

CH169-15 Beyond Science: Collaborative Student-Led Challenges (CSLC)

23/24

Department

Chemistry

Level

Undergraduate Level 1

Module leader

Tom Ritchie

Credit value

15

Module duration

20 weeks

Assessment

100% coursework

Study location

University of Warwick main campus, Coventry

Description

Introductory description

Co-created with students, A-Level students, and secondary school teachers as part of the Chemistry Curriculum Review, the new Year One optional module (Beyond Science: Collaborative Student-Led Challenges (CSLC)) provides incoming students with a structured programme to choose a research problem they want to tackle as a group. The module was also developed using research into student skills from the Royal Society of Chemistry and mapped against Warwick Skills Award criteria.

CSLC is an introductory-level research project module. It has been created to support the development of Chemistry students' skills as reflective, outward-facing, and impact-focused project leaders for the evolving workplace of the 21st century. Throughout the module, students will learn the principles, tools, and mindset needed to create, complete, and present a group research project, and reflect on their skills development through undertaking the project. This optional module is designed to give students the independence and support to explore research and skills that complement their introduction to Chemistry in the department. As well prepare them for assignments in later years, the transferable skills will benefit their employability and

development, particularly when it comes to creating CVs and applying for graduate jobs.

Module aims

The main aim of the module is for students to engage with experts and professionals from outside the academy to learn new project, research, and engagement skills. These experts currently include senior project managers from Google, politicians from the European Union, policy specialists from the European Commission and UK Civil Service, advocacy leads from a variety of UK charities, and public engagement professionals.

The module borrows from the successful non-CATs-bearing iGEM research project model, and has been designed around student feedback and wider skills audit research, which call for:

- Alternative assessment methods;
- Greater opportunity to apply learning and skills in a real-world context;
- Exposure to group working dynamics and creating research projects/posters earlier in degrees;
- A module that bridges the gap from the EPQ projects students take at A-Level;
- Greater opportunity to engage in interdisciplinary student-led research.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Beyond Science: Collaborative Student-Led Challenges (CSLC) provides students with a structured programme to choose a research problem they want to tackle as a group. Throughout the module, students will learn the principles, tools, and mindset needed to create, complete, and present a group research project. CSLC has been created to support the development of Chemistry students' skills as reflective, outward-facing, and impact-focused project leaders for the evolving workplace of the 21st century.

Students will be supported by an Early Career Fellow throughout the module, providing advice and guidance each week on their research challenge. However, the emphasis for planning and completing the project sits with the students and the extent to which they engage with the project milestones and the optional content released each week.

Learning outcomes

By the end of the module, students should be able to:

- SKU: Develop theoretical and practical knowledge of how to manage a research project, through mindset, techniques, and tools.
- SKU: Evaluate and apply theory and practice to make impacts and apply this knowledge to project challenges and external contexts.
- KS: Research skills and practical use of insight gathering methods such as networking, outreach, and interviewing techniques.
- KS: Teamwork and collaboration skills, working in teams and with interdisciplinary

stakeholders to create effective, feedback-driven dynamics to constructively move forward.

- KS: Leadership and ability to lead project processes and teams of people in problem solving scenarios.
- CS: Creative thinking and ability to look at familiar problems, experiences and environments and re-imagine them in a new way.
- CS: Critical thinking and ability to deconstruct arguments and ideas, avoid bias, create informed arguments.
- CS: Storytelling and ability to inspire action with stories that are meaningful and powerful; ability to develop compelling arguments and presentations.
- SSS: Empathising and connecting with target audience to draw valuable and in-depth insights from user research to inform action.
- SSS: Effective, innovative, and interdisciplinary decision making and problem solving.
- SSS: Recombine and come up with ideas that are radical, innovative, creative, while being focused on the target audience and intended impact.

Indicative reading list

- A Young Innovator's Guide to STEM: 5 Steps To Problem Solving For Students, Educators, and Parents, Rao, Gitanjali
- The Innovator's Guide to Growth: Putting Disruptive Innovation to Work (Harvard Business School Press), Anthony, Scott D., Johnson, Mark W., Sinfield, Joseph V., Altman, Elizabeth J.
- Running Lean: Iterate from Plan A to a Plan That Works (Lean Series), Ash Maurya
- Innovation and Entrepreneurship (Routledge Classics), Drucker, Peter.
- Zero to One: Notes on Start Ups, or How to Build the Future, Masters, Blake, Thiel, Peter.
- Ten Types of Innovation: The Discipline of Building Breakthroughs, Keeley, Larry, Walters, Helen, Pikkell, Ryan, Quinn, Brian
- The Ten Faces of Innovation: Strategies for Heightening Creativity, Kelley, Tom
- Thinkertoys: A Handbook of Creative-Thinking Techniques, Michalko, Michael.
- Creative Confidence: Unleashing the Creative Potential within Us All, Kelley, David, Kelley, Tom.
- Range: How Generalists Triumph in a Specialized World, Epstein, David.
- Adapt: Why Success Always Starts with Failure, Tim Harford.

