

THE ACCREDITATION HANDBOOK

Contents

| | |
|--|----|
| About the Royal Society of Biology | 3 |
| Introduction to accreditation | 4 |
| About this document | 5 |
| Benefits of accreditation | 6 |
| Quotes in support of accreditation | 7 |
| Process of accreditation assessment | 9 |
| Subject specific criteria | 12 |
| Degree regulations | 13 |
| Articulation agreements | 13 |
| Costs of accreditation | 14 |
| Changes made before re-accreditation..... | 14 |
| Re-accreditation processes | 14 |
| Removal of accreditation | 15 |
| Foundation degree accreditation | 16 |
| Work-based learning..... | 17 |
| Professional registers | 17 |
| Validating Institution..... | 17 |
| Criteria for foundation degree accreditation..... | 18 |
| Details and guidance on the foundation degree accreditation criteria..... | 20 |
| Degree accreditation | 27 |
| Criteria for degree accreditation..... | 28 |
| Notes on the degree accreditation criteria | 31 |
| Annexes..... | 42 |
| Advanced accreditation | 45 |
| Criteria for advanced accreditation | 46 |
| Period of practice..... | 48 |
| Master's accreditation | 49 |
| Criteria for master's degree accreditation | 50 |
| Doctoral training accreditation | 52 |
| Chartered biologist..... | 52 |
| Joint accreditation applications..... | 52 |
| Criteria for doctoral training accreditation | 53 |
| Process of applying for doctoral training accreditation..... | 54 |
| Additional guidance on the doctoral training accreditation criteria | 55 |
| Appendix A – Process of applying for accreditation | 57 |
| Appendix B – Subject specific learning outcomes..... | 59 |
| Appendix C – Assessment panel membership and guidelines..... | 62 |
| Appendix D – Guidance for the site visit | 64 |
| Appendix E – Guidelines for publicity following successful accreditation | 66 |
| Appendix F – Guidance for interim accreditation..... | 67 |
| Appendix G – Glossary | 69 |

About the Royal Society of Biology

The Royal Society of Biology is a single unified voice for biology: advising Government and influencing policy; advancing education and professional development; supporting our members; and engaging and encouraging public interest in the life sciences. With more than 18,000 individual members and over 100 member organisations, the Society represents a significant and diverse membership including students, practising scientists, industry leaders, academics and interested non-professionals.

The Royal Society of Biology is committed to promoting biology as a subject of choice to students in schools, colleges and universities. Through accreditation, we support and recognise excellence in biology teaching; champion a biology curriculum that challenges students and encourages their passion for biology; support young scientists through higher education; and provide career guidance at all levels. We offer a range of tools to assist the professional development of our members working in education; we respond to education policy consultations; and we contribute to curriculum development. Through partnership with other leading science organisations, we aim to increase our influence over the advancement of biology education.

For information about the Royal Society of Biology, see www.rsb.org.uk

Introduction to accreditation

Accreditation is acknowledgement by an external body that a programme meets a defined set of overarching criteria. Accreditation by the Royal Society of Biology (RSB) recognises and supports the advancement of skills and education in the biosciences, throughout the UK and internationally. Graduates from accredited programmes are equipped with well-rounded knowledge and skills, making them highly employable both within and beyond their chosen field.

Accreditation aims to:

- Recognise academic achievement
- Drive up standards of learning and teaching in the biosciences
- Enhance competitiveness for students in a global jobs market
- Provide industry with an assurance of the level of employability skills and subject relevant bioscience skills provided by a programme
- Maintain and improve the UK's position as a premier location to develop the life scientists of the future

The biosciences are predominately an experimental set of subjects, which require a hands-on approach to learning. Accredited programmes incorporate learning outcomes associated with key skills in laboratory and/or fieldwork thereby providing a high standard of competence. Transferable graduate skills such as communication, problem solving and team working are integral to the programmes. Biologists must be equipped with the skills necessary for self-learning and the ability to apply basic principles of maths, chemistry, physics and information technology to their learning and career. These should be taught and assessed at all levels, providing a gradual development of ability and self-confidence in students, culminating at graduation. Students will have been encouraged and supported to develop their creativity, innovation and entrepreneurship.

All graduates will have experienced self-learning and will have satisfactorily completed a substantial integrative experience (either capstone experience, work-based learning or a period of practice, depending upon the type of accreditation) demonstrating independence of thought and analysis of data.

Accredited programmes are highly regarded within the learning and teaching community and by employers. Accredited programmes are delivered by subject experts and produce graduates who will excel in their chosen field.

The accreditation process does not seek to define a highly specified curriculum. Accreditation is built on the foundations of the relevant QAA Benchmark Statements as a general description about the broad minimum standards of achievement, while focussing on those areas that the RSB believes fully prepare bioscience graduates for their place in the world.

Accreditation is based on the assumption that the course can be defined as 'biology' or a sub-section or specialism within biology. It may not be appropriate for courses where the overall objective of the course is not biology *per se*, but where biology may be a component (e.g. pharmacy and health-care professions). Such courses may not encompass all the necessary intended learning outcomes for a biology programme, and may be accredited by other professional or statutory bodies.

The RSB is keen to support all bioscience programmes that aim to meet the criteria for accreditation. For established programmes, the learning outcomes attained by graduates will be judged. However, we also encourage Higher Education Institutions (HEIs) to submit new programmes for accreditation, where there are no graduates yet. Under these circumstances, the accreditation process will include a review of the programme documentation and a site visit before the first cohort of students graduate. The Society may grant interim accreditation pending first cohort graduation, with full accreditation occurring afterwards, if appropriate. HEIs with relevant programmes in development should refer to Appendix F, and contact the Accreditation Team to discuss interim accreditation.

About this document

The Society accredits programmes of study that lead to specified named awards. This handbook is the main source of reference for those institutions seeking to apply for Foundation Degree Accreditation, Degree Accreditation, Advanced Accreditation, Master's Degree Accreditation and Doctoral Training Accreditation in the UK. The following sections of the handbook apply to all types of accreditation: benefits; process and costs of accreditation; degree regulations; articulation agreements; process for re-accreditation; and subject specific criteria and appendices. Only final awards are accredited. The Foundation Degree or BSc Honours is not assessed nor accredited within Degree Accreditation or Advanced Accreditation respectively, a separate application is required. The Society does not currently offer accreditation of Postgraduate Certificates or Postgraduate Diplomas.

Which type of accreditation to apply for

The RSB's Accreditation Programme spans across the Higher Education landscape from Level 4 FHEQ (Level 7 SCQF) through to Level 8 FHEQ (Level 12 SCQF). All accreditation programmes share core principles: to recognise academic excellence in bioscience degree programmes, drive up standards and meet the needs of employers. The type of accreditation awarded will depend on the type of programmes submitted, please see below.

For further guidance, please contact the Accreditation Team at accreditation@rsb.org.uk.

| Foundation Degree Accreditation | Degree Accreditation | Advanced Accreditation | Master's Degree Accreditation | Doctoral Training Accreditation |
|---|--|---|---|---|
| Please refer to page 16 | Please refer to page 27 | Please refer to page 45 | Please refer to page 48 | Please refer to page 51 |
| UK | UK & International | UK & International | UK & International | UK |
| FdSc 2 year programme | BSc (Hons) programme (may include sandwich year or placement year degree pathways) | BSc (Hons) with Professional Placement year/MSci Integrated Master's 4 year programme | MSc 1 year stand-alone Master's degree programme | Doctoral training programme |
| Level 4 and 5 FHEQ Level 7 and 8 SCQF | Level 4 – 6 FHEQ Level 7 – 10 SCQF | Level 4 – 6/7 FHEQ Level 7 – 10/11 SCQF | Level 7 FHEQ Level 11 SCQF | Level 8 FHEQ Level 12 SCQF |
| Defining features | | | | |
| Work-based learning (WBL) | Capstone experience minimum 30 credits | Period of Practice minimum 80 credits | Research component is equivalent to 80 credits, minimum 60 credits accounted for by the project | Accredit the training programme not the research component |
| Work-related skills | Graduate employability and transferable skills | Enhanced research skills | Period of Practice must be completed in an active research environment | Interdisciplinary collaboration with the Royal Society of Chemistry and Institute of Physics (welcome joint applications) |
| | | Period of Practice must be an evaluated working experience in an active research environment | | |
| Membership and Professional Registers | | | | |
| One year free membership at Affiliate level when enter second year | One year free membership at AMRSB (first year post graduation) | One year free membership at AMRSB (first year post graduation) | One year free membership at AMRSB (first year post graduation) | Free registration for Chartered Biologist (CBiol) |
| Can apply for registers – Registered Science Technician (RSciTech) or Registered Scientist (RSci) | | AMRSB members can become MRSB after two further years of work or professional practice, rather than the usual three years | AMRSB members can become MRSB after two further years of work or professional practice, rather than the usual three years | Accelerated entry onto CBiol – can apply after completing first year of work (as final year PhD counts towards professional experience) |

Benefits of accreditation

Benefits of accreditation for HEIs

Recognition of academic quality

Accreditation provides a mark of 'good practice', as well as providing an assurance to employers that graduates have appropriate skills and knowledge, increasing graduate competitiveness in the global jobs market.

Enhanced student recruitment opportunities

Potential students have the confidence in knowing they will study a course that meets a set of criteria determined by bioscience professionals independent of the institution. Accreditation is informed by the needs of employers and developed in collaboration with experts from industry. Employers recognise the value of accredited degree programmes and the graduates they produce.

External review of programmes and mechanism to drive change within an institution

The process of accreditation not only assesses degree programmes but also shares and highlights good practice. As part of the application process, programmes will be assessed by senior academics who may suggest improvements to the programme, and identify existing areas of excellence. As such, institutions that have undergone an assessment have reported that the process of accreditation is extremely beneficial in its own right.

Publicity following successful accreditation

Institutions will be entitled to use the RSB logo and associated literature to advertise that the degree(s) is accredited (online and in printed literature). The RSB will advertise the institution as accredited on our website, which is viewed by prospective students looking to study a bioscience degree. Institutions will be able to quote aspects of good practice, highlighted during the visit, on their website and at open days.

Benefits of accreditation for students

Greater employability prospects and enhanced competitiveness in a global jobs market

The accreditation programme establishes a profile of key skills that bioscience employers can recognise in graduates from accredited degrees. Many employers use evidence-based recruitment processes: graduates will have evidence of education, training and assessment in many key subject-specific skills (e.g. as provided to the RSB by Learned Societies) and transferable skills.

Professional body accreditation of their degree

Stands out to employers, shows that degrees have been assessed and enhanced by the accreditation process, and provides additional evidence of graduates' knowledge and skills.

Professional Registers

Graduates from accredited foundation degree and doctoral training programmes are able to obtain external professional recognition of their skills, knowledge and expertise, and commitment to Continuing Professional Development (CPD) from the RSB.

Free membership/registration to the RSB

Graduates from accredited programmes are entitled to free subscription to the Society (except for doctoral training programmes, who get a free application for CBiol instead). This will enable access to a significant network of bioscience professionals, making it easier to stay up-to-date with biology-related developments (e.g. via the free weekly bulletin of key discoveries, initiatives and policies worldwide) and provide graduates with additional recognition of their skills and experiences. This is extremely beneficial to graduates, particularly at a time when they are applying for their first employment. Membership of the Society gives students and graduates a feeling of belonging to a wide community of biologists, interested in biology for its own sake but also to contribute their knowledge and skills to help meet world challenges.

Quotes in support of accreditation

UK Institutions

“Our experience with the RSB has been nothing other than superb; I would have no hesitation in recommending the RSB to all my colleagues and students. The Accreditation Team were exceptionally professional and more importantly knowledgeable and helpful which made the accreditation process a joy.”

Dr Chris Tselepis | Programme Director for Biomedical Science | University of Birmingham

[Accreditation] “was for us as a course(s) team, a very useful and rewarding experience. It made us reflect on our teaching and assessment, challenged us to be self-critical and gave us extremely valuable advice and guidance to improve our students’ experience.”

Dr Elaine Green | Associate Head (Quality and Accreditation) | Coventry University

“We have always had a good experience in the last few years of working with the Royal Society of Biology, and our experience of applying for Master’s Accreditation was no exception. Throughout our engagement with the pilot phase of the Master’s accreditation scheme, it was clear that RSB were genuinely seeking to enhance education and skills within the sector. The site visit was professional, constructive and supportive, and while the recommendations made have enhanced our programmes it has also given us cause to reflect upon and celebrate the strengths of our postgraduate provision.”

Dr Dan Lloyd | Director of Graduate Studies | University of Kent

“The process was excellent and we always knew what we had to do. I think the instructions are very clear and the process is of a very high and professional standard.”

Dr Karin Garrie | Biosciences Undergraduate Courses Manager | Nottingham Trent University

“Thanks to [the panel] for their valuable feedback on our pathways - we very much appreciate their attention to detail and their positive approach to the discussion. It was a pleasure to engage with you all.”

Dr Angela Mousley | Programme Coordinator (Biological Science) | Queen’s University Belfast

“I found the process of the panel visit very thought provoking and productive, and a very worthwhile undertaking.”

Dr Shauna Cunningham | Course Leader for Applied Bioscience | Robert Gordon University

“We were very excited to be involved in the accreditation process for our foundation degree programme and then to be awarded accreditation status. We wanted to have the recognition for our graduates and improve their employability as well as have an opportunity to both identify what we do well and to drive forward change for how we could improve the programme. The process was rigorous but enjoyable and extremely rewarding for the whole programme team and the students involved. Accreditation really took into account the unique aspects of degree level bioscience teaching in our HEI. We have made some changes to the programme following accreditation that will really enhance what we do to prepare our students for their continuing careers.”

Luke Peakman | Programme Manager and Lecturer | South Devon College

“The accreditation process was extremely useful to us, including the mapping out of our degree schemes and skills, meeting yourselves and getting the opportunity to share our Swansea University Bioscience experience and the positive outcome of gaining accreditation. It was a lot of hard work for us, but it has really helped us to focus and refine our curriculum, it was a very positive experience.”

Dr Penny Neyland | Biosciences Programme Director | Swansea University

International Institutions

"This is a major step forward in our quest to become a leader in higher education excellence in Africa. The validation of our training quality by the RSB helps us attract the best students and gives funders further confidence to invest in our programmes."

**Professor Gordon Awandare | Head of Department of Biochemistry, Cell and Molecular Biology
| University of Ghana**

"The RSB team put us at ease i.e. that they were not there to attack the programme but to help us make it a better one and help guide us through the application procedure."

Dr Susan Ho | Deputy Enrolment Officer | Hong Kong Polytechnic University (PolyU)

"External audit of our programme in Biological Sciences through international accreditation proved to be an excellent way to ensure that it remained relevant and of high quality. We found the process developed by the RSB to be well-thought-out, constructive and helpful. Accreditation will undoubtedly enhance the employment prospects of our graduates."

**Professor C. David O'Connor | Head, Department of Biological Sciences | Xi'an Jiaotong-
Liverpool University**

Industry

"Covance is always in search of graduates who demonstrate they have industry skills, knowledge and, most importantly, the desire to be exceptional in their field. We've found graduates from the Degree Accreditation Programme bring diverse and emerging skills. Our hiring managers appreciate how quickly they demonstrate their academic rigor as they swiftly respond and adapt to real-world situations on the job."

Robert Watts | Covance

"We believe that by accrediting degrees, students and employers will be better placed to identify quality courses that provide depth of study in their discipline and strong practical skills. In future, we are confident students who graduate from these courses will have the opportunity to find rewarding work in the life sciences sector or can go on to undertake further research as a postgraduate."

Stephen Whitehead | CEO | Association of the British Pharmaceutical Industry

"To deliver the next generation of life changing medicines we need to recruit talented young scientists who combine a passion for drug discovery with strong fundamental science knowledge. All our applicants undergo a thorough assessment process designed to test their scientific and technical knowledge, ensuring that our new recruits can be confident and effective in a laboratory environment from day one. This is why at AstraZeneca we support degree accreditation by the Society of Biology and actively encourage applications from graduates with accredited degrees – it really can help individuals stand out from the crowd."

**Donna Watkin | Global Graduate Programme Manager AstraZeneca, Research & Development |
Innovative Medicines**

"MedImmune recognises that strong scientific knowledge is integral to much of its success. And when we, as potential employers, are looking out at the outside world, we need a way to understand and evaluate the research that has been undertaken by applicants. That's why the Royal Society of Biology's Degree Accreditation Programme is so valuable. It provides a very visible signal of the quality of a degree and the high standard of academic rigour which students on those degree courses achieve. This naturally translates into an assurance of employability for those students who complete those courses."

Jacqui Hall | Vice President; Learning, Standards and Skills | MedImmune

Process of accreditation assessment

The accreditation assessment process is normally achieved in three stages and will generally take a period of six to twelve months. This is outlined in Figure 1, with further information on the method of submission in Appendix A.

For applications to be assessed in the first or second half of the academic year deadlines for formal submission are usually the 1st February and 1st September respectively. Applications will be considered as soon as possible following receipt of the submission. If the application appears to meet the requirements of stage one, as described below, then the site visit will be arranged by mutual convenience of the Society and the HEI. Please note that students and recent graduates (if applicable) need to be present during the site visit. The assessment reports produced by the Accreditation Assessment Panel will not be made publicly available.

01

Stage One

HEIs are required to submit, electronically, evidence to the Society in support of their application. Full details are listed in Appendix A. This process, designed to be brief and not to replicate existing paperwork or to be unduly bureaucratic, outlines how the institution believes that it achieves the intended learning outcomes as stipulated in the accreditation criteria.

The application will be assessed by an Accreditation Assessment Panel (the Panel), which will produce a Stage One Report summarising the assessment. This will be sent to the HEI for fact checking and will act as a guideline for questions likely to arise at stage two. HEIs will have the opportunity to submit additional evidence following receipt of this report.

If the programme is deemed suitable, the Panel will recommend that the application progresses to assessment stage two. However, in some cases, the Panel may feel that the programme is not appropriate for further assessment and recommend it is not accredited.

02

Stage Two

The Panel will carry out a site visit to evaluate the HEI's facilities, speak to students about their learning experience, and hold face-to-face discussions with the programme team. Key staff with direct responsibility for resources should attend the meeting and/or be available throughout the day. A provisional recommendation on accreditation will be provided during the site visit where appropriate. Outcomes of stage two will be summarised in a Stage Two Report and sent to the HEI for fact checking.

