

Module title: STEM Research Project
SITS Module Code: 6STEM001X
Credit level: <i>Level 6</i>
Length: 6 weeks in the Summer period (June – July)
UK credit value: 20 credits
ECTS credit value: 10 ECTS
College and School: College of Liberal Arts and Sciences, School of Life Sciences
Module Leader: Dr Adele McCormick and Dr Joan Liu
Progression and assessment board: LIFSCN - Biomedical Sciences UG PAB
Pre-requisites
Co-requisites:
Study abroad: Yes the module will be offered to International students as part of the University of Westminster's London International Summer School.
Special features: N/A
Access restrictions: International Summer School Students
Are the module learning outcomes delivered, assessed, or supported through an arrangement with organisation(s) other than the University of Westminster: No
Summary of module content: This module will provide students with the knowledge and essential skills required to participate actively in research and development, as they conduct high quality research over a six-week period, within the School of Life Sciences. Students will work independently under the supervision of an experienced project supervisor to design and carry out academic research, which will provide a foundation for students seeking research at postgraduate level. Students will learn key aspects involved in planning and designing their research project such as identifying a specific research angle of interest for the project, health and safety considerations, ethical implications and risk management, contingency plans to show flexibility and adaptability, thinking forward in terms of data acquisition and analysis and considering the relevance of their study to society. Students will take ownership of their research project by first completing a critical review prior to arrival to identify the research angle, then setting research goals and conducting research over the six-week period to address these research goals, and dissemination of their research work as a conference style oral presentation.

Assessment Methods

Students undertaking this module will be required to complete two pieces of assessments: A critical review (2000 words) and a project presentation (20 minutes presentation plus 10

minutes of Q and A).

The critical review will be undertaken prior to starting the 6-week research project in the summer in the School of Life Sciences, and under guidance with the project supervisor will enable the student to research the scientific literature relevant to the research topic area to become familiar with what research has been undertaken to-date and highlight any gaps that could be addressed as part of the 6-week research project. The oral project presentation including Q and A, will be in the format of a mini symposium (which is an authentic piece of assessment as reflects researchers presenting their data at scientific conferences) and marking and feedback will be provided to the students on the day. The marking rubrics will encapsulate the following: knowledge and understanding of the research topic area, interpretation of the scientific data that was generated, Health and Safety, Ethical consideration, as well as scientific importance of the research undertaken, and engagement in learning (evidenced by attendance and performance during the research project) as well as discussion of the data and limitations and future work. Presentation style and communication as well as ability to defend questions posed will also be incorporated into the marking rubrics.

Rank	Assessment type	Assessment name	Weighting	Qualifying Mark	Qualifying set (where the minimum mark required applies across multiple assessments)
1	Coursework (2000 words)	Critical Review	40%		
2	Presentation (30-minutes)	Project presentation (oral)	60%		

Learning outcomes

At the end of the module the successful student will be able to:

1. design and execute a programme of independent research in the relevant topic area which will be conducted in the School of Life Sciences under supervision of allocated member/s of staff;
2. critically evaluate background information on the project topic area to act as a foundation for the student's own work, including how it relates to the global sustainable development goals (SDGs)
3. evaluate the risks of their project design, demonstrate awareness of ethical and related issues (e.g. health and safety) associated with research and conduct themselves as a professional researcher.
4. Critically apply appropriate methods for analysis and/or synthesis of data (including statistical and other mathematical techniques where appropriate.
5. rigorously and critically interpret the data obtained from the project and show awareness of the relevance of this work in its own field and to society as a whole
6. present a reliable and professional record of research on a day-to-day basis and communicate and reflect on their research findings in an appropriate and professional manner

Indicative syllabus content

In addition to research/investigative work and techniques specific to their project, students will gain experience of:

1. Critically evaluating a focused area of current scientific research relevant to their research project.
2. planning and conducting the final project; including reliable recording and reflections of the various project stages.
3. working as part of a team (when required), as well as an independent and professional, working within Life Sciences.
4. carrying out quantitative and/or qualitative analysis on data generated on the project
5. critical evaluating and analysing data, including statistical or mathematical/non-mathematical techniques (as appropriate to the project)
6. oral communications of their research ideas and plans through to selecting and delivering an appropriate final assessment piece for the project.

