meta) analysis and reporting of large datasets/information (e.g. marketing, business, industry, government) or careers where systematic reviews are used extensively (e.g. clinical trials/health care, policy, social sciences). Careers involving significant scientific, technical or other prescribed formats of writing.

Stakeholder Opinion

BRIEF DESCRIPTION The aim of Stakeholder Opinion capstones is for you, either individually or part of a team, to gather relevant stakeholders (e.g. students, employees, identified sections of the public) opinions on a topic relevant to the Biosciences. This gathering of opinions could be via surveys, focus groups, semi-structured interviews, social media, other means, or a combination of multiple tools. KEY SKILLS DEVELOPED: Qualitative and qualitative research methodologies and skills, numerical and analytical skills, communication skills, planning and organisation, independent and team working, leadership, resilience, cultural and ethical awareness.

IDEAL FOR: Careers that require interaction and engagement with different sections of the community e.g. social science research, market research, sales and marketing. Careers where you would analyse and use/implement information from stakeholders e.g. sales and marketing, policy development, business, healthcare, consultancy.

Educational Development

BRIEF DESCRIPTION The aim of Educational Development capstones is for you to create new, or re-purpose existing, educational resources or activities for use in your Schools /Departments undergraduate programmes. It includes evaluation of need and/or the effectiveness of the developed resource or activity. It is NOT a research capstone evaluating educational methodologies/theories or using them as “human participants” in a scientific study. Instead, its principal output is an educational resource.

KEY SKILLS DEVELOPED: Communication skills, creativity, use of initiative, planning and organisational skills, independent working, educational awareness, digital andtechnological skills

IDEAL FOR: Careers in education, training or professional development, or in the development of educational resources or activities. Careers that require excellent communication skills or involve taking complex information and making it accessible to different audiences (e.g. public

Team and Multi-team based

BRIEF DESCRIPTION In the workplace (including scientific research), outputs are usually not the work of a single individual but a team. Graduate employers require employees who are team-players, have significant experience of team-working (on large projects) and though it, have developed leadership skills. Team-based capstones are a much better representation of the workplace than individual capstones, and an ideal opportunity to develop these key

skills and graduate attributes. Taking this one stage further, any team comprises of individuals with widely differing knowledge, expertise and skill sets i.e. sub-teams within a team, all contributing to a common goal or output. In research, you will have different research groups collaborating on the same research question e.g. at the molecular, cellular and systems levels. Therefore, we should replicate this in multiteam based capstones, either in research or combining teams undertaking different formats of capstone (e.g. research, stakeholder opinion & public engagement) to collaborate on the same enquiry-based activity.

KEY SKILLS DEVELOPED: Team working, leadership, planning and organisation, emotional intelligence, skills gained via your individual capstone format.

IDEAL FOR: Any careers that involve team-working or leadership roles.

About this document

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