The Panel will make a recommendation to the Accreditation Committee to award or withhold accreditation. Institutions will be kept informed of likely timescales involved for ratification to occur.

03

Stage Three

The Accreditation Committee will make a decision that:

1. The programme should be accredited
2. The programme should be accredited subject to conditions
3. The programme should not be accredited

A Stage Three Report will be sent to the HEI where actions relating to conditions and/or recommendations should be evidenced. The HEI will have a period of six weeks to complete the Stage Three Report and provide any supporting documentation. Accreditation is not formally awarded until the Stage Three Report has been completed.

Accreditation awarded

Following a successful assessment, accreditation will normally be awarded for a period of five years. The RSB will list accredited degree programme titles and HEIs on its website, and provide a link to the HEIs' web pages. HEIs are required to provide graduate destination data for all accredited programmes on an annual basis.

Students studying on an accredited foundation degree programme will receive one year of free membership of the Royal Society of Biology at Affiliate level during the final year of their degree.

Graduates from accredited programmes will receive one year of free membership of the Royal Society of Biology at Associate level (AMRSB).

Graduates from advanced accredited degree programmes will receive one year of free membership of the Royal Society of Biology at Associate level (AMRSB). Additionally, in recognition of the period of practice, the RSB will offer graduates of advanced accredited programmes membership of the Royal Society of Biology at MRSB level after just two further years of practice, rather than the usual three years.

For more information on publicity guidelines following accreditation, please see Appendix E.

Accreditation subject to conditions

The HEI will receive a Stage Three Report listing any conditions, and details of the actions taken to address the highlighted areas will be required. The HEI will have a period of six weeks to complete the Stage Three Report and provide any supporting documentation. Accreditation is not formally awarded until the Stage Three Report has been completed.

If internal approval is required for the amendments, then it would normally be expected within the six weeks, however extensions can be granted on a case-by-case basis.

Accreditation withheld

If the programme does not meet the accreditation criteria, guidance will be provided by the RSB on how the programme could meet the criteria. Usually the programme will not be reconsidered for accreditation until a period of 12 months has elapsed from the date the Stage Two Report is received by the HEI. For reconsideration, a full report will be required from the programme organisers explaining and documenting changes made to address each of the points made by the Accreditation Assessment Panel. If internal approval is required for the amendments, it would normally be expected that approval has been given before the programme is reconsidered. The Accreditation Committee shall decide whether a further full panel site visit, light touch visit, or no visit, is required.

The RSB maintains an appeals procedure for HEIs that wish to challenge specific decisions, where they feel that an assessment was not conducted as it should have been and in a fair and transparent manner. HEIs cannot appeal against a judgement, only aspects of the process.

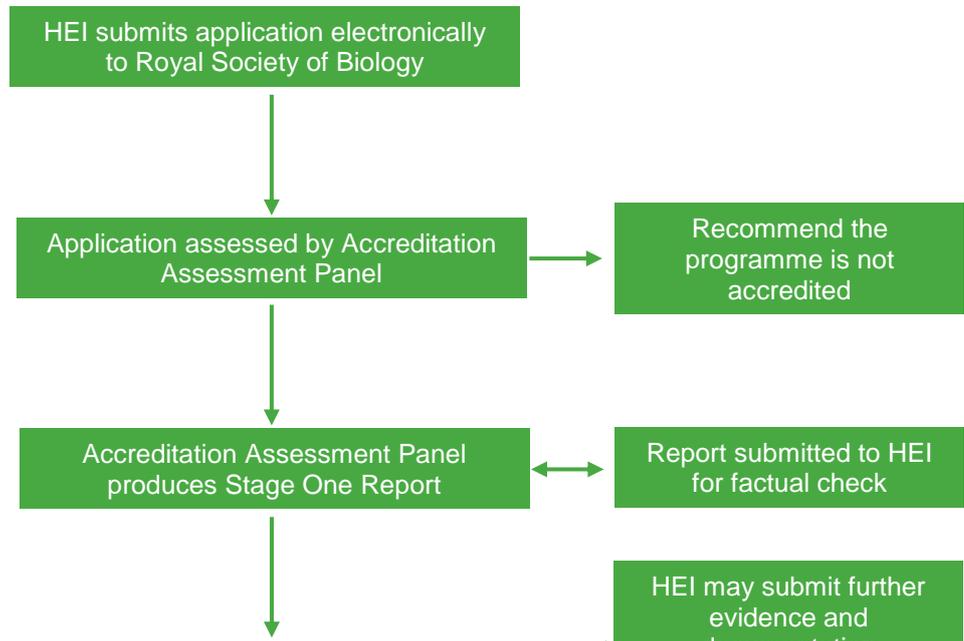
Appeals should be made to the Accreditation Committee in the first instance. If the institution feels that an unfair decision has been reached by the Accreditation Committee, a follow-up appeal can be made to RSB Council, whose decision will be final. Further details about the appeals process are available on request.

Interim accreditation

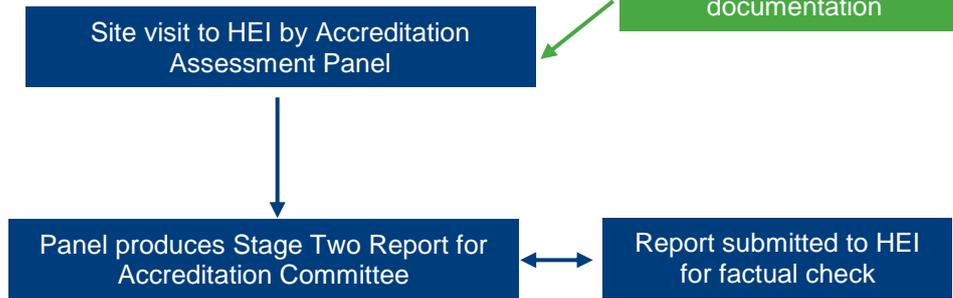
Interim accreditation is available to HEIs for recently validated programmes where there have been no graduate awards. See Appendix F.

Figure 1 – Process of Accreditation

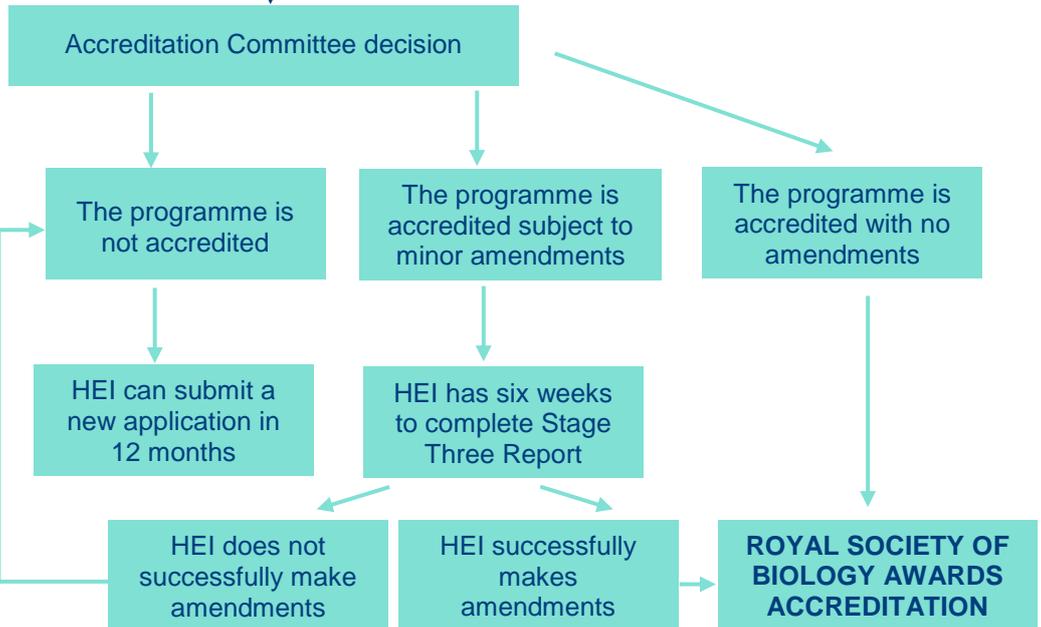
01 Stage One



02 Stage Two



03 Stage Three



Subject specific criteria

The Royal Society of Biology recognises the general areas outlined in the Biosciences Benchmark Statement and the specific guidance in the Biomedical Sciences Benchmark. Accredited programmes will be expected to adhere to the guidance for the Typical Standard of the current Biosciences Benchmark and/or Biomedical Sciences Benchmark as appropriate. Accredited programmes should also adhere to any subject specific guidance developed by the appropriate Learned Society written specifically for accreditation by the RSB (please see Appendix B). The subject specific criteria provided in the Benchmark Statements are not repeated here, but the assessment panel may refer to the Benchmarks when arriving at a recommendation.

Following consultation with stakeholders in the sector, accreditation spans three broad areas of biology, and applications must be made to a specific stream chosen by the institution, to allow for the selection of the most suitable Panel members. These are:

- Molecular Aspects of Biology
- Whole Organism Biology
- Ecological and Environmental Sciences

Specific criteria are based on the learning outcomes for each subject area, and primarily on the required skills of graduates entering job roles, as contributed by industry and relevant Learned Societies.

Some degree programmes may meet the criteria for accreditation only if a specific combination of units or modules is selected. Where this is the case it is only possible to award accreditation if the route or pathway that meets the criteria is formally identifiable in the graduation certificate. A programme may contain modules spanning the three streams mentioned above. If this is the case the HEI should apply to the stream which is most relevant to the programme. When a degree is accredited it will not be labelled with a specific stream, rather the streams enable programmes to be assessed on the subject specific criteria and by the most appropriate assessors.

Degree regulations

The Society's accreditation criteria must be evident in programme learning outcomes (LOs). Unless otherwise indicated, it will be assumed that all programme LOs must be achieved by a student in order to graduate with the award. Generic regulations, and where necessary programme-specific regulations, must ensure that all students graduating with an accredited degree have achieved these outcomes. Compensation, where permitted within the regulations of the institution, must only be applied if, and when, the relevant LOs are achieved in an alternative, passed, module(s) covering the same LO(s). Compensation cannot be applied if a programme LO is identified specifically and uniquely with a single module and consequently assessed only once. Specifically, compensation cannot be applied to the capstone experience.

The Society expects institutions to have policies and procedures in place that support and enable students with mitigating and/or extenuating circumstances to meet the LOs of a programme.

The HEI must make the assessment regulations available to accreditation panels, and inform the Society annually of any changes to regulations during the period of accreditation.

Articulation agreements

If the HEI applying for accreditation has a formally approved articulation agreement with a Partner Organisation (PO) in the UK or overseas it must be indicated in the Letter of Intent. An articulation agreement is defined as a formal arrangement whereby PO students may transfer to the HEI's programme and graduate from the HEI. For the assessment of accreditation, the panel will wish to assure itself that key learning outcomes normally achieved in the part of the programme prior to the students' transfer (the articulation) are met.

Where HEIs have agreements with POs, either to franchise programmes, or to deliver equivalent programmes in other locations, these programmes will be treated as separate from the parent programme. Accreditation may look at all courses within the same application, but each version of the programme will be individually assessed for accreditation. Programmes delivered solely in an overseas institution will be assessed for accreditation via the International Accreditation process.

Costs of accreditation

Details regarding the costs of accreditation can be found on the Society's website and on the formal expression of interest form. For further information, please contact the Accreditation Team at accreditation@rsb.org.uk.

Assessment fee

The fee covers all expenses associated with the assessment and site visit except for overnight accommodation for the assessment panel. HEIs will be required to book accommodation, including breakfast, for the panel members in a suitable nearby hotel for the evening before the site visit. Please note if the application is unsuccessful, the assessment fee is a non-returnable payment.

Accreditation fees

The fees for accreditation will be charged on an annual basis according to the number of programmes submitted and as agreed by the Society. The Society will consider the level of work required for the application, the number of students and the complexity of programmes in order to ensure, as far as possible, that costs are representative and equitable. The first annual fee payment will be required once accreditation has been awarded and formally ratified by the Accreditation Committee.

Changes made before re-accreditation

Programmes of study evolve to reflect the latest developments in the subject and to meet the needs of students, external influences such as professional and statutory bodies and policy changes. Variations in human and physical resources may also bring about programme changes.

The HEI must inform the RSB immediately of any significant planned changes to the accredited programme(s), which occur during the period of accreditation, as well as providing a clear rationale for the change. HEIs are required to complete and submit a review form on an annual basis, highlighting any changes that may have been made. The rationale behind any changes impacting the accreditation criteria must be explained. There may be a charge for assessing accredited programmes if significant changes have been made. The RSB reserves the right to remove accreditation from a degree programme if significant changes are made to the programme that deviate from the learning outcomes defined by the Society.

Re-accreditation processes

HEIs that have an accredited degree programme will be contacted by the RSB towards the end of the period of accreditation to invite them to submit their programme for re-accreditation. Where there are significant changes to a programme within the accreditation period, the HEI may be asked to re-submit earlier.

Re-accreditation will follow the three-stage process of accreditation and will involve a full review of all programmes submitted.

If an institution chooses not to apply for re-accreditation the following withdrawal of accreditation guidance will apply.

Removal of accreditation

Reasons for the Society to consider the withdrawal of accreditation from a previously accredited course:

1. Failure of the HEI to pay the continuing cost of accreditation.
2. Failure of the HEI to notify the Society of changes made to the accredited programme structure or changes that affect the delivery of the programme.
3. Changes made to the programme specification so that some of the learning outcomes are not being met.
4. Changes made to the programme specification that alter the learning outcomes so that some accreditation criteria cannot be met.
5. Any changes made to the HEI that result in a failure to deliver the learning outcomes of the programme which result in a departure from the Society's accreditation criteria.

The withdrawal of accreditation from a course will not be done without consultation with the HEI. The degree awarding HEI should notify the Society of change(s) made to the programme structure or its delivery, with a clear rationale for the change(s). The Society will review the changes and appoint a review panel for a site visit, if necessary. If it is found that the change(s) lead(s) to a failure to deliver a learning outcome(s) that covers accreditation criteria/criterion, then conditions will be set. If these conditions are not met within the academic year of the assessment, the accreditation status may be withdrawn.

If accreditation is removed, all reference to the RSB accreditation must be removed from websites and public documents. While the RSB understands that course guides may be published many months in advance of a new cohort starting, information on websites can, and should be, removed as soon as the accreditation is rescinded. Because loss of accreditation means that RSB can no longer comment on the quality even of degree cohorts already at the HEI, only cohorts who have graduated during the accreditation period can claim benefit of an accredited degree. The RSB will remove the HEI programmes from the list of accredited programmes maintained on the RSB website. Information relevant to the accreditation will be kept for the five years following a lapse in Accreditation, in case of questions by graduates of the programmes.

Foundation degree accreditation

Foundation degrees integrate academic and work-based learning through close collaboration between employers and higher education providers¹. Foundation degree accreditation by the RSB follows an independent and rigorous assessment of degrees which contain a solid academic foundation in biological knowledge and key skills and prepare graduates to address the needs of employers. Foundation degree accreditation aims to: foster the development of key learning outcomes and recognise the excellence that exists in giving graduates the skills, knowledge and professional development experiences that enable successful progression to employment and/or further qualifications in the biosciences.

Foundation degrees provide students with the opportunity to develop both academic knowledge and professional skills supported by the provision of experiences within the workplace. This means that the development and experience of laboratory and/or field skills, problem solving, innovation and creativity, underpinned by work-based learning are integral characteristics of bioscience foundation degrees. To that end, the central principle of accreditation is that the intended learning outcomes of a programme are linked to assessment.

Accreditation of foundation degrees is based on six overarching criteria, underpinned by the QAA Bioscience Benchmark Statement and QAA Foundation Degree Characteristics Statement¹; focusing on those areas that the RSB believes will fully prepare graduates for their place in the UK and the world.

Whilst recognising the role foundation degrees can play in providing access to honours degree courses, the Society will be assessing the programmes as end qualifications in their own right.

Graduates from accredited foundation degree programmes will have the specialised knowledge of their chosen discipline plus core knowledge of the biosciences, including cell biology, an appreciation of biodiversity and the concepts and application of the theory of evolution. Their knowledge of biology will be underpinned by appropriate competence in chemistry, physics and mathematics, including statistics².

All graduates will have experienced self-learning and will have satisfactorily completed an assessed work placement, demonstrating application of skills, knowledge and understanding within the relevant working environment.

All documents linked to Foundation Degree Accreditation can be found at www.rsb.org.uk/education/accreditation/Foundation-Degree-Accreditation-Important-Documents.

¹ QAA Foundation Degree Characteristics Statement 2015

² The extent to which these subjects are studied in depth will vary by programme (e.g. a foundation degree in biotechnology will have a greater emphasis on the physical sciences, than a foundation degree in environmental biology, which will include more detail on biodiversity etc.).

Work-based learning

The Society regards work-based learning (WBL) to be a defining characteristic of foundation degrees. Guidance on WBL can be found in the QAA Foundation Degree Characteristics Statement. The Society's criteria for accreditation do not state a minimum period for WBL in order to encourage course teams to consider what is most appropriate to the programme and beneficial for the students, rather than simply meeting a minimum threshold.

Professional registers

The criteria for Foundation Degree Accreditation closely align with the attributes required for Registered Science Technician (RSciTech) and Registered Scientist (RSci). Graduates from an accredited foundation degree programme are able to obtain external professional recognition of their skills, knowledge and expertise, and commitment to Continuing Professional Development (CPD) from the Royal Society of Biology.

For more information about professional registers, see www.rsb.org.uk/careers-and-cpd/registers

Validating Institution

Please note that during the site visit the assessment Panel will need to meet with key individuals from the programme team. Where programmes are validated by an external institution the RSB would expect the HE lead in the College, a representative from the validating body and the assessment officer (or equivalent) to be in attendance.

Criteria for foundation degree accreditation

To achieve accreditation for a programme, HEIs will need to provide robust evidence in support of their application, which will be judged by peer review against the standard metrics listed below. The evidence should show how the intended learning outcomes are being achieved through appropriate assessment strategies.