Taught sessions will cover:

1. importance of project planning and management angles
2. essential healthy, safety and well-being guidance with emphasis on good research practices.
3. importance of ethical and legal considerations (e.g. Human Tissue Act) when planning projects in Life Sciences and understanding relevant institutional governance aspects.
4. various angles for data collection, analysis and interpretation, using appropriate processes and analysis software.
5. key aspects of scientific writing and various alternative ways of implementing and communicating a project in Life Sciences.

Teaching and Learning Methods

Learning on this module primarily involves experimental and/or analytical based research with students spending much of their time carrying out independent project related work. Depending on the project angle, this may involve time spent in the University laboratories or other facilities, in community settings. Each student will be allocated academic supervisor/s, who will meet with the student to discuss their progress, guide them with the critical review and in the initial design for their project, support them in steps required for project progress and advise them when needed through this project. There will also be a series of authentic lectures to support and

extend students' learning in terms of project management angles, health and safety, ethical considerations, good practice and professional conduct as well as how to make your research project sustainable. Taught sessions will provide students with tools for selecting and applying appropriate analysis for their project work.

After each lecture, there will be bespoke tutorials sessions so that students can work in small groups on aspects related to a particular lecture topic area and promote peer learning and active learning through discussion/debates. Both the lecture and tutorial sessions will incorporate flipped classroom approach to enhance student engagement and include poll everywhere as well as quizzes to monitor knowledge and understanding. From a health and wellbeing perspective, will also incorporate a bespoke session on "resilience for researchers", to develop coping skills, a strong support network, and self-care strategies to navigate common challenges in a research environment such as stress and meeting deadlines and how to cope if experiments do not go to plan.

Students will have the opportunity to attend external visits such as visiting museums/scientific exhibitions or tour laboratories focused on healthcare and/or industry so that students get exposed to research areas other than academic research and will benefit them when deciding upon their career plans.

Activity type	Category	Student learning and teaching hours*
Lecture	Scheduled	6
Seminar	Scheduled	
Tutorial	Scheduled	6
Project supervisor	Scheduled	14
Demonstration	Scheduled	
Practical classes and workshops	Scheduled	
Supervised time in studio/workshop	Scheduled	
Fieldwork	Scheduled	
External visits	Scheduled	6
Work based learning	Scheduled	
Scheduled online learning	Scheduled	
Other learning	Scheduled	60
Total scheduled		92
Placement	Placement	
Independent study	Independent	108

Total student learning and teaching hours		200hrs
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*hours per activity type are indicative and subject to change.

A total of approximately 60 hours will be spent directly in project related activity but the type of activity applicable (or which combination, if more than one is involved) will depend on the specific project. This may be, for example, practical/analytical sessions/workshops, fieldwork, community event preparation and implementation. Alongside the scheduled activities, students are expected to undertake 108 hours of independent study for this module. Timetabled weekly sessions will include 'extension tasks' designed for completion as independent study outside formal taught sessions which will prepare students for the project journey. The content of these tasks will feed into their project design, thinking through ethical and health and safety aspects through to data collection and analysis. Along with these extension tasks, students will also need to work independently to prepare for the two pieces of assessment within this module. In addition, additional time will be allocated for external visits in central London such as visiting science or anatomical museums, laboratory tours (healthcare/industry) sustainability walks in London.

Assessment rationale: why has this assessment been used for this module?

- 1. Critical review: (2000 words)** Before embarking on the research study, students will produce a critical review based on an area of current scientific research applicable to their research project topic area. This will demonstrate their ability to search and use the primary literature as well as their ability to synthesise conceptual ideas and communicate their findings effectively (LO2).
- 2. Project Presentation: (20 mins oral presentation plus 10 mins Q and A)** Students will present details of their research project to their supervisor/s as an oral presentation- in terms of background information, experimental/analytical approach, research findings and discuss the significance of the data generated and proposed future work. From the very start, students will be encouraged to be able to justify their research in relation to its field and to society as well as communicate their research findings to a scientific audience and defend their research following Q and A. This assessment will help further develop their communication and presentation skills, and build on the planning, analytical/technical skills they acquired during the research project, which are key transferrable skills in all areas of employment and further study, especially if considering embarking on research at postgraduate level. LO1, LO2, LO3, LO4, LO5 and LO6.

Assessment criteria: what criteria will be used to assess my work on this module?

