

Programme Specification 2018-19**Postgraduate Certificate in Biocuration**

Awarding body	University of Cambridge
Teaching institution	University of Cambridge, Institute of Continuing Education*
Accreditation details	None
Name of final award	Postgraduate Certificate in Biocuration
Programme title	Postgraduate Certificate in Biocuration*
UCAS code	N/A
JACS code(s)	B9, C9, I5
Relevant QAA benchmark statement(s)	None
Qualifications framework level	FHEQ Level 7, PGT
Date specification produced	October 2018

* Cognate Faculty endorsement provided by the Department of Genetics and Faculty of Biology

This Postgraduate Certificate Programme in Biocuration is part of the Institute of Continuing Education's award-bearing programme at FHEQ level 7, offered to part-time adult students.

ICE is a General Board, non-School institution whose purpose can be defined in two complementary ways. It is a conduit both for transmission of the University's knowledge and research on the one hand and for enabling members of the public to access higher education courses, whether for personal interest or professional development, on the other. In these ways it contributes significantly to the University's public engagement and widening participation commitments.

Introduction

A **biocurator** is a professional scientist who curates, collects, annotates, and validates information that is generated through life-science and biomedical research. The importance of big data to life-science research has resulted in a need for an increasing number of skilled biocurators.

The Programme, developed by the University of Cambridge and the European Bioinformatics Institute (EMBL-EBI), is designed to educate new biocurators with the requisite skills to work in this field and to provide established biocurators with a recognised qualification that reflects their diverse life-science and computational skills.

Educational aims

The course will:

- provide professionally relevant teaching and learning of the knowledge and skills which underpin, and are at the forefront, of the role of a biocurator.
- develop, create and upskill biocurators with the necessary expertise, and originality of application, to pursue and expand their roles in the rapidly evolving environment of biocuration.

- equip biocurators to exercise initiative, personal responsibility and make complex decisions for successful careers in all branches of biocuration, including those in academic, research institute, industrial and health settings.
- promote a comprehensive understanding of, and expertise in, the use of computational techniques as applied to biocuration.
- encourage a commitment to intellectual challenge and the need to engage and interact with user communities.
- provide work relevant learning and practical expertise in the context of a critical awareness of current problems and challenges to ensure development of best-practice in biocuration.
- ensure a systematic understanding of knowledge to facilitate the development of critical thinking, analytical and problem-solving skills relevant to the career of a biocurator.
- instil the values of Open Science, open access and FAIR principles.

Learning outcomes

The over-arching learning outcomes are:

Knowledge and understanding

- To enhance the students' systematic knowledge and critical understanding of the range of data being produced, the problems this presents, the need for curation, and its applicability across all life-science sectors.
- To develop students' ability to evaluate and to critically compare manual and automatic approaches to biocuration.
- To enable students to describe and critique the functional and organisational structure of an appropriate data repository
- To provide a comprehensive understanding of the skills necessary to enable students' to critically review and interpret database requirements and to use their initiative to action this
- To create an enquiring perspective to enable critical and evaluative discussion that extends student understanding of key ethical issues in data acquisition and use.
- To develop an appropriate understanding of the methods for engaging new user groups with diverse professional, specialist and non-specialist backgrounds and how they should be best applied.
- To develop students' ability to evaluate best practices in biocuration and apply appropriate methods to their own work.
- To provide a conceptual understanding of the requirements and importance of Open Science and FAIR principles and to be able to independently implement them.

Skills and other attributes

- To define a robust data management plan and describe requirements for a secure data system.
- To demonstrate systematic knowledge of the skills and methodologies necessary to: prepare data for harvesting into a repository; create basic modules using an appropriate programming language; apply appropriate formats for developing ontologies / controlled vocabularies; to curate and annotate a given dataset using appropriate standards / ontologies; and to implement these in a critically evaluative manner under their own initiative.
- To implement and engage in FAIR principles and Open Science.

Programme structure

The Postgraduate Certificate (PgCert) is a one-year part-time Masters level programme resulting in 60 FHEQ (Framework for Higher Education Qualifications) level 7 credits and a University of Cambridge award. There are three taught modules structured as follows:

Module 1: Principles of Biocuration

Aim: To introduce students to the diverse range of data available and provide a practical foundation in the basic skills required in Biocuration, including an awareness of evidence based ontologies.