1. Development of work-based learning that demonstrates relevant industry skills at an appropriate level

- i. A substantial focus on work-based learning relevant to the programme
- ii. Underpinned by a range of relevant sources demonstrating appropriate recognition of health, safety and ethical considerations and professional best practice
- iii. Contextualised, showing critical reflective practice and development

2. Demonstration of the acquisition of professional skills and familiarity with the practical environment, in a work related context

- i. Students learn in a hands-on, practical environment, and are trained in the professional skills appropriate to their main subject interest
- ii. Skill acquisition is a progressive process
- iii. There is a list of the core, assessed and professional skills used in the laboratory, workplace and/or field which are fully integrated into the programme
- iv. There is evidence of competency in the core professional skills for all students on the programme

3. The development and use of transferable graduate skills

- i. Graduates will have the basic skills of word processing, use of spreadsheets, and presentation software
- ii. The assessment strategy will include opportunities for the students to find, cite, evaluate and use information
- iii. There will be clear evidence that students are given the opportunity to consider and approach problems critically, confidently and independently
- iv. The assessment strategy will include opportunities for the students to demonstrate academic communication through both oral and written approaches and to a range of audiences
- v. There will be an approach to the development of teams, including leadership
- vi. There will be evidence of acquisition of general management skills including task management
- vii. Ethical and regulatory issues are addressed where appropriate

4. A foundation in mathematics, statistics, chemistry and physics within a biological context appropriate to the discipline

- i. The coverage of chemistry and physics should be of sufficient depth and breadth to provide the necessary knowledge and understanding for students to appreciate and apply these subjects within a biological context²
- ii. The knowledge and appreciation of mathematical principles must be sufficient to support the understanding and application of key biological concepts and underpin problem solving at the theoretical and practical levels
- iii. Graduates will be equipped with the mathematical knowledge and skills needed to handle variation in data analysis at different levels

5. Specific skills and knowledge appropriate to the foundation degree title

- i. Bioscience graduates will have some general knowledge of the basic fundamentals of biology, including: an overview of biodiversity, the cell, basic genetics, the concept of evolution, biochemistry, molecular biology, and organismal biology
- ii. Programmes will adhere to the relevant recommendations within the QAA Subject Benchmark for Biosciences (with reference to other Benchmarks if appropriate) appropriate to level 5 (8 in Scotland)
- iii. HEIs will have engaged with relevant Learned Societies to inform the curriculum

6. Development of creativity and innovation relevant to the work place

- i. The programme incorporates the development of creativity and innovation in undergraduates and is an implicit part of the student experience
- ii. Students are given the opportunity and encouragement to apply original or unconventional ideas, to be imaginative, and to tackle problem solving using techniques designed to develop individual and group creativity

The Royal Society of Biology recognises the importance of creating environments that support and promote the development of creativity and innovation. At the same time, the Society recognises that these aspects of education are at a developmental stage in many programmes and this will be acknowledged in the application of the criteria.

² The extent to which these subjects are studied in depth will vary by programme (e.g. a foundation degree in biotechnology will have a greater emphasis on the physical sciences, than a foundation degree in environmental biology, which will include more detail on biodiversity etc.).

Details and guidance on the foundation degree accreditation criteria

The Royal Society of Biology takes a learning outcomes based approach to accrediting degrees. Intended learning outcomes of a programme identify important learning requirements. They are understandable to students, achievable, and assessed. The Society recognises that a distinction can be made between “assessment” and “grading”. The Society does not necessarily expect every assessment to be graded, and indeed encourages HEIs to consider whether grading is necessary in all cases (e.g. in the assessment of a technical skill). Advice on learning outcomes and assessment can be obtained from the Higher Education Academy www.heacademy.ac.uk.

1. Development of work-based learning that demonstrates relevant industry skills at an appropriate level

Work-based learning is an integral part of foundation degrees. Well-designed degrees should consider the wide range of provisions and purposes associated with work-based learning appropriate to the degree programme. This will allow the student to apply the knowledge and learning acquired during their degree programme in the workplace while gaining relevant industry skills and experience. The Society makes a distinction between work-based learning, work-related learning and work experience (see Appendix G).

For accreditation, evidence of achieving the learning outcomes should be clearly documented against the appropriate student outputs.

Guidelines

A. The work placement should be contextualised and relevant to the foundation degree discipline

The work placement needs to be put in to context through reference to the larger disciplinary and real-world contexts to which the student is contributing.

B. The work placement will include an element of reflective commentary by the student and employer feedback

This may be evidenced by reference to the student handbook for the work placement or equivalent and is most easily confirmed through the provision of student outputs at the site visit.

C. The work placement should inculcate an appropriate understanding of health and safety, professional best practice, an appreciation of ethical issues, and demonstrate an understanding of scientific integrity

The Society recognises that responsibility for health and safety, risk analysis and ethical approval lies with the institution and/or employer. However, the student should have been involved in these processes as they apply to their work placement (e.g. by preparing a draft risk assessment or ethics application that can be submitted as assessed coursework or included in the work placement report or equivalent).

D. The work placement should be underpinned by a range of relevant sources

Sources that inform work-based learning include textbooks, journal articles, surveys, interviews, experiments, original data, secondary data, websites, blogs, tweets, wikis, practice reports and direct personal experience. What is appropriate depends on the type of work placement and the purpose that the source is being used for. It should be recognised that all sources have strengths and limitations, and reflection on the limitations and validity of the sources used is part of the process.

2. Demonstration of the acquisition of professional skills and familiarity with the practical environment, in a work-related context

Foundation degrees within the biosciences enable students to benefit from the involvement and collaboration between the employer and higher education provider. The Royal Society of Biology recognises the diversity of ways in which such close collaboration may be evident in the programme. The Society seeks to ensure all students can demonstrate the progressive development of industry relevant skills through a work experience or equivalent work-informed simulated experience.

Guidelines

A. The HEI should have, and provide, a list of the core technical skills used in the laboratory and/or field, which form the foundation for the degree subject, and what would be deemed appropriate as a level of competency

A bespoke list may not be necessary if it is already present, for example in validation documentation or student handbooks. The Society will need to feel confident that the HEI is explicit about which technical skills are being acquired by its students and where they are assessed. If a bespoke summary for the submission is required then please follow the format of the table provided below. The table ideally should evidence a progressive approach, where basic techniques and skills are built on during the course of the programme.

| Skill | Level 4 | Level 5 |
|-------------------|-------------------------------|------------------------------|
| Aseptic technique | Introduced in module BIO40001 | Developed in module BIO50001 |
| Etc. | | |

B. A description of how the technical skills are assessed

This can be briefly summarised in the submitted matrix. For example, “technical skills of individuals are assessed on a pass/fail basis by laboratory demonstrators during the series of practical classes in modules BIO40001, BIO40002”, or any other appropriate approach. HEIs may wish to discuss their approach with the Society who provide training courses for Society members on teaching, learning and assessment in the biosciences, and generate and share examples of good practice.

C. Evidence is provided of a basic competency in the core technical skills for all students on the programme

There must be evidence that students are trained and tested in the basic competencies, and achieve a threshold standard set by the HEI, and deemed appropriate say by employers.

D. The Society is specifically seeking evidence for the development of the appropriate technical skills in relation to the subject, whether in the field, the laboratory or the workplace

A system for recording the development of skills and experience of the practical environment should be present within the programme. There is no defined core list of competencies which must be achieved due to the fact that any significant list would be rapidly out-of-date. However the very basic operations (sample and specimen handling, pipetting, manipulation of solutions, measurement, use of basic equipment, and the different forms of error) would be expected. Different subject areas will have different requirements, perhaps informed by the work of the relevant Learned Societies, which could be used as a basis for submission.

3. The development, use and recording of transferable professional skills. As well as the basic skills of word processing, use of spreadsheets and presentation software, graduates should:

There should be clear evidence that students are given opportunities to develop and recognise a range of skills that enable them to consider/approach problems critically, confidently and independently.

Communication skills are considered both in terms of communicating science to a range of audiences, and through both oral and written approaches.

The Society will seek evidence of an approach for the development of teams and different roles within teams (including leadership), and general management skills, including task management.

The Society will seek evidence that ethical and regulatory issues are appropriately addressed. While for many students this may be built on through the capstone experience, the underlying issues will need to be addressed for everyone.

Guidelines

Existing HEI documentation may show where graduate skills outcomes are taught and assessed. If this is not available, or felt by the applicant to be insufficiently clear for the purposes of accreditation, the submission should include a skills table as described in the guidance to criterion 2A above.

A. There is a system for the development of basic skills such as word processing, spreadsheets and presentation software

There should be clear evidence that students have acquired these essential basic skills.

B. Students should be able to demonstrate how to find and distinguish/evaluate/cite appropriately valid sources of scientific and other information online and offline

There should be evidence that students:

- are able to collect, sort and protect/backup personal and professional online resources, including issues of intellectual property
- demonstrate competence in the use of reference management systems
- understand and avoid plagiarism and the importance of personal integrity and its relationship to professional conduct
- make the most of social media opportunities for networking responsibly

C. Students are given the opportunity to develop, and recognise a range of skills that enable them to consider/approach problems critically, confidently and independently

The curriculum should show evidence of integration and reinforcement of problem solving skills throughout the programme. Institutions should provide evidence that there are opportunities for the development of these skills at both levels so that students graduate as creative and effective problem solvers.

Students should be encouraged (wherever appropriate) to:

- rephrase problems in their own words and be clear about what is being asked; divide a complex problem into smaller, more manageable steps
- reformulate a problem, allowing for the identification of more than one solution
- ensure the answers/solutions to problems make sense/are feasible

Students should also be given the opportunity to solve open-ended problems where more than one solution is apparent from the outset (see criterion six for further consideration of creative approaches to problem solving).

Problem solving frameworks that can help define and clarify the nature of a problem, and identify a solution, may also be considered. These could include the 5Ws and 1H (Who, What, Where, When, Why, How) tool and the Osborn-Parnes Creative Problem Solving Process. Institutions may wish to make use of these frameworks when developing students' problem solving skills.

D. Communication skills are considered in terms of communicating science to a range of audiences, and through both oral and written approaches

Institutions should provide evidence that they enable students to communicate effectively through oral and written presentations. This could be formally in the programme and less formally through outreach or presentations to (for instance) student-led societies.

E. There is evidence of an approach to the development of teams and different team members (including leadership)

Teamwork can be particularly valuable with diverse teams, where each member may have a different background and therefore a distinct perspective on problems to be solved. Providing a curriculum framework in which teamwork and leadership skills are developed is a vital recognition of their importance.

F. Ethical and regulatory issues are appropriately addressed

Student exposure to and understanding of ethical issues regarding experimentation and its regulation, provides the necessary appreciation needed for certain types of research, particularly those dealing with animals and humans. The study of ethics helps students to develop widely applicable skills in communication, reasoning and reflection, as well as an introduction to codes of conduct and work as a professional scientist. As stated in criterion one, HEIs need to be clear about the difference between the institution's responsibilities in securing ethical approval and meeting legal requirements around health and safety and the learning, teaching and assessment of students' knowledge of these aspects within a programme.

4. A foundation in mathematics, statistics, chemistry and physics within a biological context appropriate to the discipline

At a basic level, all bioscience foundation degrees should integrate mathematics, statistics, chemistry and physics. Knowledge and understanding of science principles governing current techniques and concepts should be embedded within the curriculum. The knowledge and understanding of mathematical principles that support the application of key biological concepts must be sufficient to promote problem solving at the theoretical and practical levels. Students should be equipped with the mathematics needed to handle variation at different levels, especially with regard to the greatly increased amount of data being generated by modern laboratory and computing techniques. Students should understand the statistical aspects of experimental procedures, encompassing the analysis of collected data, the design and analysis of studies, the development of calibration and analysis techniques, and the robustness of data.

Guidelines

A. The coverage of mathematics, statistics, chemistry and physics should be of sufficient depth and breadth to provide the necessary knowledge and understanding for students to appreciate and apply these subjects within a biological context

Contextual understanding should be demonstrated through the integration of these physical sciences with the biological curriculum, as appropriate. It is to be expected that this coverage will vary within the biological disciplines. The curriculum should highlight, via learning outcomes, where interdisciplinary science knowledge and understanding is fundamental to future developments within specific fields.

B. Knowledge and understanding of science principles governing current techniques and concepts, and their evolution, are embedded within the curriculum

The biological sciences sit on a foundation of physical and mathematical sciences. It is appropriate that the integration of mathematics, chemistry and physics be taught within a biological context. In this way, these subjects can be embedded within the curriculum as part of the learning developmental cycle that is relevant to specific bioscience disciplines. The use of molecular techniques in all areas of biology necessitates the need for chemistry to be included in the curriculum of all bioscience foundation degrees. The extent to which this is covered will depend upon the discipline. However, a bioscience graduate should be able to prepare solutions at known concentrations, understand the concepts of molar, molarity and molality, and manipulate solutions, as well as understand the nature and application of buffers. Different specialisms may vary in the underpinning of mathematics, statistics, chemistry and physics at the technical and analytic skills levels. For instance, the treatment of descriptive and analytical statistics may vary between the molecular and the ecological and environmental sciences streams. A greater underpinning of physics might be deemed necessary for disciplines within the molecular stream where the biological applications of synchrotron radiation, x-ray crystallography or other physical science techniques are covered.

C. The knowledge and understanding of mathematical principles that support the application of key biological concepts are sufficient to promote problem solving at the theoretical and practical levels

Provide an overview. This section is primarily concerned with mathematical problems rather than logistical problems, see 3C.

D. Students should be equipped with the mathematics needed to handle variation at different levels

Provide an overview of the statistics learning outcomes and where they are acquired.

E. Students should understand the statistical aspects of experimental procedures, encompassing the analysis of collected data, the design and analysis of studies, the development of calibration and analysis techniques, and the robustness of data

Show how students apply statistics in experimental situations. Section D above is concerned with how students learn the mathematical principles, this section, E, is about how that knowledge is applied in experimental situations.

5. Specific skills and knowledge appropriate to the foundation degree title.

While foundation degrees accredited by the Royal Society of Biology may involve a great deal of specialisation, they should have some underpinning general knowledge of the basic fundamentals in biology, including: an overview of biodiversity, the cell, basic genetics, the concept of evolution, biochemistry and molecular biology, and organismal biology. HEIs, in their documentation will provide details of the specialist curriculum. Reference will be made to Learned Societies where relevant.

Guidelines

A. All bioscience graduates in any area should have some basic knowledge of genetics, evolution, biochemistry, molecular biology, and organismal biology

The Society feels that it is essential that graduates from an accredited degree not only have an overview that helps them understand their chosen field of study but that they can “hold their own” in terms of basic biological knowledge in the context of overall public awareness. The topics forming the fundamentals of biology provide the underpinning context to the specialisation. The Society accepts that they may be explored to a greater or lesser extent according to specialisation of the degree and it may be appropriate that some of the core topics be mainly taught at FHEQ Level 4 (or SHEQ Levels 7 or 8 in Scotland).

B. There has been consultation with the appropriate Learned Society for the specific skills and knowledge that may be required for a specific programme name

HEIs should consult with the appropriate Learned Societies for the specific skills and knowledge that may be required for a specific programme name.

C. The programme adheres to the guidance of the Biosciences Benchmark

The Society recognises general areas (e.g. Molecular Aspects of Biology, Whole Organism Biology, Ecological and Environmental Sciences). The key topics within these degrees are outlined in the Quality Assurance Agency Biosciences Benchmark Statement and are not repeated here. Accredited programmes will be expected to refer to the guidance in the Biosciences Benchmark Statement (but within the context of the level of award; note the “typical standard” in the Benchmarks refers to honours degrees). (www.qaa.ac.uk/quality-code/subject-benchmark-statements#) and the QAA Foundation Degree Characteristics Statement (https://www.qaa.ac.uk/docs/qaa/quality-code/foundation-degree-characteristics-15.pdf?sfvrsn=ea05f781_10).

6. Development of creativity and innovation relevant to the work place

Developing creativity and innovation in graduates should be an implicit part of the student experience. These characteristics will serve graduates well, wherever they plan to make their careers.

Institutions should provide evidence that they encourage students to be creative by thinking differently and they should describe the steps they have taken towards providing an environment that promotes creativity and innovation. Institutions should also make it clear how they promote problem solving using techniques designed to develop individual and group creativity.

Guidelines

The development of creativity and innovation within the curriculum for an accredited degree programme could contain some or all of the following elements.

A. Institutions should provide evidence that they encourage students to be creative by 'thinking differently'

HEIs should provide evidence that they promote a creative mind set in students by encouraging them to think differently. Students should be encouraged to:

- be inquisitive and open-minded
- welcome the unexpected
- challenge assumptions and (from time-to-time) defy convention
- think beyond their own discipline and make interdisciplinary connections
- consider problems from the perspective of non-biologists

B. HEIs should describe steps that they have taken towards providing an environment that promotes creativity and innovation

There should be evidence that institutions provide the time and space for students to think creatively. This should involve the creation of a culture, ideally at all levels of degree programmes, in which creativity is stimulated and innovation thrives. Important elements of this culture include:

- the encouragement of 'off the wall' ideas, that may lead to genuinely creative solutions to problems
- the building of confidence in students so they have the courage and conviction to pursue their ideas to fruition

C. Engagement of students with techniques that can promote individual and group creativity

HEIs should make it clear how they promote creativity and creative problem solving, using techniques designed to develop individual and group creativity. For group sessions there should be evidence that institutions offer structured, constructive and inclusive approaches to creative problem solving. Where these activities are assessed, emphasis should be placed on students demonstrating how they have engaged with techniques designed to promote creativity in individuals, and the extent of their participation in group sessions. As an example for the former, students could be asked how they have utilised a specific technique during creative problem solving. Students should not be awarded marks solely on the basis of coming up with novel ideas, as this is frequently an unrealistic expectation.

Degree accreditation

Degree Accreditation by the RSB follows an independent and rigorous assessment of degree programmes which contain a solid academic foundation in biological knowledge and key skills, and prepare graduates to address the needs of employers. The accreditation criteria require evidence that graduates from accredited programmes meet defined sets of learning outcomes, including subject knowledge, technical ability and transferable skills.

The development and experience of laboratory and/or field skills are important components of bioscience degrees. Problem solving, innovation and creativity are also important characteristics of how biological subjects are understood and applied. Evidence of the assessment of these skills, knowledge, and the ability to make interpretations based on experimental approaches is required to achieve accreditation. To that end, a central principle of accreditation is that the intended learning outcomes of a programme are linked to assessment.

The accreditation of degrees in the biosciences is based on six overarching learning outcomes. All of these outcomes require an understanding of the context and an appreciation of how the living world operates. They are underpinned by the QAA Biosciences and Biomedical Sciences Benchmark Statements and by reference to other relevant Benchmark Statements, which should be taken as the foundation documents on which the general subject specific requirements are built.

