

Critical Thinking and Ethics Course Descriptor

Course Title	Critical Thinking and Ethics	Faculty	EDGE Innovation Unit (London)
Course code	NCHNAP6133	Course Leader	Professor Scott Wildman (interim)
Credit points	15	Teaching Period	This course will typically be delivered over a 6-week period.
FHEQ level	6	Date approved	Sep 2021
Compulsory/ Optional	Compulsory	Date modified	
Pre-requisites	None		
Co-requisites	None		

Course Summary

The course examines the principles, theories and practices that underpin the application of critical thinking within bioscience contexts. Scientists apply critical thinking skills in every aspect of their work from experimental protocols to advanced statistical hypothesis testing and the evaluation of experiments. They employ a range of tools and methodologies such as Root Cause to efficiently and effectively identify problems and address them. Critical thinking is also vital to the rigorous and accurate use of established statistical models and the logical evaluation of results. Probability distributions, significance testing, confidence limits, regression & correlation and hypothesis testing to evaluate results are explored in the course.

Course Aims

- To enhance the ability of learners' critical thinking.
- To explore advanced critical thinking aligned to statistical tools and methodologies.

- To examine critical thinking within a range of complex problem-solving contexts.

Learning Outcomes

On successful completion of the course, learners will be able to:

Knowledge and Understanding

- K1c Critically understand the principles, theory and practices that underpin critical approaches to scientific enquiry and research.
- K3c Systematically understand the use of statistics and data mining in critical thinking and research methodology.
- K4c Critically understand the ethical questions and dilemmas within bioscience contexts.

Subject Specific Skills

- S1c Work autonomously to critically analyse, interpret and robustly evaluate scientific data.
- S2c Accurately apply advanced statistical analysis tools and methodologies to test hypothesis and evaluate the results of experiments.

Transferable and Professional Skills

- T1c Use reflective practice to challenge own assumptions.
- T2c Use advanced statistical and analytical skills to solve complex problems.
- T3ci Communicate clear arguments and critical analysis to specialist and non-specialist audiences.
- T3cii Display an advanced level of technical proficiency in written English and competence in applying scholarly terminology, so as to be able to apply skills in critical evaluation, analysis and judgement effectively in a diverse range of contexts.

Teaching and Learning

This is an e-learning course, taught throughout the year.

This course can be offered as a standalone short course.

Teaching and learning strategies for this course will include:

- Online learning
- Online discussion groups
- Online assessment

Course information and supplementary materials will be available on the University's Virtual Learning Environment (VLE).

Learners are required to attend and participate in all the formal and timetabled sessions for this course. Learners are also expected to manage their self-directed learning and independent study in support of the course.

The course learning and teaching hours will be structured as follows:

- Off-the-job learning and teaching (6 days x 7 hours) = 42 hours
- One-the-job learning (12 days x 7 hours) = 84 hours (e.g. 2 days per week for 6 weeks)
- Private study (4 hours per week) = 24 hours

Total = 150 hours

Workplace assignments (see below) will be completed as part of on-the-job learning.

Assessment

Formative

Learners will be formatively assessed during the course by means of set assignments. These will not count towards the final degree but will provide learners with developmental feedback.

Summative

Assessment will be in two forms:

AE	Assessment Type	Weighting	Online submission	Duration	Length
1	Written Assignment (case study based)	50%	Yes	Requiring on average 20 – 25 hours to complete	2500 words +/- 10%
2	Set Exercises (problem-solving)	50%	Yes	Requiring on average 20 – 25 hours to complete	-

Feedback

Learners will receive formal feedback in a variety of ways: written (via email or VLE correspondence) and indirectly through online discussion groups. Learners will also attend a formal meeting with their Academic Mentor (and for apprentices, including their Line Manager). These bi or tri-partite reviews will monitor and evaluate the learner's progress.

Feedback is provided on summatively assessed assignments and through generic internal examiners' reports, both of which are posted on the VLE.

Indicative Reading

Note: Comprehensive and current reading lists for courses are produced annually in the Course Syllabus or other documentation provided to learners; the indicative reading list provided below is used as part of the approval/modification process only.

Books

- Pesut, D. J., and Herman, J. (1999). *Clinical Reasoning : The Art and Science of Critical and Creative Thinking*, Albany : Delmar
- Sandler, R. L. (2014). *Ethics and emerging technologies*. Houndsmills, Basingstoke, Hampshire ; New York, NY : Palgrave Macmillan
- Macrina, Francis L. (2014). *Scientific Integrity Text and Cases in Responsible Conduct of Research*. Washington : ASM Press

Journals

Learners are encouraged to read material from relevant journals on applied cell biology as directed by their course leader.

Electronic Resources

Learners are encouraged to consult relevant websites on applied cell biology.

Indicative Topics

- Critical thinking
- Advanced statistical tools and methodologies
- Advanced hypothesis and experiment testing methodologies and tools

Version History

Title: NCHNAP133 Critical Thinking and Ethics Course Descriptor					
Approved by: Academic Board					
Location: Academic Handbook/Programme specifications and Handbooks/ Undergraduate Apprenticeship Programmes/BSc (Hons) Bioscience with Digital Technologies Programme Specification/Course Descriptors					
Version number	Date approved	Date published	Owner	Proposed next review date	Modification (As per AQF4) & category number
3.0	October 2022	January 2023	Scott Wildman	September 2026	Category 1: Corrections/clarifications to documents which do not change approved content. Category 3: Changes to Learning Outcomes
2.1	May 2022	May 2022	Scott Wildman	September 2026	Category 1: Corrections/clarifications to documents which do not change approved content.
2.0	January 2022	April 2022	Scott Wildman	September 2026	Category 3: Changes to Learning Outcomes
1.0	September 2021	September 2021	Scott Wildman	September 2026	