- 1. Critical review (40%).**

Students will be assessment on the extent to which they have:

- ability to engage with the current literature in a specified area related to their intended research project.

- to produce a coherent and fluent and well-integrated document containing extensive review of the literature
- ability to critically evaluate the papers that they have read and go beyond merely summarising their content.
- Demonstrated the ability to synthesis the key concepts from the literature identifying open questions and highlight gaps in the literature as well as discuss limitations of existing studies.

Word Limit 2000 words

2. Project Presentation (60%):

Students will be assessed on the extent to which they have:

- to communicate their knowledge and understanding of the research project undertaken in terms of background information, experimental/analytical approach undertaken as well as interpretation of the data generated, and future work proposed to fill in any gaps not met.
- the scientific importance and relevance of the research undertaken and how it relates to SDGs.
- Students will also be assessed on their understanding of health and safety risks as well as ethics, (which they would have considered prior to embarking on the research project)
- the level of engagement which will be based on attendance and performance during the research project.

This information will be assessed as a **20-minute oral presentation followed by 10 minutes of Q and A.**

Generic Grade Descriptors at level 6:

80-100 An outstanding piece of work: All assessment criteria have been met at an exceptionally high standard

- Demonstrates exceptional independent thought and reflection in relation to complex ideas and concepts.
- Provides creative analysis of techniques/knowledge. Critically analyses information sources, techniques and approaches to analysis.
- Demonstrates extensive research across a range of sources. Communicates ideas and complexity with confidence, using appropriate format and excellent presentation.

70-79 An excellent piece of work: All assessment criteria have been met at a high standard.

- Takes a confident approach to critical analysis/reflection across a range of techniques/knowledge.
- Shows in-depth understanding of ideas and concepts. Demonstrates

insightful/independent contextualisation and implications of theories/practices.

- Synthesises independent research across a range of authoritative sources.
- Communicates with clarity using appropriate format and excellent presentation.

60-69 A good piece of work: All assessment criteria have been met at a good standard.

- Demonstrates systematic understanding across a range of techniques/knowledge in specialised area.
- Demonstrates confident analysis/reflection on key concepts/frameworks.
- Explores relationship of theories /practices within the wider context.
- Provides additional independent research across a range of authoritative sources.
- Communicates clearly, using appropriate format and with sound presentation.

50-59 A sound piece of work: All assessment criteria have clearly been met.

- Demonstrates clear understanding of techniques/knowledge in specialised area.
- Demonstrates some independent synthesis and reflective analysis across key concepts/ frameworks.
- Provides evidence of research across a range of resources provided within the module.
- Communicates using appropriate format with satisfactory presentation.

40-49 An adequate piece of work: All assessment criteria have just been met.

- Demonstrates descriptive understanding of techniques/knowledge.
- Provides limited evaluation of ideas and concepts.
- Undertakes minimal research within module content.
- Communicates work using appropriate format with some weaknesses of presentation.

30-39 FAIL: An inadequate piece of work: One or more relevant assessment criteria are not met.

- Applies techniques/knowledge with limited with some weaknesses/omissions.
- Demonstrates inadequate knowledge of key concepts and principles.
- Uses a minimal amount of relevant information from within the module.
- Communication is unclear with poor standard of presentation.

0-29 FAIL: A poor piece of work: Most of the relevant assessment criteria have

not been met.

- Applies techniques/knowledge with significant weaknesses and omissions.
- Demonstrates major inaccuracies and/or misunderstandings flaws of key concepts and principles.
- Uses inadequate information sources from within the module.
- Communication is unclear with poor standard of presentation.

How will this module enhance employability?

For most students this will be the first opportunity they have had to embark on their own research project, where they manage a project from inception to conclusion, and the onus is on them to deliver at all stages. During the project journey, students will build confidence in the ability to recognise areas for question or of concern and then frame project related aims and objectives. They will have the opportunity to identify and deploy methods/tools appropriate for carrying out the project in the chosen area, be able to justify choices made and decipher appropriate data collection and analysis. In turn, students will develop skills to interpret the project related data such that towards the end of the project, students are able to suggest possible future directions based upon critical and authentic evaluation of output. These are all essential skills for graduate level employment. Through this module, students will continue to develop their critical and creative thinking skills, along with communication skills (from oral communications to written reports) to build competence and confidence that are desirable attributes for employability purposes, especially embarking on research at postgraduate level.