Graduates from accredited programmes will have the specialised knowledge of their chosen discipline plus core knowledge of the biosciences, including cell biology, an appreciation of biodiversity³ and the concepts and application of the theory of evolution. Their knowledge of biology will be underpinned by appropriate competence in chemistry, physics and mathematics, including statistics³.

All documents linked to Accreditation can be found at www.rsb.org.uk/education/accreditation/Degree-Accreditation-Important-Documents.

³ The extent to which these subjects are studied in depth will vary by programme (e.g. a degree in biochemistry will have a greater emphasis on physical science, whereas a degree in environmental science will include more detail on biodiversity etc.).

Criteria for degree accreditation

To achieve accreditation for a programme, HEIs will need to provide robust evidence in support of their application, which will be judged by peer review against the standard metrics listed below. The evidence should show how the intended learning outcomes are being achieved through appropriate assessment strategies.

1. A graduating level capstone experience which includes analysis, synthesis and critical evaluation, resulting in a defined output

- i. The capstone experience will integrate and develop the skills and knowledge gained in earlier years; bring reflection and focus to the whole of the degree experience; and provide students with the opportunity to demonstrate and apply the understanding and skills that they have developed
- ii. The capstone experience will be:
 - a. An extended piece of enquiry-based work, relevant to the degree, with a justified approach that effectively communicates its outcomes
 - b. Underpinned by a range of relevant sources, and will show recognition of health and safety, environmental and ethical considerations
 - c. Contextualised, and show recognition of the provisional nature of knowledge, building to an appropriate conclusion
 - d. Based on the processes of critical thinking, synthesis, reflection and evaluation

2. Demonstration of the acquisition of technical skills and familiarity with the practical environment

- i. Students learn in a hands-on, practical environment, and are trained in the technical skills appropriate to their main subject interest
- ii. Skill acquisition is demonstrably a progressive process
- iii. There is a list of the core, assessed, technical skills used in the laboratory, field or other setting which form the foundation for the degree(s)
- iv. There is evidence of competency in the core technical skills for all students on the programme
- v. Training in research study design and the principles of data management, such as Good Laboratory Practice
- vi. Students will appreciate the concept of 'Big Data' and its importance in understanding the living world

3. The development and use of transferable graduate skills

- i. Graduates will have the basic skills of word processing, use of spreadsheets, and presentation software
- ii. Graduates will be able to find, cite and use information
- iii. There will be evidence that students will consider and approach a wide range of problems and problem types critically, confidently and independently
- iv. Students will communicate through both oral and written approaches and to a range of audiences

- v. Graduates will be experienced in teamwork approaches, including the concepts of leadership; the recognition of individual contributions; and the significance of group dynamics to effective teamworking
- vi. There will be evidence of acquisition of general management skills including project management
- vii. Regulatory and ethical issues, including environmental and social aspects, are considered and addressed by students at appropriate times throughout their programme of study

4. A foundation in mathematics, statistics, chemistry and physics within a biological context appropriate to the discipline

At a basic level, all bioscience degrees should integrate mathematics, statistics, chemistry and physics to the extent that knowledge and understanding of science principles governing current techniques and concepts should be embedded within the curriculum.

- i. The coverage of chemistry and physics should be of sufficient depth and breadth to provide the necessary knowledge and understanding for students to appreciate and apply these subjects within a biological context
- ii. The knowledge and appreciation of mathematical principles must be sufficient to support the understanding and application of key biological concepts, and underpin problem solving at the theoretical and practical levels
- iii. Graduates will be equipped with the appropriate knowledge and skills needed to handle variation in data at different levels of complexity

5. Specific skills and knowledge appropriate to the degree title

- i. Bioscience graduates will have knowledge of the fundamentals of biology, including: an overview of biodiversity and the biological environment; molecular, cell and whole organism biology; biochemistry, genetics, and the concept of evolution
- ii. Degrees will adhere to the relevant recommendations within the QAA Subject Benchmark Statements for Biosciences and/or Biomedical Sciences, with reference to other Benchmark Statements as appropriate
- iii. Specialist degrees will meet the subject-specific requirements of the relevant Learned Societies as listed in the Appendix B

6. Developing creativity and innovation

The RSB recognises the importance of creating environments that support and promote the development of creativity, enterprise and entrepreneurship with our primary focus being on the experiential creative and innovative side, as being of key value to all graduates in their future employment. Creativity requires the development of approaches to solving problems, for thinking 'outside the box' – more usually recognised through contributions in the arts, it is also a skill required to research and solve scientific problems, and should be taught in that context, providing key transferable employability skills.

- i. Students are taught to apply and evaluate original or unconventional ideas, and to tackle problem solving using techniques designed to develop individual and group creativity, evidenced through assessment approaches which recognise and reward such thinking

- ii. Graduates are expected to have an understanding, embedded in the teaching of their subject(s), of:
 - a. A contextualised learning experience using real-world scenarios to gain better alignment with expected key employability skills
 - b. The notion and value of intellectual property
 - c. The importance of evaluating feasibility and impact through a reflective approach
 - d. The interdisciplinary nature of enterprise
 - e. Financial literacy in the context of developing commercial awareness

Notes on the degree accreditation criteria

The Royal Society of Biology takes a learning outcomes based approach to accrediting degrees. Intended learning outcomes of a programme identify important learning requirements. They are understandable to students, achievable, and assessed. The Society recognises that a distinction can be made between “assessment” and “grading”. The Society does not necessarily expect every assessment to be graded, and indeed encourages HEIs to consider whether grading is necessary in all cases (e.g. in the assessment of a technical skill). Advice on learning outcomes and assessment can be obtained from the Higher Education Academy www.heacademy.ac.uk.

| 1. A graduating level capstone experience which includes analysis, synthesis and critical evaluation, resulting in a defined output | |
|---|---|
| Attributes | Notes |
| i. The capstone experience will integrate and develop the skills and knowledge gained in earlier years; bring reflection and focus to the whole of the degree experience; and provide students with the opportunity to demonstrate and apply the understanding and skills that they have developed | The capstone experience tackles a central scientific question or issue in depth, which the students take ownership of. All sections of the capstone experience should relate to the same issue rather than being a collection of unrelated essays. The capstone experience must be the pinnacle of the course, drawing on and extending the students' learning at previous levels. It should be a first-hand experience of performing science. The Society accepts that research is a collaborative process (e.g. between student and supervisor) but the contribution of individual students must be identifiable and assessable. |
| ii. The capstone experience will be: | <i>Further notes can be found in Annex 1.</i> |
| a. An extended piece of enquiry-based work, relevant to the degree, with a justified approach that effectively communicates its outcomes | <p>There are a variety of approaches to research, but central to these is a desire to find out something, and relate it to a hypothesis. The research can be qualitative, quantitative, laboratory/field or design-based, or utilise other scholarly approaches. Many types of experiences can be devised that can fulfil the criterion for a capstone experience (<i>e.g. laboratory or field-based, pedagogic, computer-based, socio-biological and biogeographical research</i>). There may also be different approaches such as a biotechnology-business study, and group approaches. The important factor in deciding whether these represent a capstone experience is the presence of independently sourced information that is critically analysed. There should be no discrimination based on previous achievements: all types of capstone experiences should be available for each student.</p> <p>Capstone experiences should be based on systematic and rigorous methods, with a clear explanation of how these methods are applied, to achieve the purpose and goals of the capstone experience. The capstone experience is expected to be an “extensive” piece of work, and the Society interprets this to mean</p> |

| | |
|--|---|
| | <p>that it should be equivalent to at least 25% of final year full-time study. The capstone experience need not be limited to one module, as long as the links between modules are clear. Commonly, for instance, the Research Methods aspect is taught separately from the research experience itself, such that two or more modules together make up at least 25% of the time in the final year.</p> <p>Group approaches are to be encouraged: team working does not mean that every member of a team does exactly the same tasks. On the contrary, team working (as emphasised by employers) involves individuals with their own areas of expertise combining on a group-based task with the individuals' contributions clear. If group's capstone experiences lead to the production of a single report, then it must be clear what the individual contributions are, supported by additional evidence of the individual students' input and understanding (e.g. a viva or individual oral presentation, and/or supplementary written evidence). Students must be able to demonstrate their unique contribution.</p> |
| <p>b. Underpinned by a range of relevant sources, and will show recognition of health and safety, environmental and ethical considerations</p> | <p>Sources that inform capstone experiences include textbooks, journal articles, surveys, interviews, experiments, original data, secondary data, websites, blogs, tweets, wikis, practice reports and direct personal experience. What is appropriate depends on the type of capstone experience and the purpose that the source is being used for. It should be recognised that all sources have strengths and limitations, and reflection on the limitations and validity of the sources used is part of the process.</p> <p>The Society recognises that responsibility for health and safety, risk analysis and appropriate environmental and ethical approval lies with the institution. However, the student should have been involved in these processes as they apply to their capstone experience (<i>e.g. by preparing a draft risk assessment or ethics application that can be submitted as assessed coursework or included in the capstone experience report</i>).</p> |
| <p>c. Contextualised, and show recognition of the provisional nature of knowledge, building to an appropriate conclusion</p> <p>d. Based on the processes of critical thinking, synthesis, reflection and evaluation</p> | <p>Students must (1) frame their research within the context of existing knowledge, recognising that it may be provisional; (2) develop and test ideas or hypotheses to explain observations, connections and relevance of links; (3) execute and manage objectives; (4) critically analyse data and (5) communicate the results of their study with reference to information sources and potential avenues for further exploration.</p> |

| 2. Demonstration of the acquisition of technical skills and familiarity with the practical environment | |
|--|--|
| Attributes | Notes |
| i. Students learn in a hands-on, practical environment, and are trained in the technical skills appropriate to their main subject interest | <p>The biosciences are a collection of subjects which require significant technical and practical training to demonstrate the key principles and develop problem solving approaches which use an experimental approach. Different subjects have their own requirements: while recognising this diversity, the RSB seeks to ensure that all students learn in a hands-on, practical environment, and are trained in the technical skills appropriate to their main subject interest. Competency requires repeated learning and assessment of individual students' skills, whether working in a group or alone</p> |
| ii. Skill acquisition is demonstrably a progressive process | <p>Students are expected to evidence increasing competency and familiarity with the skills they are acquiring over the period of their programme. The Society is specifically seeking evidence for the development of the appropriate technical skills in relation to the subject, whether in the field, the laboratory or the workplace.</p> <p>A system for recording the development of skills and experience of the practical environment should be present within the programme, to demonstrate the progressive nature of the learning.</p> |
| iii. There is a list of the core, assessed, technical skills used in the laboratory, field or other setting which form the foundation for the degree(s) | <p>There is no defined core list of competencies which must be achieved by all students: any such list would be rapidly out-of-date. However, the very basic operations (<i>sample and specimen handling, pipetting, manipulation of solutions, measurement, use of basic equipment, and the different forms of error</i>) would be expected.</p> <p>Different subject areas will have different requirements - please check the requirements under criterion five, which gives links to subject-specific material. The Society will need to feel confident that the HEI is explicit about which technical skills are being acquired by its students and where they are assessed. The HEI should have, and provide, a list of the core technical skills used in the laboratory and/or field, which form the foundation for the degree subject, and what would be deemed appropriate as a level of competency.</p> <p>A bespoke list may not be necessary if it is already present, for example in validation documentation or student handbooks. If a bespoke summary for the submission is required then please follow the format of the table given in Annex 2. The table ideally should evidence a progressive approach (see 2ii), where basic techniques and skills are built on during the course of the programme.</p> |
| | |

| | |
|--|--|
| <p>iv. There is evidence of competency in the core technical skills for all students on the programme</p> | <p>There should be description of how the technical skills are assessed. This can be briefly summarised in the submitted matrix (Annex 2). For example, "<i>technical skills of individuals are assessed on a pass/fail basis by laboratory demonstrators during the series of practical classes in modules BIO40001, BIO40002</i>", or any other appropriate approach. Assessments that test knowledge and understanding (e.g. written reports or theory examinations) cannot, on their own, be used to assess technical skill. HEIs may wish to discuss their approach with the Society who provide training courses for Society members on teaching, learning and assessment in the biosciences, and generate and share examples of good practice.</p> <p>If technical skill is being acquired and assessed in a module we would normally expect it to be reflected in the module learning outcomes.</p> <p>Evidence should be provided of a basic competency in the core technical skills for all students on the programme. For example, through a record of the individual achievement of skills, or identification of compulsory learning outcomes. There must be evidence that students are trained and tested in the basic competencies, and achieve a threshold standard set by the HEI, and which would be deemed appropriate, for example, by employers. However, there is no requirement for all students to achieve a high level of competency in every technical skill. The Society is accrediting life science programmes, not professional training programmes.</p> |
| <p>v. Training in research study design and the principles of data management, such as Good Laboratory Practice</p> | <p>Obtaining and managing data is critical for successful evidence-based approaches, be they in the laboratory or in wider employment. Data management in particular is critical for ensuring that evidence gathered is verifiable; and for Quality Management, embodied in the wide range of Good Practice (GxP) approaches, such as the principles of Good Laboratory Practice (GLP), Good Manufacturing Practice (GMP) and other similar approaches. GLP and GMP are internationally recognised for the development and manufacture of drugs. While using a full GLP approach in a learning and teaching environment is not usually feasible, students should be introduced to the concepts embodied by GLP and Quality Management, including an awareness of the regulatory environment, and the role of Quality Control and Quality Assurance, and should be able to discuss and defend the approaches implicit in this approach.</p> |
| <p>vi. Students will appreciate the concept of 'Big Data' and its importance in understanding the living world</p> | <p>"Big Data" is the name given to extremely large data sets that are now generated both in biological research and in the wider business and industrial world. In particular, for the biosciences, the development of large data sets to address questions from the molecular level to the population, be it genomics or environmental level analyses, poses challenges in understanding the scale, advantages and drawbacks of such datasets. Students should understand the nature and difficulties of working with large data sets, including their strengths and limitations.</p> |

| 3. The development and use of transferable graduate skills | |
|--|---|
| Attributes | Notes |
| i. Graduates will have the basic skills of word processing, use of spreadsheets, and presentation software | <p>There should be clear evidence that students have acquired these essential basic skills.</p> <p>As a general point, we would normally expect to see transferable skills in the learning outcomes of a module if the skill (as opposed to knowledge and understanding) is both acquired and assessed. But given the widespread use of IT in assignments we do not expect it to appear in the LOs of all modules, only those where it represents a significant feature (e.g. where students are first introduced to spreadsheets etc.).</p> |
| ii. Graduates will be able to find, cite and use appropriate information | <p>There should be evidence that students:</p> <ul style="list-style-type: none"> - are able to collect, sort and protect/backup personal online resources and to take into consideration issues relating to intellectual property - demonstrate competence in the use of reference management systems - understand and avoid plagiarism and the importance of personal integrity - critically evaluate sources of information - make the most of social media opportunities for networking ethically and responsibly. |
| iii. There will be evidence that students will consider and approach a wide range of problems and problem types critically, confidently and independently | <p>The criterion includes two broad categories of problem: mathematical and logistical (e.g. in research, manufacture, health care or environmental management). Students should be exposed to both during the programme.</p> <p>The curriculum should show evidence of integration and reinforcement of problem solving skills throughout a degree programme. Institutions should provide evidence that there are opportunities for the development of these skills at all levels of degree programmes so that students graduate as creative and effective problem solvers.</p> <p><i>Students should be encouraged (wherever appropriate) to:</i></p> <ul style="list-style-type: none"> - <i>rephrase problems in their own words and be clear about what is being asked; divide a complex problem into smaller, more manageable steps</i> - <i>reformulate a problem, allowing for the identification of more than one solution</i> - <i>ensure the answers/solutions to problems make sense/are feasible.</i> <p>Students should also be given the opportunity to solve open-ended problems where more than one solution is apparent from the outset (see criterion six for further consideration of creative approaches to problem solving).</p> |

| | |
|---|---|
| | <p>Problem solving frameworks that can help define and clarify the nature of a problem, and identify a solution, may also be considered. These could include the 5Ws and 1H (Who, What, Where, When, Why, How) tool and the Osborn-Parnes Creative Problem Solving Process. Institutions may wish to make use of these frameworks when developing students' problem solving skills, as well as formally teaching null hypothesis synthesis and validation.</p> |
| <p>iv. Students will communicate through both oral and written approaches, and to a range of audiences</p> | <p>Institutions should provide evidence that they develop students to communicate effectively through oral and written presentations. This could be formally in the programme and less formally through outreach or presentations to (for instance) student-led societies.</p> |
| <p>v. Graduates will be experienced in teamwork approaches, including the concepts of leadership; the recognition of individual contributions; and the significance of group dynamics to effective teamworking</p> | <p>Teamwork can be particularly valuable with diverse teams, where each member may have a different background and therefore a distinct perspective on problems to be solved.</p> <p>Providing a curriculum framework in which teamwork and leadership skills are developed is a vital recognition of their importance. HEIs must show where they teach the principles of teamwork, and how they implement those principles: it is not enough to say that 'students work in pairs/groups', if those students have no understanding of the benefits and challenges of working as part of a team. Teamwork should also address the question of interdisciplinarity, where teams with different skills and knowledge come together to solve a problem (<i>see criterion six</i>).</p> |
| <p>vi. There will be evidence of acquisition of general management skills including project management</p> | <p>There should be reference to these skills in learning outcomes of specified modules where it is a significant feature (e.g. where students plan and/or cost a piece of work). This framework should include the development of time management, organisation and interpersonal skills, including the use of milestones. <i>This may be cross-referred to the learning points in criterion six.</i></p> |
| <p>vii. Regulatory and ethical issues, including environmental and social aspects, are considered and addressed by students at appropriate times throughout their programme of study</p> | <p>Student exposure to and understanding of ethical issues regarding experimentation and its regulation, including adherence to the General Data Protection Regulation (GDPR), provides the necessary appreciation needed for certain types of research, particularly those dealing with animals, humans and the wider environment. The study of ethics helps students to develop widely applicable skills in communication, reasoning and reflection, as well as an introduction to codes of conduct and work as a professional scientist.</p> <p>As stated in criterion one, HEIs need to be clear about the difference between the institution's responsibilities in securing ethical approval and meeting legal requirements around health and safety and the learning, teaching and assessment of students' knowledge of these aspects within a programme.</p> |