Indicative content:

- Basics of biodata (range of data produced; requirements for curation; manual vs automatic methods)
- Basic curation skills (working with sequence & small molecule data; literature searching and text mining)
- Ontologies and controlled vocabularies (what is an ontology vs controlled vocab; development of ontologies; use of reference ontologies for example in improving metadata annotation)

Assessment: Summative written assignment equivalent to 2500-3500 words

Module 2: Computational skills for Biocuration

Aim: To provide students with a working knowledge of database structure and interaction and a foundation in a key programming language for working with bioinformatics tools.

Indicative content:

- Understanding databases (database architecture; data download and exchange formats, standards, and policies; SQL querying)
- Database usability (user access and interface design)
- Programming concepts (principles of efficient programming and application of programming to an automated curation task)

Assessment: Summative assessment using a computational based assignment.

Module 3: Open Science, data management and user engagement

Aim: To instil the concept of Open Science through the context of open access and FAIR principles. To enable students to define a robust data management plan and demonstrate the importance of communicating and engaging with users to encourage user acceptance of resources. To understand the importance of biocuration in the ongoing improvement of data standards and policies.

Indicative content:

- Principles, relevance and requirements of Open Science and FAIR principles
- Data management planning
- Ethical and legal principles for data acquisition, storage and use (review mechanisms and frameworks for data systems)
- User engagement and training (defining target audience, need for dissemination)

Assessment: Summative written assignment equivalent to 2500-3500 words.

Teaching methods

The course is delivered in a blended manner through a mixture of face to face and online delivery. Interactive lectures, webinars, practical demonstrations and workshops, problem based learning and small group working will be delivered and facilitated by experts in the field of biocuration. Teaching sessions integrate academic theory with practical application and allow for discussion and critical appraisal. Online resources, provided through a Virtual Learning Environment, focus on individual study topics, worked examples and the exploration of appropriate resources.

Assessment methods

Module 1 and 3 are assessed by subject tailored summative written assignments of 2500-3500 words. Module 2 is assessed via a practical computational task such as the development of a piece of code for undertaking a specified database related task.

The students receive continual formative feedback throughout the course using a variety of strategies and techniques including evidence of regular reflection.

Entry and/or progression requirements

1. Applicants are normally expected to hold a 2i degree or higher from a UK university or an equivalent from an overseas university in a life sciences subject.
2. Applicants to the programme are expected to demonstrate proficiency in the English language; students whose first language is not English must be able to satisfy the current English Language Competence requirements of the University's Board of Graduate Studies in the year in which they apply for admission to the course.
3. The structure of the programme allows international students to attend on Student Visitor Visas, and those in full-time employment, whether in the UK or abroad, to work and study at the same time.

Management of teaching quality and standards

The University ensures high standards of teaching and learning in the following ways:

- The completion of Annual Quality Updates by each Faculty and Department, to enable central overview of provision and assist in dissemination of good practice
- Scrutiny of the reports of External Examiners for all teaching programmes
- Encouraging student engagement at both the local level, through involvement in Faculty and Departmental Committees, and at a central level by participation in the nationally-benchmarked surveys
- Holding reflective, centrally-coordinated, Learning and Teaching Reviews for all teaching institutions every six years to explore provision and suggest constructive courses of action
- Mentoring, appraisal, and peer review of staff, and encouraging staff participation in personal development programmes

Graduate employability and career destinations

The majority of students are in full-time or part-time employment in biocuration, or a closely related discipline, and take this course for reasons of professional and career development, advancement, personal development, or to enhance their skills and knowledge. Some students are recent graduates looking to enter the field of biocuration.

Every effort has been made to ensure the accuracy of the information in this programme specification. At the time of publication, the programme specification has been approved by the relevant Faculty Board (or equivalent). Programme specifications are reviewed annually, however, during the course of the academical year, any approved changes to the programme will be communicated to enrolled students through email notification or publication in the Reporter. The relevant faculty or department will endeavour to update the programme specification accordingly, and prior to the start of the next academical year.

Further information about specifications and an archive of programme specifications for all awards of the University is available online at: <https://www.camdata.admin.cam.ac.uk/>