Northeastern University London

Laboratory Science Capstone Project Course Descriptor

Course Title	Laboratory Science Capstone Project	Faculty	EDGE Innovation Unit (London)
Course code	NCHNAP6136	Course Leader	Professor Scott Wildman (interim)
Credit points	60	Teaching Period	This course will typically be delivered over a 18-week period.
FHEQ level	6	Date approved	September 2021
Compulsory/ Optional	Compulsory	Date modified	
Pre-requisites	None		

Course Summary

In this course, learners will research, develop and implement a scientific work-based project of their choosing. Learners will undertake critical analysis of the literature and develop and implement a robust procedure of scientific inquiry. Data analysis will be a key focus of the project, using appropriate analytical, statistical and data visualisation methods to draw robust and balanced conclusions. The project is assessed through a dissertation and viva voce exam. Typical project examples include implementation of a new analytical technique; experimental design to contribute to an R&D project or design of a new synthetic step within a formulation pathway.

Course Aims

- Give learners the opportunity to implement and manage a scientific project in a business context.

- Give learners the opportunity to reflect upon the underlying principles of laboratory science and data analysis and put their knowledge, skills and behaviours into practice.
- Train learners to present their own arguments logically and competently, to engage specialist and non-specialist stakeholders.

Learning Outcomes

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

Knowledge and Understanding

K1c Have a systematic understanding the underlying scientific principles, principal theories, concepts and terminology of laboratory based experimentation, including laboratory techniques relevant to the specialist discipline and the theoretical basis for application of the science relevant to one specialist discipline including how to apply this during experimental design and implementation of research programmes.

K2c Have a critical understanding of the requirements for the development and validation of analytical methods and instrumentation, including suitable sampling methods as appropriate to the specialist discipline and how to independently implement new processes according to the literature, data mining results and input from colleagues.

K3c Have a systematic understanding of statistical techniques, probability distributions, significance testing & confidence limits, regression & correlation and hypothesis testing to evaluate results, design experiments and draw evidence based conclusions and the ways in which advanced science and technology is developed, established techniques of scientific enquiry and research methodologies.

K4c Have a systematic understanding of the business environment in which the company operates including personal role within the organisation, ethical practice and codes of conduct; the internal and external regulatory environment pertinent to the science sector and area of specialisation; understand how to initiate, plan, execute and close a project and incorporate the organisation’s project management procedures into the scientific work environment working with team members; and understand the requirements of internal or external customers and how to recommend the appropriate workflows, improvements or scientific solutions.

Subject Specific Skills

S1c Identify and use the scientific approaches appropriate to one specialist discipline required to solve problems, support new investigations and follow-up experiments in the laboratory and promote and ensure the application of quality standards, safe working practices and compliance with risk management systems relevant to the workplace in own work and the work of others.

S2c Appraise scientific experimentation, independently design and implement new processes according to relevant literature and other data sources interrogated using data mining techniques using input from colleagues; use creative thinking and problem solving techniques such as root cause analysis, to challenge assumptions, innovate, make new proposals and build on existing ideas; and support appraisal of scientific experimentation with numerical and statistical analysis.

S3c Work autonomously to analyse, interpret and evaluate scientific data and present the results of laboratory work and problem solving clearly and concisely in written and oral form; and comply with regulations including compliance with business rules pertaining to record keeping, data integrity, traceability and confidentiality.

S4c Autonomously plan and prioritise tasks, review and evaluate progress against objectives and investigate alternative scenarios; contribute to the development of specific technical projects across multi-disciplinary teams; and ensure that targets are met and maintained, within own area of responsibility, whilst complying with defined company procedures and legislative requirements.

Transferable and Professional Skills

T1c Takes responsibility for continuing personal and professional development, demonstrating commitment to learning and self improvement and supports the development of others as appropriate.

T2c Works autonomously and interact effectively including challenging assumptions within a wide, multi-disciplinary project team; manages time effectively, being able to plan and complete work to schedule.

T3ci Communicates effectively to a scientific and non-scientific audience using oral presentation, scientific debate & technical writing skills.

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.

T4c Takes account of the impact of work on others, especially where related to diversity and equality.

Teaching and Learning

The contact hours on this course are formed predominantly of supervisory meetings, typically 8 x 1 hour.

Learners are expected to carry out independent research into the topic.

Readings should include a mix of books, journal articles, policy papers and other relevant documents, depending on the topic and the approach taken in the dissertation.

Course information and supplementary materials are 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 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 (18 days x 7 hours) = 126 hours (e.g. 1 day per week for 18 weeks)
- On-the-job learning (54 days x 7 hours) = 378 hours (e.g. 3 days per week for 18 weeks)
- Private study (5.33 hours per week for 18 weeks) = 96 hours
- Total 600 hours

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	Dissertation (following work based project)	70%	Yes	-	7,500 words +/- 10%
2	Oral Presentation	30%	Yes	Presentation: 15 mins followed by 10 mins questions	-

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 Guide or other documentation provided to learners; the indicative reading list provided below is used as part of the approval/modification process only.

Books

- Preece, R., 1994. *Starting Research : An Introduction to Academic Research and Dissertation Writing*. London, New York : Pinter Publishers
- Stephan F. M., and Smith, I., 2019. *A Practical Guide to Dissertation and Thesis Writing*. Newcastle upon Tyne, England : Cambridge Scholars Publishing
- Mader, S. S. (2004). *Biology* (8th ed.). Boston: McGraw-Hill.

Journals

Learners are encouraged to read material from relevant journals on laboratory science as directed by their course leader.

Electronic Resources

Learners are encouraged to consult relevant websites on laboratory science.

Indicative Topics

Learners will study the following topics:

- Laboratory Science in practice
- Professional context
- Work based project

Version History

Title: NCHNAP6136 Laboratory Science Capstone Project 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	March 2023	Scott Wildman	September 2026	Category 1: Corrections/clarifications to documents which do not change approved content or learning outcomes Category 3: Changes to Learning Outcomes
2.0	February 2022	May 2022	Scott Wildman	September 2026	Category 2: Change to Learning and Teaching Strategy
1.0	September 2021	September 2021	Scott Wildman	September 2026	