4. A foundation in mathematics, statistics, chemistry and physics within a biological context appropriate to the discipline

At a basic level, all bioscience degrees should integrate mathematics, statistics, chemistry and physics to the extent that knowledge and understanding of science principles governing current techniques and concepts should be embedded within the curriculum.

| Attributes | Notes |
|--|--|
| <p>i. The coverage of chemistry and physics should be of sufficient depth and breadth to provide the necessary knowledge and understanding for students to appreciate and apply these subjects within a biological context</p> | <p>The biological sciences sit on a foundation of physical and mathematical sciences. It is appropriate that the integration of mathematics, chemistry and physics be taught within a biological context. In this way, these subjects can be embedded within the curriculum as part of the learning developmental cycle that is relevant to specific bioscience disciplines. The use of molecular techniques in all areas of biology necessitates the need for chemistry to be included in the curriculum of all bioscience degrees.</p> <p>Contextual understanding should be demonstrated through the integration of these physical sciences with the biological curriculum, as appropriate. It is to be expected that this coverage will vary within the biological disciplines. The curriculum should highlight, via learning outcomes, where interdisciplinary science knowledge and understanding is fundamental to future developments within specific fields. The extent to which this is covered will depend upon the discipline. However, a bioscience graduate should be able to prepare solutions at known concentrations, understand the concepts of molar, molarity and molality, and manipulate solutions, as well as understand the nature and application of buffers.</p> |
| <p>ii. The knowledge and appreciation of mathematical principles must be sufficient to support the understanding and application of key biological concepts, and underpin problem solving at the theoretical and practical levels</p> | <p>Different specialisms may vary in the underpinning of mathematics, statistics, chemistry and physics at the technical and analytic skills levels. For instance, the treatment of descriptive and analytical statistics may vary between the molecular and the ecological and environmental sciences streams.</p> <p>A greater underpinning of physics might be deemed necessary for disciplines within the molecular stream where the biological applications of synchrotron radiation, x-ray crystallography or other physical science techniques are covered.</p> <p>We would expect all students to have at least some basic knowledge of the science principles behind the technical equipment they use.</p> |

iii. Graduates will be equipped with the appropriate knowledge and skills needed to handle variation in data at different levels of complexity

Students should be equipped with the knowledge of mathematics and statistical approaches needed to handle variation at different levels, especially with regard to the greatly increased amount of data being generated by modern laboratory and computing techniques. Students should understand the statistical aspects of experimental procedures, encompassing the analysis of collected data, the design and analysis of studies, the development of calibration and analysis techniques, and the robustness of data.

| 5. Specific skills and knowledge appropriate to the degree title | |
|--|--|
| Attributes | Notes |
| i. Bioscience graduates will have knowledge of the fundamentals of biology, including: an overview of biodiversity and the biological environment; molecular, cell and whole organism biology; biochemistry, genetics, and the concept of evolution | <p>It is essential that graduates from an accredited degree not only have an overview that helps them understand their chosen field of study but that they can “hold their own” in terms of basic biological knowledge in the context of overall public awareness.</p> <p>The topics forming the fundamentals of biology provide the underpinning context to the specialisation. The Society accepts that they may be explored to a greater or lesser extent according to specialisation of the degree and it may be appropriate that some of the core topics be mainly taught at FHEQ Level 4 (or SHEQ Levels 7 or 8 in Scotland).</p> |
| ii. Degrees will adhere to the relevant recommendations within the QAA Subject Benchmark Statements for Biosciences and/or Biomedical Sciences, with reference to other Benchmark Statements as appropriate | <p>The Society recognises general areas (e.g. Molecular Aspects of Biology, Whole Organism Biology, Ecological and Environmental Sciences). The key topics within these degrees are outlined in the Quality Assurance Agency Biosciences Benchmark Statement and/or the Biomedical Sciences Benchmark Statement and are not repeated here. Accredited programmes will be expected to adhere to the guidance for the typical standard of the most current Benchmark Statements (available at www.qaa.ac.uk/quality-code/subject-benchmark-statements#).</p> |
| iii. Specialist degrees will meet the subject-specific requirements of the relevant Learned Societies as listed in Appendix B | <p>Many honours degrees are awarded in subjects that have relevant Learned Societies. HEIs should consult with the appropriate Learned Societies for the specific skills and knowledge that may be required for a specific programme name. Some subject areas have defined additional Learning Outcomes (see Appendix B) which should be considered as conditions for accreditation of degrees with relevant titles or foci.</p> |

6. Developing creativity and enterprise

The RSB recognises the importance of creating environments that support and promote the development of creativity, enterprise and entrepreneurship with our primary focus being on the experiential creative and innovative side, as being of key value to all graduates in their future employment. Creativity requires the development of approaches to solving problems, for thinking 'outside the box' – more usually recognised through contributions in the arts, it is also a skill required to research and solve scientific problems, and should be taught in that context, providing key transferable employability skills.

| Attributes | Notes |
|---|--|
| <p>i. Students are taught to apply and evaluate original or unconventional ideas, and to tackle problem solving using techniques designed to develop individual and group creativity, evidenced through assessment approaches which recognise and reward such thinking</p> | <p>Institutions should make it clear how they promote creativity and creative problem solving, in the students' programme of study, using techniques designed to develop individual and group creativity.</p> <p>For group sessions there should be evidence that students experience structured, constructive and inclusive approaches to creative problem solving. When these activities are assessed, emphasis should be placed on students demonstrating how they have engaged with techniques designed to promote creativity in individuals, and the extent of their participation in group sessions. As an example for the former, students could be asked how they have utilised a specific technique during creative problem solving. Students should not be awarded marks solely on the basis of coming up with novel ideas, as this is frequently an unrealistic expectation.</p> |
| <p>ii. Graduates are expected to have an understanding, embedded in the teaching of their subject(s), of the following concepts (a-e):</p> | <p>As well as an environment which promotes enterprise and entrepreneurship, there are some key learning points which students should be exposed to in order to aid their understanding of the post-degree work environment.</p> <p>This learning should not solely be in addition to current curricula, which would lead to student overload, but should look at current curricula and approaches to see how they can be adapted to address the skills and knowledge cited.</p> |
| <p>a. A contextualised learning experience using real-world scenarios to gain better alignment with expected key employability skills</p> | <p>Students learn through application and practice: there are many areas of the life sciences where principles can be taught by reference to "real-world" examples. This can often be done by inviting external specialist and employers to show how the basic science relates to their industry, for instances using Enterprise Masterclasses. Employers seek an awareness of the wider context and how to develop graduates' skills for that wider context, and HEIs are charged with preparing their students for that world.</p> |
| <p>b. The notion and value of intellectual property</p> | <p>Intellectual Property drives the economic engines of innovation - students should understand how IP rights work locally and more widely outside the UK, why IP is important for development, and how to exploit it, protect it, and be aware of the potential for infringement.</p> |

| | |
|--|---|
| <p>HEIs will recognise that these three areas (c, d and e) are intrinsic to scientific research and the use of that research. While detailed learning in these areas is dependent on the particular degrees being studied, all students should at least have an awareness of these different concepts as they relate to the successful translation of research to public benefit, be it commercial exploitation or social and environmental improvement.</p> | |
| <p>c. The importance of evaluating feasibility and impact through a reflective approach</p> | <p>Students should be able to place their work in the wider social and commercial context, and understand the value and importance of it, relative to the wider world. 'Feasibility' can include concepts such as 'Technology Readiness Levels (TRL, see https://publications.parliament.uk/pa/cm201011/cmselect/cmstech/619/61913.htm) as well as financial and public benefit aspects.</p> |
| <p>d. The interdisciplinary nature of enterprise</p> | <p>As well as scientific interdisciplinarity, students should be made aware of the different types of business culture and company sizes that exist, and their different attributes – a good example framework might be the supply chain in drug manufacture and its role and importance in delivering translational research. Enterprise is not just about business, and students should also be made aware of the "application of enterprise behaviours, attributes and competencies into the creation of cultural, social or economic value; Green entrepreneurship is where environmental problems are explored to result in a net positive impact on the natural environment using sustainable processes".¹</p> |
| <p>e. Financial literacy in the context of developing commercial awareness</p> | <p>'Financial literacy' is about understanding the wider value chain in business, and links strongly to feasibility (c above), relevant to commercial, social and green enterprises.</p> |

¹ Enterprise and Entrepreneurship Education: Guidance for UK Higher Education Providers, January 2018, QAA

Annexes

Annex 1 – Further notes for the capstone experience

The type of capstone experience

Many types of EQF level 6 (SCQF level 10) capstone experiences can be devised that can fulfil the criterion for a capstone experience (e.g. laboratory or field-based, pedagogic, computer-based, socio-biological and biogeographical research). There may also be different approaches such as a biotechnology-business study. The important factor in deciding whether these represent a capstone experience is the presence of independently sourced information that is critically analysed. For guidance, some examples other than traditional laboratory or field capstone experiences include the following.

- 1) Informatics capstone experiences. These may use computer-held, information databases that are ecological, molecular, physiological or taxonomical in nature, which can be investigated using software to identify trends or relationships or processes. In this type of capstone experience the data already exists in one form but it has to be found, manipulated and analysed so that conclusions may be reached.
- 2) Science education capstone experiences. These may create new ways of imparting knowledge and will include analysis of the reaction to, or success of, a particular pedagogic approach or method.
- 3) Questionnaire-based capstone experiences. These may find out what is known or not known, acted on, or understood about a process or treatment. They may test an idea by asking and analysing the answer to questions. A hypothesis is required, with ethical or other matters considered and response data generated and analysed.
- 4) Business development projects, where the focus is on project selection and analysis of business potential for commercial exploitation and translation of biological innovations. These are frequently in collaboration with colleagues in Business Schools, and/or involving 'real world' entrepreneurs in their research.

This note is cautious about use of the word "dissertation" as it is used differently across HEIs. It may for example be a term used to describe the submitted written report following a period of laboratory/field research or it could be used to describe a literature review. Panel members will need to be confident about how an applicant uses the term and may need to specifically seek clarification when considering an application.

Literature-based reviews of a topic do not qualify as a capstone experience if critical analysis of data is absent. Although students are expected to write literature reviews of subjects, this activity alone is not considered sufficient for the student to demonstrate the attributes needed to perform a capstone experience. Accordingly, literature-based capstone experiences should include data mining, analysis and hypothesis testing in addition to a literature review.

An example of a literature-based capstone experience that meets the Society's criteria are meta-analyses. These use statistical techniques to combine results from independent researchers; they are frequently applied for example when investigating multiple studies on the clinical effectiveness of a healthcare intervention. It is important to distinguish meta-analysis from a critical analysis of a series of research papers, where there is no manipulation or analysis of data, as expected from a literature review. If students are being offered meta-analysis capstone experiences, it is likely that they will have received appropriate education in the statistical methods appropriate.

Individual or group capstone experiences

Independent work is an important aspect of the capstone experience. Independence is demonstrated easily when a capstone experience is performed individually, but this does not necessarily mean that capstone experiences performed in a group setting fail to meet this criterion. It is possible for a number of students to follow the same line of enquiry, or be using the same methods, or be co-supervised, or perform a group environmental study, but they each generate and analyse data independently so that unique reports are produced. In which case, the capstone experiences meet the accreditation criterion.

It is important to understand that team working does not mean that every member of a team does exactly the same tasks. On the contrary, team working (as emphasised by employers) involves individuals with their own areas of expertise combining on a group-based task with the individuals' contributions clear. One helpful approach is to assign clear roles and responsibilities to each member of the team, and assessing them individually against those roles and responsibilities

Examples of capstone experiences that are "individual" and **do** meet the criteria, but have a team ethos are where students:

- investigate the same receptor but each student studying a different antagonist
- study an enzyme but under different conditions
- use a DNA database but investigate different mutations
- work on the same medicine but from different angles such as research and development, health and safety, or patient information
- investigate the same environment but from different perspectives.
- make contributions that are clearly identified as individual and assessable
- work in a multi-disciplinary environment where their personal biological input is discernible and assessable

If group's capstone experiences lead to the production of one report, then it must be clear what the individual contributions are, supported by additional evidence of the individual students' input and understanding (e.g. a viva or individual oral presentation, and/or supplementary written evidence). Students must be able to demonstrate their unique contribution, The use of rubrics can be particularly valuable in ensuring fair and objective assessment.

Capstone experiences that would **not** meet the criteria are those where students all work together generating just one set of data, submitted as one written report, with no identification of the individuals' efforts and all students receive the same mark.

Range and choice

It is likely that an institution will provide a range of capstone experience types for their students. It is a requirement for accreditation that all capstone experiences offered to students meet the accreditation criteria. This ensures that all students can demonstrate the threshold levels for the learning outcomes associated with the capstone experience. The process for the allocation of capstone experiences should be clearly stated, matching the career aspirations of the students and their ability. Where a choice of capstone experience type is available, this process should ideally ensure that all students who wish to undertake a laboratory or field-based capstone experience should be able to do so, with no discrimination based on previous achievements: all capstone experiences should be available for each student. This position can be achieved by an institution by ensuring that the range of capstone experiences offered have equal status, and are equally relevant to the students and the programme

Annex 2 – Technical skills table

If a bespoke technical skills table is required, then please follow the format of the table below. The table ideally should evidence a progressive approach, where basic techniques and skills are built on during the course of the programme. There should be description of how the technical skills are assessed. This can be briefly summarised in the table. For example, “technical skills of individuals are assessed on a pass/fail basis by laboratory demonstrators during the series of practical classes in modules BIO40001, BIO40002”, or any other appropriate approach.

| Skill | Level 4 | Level 5 | Level 6 |
|-------------------|-------------------------------|------------------------------|--|
| Aseptic Technique | Introduced in module BIO40001 | Developed in module BIO50001 | Applied in microbiology capstone experience, module BIO60008 |
| Etc. | | | |

Advanced accreditation

Advanced Accreditation by the RSB recognises academic excellence in the biosciences, highlighting degrees which contain a significant research element and educate the research and development leaders and innovators of the future. The advanced accreditation criteria require institutions to provide evidence that their graduates meet defined sets of learning outcomes, including gaining substantial research experience.

Through the process of advanced accreditation, HEIs will reflect on the needs of their learners in preparing them for key research positions within the biosciences. Advanced accreditation will also enable the sharing of good practice across the sector, thus driving up the standard of graduates in the specific biological and life sciences.

Advanced accreditation is not about wide recognition of threshold standards, nor does it seek to make judgements on the wide range of excellent degrees delivered in UK higher education. Rather, it seeks to identify and recognise programmes that deliver the research and development leaders and innovators of the future.

Degree programmes recognised for advanced accreditation by the RSB are likely to be those that:

Enhance leadership and reward innovation

Successful degree programmes will equip students with the skills to become leaders and innovators in research and development. For this reason, the research environment in which this learning takes place is a key consideration of the accreditation process, as is the learning and teaching environment.

Develop independent research skills

Degree programmes gaining advanced accredited status will bestow independent research capabilities upon their graduates. A period of practice will allow the student to apply the knowledge and learning gained in their academic training, while carrying out their own supervised research in an active research environment. The research will be related to, and draw on, the theoretical knowledge and skills already acquired. During this period, students will become fully integrated into the research environment and become more independent thinkers.

Deliver excellence

Advanced accredited degree programmes will be highly regarded within the learning and teaching community, the research community, and by employers. Such programmes will be delivered by subject experts and produce graduates with the potential to excel in a career in their chosen field.

Advanced accreditation recognises three facets of a particular programme:

1. A base of knowledge, understanding, skills and excellence as defined by the RSB, which provides the framework and standards for accreditation
2. Specific knowledge, understanding and skills for routes identified by the intended learning outcomes, and defined in partnership between the RSB, relevant Learned Societies, and other partners
3. A sizeable research element, which provides the opportunity to develop skills in a range of research techniques and experience of planning and undertaking at least one substantial research project

All documents linked to Advanced Accreditation can be found at www.rsb.org.uk/education/accreditation/Advanced-Degree-Accreditation-Important-Documents.

Criteria for advanced accreditation

To achieve advanced accreditation for a programme, HEIs will need to provide robust evidence of excellence in support of their application, which will be judged by peer review against the standard metrics listed below. The evidence for (1) and (4) should show how the appropriate intended learning outcomes are being achieved through appropriate assessment strategies.

1. Academic excellence

- i. Knowledge and understanding of the subject informed by current scholarship and research
- ii. Proven practical expertise in the laboratory, field and elsewhere appropriate for the main research project
- iii. A knowledge and understanding of research methodology
- iv. Appropriate and clear assessment criteria

2. Research-active environment, as evidenced by:

- i. An appropriate breadth in the area being offered for advanced accreditation
- ii. Research excellence, as defined by appropriate national and international criteria
- iii. The provision of projects in research-active laboratories
- iv. Achievement of the period of practice learning outcomes

3. The infrastructure supporting the claim for excellence, including:

- i. Access to, and standards of, library and information and communications technology
- ii. Learning and teaching environments and research laboratories and facilities
- iii. Experience and expertise of teaching team
- iv. Processes to support monitoring achievement throughout, including processes for approving progression to higher levels
- v. A track record of success for the programme's graduates in research in industry or higher education

4. Other student outcomes, requiring evidence of the means by which students are brought to the level needed to support their particular specialism

- i. Appropriate levels of knowledge and understanding of physics, chemistry and maths in a biological context
- ii. The ability to study independently
- iii. Experience of using a range of techniques and research methods in a safe and responsible manner
- iv. An analytical, problem solving approach to their work and the ability to critically evaluate evidence
- v. An understanding of research study design
- vi. Provision of necessary and appropriate research facilities and equipment
- vii. Effective communication through a variety of media, to specialist and non-specialist audiences
- viii. An appreciation of the significance of ethical, social and legal issues and critical awareness of current developments in the subject

5. Evidence of a period of practice with the following outcomes:

- i. A period of practice will allow the student to apply the knowledge and learning gained in their academic training while carrying out their own supervised research in an active research environment
- ii. The research will be related to, and draw on, the theoretical knowledge and skills already acquired during the degree programme
- iii. The student effort is substantial, there is a written report and other evidence of achievement of learning outcomes; there is a contact between the HEI and the student; and a pass is required for the award of the named degree

6. Relevant subject specific criteria developed by the Royal Society of Biology

- i. The programme meets the requirements of the relevant subject specific criteria developed by the Royal Society of Biology (see Appendix B)
- ii. Programme outcomes are clearly stated and support the subject specific criteria
- iii. There should be a clear distinction between the Bachelors and Master's levels. This should be reflected as a greater exposure to work-placed and/or research environments at Master's level, with clear demonstrations of independent work
- iv. There should be a clear statement regarding the teaching and learning, and assessment strategies, e-learning, research-informed teaching, employability skills, and bioethics within the modules

Period of practice

For an advanced accredited degree programme, the student period of practice must be an evaluated working experience in an appropriate environment.

Inclusion of a period of practice, outside the normal learning environment, in a professional working structure will enhance the students' experience and should be considered normal practice for advanced accredited degree programmes. The clear objective, therefore, is to augment and develop the skills and competencies delivered by the degree programme, and to practice science in a working context. The period of practice is also a valuable experience for employers as it provides an opportunity for staff to interact with young scientists at a formative stage of their career, as well as offering supervisory or mentoring experience as part of career development.

Periods of practice in advanced accredited degree programmes should have the following outcomes:

1. A period of practice will allow the student to apply the knowledge and learning gained in their academic training while carrying out their own supervised research in an active research environment
2. The research will be related to, and draw on, the theoretical knowledge and skills already acquired during the degree programme

Factors that define appropriate periods of practice

It is expected that the student will gain scientific and interpersonal skills, which complement the learning experience delivered by their sponsoring HEI. Periods of practice will therefore contribute to the overall objective of identification and training of talented students interested in careers as practising scientists.

Appropriate locations for periods of practice

There are significant opportunities for student periods of practice in universities, hospitals, other public institutions and the private sector, both inside and outside the UK. The HEI responsible for the student must ensure that the location of the period of practice provides a suitable environment for that student (i.e. safe, appropriate, and able to support the development needs of the individual concerned).

Small and medium-sized enterprises (SMEs) and contract organisations (CROs) are currently under-used as hosts for the period of research training. The Society encourages HEIs to consider these institutions but the HEI must ensure that the host SME or CRO can support the project, provide sufficiently challenging research topics and adequate supervision.

Common format

There are a number of common elements, which should be included in the process regardless of subject or location. These are:

1. The effort required by the student for the research component of this work would normally be the equivalent of at least 80 credits, with the final assessment made at a minimum of level 6 (QCF/QCFW/EQF)/level 10 (SCQF) [equivalent to the 'end of first cycle' point in the language of the QF-EHEA]
2. The assessment of the period of practice will include a written report and other evidence (e.g. a self-reflective report, or oral examination) to show achievement of the learning outcomes
3. The student should receive significant contact from the sponsoring HEI, site visits or teleconferences
4. Passing the period of practice must be a requirement for award of the degree

Placements and assessment

The RSB's Advanced Accreditation Assessment Panel must see evidence of the common elements described above, as well as a clear account of the discipline-specific learning and skills required within any subject. HEIs must justify their calculation of equivalent credits and illustrate how they assess outcomes one and two to the assessors in their stage one application. There will be flexibility for exceptional circumstances at the discretion of the Panel.

Master's accreditation

Master's degree accreditation by the RSB highlights degrees which support the development of specific skill sets, competencies and training which will enhance Life and Health Science research. The master's degree criteria require institutions to provide evidence that their graduates meet defined sets of learning outcomes, including gaining substantial research experience.

The RSB will accredit 180 credit, or equivalent, Master's level programmes in the Life and Health Sciences, provided as full-time or part-time qualifications. Programmes submitted for accreditation must satisfy the general requirements for Advanced Accreditation⁴, which includes a significant period of practice.

Master's qualifications mix specialisation with advanced level (level 7 [QCF/QCFW/EQF]/level 11 [SCQF]) learning and practice. The Society recognises that this should lead to a wide range of pedagogic approaches, and offers these examples as extremes of a normal distribution – there is no 'right' way to deliver an accredited programme, only a set of outcomes which should be achieved.

Full time 180 credit or equivalent programmes, taken over a 12 month period, must include a period of research practice in an environment appropriate to the subject of the Master's programme – many of the core requirements will have been recognised in the admissions process to the Master's programme. Part time 180 credit or equivalent programmes, taken over a longer period as part of employment in a Life and Health Sciences industry, such as the Health Service, are likely to have a less clearly defined project (in terms of credit equivalents), strongly embedded in the workplace. The aims remain the same (see below), and the judgement of excellence remains a peer review judgement by an appropriate panel of experts, using the accreditation framework as the basis for the judgement.

There are many reasons why a Master's-level course might have been designed, ranging from fundamental research training to the directed education of researchers in industrially-focused topics or to the creation of specifically trained researchers in a highly specialised field. It is requested that when learning outcomes have been designed to align with or fulfil a particular need, the HEI clearly explain this link so that the review panel can accurately assess the success of the course in delivering its stated objectives. This could include, for example, the expectations of employers, learned societies or other similar sponsor or stakeholder.

All documents linked to Master's Accreditation can be found at www.rsb.org.uk/education/accreditation/Masters-Degree-Accreditation-Important-Documents.

⁴ Please refer to the Advanced Accreditation section of this handbook

Criteria for master's degree accreditation

To achieve master's degree accreditation for a programme, HEIs will need to provide robust evidence of excellence in support of their application, which will be judged by peer review against the standard metrics listed below. The evidence for (A) and (E) should show how the appropriate intended learning outcomes are being achieved through appropriate assessment strategies.

1. Does the documentation indicate that the programme incorporates academic excellence within the teaching programme supporting a structured learning opportunity? Does documentation provide evidence of academic excellence:

- i. Knowledge and understanding of the specialist subject informed by current scholarship and research
- ii. Proven practical expertise in the laboratory, field and elsewhere appropriate for the main research project
- iii. A knowledge and understanding of research methodology
- iv. A critical awareness of current issues and developments in the subject area
- v. Completion of an extended research project in the subject area, including a clear demonstration of critical analysis
- vi. Communication of the research outcomes appropriately and effectively
- vii. Appropriate and clear assessment criteria, mapped to the learning outcomes
- viii. Specialisation in a subject area that supports the development of specific skills

2. Research-active environment, as evidenced by:

- i. An appropriate breadth in the area being offered for master's accreditation
- ii. Research excellence, as defined by appropriate national and international criteria
- iii. Appropriate training in research methodology and techniques and assessment
- iv. The provision of projects in research-active environments, where the effort required by the student for the research component of this work would normally be the equivalent of at least 80 credits, of which at least 60 credits should be accounted for by the project

3. Does the documentation provide evidence of an infrastructure supporting the incorporation of excellence within the teaching programme? This will include:

- i. Access to, and standards of, library and information and communications technology
- ii. Learning and teaching environments and research laboratories and facilities
- iii. Experience and expertise of teaching team
- iv. Processes to support monitoring achievement throughout, including process of approving progression to higher levels
- v. A track record of success for the programme's graduates in research in industry or higher education
- vi. Provision of necessary and appropriate research facilities and equipment
- vii. There is an approach to general management skills, including project management
- viii. Ethical, health and safety and regulatory issues are appropriately addressed

4. Does the documentation provide evidence of generic and specific skill acquisition appropriate to the degree title? This will include:

- i. Appropriate levels of knowledge and understanding in physics, chemistry and mathematics necessary to apply advanced bioscience techniques related to the subject area
- ii. The ability to study independently
- iii. Experience of using a range of techniques and research methods in a safe and responsible manner
- iv. An analytical, problem-solving approach to their work and the ability to critically evaluate evidence
- v. An understanding of research design
- vi. Effective communication through a variety of media, to non-specialist audiences
- vii. An appreciation for the significance of ethical, social and legal issues and critical awareness of current developments in the subject
- viii. Prepare the student for a future career
- ix. There is evidence of an approach to the development of teams and different team members (including leadership)
- x. Students should understand the statistical aspects of experimental procedures, encompassing the analysis of collected data, the design and analysis of studies, the development of calibration and analysis techniques, and the robustness of data
- xi. Awareness of data banks and analysis of large data sets
- xii. Health and safety training in the laboratory/field

5. The period of practice is that part of the course concerned with a research project completed in a work environment – it is where the student experiences the practice of science. The nature of the research may be experimental, where it is performed in a laboratory, or computational linked to bioinformatics, or it may be more related to bio-enterprise. It is expected that the research will generate information that can be critically evaluated. The work environment may be a research laboratory within an academic institute or at an industrial or commercial company, or in a designated research area such as a specific field location or aboard a research ship. For accreditation, when the student is working away from the home institution, it is important that the mechanisms for monitoring student progress be clearly described.

- i. A period of practice will allow the student to apply the knowledge and learning gained in their academic training while carrying out their own supervised research in an active research environment
- ii. The research will be related to, and draw on, the theoretical knowledge and skills already acquired during the degree programme
- iii. The student effort should be substantial (equivalent to 60 credits or more for a research-based course), and evidence of achieving the learning outcomes should be clearly documented against the produced written work
- iv. Throughout the period of practice, the interaction of the student with the supervisor should be documented allowing progress to be clearly monitored
- v. The period of practice should be passed for the award of the degree

All supporting documentation including the master's degree accreditation formal expression of interest form and template evidence matrix can be found on the Society's website www.rsb.org.uk/education/accreditation/Masters-Degree-Accreditation-Important-Documents.

Doctoral training accreditation

Doctoral training programmes allow PhD students the opportunity to study at centres of excellence, undertaking an integrated training experience, typically focussed in particular research areas. The RSB will accredit the training component of such programmes in the Life and Health Sciences, to support the development of specific skill sets, competencies and training which will enhance Life and Health Science research. Moreover, working with the Royal Society of Chemistry and the Institute of Physics we aim to provide an accreditation process for Doctoral training programmes that is capable of encompassing the broad range of expertise that exists to support doctoral students working in interdisciplinary teams.

Accreditation of doctoral training programmes follows an independent and rigorous assessment of the training aspects of a doctoral programme. It does not assess the quality of the research produced by doctoral students, which must, quite rightly, fall under the remit of the thesis examiners. Similarly, the accreditation process does not seek to define a highly specified curriculum for doctoral training, or an approach to delivery. The assessment of such programmes will, however, take a view on both the preparedness of students to undertake original research and how the research environment may enable them to achieve their research goals. In addition, the accreditation process will seek to ensure that students are provided with opportunities to equip themselves with the skills necessary to promote and explain their research to a variety of audiences.

The accreditation of doctoral training programmes in the biosciences is based on twelve criteria, which have been developed in consultation with the community. These criteria enable graduate students to function safely and effectively as researchers both within their specialised field of research and on a wider stage.

All documents linked to Doctoral Training Accreditation can be found at www.rsb.org.uk/education/accreditation/Doctoral-Training-Accreditation-Important-Documents.

Chartered biologist

The criteria for Doctoral Training Accreditation closely align with the attributes required for Chartered Biologist (CBiol). Once students graduate from an accredited doctoral training programme, they will only need to complete one further year of professional experience (rather than the normal two) in order to be eligible to apply for Chartered Biologist.

Chartered Biologist status (designated by the post nominal CBiol) provides a benchmark for bioscientists working in a vast and continually growing array of settings and the RSB are the only body that can award the title Chartered Biologist.

For more information about CBiol, see www.rsb.org.uk/images/CBiolandCSciguide.pdf

Joint accreditation applications

In recognition that many doctoral training programmes encourage interdisciplinarity, Doctoral Training Accreditation by the Royal Society of Biology has been developed as a joint venture with the Royal Society of Chemistry and the Institute of Physics. If an institution would like more than one discipline accredited, this can be done with the desired combination of the three professional bodies (or all three) in one single joint application.

For more information regarding joint accreditation applications, please contact the Accreditation Team at accreditation@rsb.org.uk.

Criteria for doctoral training accreditation

To achieve accreditation for a programme, HEIs will need to provide robust evidence in support of their application, which will be judged by peer review against the standard metrics listed below.

Evidence will be required to indicate that graduates have been trained to have:

1. A high level of professional skills in the field of biology, including thoroughness and reliability
2. An understanding and appreciation of health, safety, environmental and ethical issues and adherence to the requirements relevant to their role
3. Integrity and respect for confidentiality in work, personal and professional issues, such as ethical practice
4. An interest in broader developments in biological science; and a contribution to the profession of biology outside their disciplinary specialism
5. An ability to work as part of a team
6. Skills in biological science plus other professional skills as required for work undertaken and career development
7. Skills in critical evaluation and in drawing conclusions from scientific and other data
8. Time management skills, demonstrating foresight in carrying out responsibilities and ability to make improvements as appropriate
9. An ability to make a contribution to key tasks in their work, understanding fully the biological science objectives of the work done and its relevance to their employer and others
10. Written and oral communication skills relevant to a range of expert and non-expert audiences, and demonstrate an ability to convey both the broad context and detailed description of the work done
11. An ability to discuss work constructively and objectively with colleagues and others; that they respond respectfully to, and acknowledge, the value of alternative views and hypotheses, whilst also demonstrating an ability to defend and promote their own perspective
12. An ability to think creatively and reflectively, and make persuasive arguments to influence colleagues, employers or others

Although accreditation will not judge the quality of the research output, the outcomes-based approach to accreditation means that it will be likely that the panel will need to examine theses and other student-generated outputs as evidence that they have acquired many of the skills and traits listed above. In addition, student progression in the acquisition of the above skills should be evidenced.

Process of applying for doctoral training accreditation

Institutions should first indicate their interest in seeking accreditation by contacting the Accreditation Team at accreditation@rsb.org.uk. Following initial conversations, the institution will be required to complete and submit a formal expression of interest form.

Once a site visit date has been agreed, a suitable document submission date shall be arranged (usually 8 weeks before the site visit). Documentation for the stage one review should be submitted to the Accreditation Team by 17:00 on the specified date. For guidance, please contact the Accreditation Team by emailing accreditation@rsb.org.uk.

The following should be submitted electronically to the Royal Society of Biology:

1. Application document

Within the application document, please address the following sections, and provide evidence where necessary. This document can be free-flowing and set out in the style of the applicant's choice however where appropriate please address and/or include the following as a minimum:

- Aim of the Scheme
- Glossary of Terms (including a list of acronyms and definitions used by the HEI)
- Overview of the Doctoral Training Programme
- Staff Structure
- Training and Development
- Supervisor Training
- Mentoring and Support Networks
- Quality Assurance and Assessment of the Training Programme
- Recruitment and Selection including Equality and Diversity
- Progression Processes
- Scope of the Accreditation
- Evaluation Strategy/Plan
- Evidence Template

2. Completed accreditation matrix

3. Destination data for recent graduates of the programme

4. Resource documents:

- an overview of the facilities available at the HEI relating to the programme
- brief CVs for the key academic staff involved in the programme, and supervisors of student research projects

Wherever possible, online access to the HEI's e-learning facilities should be made available to the Accreditation Assessment Panel.

Accreditation matrix

All applying HEIs must complete at least one accreditation matrix. For a complex and broad set of programmes, the HEI may consider it easier to present a matrix for each set of related awards; however, this should be discussed with the Accreditation Team in the first instance.

For ease of reference, the matrix is based on the twelve criteria and closely follows the template for the Stage One Report used by assessors.

Additional guidance on the doctoral training accreditation criteria

In the following table, the criteria for Doctoral Training Accreditation have been mapped against the Vitae Researcher Development Framework (RDF) along with some generic examples of suitable responses, which could be included within an application.

| Doctoral Training Accreditation Criteria | Vitae Researcher Development Framework | Accreditation Example Responses |
|---|---|---|
| A high level of professional skills in the field of biology, including thoroughness and reliability | B. Personal effectiveness – the personal qualities and approach to be an effective researcher B1 – Personal qualities B2 – Self-management B3 – Professional and career development | <ul style="list-style-type: none"> - Develop scientific expertise through attending courses and practical experience - Reproducibility of research results and recording of data and laboratory experiments via a laboratory book - Continuously develop awareness of the relevant area of science, through reading literature, attending conferences and seminars - Attendance and engagement at journal clubs |
| An understanding and appreciation of health, safety, environmental and ethical issues and adherence to the requirements relevant to their role | C. Engagement, influence and impact – the knowledge and skills to work with others and ensure the wider impact of research C1 – Professional conduct C2 – Research management | <ul style="list-style-type: none"> - Demonstrate a knowledge of and adherence to the School's safety procedures in all experiments carried out - Critically evaluate the safety of every chemical procedure by completing COSHH forms and risk assessments - Disposal of wastes in a safe, appropriate and environmentally friendly manner according to the University policy |
| Integrity and respect for confidentiality in work, personal and professional issues, such as ethical practice | C2 – Research management | <ul style="list-style-type: none"> - Attend ethics courses, in order to demonstrate the importance of scientific integrity - Appreciate and show an understanding of the importance of confidentiality most especially when sharing science - Pass all submitted work through approved plagiarism detection software - Involvement with University online development courses including research integrity and ethics |
| An interest in broader developments in biological science; and a contribution to the profession of biology outside their disciplinary specialism | D. Engagement, influence and impact – the knowledge and skills to work with others and ensure the wider impact of research D3 – Engagement and impact | <ul style="list-style-type: none"> - Participation in and engagement with journal clubs and paper critique exercises - Encouragement to join a learned society which is relevant to their particular field of biology and engage with public engagement events - Become a STEM ambassador and take part in at least one outreach activity |
| An ability to work as part of a team | D. Engagement, influence and impact – the knowledge and skills to work with others and ensure the wider impact of research D1 – Working with others | <ul style="list-style-type: none"> - Build effective and collaborative working relationships with research team members and also laboratory members within the School - Participate fully in all group meetings - Help both members of the research group and of the wider School community |
| Skills in biological science plus other professional skills as required for work undertaken and career development | A. Knowledge and intellectual abilities – the knowledge, intellectual abilities and techniques to do research A1 – Knowledge base B. Personal effectiveness – the personal qualities and approach to be an effective researcher B3 – Professional and career development | <ul style="list-style-type: none"> - Attendance of conferences, both internal and external - Engagement with professional skills development - Attendance and engagement of journal clubs - Attend seminars and conferences relevant to research undertaken - Complete all transferable skills courses run by the CDT - Submission of scientific output documents as part of CDT |

| | | |
|---|---|---|
| <p>Skills in critical evaluation and in drawing conclusions from scientific and other data</p> | <p>A. Knowledge and intellectual abilities – the knowledge, intellectual abilities and techniques to do research A1 – Knowledge base A2 – Cognitive abilities</p> | <ul style="list-style-type: none"> - Present data and research findings at regular supervisory meetings - Participate in journal clubs by choosing suitable papers to critique and critically assessing papers others have chosen - Generate relevant data to the project and use it to decide direction of project - Keep a good record of data in lab books |
| <p>Time management skills, demonstrating foresight in carrying out responsibilities and ability to make improvements as appropriate</p> | <p>B. Personal effectiveness – the personal qualities and approach to be an effective researcher B1 – Personal qualities B2 – Self-management</p> | <ul style="list-style-type: none"> - Plans, organises and prioritises time in order to successfully attend and complete all aspects of the programme - Able to reflect on one's own training and skills and development needs and identify gaps - Takes responsibility for project goals and direction - Works autonomously within project - Participates fully with group meetings, sharing project data with others |
| <p>An ability to make a contribution to key tasks in their work, understanding fully the biological science objectives of the work done and its relevance to their employer and others</p> | <p>A. Knowledge and intellectual abilities – the knowledge, intellectual abilities and techniques to do research A1 – Knowledge base A2 – Cognitive abilities A3 – Creativity D. Engagement, influence and impact – the knowledge and skills to work with others and ensure the wider impact of research D1 – Working with others</p> | <ul style="list-style-type: none"> - Understanding the importance of research outputs and the Research Excellence Framework - Attendance and presentations at conferences - Continuously develop awareness of the relevant area of science, through reading literature, attending conferences and seminars - Develop scientific expertise through attending courses and practical experience |
| <p>Written and oral communication skills relevant to a range of expert and non-expert audiences, and demonstrate an ability to convey both the broad context and detailed description of the work done</p> | <p>D. Engagement, influence and impact – the knowledge and skills to work with others and ensure the wider impact of research D2 – Communication and dissemination</p> | <ul style="list-style-type: none"> - Attendance and engagement at journal clubs - Complete the scientific writing workshop - Write and defend PhD thesis - Presentation as part of CDT conference - Submission of literature review document - Present data and research findings at regular supervisory meeting - Participation in team activities |
| <p>An ability to discuss work constructively and objectively with colleagues and others; that they respond respectfully to, and acknowledge, the value of alternative views and hypotheses, whilst also demonstrating an ability to defend and promote their own perspective</p> | <p>D. Engagement, influence and impact – the knowledge and skills to work with others and ensure the wider impact of research D1 – Working with others D2 – Communication and dissemination</p> | <ul style="list-style-type: none"> - Ensure opportunities to present are taken regularly - Attendance and engagement at journal clubs - Attendance of regular supervisory/lab meetings, present data and research findings orally to the group, discuss own data and peer data in a critical yet constructive manner - Engagement with the PGR Development Programme - Attendance and presentations at conferences - Present seminars within the School |
| <p>An ability to think creatively and reflectively, and make persuasive arguments to influence colleagues, employers or others</p> | <p>D. Engagement, influence and impact – the knowledge and skills to work with others and ensure the wider impact of research D1 – Working with others</p> | <ul style="list-style-type: none"> - Build relationships both with other cohorts of the CDT and others within the School - Work effectively with other members of the laboratory - Accommodate the needs and priorities of other group members |

Appendix A – Process of applying for accreditation

Institutions should first indicate their interest in seeking accreditation by contacting the Accreditation Team at accreditation@rsb.org.uk. Following initial conversations, the institution will be required to complete and submit a formal expression of interest form, which can be downloaded from our website: www.rsb.org.uk/education/accreditation/.

Once a site visit date has been agreed, a suitable document submission date shall be arranged (usually 8 weeks before the site visit). Documentation for the stage one review should be submitted to the Accreditation Team by 17:00 on the specified date. For guidance, please contact the Accreditation Team by emailing accreditation@rsb.org.uk.

The following documents should be submitted electronically to the Royal Society of Biology:

1. Letter of intent

This should summarise how the programme meets the criteria for accreditation and characteristics of an accredited programme (see advice below). Only one letter of intent is required per application, and must refer to all programmes seeking accreditation.

The letter of intent must include:

- a list of the degree titles for which accreditation is sought
- a brief summary of the structure of the degrees and any options
- a declaration of any articulation agreements if appropriate
- the numbers of students enrolled on each degree programme
- date of the last periodic review
- paragraphs summarising how the programme(s) meet each of the criteria
- a brief explanation of how the submitted evidence is organised (e.g. a list of folders and their contents, this can be provided as a separate paper attached to the letter of intent if desired)

2. Completed accreditation matrix

3. Table of technical skills

4. Programme specifications

5. Programme details, including:

- programme structure including optional routes (where only a specific route or pathway within the core degree programme will meet the accreditation criteria, the HEI should ensure that this is made clear)
- knowledge and skills learning outcomes
- list of acronyms and definitions used by the HEI
- the learning, teaching and assessment strategy
- student handbook(s)

6. Module (or unit) descriptors and handbooks

7. Resource documents:
 - an overview of the facilities available at the HEI relating to the programme
 - brief CVs for the programme leader(s) and key academic staff involved in the programme
8. Internal or external reviews and reports. The following should be included, if available:
 - periodic review self-evaluation statement and recommendations
 - external examiners' reports covering the previous two years
 - most recent QAA or QAA (Scotland) Review, if applicable, e.g. Institutional Audit or Review (England, Northern Ireland and Wales), Integrated Quality and Enhancement Review (England and Northern Ireland), or Enhancement-led Institutional Review (Scotland)
9. Details of procedures and processes adopted within the HEI, for consideration and approval of ethical issues and Home Office Licences, as relevant to the programme submitted for accreditation. Evidence of student exposure to and understanding of these processes.
10. Destination data for recent graduates of the programme
11. Most recent summative assessments (e.g. examination papers, etc.); coursework assessments may be listed and/or described in student handbooks (item 5) or module descriptors (item 6), if so they need not be sent as a separate file

Where internal programme reviews contain the required information (i.e. items 4 to 11), it is perfectly acceptable to submit these.

Wherever possible, online access to the HEI's e-learning facilities should be made available to the Accreditation Assessment Panel.

Accreditation matrix

All applying HEIs must complete at least one accreditation matrix. For a complex and broad set of programmes, the HEI may consider it easier to present a matrix for each set of related awards; however, this should be discussed with the Accreditation Team in the first instance. If existing documentation does not summarise where skills are taught and assessed additional tables as appendices to the matrix should be supplied.

For ease of reference, the matrix is based on the criteria and closely follows the template for the Stage One Report used by assessors.

A template for the matrix can be downloaded from our website:
www.rsb.org.uk/education/accreditation/.

Appendix B – Subject specific learning outcomes

In addition to the core learning outcomes specified for each accreditation type, specific outcomes have been developed by Learned Societies across the key areas of the biosciences for specific skills and knowledge, appropriate to specific undergraduate (FdSc, BSc (Hons), MSci/MBiol) degree titles.

Degrees using 'Biochemistry' in their title

The Biochemical Society suggests that the graduates of a biochemistry degree programme should be able to:

- demonstrate an understanding of the chemistry, structure and function of biological molecules
- explain biological mechanisms, such as the processes and control of bioenergetics and metabolism, as chemical reactions
- explain the biochemical processes that underlie the relationship between genotype and phenotype
- demonstrate an understanding of the structure and function of both prokaryotic and eukaryotic cells (including the molecular basis and role of subcellular compartmentalisation)
- apply laboratory-orientated numerical calculations (e.g. inter-conversion of masses, moles, and molarity, preparation of solutions and accurate dilutions)
- be capable in data visualization and analysis, including the application of data transformations (e.g. logarithmic, exponential)
- demonstrate an understanding of the principles, and have practical experience of, a wide range of biochemical techniques (e.g. basic molecular biology, genetic modification, cell biology and microbiology methods, spectrophotometry, the use of standards for quantification, enzyme kinetics; macromolecular purification, chromatography and electrophoresis)
- analyse biochemical data (e.g. in enzyme kinetics, molecular structure analysis and biological databases, understanding and application of computational biology)

The following further subject specific guidance provides advice on chemistry within Biochemistry degrees:

- a) Biochemistry degrees require a higher level of chemistry content than many/most other biological science degrees:
'A solid foundation in chemistry is essential for any Biochemistry degree programme. Relevant aspects of chemistry beyond that included in A-level courses should be taught, ideally early on within the degree programme, so that these principles can be related to key biochemical concepts. More advanced biological chemistry topics might also require the inclusion of chemistry material later on within the biochemistry degree, once the fundamentals have been covered.'
- b) The aim of the core material in chemistry is to provide the student with sufficient knowledge of the basics of chemistry (physical, analytical, bioinorganic and organic) to be able to study and understand the subject of biochemistry.
The content should include a sensible grounding in the following topics, not necessarily all embedded within chemistry specific modules/courses:
 - Atomic and molecular structure (including bonding and stereochemistry); non-covalent interactions
 - Thermodynamics, particularly of solutions, including electrochemistry
 - Organic mechanisms and functional-group organic chemistry
 - Chemical reaction kinetics
 - Analytical methods e.g., UV-Vis., IR spectroscopy, NMR, MS
 - Bio-inorganic chemistry (i.e. the importance of metals in biology)
 - Practical experience of analytical approaches, including different types of spectroscopy

Degrees using 'Ecology' in their title

The British Ecological Society suggests that the graduates of an ecology degree programme should be able to:

- demonstrate practical fieldwork skills (e.g. ecological survey techniques, species identification and ecological impact assessments)
- demonstrate an understanding of key ecological interactions and processes: the distribution and abundance of organisms, the interactions among organisms, the interaction between organisms and their environment, and the structure and function of ecosystems
- explain scales and patterns in ecology and biodiversity (e.g. individual to biosphere, landscape ecology, geographic and global ecology)
- appreciate the relationships between ecology and society (e.g. science into policy, conservation ecology, biodiversity conservation, natural resource capital, ecosystem services)

Degrees using 'Microbiology' in their title

The Society for Applied Microbiology suggests that the graduates of a microbiology degree programme should be able to:

- analyse and manipulate microorganisms under appropriate containment conditions
- apply aseptic technique for isolation, culture, enumeration and safe disposal of microorganisms
- characterise and identify microorganisms using a wide variety of systematic techniques (including those based on physiology, biochemistry, chemosystematics and molecular biology)
- analyse the interaction of microbes with their environment, including other microflora
- explain the application of microbiology, and its contribution to solving global challenges facing humanity (including infection control, food security, energy supply and climate change)

Degrees using 'Pharmacology' in their title

The British Pharmacological Society suggests that the graduates of a pharmacology degree programme should be able to:

- construct and analyse drug concentration/dose-response relationships using living tissues or model systems with knowledge of the pharmacologist's role in developing *in vitro* and *in vivo* models in which drug action can be tested
- evaluate the action of drugs in whole organisms, living tissues, and/or model systems using a variety of pharmacological techniques (e.g. bioassays, receptor binding, receptor cloning, recombinant proteins for therapy, animal models of disease, genetic manipulation of cells and animals and their uses)
- apply principles of pharmacokinetics using living tissues, model systems or simulations (e.g. pharmacokinetic modelling software) and demonstrate numeracy in pharmacological calculations (e.g. drug concentration, loading dose, therapeutic index)
- explain how advances in pharmacology (e.g. small molecular inhibitors, antisense therapy, biopharmaceuticals, pharmacogenomics, novel drug delivery systems) can contribute to improving human and animal health including the development of personalised therapies

These learning outcomes could be achieved through the following:

www.bps.ac.uk/education-engagement/teaching-pharmacology/core-curricula/undergraduate-pharmacology-core-curriculum

For Pharmacology degrees where students are taught about, carry out research, analyse literature or use data generated from studies involving research animals please also refer to the additional guidance in the 'Research animal sciences' section.

Degrees using 'Physiology' in their title

The Physiological Society suggests that the graduates of a physiology degree programme should possess the following subject specific skills and knowledge:

- describe and explain the fundamental relationship between the molecular, cellular and tissue structure of body systems and relate this to their different functions and physiological roles in health and disease
- explain the concept and importance of maintaining physiological homeostasis at the molecular, cellular, system and organismal level, and the consequences of homeostatic imbalance in disease
- describe how cells communicate with each other, the concepts of positive and negative feedback between cells, and the importance of these processes in maintaining molecular homeostasis
- explain the principles of collecting physiological data, and apply practical skills in either human or animal models both *in vivo* (e.g. ECG, spirometry, nerve conduction) and *ex vivo* (e.g. molecular and cellular biology techniques)
- analyse physiological data (e.g. electrophysiological signals, fluorescence images) using appropriate data handling and statistical methods, and demonstrate an awareness of the ethical and legal issues that relate to collecting physiological data from human and animal subjects

For Physiology degrees where students are taught about, carry out research, analyse literature or use data generated from studies involving research animals please also refer to the additional guidance in the 'Research animal sciences' section below.

Research animal sciences specific learning outcomes

Degrees where students are taught about, carry out research, analyse literature or use data generated from studies involving research animals.

The British Pharmacological Society, in discussion with a range of stakeholders⁵, define "Studies involving research animals" as studies where the involvement of animals is subject to legislation, regulation, or national standard, for example, in the United Kingdom, studies regulated by the Animals (Scientific Procedures) Act 1986. They suggest that graduates of such degree programmes or courses should be able to:

- demonstrate knowledge and understanding of the scientific use of research animals
- demonstrate knowledge and understanding of the regulatory, ethical & welfare issues surrounding the use of research animals
- analyse and critique literature and/or data that has been generated from studies involving research animals

These learning outcomes could be achieved through the following:

<https://www.bps.ac.uk/education-engagement/research-animals/curriculum-for-the-use-of-research-animals>

Further Guidance for Research Animal Sciences

Unlike many of the subject-specific skills and knowledge criteria, it is unlikely that entire degree programmes are devoted to this topic, rather students will acquire knowledge, skills and understanding of the discipline in specific modules or courses (or elements of these) encompassing, but not limited to: animal welfare; ethics; law; animal physiology and pathophysiology; the use of research animals to better understand physiology, disease processes, in drug development, to fulfil regulatory obligations, and in translational studies; experimental design; data analysis and interpretation; experimental procedures and techniques involving research animals. This knowledge, skills and understanding could also be acquired in capstone research projects or experiences.

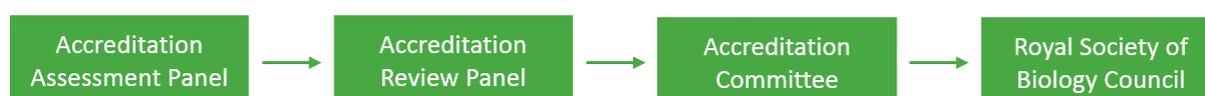
The modules or courses could form part of many different undergraduate and Taught Masters degree programmes including (but not limited to): Animal Physiology and Nutrition; Animal Sciences; Behavioural Sciences; Biology; Degree programmes in the Biomedical, Medical or Life Sciences; Psychology; Toxicology; Zoology.

⁵ The British Pharmacological Society, British Association of Psychopharmacology, British Toxicology Society, Chinese National Pharmacological Society, International Union of Basic and Clinical Pharmacology, Laboratory Animal Science Association, Physiological Society and the Safety Pharmacology Society, among others.

Appendix C – Assessment panel membership and guidelines

The Accreditation Assessment Panel considers the evidence submitted by HEIs through an initial application and site visit and provides a recommendation to the Accreditation Review Panel (a subcommittee of the Accreditation Committee) as to whether the degree programme(s) should be accredited. The decision approval process is shown in Figure 2 below. The assessment is not simply a tick-box exercise and requires academic judgement.

Figure 2 – Decision Approval Process



A Panel will include a panel Chair with experience of chairing, approvals, and quality assurance, and at least one other panel member. Panel members are selected based on their experience and subject area expertise. The RSB provides training for panel members, administrative support, and a panel secretary for the site visit.

The size and composition of a Panel may depend on the type of programme(s) being accredited. Members of the Panel are expected to be up to date with current practice in higher education with a focus on quality assurance, programme design and content.

Members of the Accreditation Assessment Panel are expected to:

- Complete a comprehensive online distance training course
- Read all initial documentation submitted by the applying HEI and work with the Chair to complete the Stage One Report
- Take part in a pre-meeting with other panel members
- Attend a stage two site visit to the applying HEI
- Work with the panel Chair to draft a Stage Two Report for submission to the Accreditation Review Panel

Members of the Accreditation Assessment Panel must abide by the Royal Society of Biology Code of Conduct and declare, prior to the start of the accreditation process, any potential conflicts of interest with the degree programme being accredited.

Conflicts of interest

Members of the Panel must not have worked for, or acted as an external examiner for, the HEI being assessed in the last five years. Members of the Panel are expected to (and will be given the opportunity to) declare any previous working relationships with the HEI that would prevent them assessing a particular application.

Code of Conduct

In the course of conducting accreditation assessments for the RSB, the Panel may come in contact with individually identifiable, commercially sensitive and/or confidential information. Panel members must treat all information received or obtained while performing any duties on behalf of the RSB as confidential and not divulge such information to any other person or organisation unless authorised to do so. This responsibility continues after the assessment has concluded.

In order to ensure that HEIs, the scientific community, and the wider public may have confidence in the effectiveness and impartiality of the RSB's Degree Accreditation Programme, members of the Panel must undertake to:

- Inform the RSB of any potential conflicts of interest as soon as possible
- Not use their position as a member of the Panel to promote their personal, professional or business interests
- Respect the confidentiality of information acquired to them solely by virtue of their position as a member of the Panel and not discuss any specific aspects of an ongoing accreditation application with anyone working/studying at, or associated with, the HEI being accredited or any other unauthorised person
- Attend all meetings at which their presence is required
- Prepare for meetings by reading all papers issued beforehand
- Direct relevant questions about an accreditation event to the RSB
- Be fair, open-minded, unbiased and non-prejudicial on grounds of gender, race, disability, lifestyle, culture, beliefs, sexuality, age or any other irrelevant ground and not use any language that could be deemed offensive or discriminatory
- Not request or accept any inducement, gift, commission, discount or any other profit from the HEI being assessed or from any other interested person

Adhering to this Code of Conduct is a minimum expectation of all members of the Royal Society of Biology Accreditation Assessment Panel. The RSB reserves the right to revoke membership of the Panel if any panel member does not abide by this Code of Conduct.

The Panel will be covered by public liability and/or indemnity insurance for committee members held by the Society whilst carrying out assessments.

Appendix D – Guidance for the site visit

Before the site visit

The Panel will meet the evening before the site visit.

HEIs will book accommodation including breakfast for the Panel members in a suitable nearby hotel. If necessary, the HEI should also arrange transport for the Assessment Panel to the venue for 09:00 on the morning of the visit.

Day of site visit

The example agenda and guidance provided below are flexible and subject to change, depending on individual circumstances. All times given are approximate. A conference room, large enough for all meetings, with tea, coffee and water, set out in boardroom style should be provided. Student project reports and any additional documentation requested should be made available for viewing by the Panel.

09:00 – 09:20 **Arrival of the Assessment Panel**

09:20 – 09:40 **Private meeting of the Assessment Panel**

09:40 – 09:55 **Presentation by programme team**

The HEI should prepare a presentation of no more than 15 minutes duration on the degree programme(s) being submitted for accreditation, preferably given by the programme leader. This should describe any unique or particularly valuable features of the programme(s) and provide details of any optional pathways. The presentation must not attempt to answer the questions arising from the Stage One Report.

10:00 – 11.45 **Meeting with programme team**

The Panel will meet with (ideally no more than 10) key individuals from the programme team. The Panel may request particular individuals to be present, and the programme leader, and assessment officer (or equivalent) should be present. The HEI should provide name boards including job titles for all attendees of this meeting.

The Panel will discuss aspects arising from the Stage One Report. Normally this report will set the agenda for the meeting; however, it is possible that topics may arise from the presentation or any documentation submitted after receipt of the Stage One Report. The programme team will have the opportunity to respond and provide further evidence. The programme team may wish to explain how they have addressed, or plan to address, any issues or to query the Panel's interpretation of the evidence provided.

11.45 – 12.00 **Private meeting of the Assessment Panel**

12:00 – 13:00 **Meeting with students and recent graduates**

The HEI should issue an invitation to students and recent graduates to speak to the Panel about their learning experiences. The Panel ask that a selection of 10-20 student representatives across all years of the programme should attend, including, if possible, recent graduates.

13:00 – 13:30 Lunch with students and recent graduates

The HEI should provide a light lunch for the Panel and the students in a suitable venue.

13:30 – 14:15 Tour of facilities

A tour should be arranged to give the Panel a chance to see laboratories and other facilities available to students on the programme(s) being considered. This should concentrate on facilities integral to learning and teaching for students on the programme(s) being assessed.

Where possible, any relevant student activities taking place on the day, such as laboratory-based learning, teaching, or presentations, should be included. The Panel may request to see particular laboratories or facilities and advanced notice will be given if this is the case. Where visits to particular facilities that may have restricted access are required, the HEI is kindly asked to arrange this in advance. The timing of this stage of the visit is flexible to ensure that the facilities are accessible. Please alert the RSB if this is not a suitable time for the tour.

14:15 – 16:00 (approx.) Private meeting of the Panel

A private meeting room should be provided. The Panel may require that additional documentation is made available during this meeting. Therefore, the contact details of a member of staff, who will be available to assist, should be provided. The Panel are likely to review examples of assessed work during this time, for example project reports.

16:00 – 16.30 Feedback to team

The timing of the feedback session is flexible depending on the private meeting of the Panel. The Chair will deliver feedback to the programme team including the provisional outcome of the process where possible (final decisions are made by the RSB's Accreditation Committee).

17:00 End of visit

Appendix E – Guidelines for publicity following successful accreditation

Programmes undertaking the accreditation process will not be publicly announced until they have successfully completed the accreditation process and we ask that the institution keep their participation confidential.

Further tailored publicity guidance (dependent on the type of accreditation awarded) will be sent once the institution is successfully awarded accreditation.

Upon completion, successfully accredited degree programmes will be entitled to:

- Receive a certificate of Accreditation from the Royal Society of Biology
- Promote the accredited degree programme(s) and the benefits of studying and graduating from an accredited programme in marketing materials
- Use the Royal Society of Biology's name and logo on all materials relating to an accredited degree programme(s)
- Use the Royal Society of Biology's name and logo on the HEI's website in relation to the accredited degree programme(s)
- Use the Royal Society of Biology's name and logo on the UCAS website where the HEI's name appears in relation to the accredited degree programme(s)
- Use the Royal Society of Biology's name and logo on other marketing materials relating to the accredited degree programme(s), following permission from the Royal Society of Biology
- Use the following statement for the Key Information Set in relation to the accredited degree programme(s):

This course is accredited by the Royal Society of Biology for the purpose of meeting in part the academic and experience requirement for Membership and Chartered Biologist (CBiol).
- Use the following statement on the HEI's website in relation to the accredited degree programme(s):

This programme has been accredited by the Royal Society of Biology following an independent and rigorous assessment. Accredited degree programmes contain a solid academic foundation in biological knowledge and key skills, and prepare graduates to address the needs of employers. The accreditation criteria require evidence that graduates from accredited programmes meet defined sets of learning outcomes, including subject knowledge, technical ability and transferable skills.

Participating HEIs must not imply that other establishments, yet to achieve accreditation, are not offering relevant, high-quality programmes when referring to the Accreditation Programme in external literature.

The Royal Society of Biology maintains the right to request the removal of its name and all of its trademarks, including its logo, from printed or electronic material or publications at any time.

Appendix F – Guidance for interim accreditation

The Royal Society of Biology encourages HEIs with new programmes, where students have yet to graduate, to apply for accreditation. Under these circumstances, the accreditation process is likely to include a review of the programme documentation and a site visit before the first cohort of students graduate. The Society may grant interim accreditation pending first cohort graduation, with full accreditation status awarded afterwards, if appropriate.

HEIs with relevant programmes should contact the Accreditation Team in advance of their application.

The decision process for interim accreditation is likely to involve the following steps:

- Submission of all relevant stage one documentation, as detailed in Appendix A
- Review of documentation by the Accreditation Assessment Panel, and completion of an interim accreditation Stage One Report:

If assessors feel there is a substantial gap between the proposed outcomes for the programme and those required for accreditation, this will be communicated to the HEI. At this point, the HEI may choose to implement any suggested changes and resubmit for interim accreditation; or apply for full accreditation following the graduation of the first cohort of students; or withdraw their application. Any reapplication will incur additional costs for assessors' time and effort, but consideration will be given to the initial review.

- If assessors feel the course demonstrates the potential to meet the required outcomes, a site visit will be scheduled, as detailed in Appendix D
- Following the site visit, the Panel will complete an interim accreditation Stage Two Report, highlighting the final steps for the programme in question:

If the site visit highlights aspects of the programme that do not achieve the outcomes for accreditation, these will be communicated to the HEI. At this point, the HEI may choose to implement any suggested changes and resubmit for interim accreditation; or apply for full accreditation following the graduation of the first cohort of students; or withdraw their application. Any reapplication will incur additional costs for assessors' time and effort, but consideration will be given to the initial review.

If the Panel is satisfied that the required outcomes for accreditation will be achieved, they can recommend to the RSB Accreditation Committee that the programme should be awarded interim accreditation. An interim accreditation Stage Three Report will be sent to the HEI where actions relating to conditions or recommendations should be evidenced. The HEI will have a period of six weeks to complete the Stage Three Report and provide any supporting documentation. Interim accreditation is not formally awarded until the Stage Three Report has been completed.

- Following the award of interim accreditation, the HEI must complete an annual report declaring any changes implemented since the initial stage one review

Interim to Full Accreditation

In order to gain full accreditation, documentation should be provided to assure the assessors that the graduate learning outcomes are being achieved, and that any recommendations made by the Panel for improving the programme are being acted upon.

Once the first cohort of students has graduated, and if the Panel is satisfied that the programme meets the requirements for accreditation, it can recommend to the RSB Accreditation Committee that full accreditation status should be awarded.

Should the Panel conclude that there is insufficient evidence to award full accreditation, the programme will continue with the status of interim accreditation, until sufficient evidence is submitted.

Interim accreditation will be awarded for a period of five years; if there is insufficient evidence that the programme meets the requirements for full accreditation at the end of that period, interim accreditation status will be withdrawn.

Programmes will be awarded full accredited status for the remainder of the initial five year period, unless a site visit is required. If a site visit is required, full accredited status will be awarded for a period of five years from the date of ratification.

Guidelines for publicity following award of interim accreditation

Following the achievement of interim accreditation, the HEI will be entitled to:

- Use the Royal Society of Biology's name and logo on all printed and digital materials, including the HEI's website, relating to programmes awarded with interim accreditation
- Use the Royal Society of Biology's name and logo on the UCAS website where the HEI's name appears in relation to the interim accredited degree
- Use the Society's name and logo on all other marketing materials relating to the interim accredited programme(s), following permission from the Royal Society of Biology
- Use the following statement on the HEI's website in relation to the interim accredited programme(s):

This programme has been interim accredited by the Royal Society of Biology following an independent and rigorous assessment. Accredited degree programmes contain a solid academic foundation in biological knowledge and key skills, and prepare graduates to address the needs of employers. The accreditation criteria require evidence that graduates from accredited programmes meet defined sets of learning outcomes, including subject knowledge, technical ability and transferable skills. Following a successful demonstration to the Society that these graduate attributes have been attained, and the first cohort of students from the programme have graduated, the programme may be awarded full accreditation.

Further tailored publicity guidance will be sent once the institution is successfully awarded interim accreditation, depending on the type of accreditation awarded.

Institutions must not imply that full accreditation of any programme is guaranteed following receipt of interim accreditation.

Participating HEIs must not imply that other establishments, yet to achieve accreditation or interim accreditation, are not offering relevant, high-quality programmes when referring to the Degree Accreditation Programme in external literature.

The Royal Society of Biology maintains the right to request the removal of its name and all of its trademarks, including its logo, from printed or electronic material or publications at any time.

Appendix G – Glossary

| | |
|----------------------------------|--|
| Credit | One credit is notionally ten hours of student effort, assuming that one academic year is 120 credits, and one calendar year is 180 credits: 80 credits is equivalent to 40 European Credit Transfer and Accumulation System (ECTS) credits. |
| Degree accreditation | Acknowledgement by an external body that a degree programme meets certain prescribed specifications. |
| Foundation degree | Integrates academic and work-based learning through close collaboration between employers and higher education providers. |
| Interim accreditation | Acknowledgement by the Royal Society of Biology that a degree programme with no current graduates demonstrates the potential to meet the prescribed criteria for accreditation. Full accreditation may be granted following further assessment, and a sufficient number of students have graduated to demonstrate the learning outcomes are being achieved. |
| Learning outcomes | Statements that specify what a graduate will know, understand, or be capable of doing as a result of obtaining a qualification. Learning outcomes are expressed knowledge, understanding, skills, and attributes, and will have been assessed in the degree programme. |
| Levels | <p>Qualification levels indicate the relative academic demand, complexity of understanding, depth of learning and degree of autonomy expected of the learner. A number of different qualifications frameworks are used in the UK and when referring to levels it is essential to know which framework is being used:</p> <p>The Framework for Higher Education Qualifications (FHEQ) applies in England, Wales and Northern Ireland (NI). Although it replaced a previous version of FHEQ, the titles used in the previous version (e.g. Master's) are still widely used. FHEQ describes five levels of qualifications, 4-8 (with 8 being the highest). This definition aligns with the Qualifications and Credit Framework (QCF) that encompasses post-16 levels of learning, including National Vocational Qualifications (NVQs).</p> <p>In Scotland, the Scottish Credit and Qualifications Framework (SCQF) is mapped against the Scottish Higher Education Levels (SHE).</p> <p>The Bologna Process requires each country to verify that its national framework is compatible with an overarching Framework for Qualifications of the European Higher Education Area (FQ-EHEA). The FQ-EHEA consists of three main cycles.</p> <p>The relationship between the different systems is shown on the next page.</p> |
| Outcomes-based procedures | The methods our Accreditation Assessment Panel use to judge applications for accreditation. Graduates of these courses meet our learning outcomes within the specified criteria upon graduation. |
| Period of practice | A planned period of learning which is designed to support the student's attainment of a defined set of learning outcomes relating to supervised practice in the particular subject area. It includes those circumstances where students have arranged their own learning opportunity with a provider, with the approval of the HEI. In all cases, programme providers are responsible for monitoring the quality of the learning experience, and its ongoing capacity to meet students' needs. |

Table based on www.qaa.ac.uk/docs/qaa/quality-code/bologna-process-in-he.pdf?sfvrsn=e04cf981_14 and www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf

| FHEQ level (England, Wales and NI) | FHEQ 2001 Level | SCQF level (Scotland) | SHE level (Scotland) | FQ-EHEA cycle | Qualification |
|------------------------------------|------------------|-----------------------|----------------------|--|---|
| 8 | Doctoral (D) | 12 | D | Third cycle (end of cycle) qualifications | Doctoral degrees (e.g. PhD/ DPhil (including new-route PhD), EdD, DBA, DClinPsy)* |
| 7 | Master (M) | 11 | M | Second cycle (end of cycle) qualifications | Master's degrees (e.g. MPhil, MLitt, MRes, MA, MSc) |
| | | | | | Integrated Master's degrees** (e.g. MEng, MChem, MPhys, MPharm) |
| | | | | | Postgraduate diplomas |
| | | | | | Postgraduate Certificate in Education (PGCE)*** |
| | | | | | Postgraduate certificate |
| 6 | Honours (H) | 10 | H | First cycle (end of cycle) qualifications | Bachelor's degrees with honours (e.g. BA/BSc Hons) |
| | | | 9 | | 3 |
| | | | | | Professional Graduate Certificate in Education (PGCE)*** |
| | | | | | Graduate diplomas |
| | | | | | Graduate certificate |
| 5 | Intermediate (I) | 8 | 2 | Short cycle (within or linked to the first cycle) qualifications | Foundation degrees (e.g. FdA, FdSc) |
| | | | | | Diplomas of Higher Education (DipHE) |
| | | | | | Higher National Diplomas (HND) |
| 4 | Certificate (C) | 7 | 1 | | Higher National Certificates (HNC)**** |
| | | | | | Certificates of Higher Education (CertHE) |

Notes

- * Professional doctorate programmes include some taught elements in addition to the research dissertation. Practice varies but typically, professional doctorates include postgraduate study equivalent to a minimum of three full-time calendar years with level 7 study representing no more than one-third of this.
- ** Integrated Master's degree programmes typically include study equivalent to at least four full-time academic years, of which study equivalent to at least one full-time academic year is at level 7. Thus, study at Bachelor's level is integrated with study at Master's level and the programmes are designed to meet the level 6 and level 7 qualification descriptors in full.
- *** See www.qaa.ac.uk
- **** Higher National Certificates (HNCs) are positioned at level 4, to reflect typical practice among higher education awarding bodies that award HNC under license from Edexcel.

| | |
|--|---|
| Programme | A coherent learning experience followed by an individual, the successful completion of which results in the conferment of a named HE award. |
| Programme specification | A concise description of the intended learning outcomes of an HE programme, and the means by which the outcomes are achieved and demonstrated. |
| Programme structure | Content of the programme, including mandatory and optional modules, rules for combining units and any specified pathways. |
| QAA | The Quality Assurance Agency for higher education responsible for maintaining standards across UK HEIs (www.qaa.ac.uk). |
| Quality assurance | A range of review procedures designed to safeguard academic standards and promote learning opportunities for students of acceptable quality. |
| RSB Degree Accreditation | Follows an independent and rigorous assessment of degree programmes which contain a solid academic foundation in biological knowledge and key skills, and prepare graduates to address the needs of employers. |
| RSB Advanced Degree Accreditation | Externally recognises academic excellence in the biosciences, highlighting degrees which educate the research and development leaders and innovators of the future. |
| Subject Benchmark Statement (UK) | This is overseen by QAA in England, and provides a reference point against which outcomes can be measured. Subject Benchmark Statements provide a means for the academic community to describe the nature and characteristics of programmes in a specific subject. They also represent general expectations about the standards for the award of qualifications at a given level and articulate the attributes and capabilities that those possessing such qualifications should be able to demonstrate. |
| Work-based learning | Includes a wide range of provisions where the focus of student learning is delivered in the workplace. The curriculum meets the needs of both the HEI and employers and is jointly planned, delivered and assessed. It requires the identification and achievement of defined and related learning outcomes. |
| Work-related learning | Derives from the context of work but which is wholly campus based and includes activities such as business simulation, role play, case studies or reports arising from visits to companies, field trips or similar (QAA Quality Code Chapter B3, 2011). |
| Work experience | A specified period of time that a person spends with a business, during which they have an opportunity to learn directly about working life and the working environment. Some work experience positions offer people the chance to try their hand at particular tasks, others simply provide an opportunity to watch and learn. The nature, length and arrangements for work experience vary greatly (https://www.gov.uk/guidance/national-minimum-wage-work-experience-and-internships#what-is-work-experience). |



Becoming a member

The Royal Society of Biology is the leading professional body for the life sciences in the UK. Our vision is to represent all who are committed to biology in academia, industry, education and research; facilitate the promotion and translation of advances in biological science for national and international benefit; and engage and encourage public interest in the life sciences.

The Society represents more than 18,000 individual members, including professionals from industry, academia and education; practising scientists; students; and interested non-professionals.

As a member, you will receive a wide range of benefits, all designed to support you as a biologist, which include:

- **Access to Professional Registers and Continuing Professional Development programme:** Chartered Scientist (CSci), Chartered Biologist (CBiol), Chartered Science Teacher (CSciTeach), Registered Scientist (RSci) and Registered Science Technician (RSciTech)
- **Discounted training courses:** members save up to 50% when attending courses from our newly-expanded training programme
- **Networking events:** members are invited to attend nationally and locally organised events throughout the year, where they can meet peers, other biologists and senior Society staff
- **The Biologist magazine:** all members receive a subscription to our award-winning magazine, published six times a year
- **Opportunities to proactively support the future of UK biology:** input to our science and education policy work, and support our public engagement regional activities
- **Post-nominal letters:** Associates, Members and Fellows of the Society can use the appropriate post-nominal letters (AMRSB, MRSB or FRSB) to signify their status as a professional biologist





To find out more about degree accreditation
visit www.rsb.org.uk/education/accreditation
or contact the Accreditation Team at
accreditation@rsb.org.uk

Royal Society of Biology

1 Naorji Street
London
WC1X 0GB

info@rsb.org.uk
www.rsb.org.uk

Charity Number: 277981
Incorporated by Royal Charter