Books/Resources available in Warwick Library

- Lean project management -- How to apply Lean thinking to project management / Rainer Erne.
https://encore.lib.warwick.ac.uk/iii/encore/record/C__Rb3754481__Sproject%20management__P0%20management
- Project management, Harvey Maylor, Neil Turner.
https://encore.lib.warwick.ac.uk/iii/encore/record/C__Rb3766441__Sproject%20management__P0%20management
- Time Management, Kate Williams, Michelle Reid.
https://encore.lib.warwick.ac.uk/iii/encore/record/C__Rb3442969__Stime%20management__P0%20management

Research element

The projects that groups will be completing will require basic research skills.

Interdisciplinary

Mentors will be from non-Chemistry backgrounds. Research skills will come from business, innovation, and design thinking disciplines, and the project teams will be encouraged to engage with others outside of Chemistry.

International

Contributors to the module content will be from overseas organisations (EU, World Bank etc).

Subject specific skills

N/A - not a Chemistry subject-specific module.

Transferable skills

Analysing, Synthesising, and Evaluating

Information Seeking

Information Management

Communication and Collaboration

IT and Data Skills

Information evaluation

Social Media

Systems thinking

Societal engagement

Verbal, Written, Reading, Listening

Interacting with others

Intercultural Curiosity

Collegiality

Team Working

Building Rapport

Peer Support

Intelligence Gathering

Preparation and Prioritisation

Project Planning and Delivery

Time Management

Proactivity

Creativity and Imagination

Lateral Thinking

Learning from Failure

Self-Reflection

Mapped on Warwick Skills Award Criteria

Critical Thinking

Information Literacy

Digital Literacy
Sustainability
Communication
Intercultural Awareness
Teamwork
Organisational Awareness
Professionalism
Problem Solving
Self-Awareness
Ethics

Study

Study time

Type	Required
Lectures	23 sessions of 1 hour (15%)
Online learning (independent)	15 sessions of 1 hour (10%)
Other activity	30 hours (20%)
Private study	37 hours (25%)
Assessment	45 hours (30%)
Total	150 hours

Private study description

N/A

Other activity description

Groups expected to do 2 hours per week of non-timetabled group work on their project. This will be monitored through weekly catch-ups and through assessments at end of each five-week block.

Costs

Category	Description	Funded by	Cost to student
	600 overall hours to be paid to mentors:		
Other	<ul style="list-style-type: none">Hours – four hours per week per mentor (1 hour per group (x2), 1 hour as a wider group (split into two thirty-minute sessions, and 1 hour with Tom/Chris as part of preparation).	Department	£0.00

Category	Description	Funded by	Cost to student
	60 hours per mentor		
	<ul style="list-style-type: none"> FA5 (PhD): £643.05 (without on costs) FA6 (ECF): £744.75 (without on costs) 		
	Overall projected costs (without on costs):		
	<ul style="list-style-type: none"> 300 x 14.29 (FA5) = £4,287 300 x 16.55 (FA6) = £4,965 Total = £9,252 		
	Costs for Launch Session and Conference Poster Presentations:		
	<ul style="list-style-type: none"> £1,500 for branding, prizes, refreshments, and expenses for two guest judges 		
	Cost to add VR component:		
	<ul style="list-style-type: none"> £2,000 - Have applied to IATL for this - will update. 		

Assessment

You must pass all assessment components to pass the module.

Assessment group A

	Weighting	Study time	Eligible for self-certification
Assessment component			
Project Poster	40%	10 hours	No
At the end of the module, students will submit a poster detailing their chosen research topic.			
Reassessment component is the same			
Assessment component			
Reflection Portfolio	32%	10 hours	No
Alongside their poster submission, students will submit a group reflective portfolio detailing the			

	Weighting	Study time	Eligible for self-certification
skills and processes of working on their group project.			

Reassessment component is the same

Assessment component

Module Engagement	10%	10 hours	No
This assessment will be judged against engagement with weekly content in online Teams groups, including quizzes and short answer questions.			

Reassessment component is the same

Assessment component

Project Design Piece	8%	5 hours	No
At the end of phase one of the project, teams will be required to create a project video/wiki on Teams of their project work and plan. This piece will need to engage the public.			

Reassessment component is the same

Assessment component

Poster Presentation	10%	10 hours	No
In term three, project groups will demonstrate and present their research project at a symposium.			

Reassessment component is the same

Feedback on assessment

Feedback will be given in written form on Moodle and Teams and verbally at weekly check ins.

Availability

Courses

This module is Optional for:

- UCHA-4 Undergraduate Chemistry (with Intercalated Year) Variants
 - Year 1 of F101 Chemistry (with Intercalated Year)
 - Year 1 of F122 Chemistry with Medicinal Chemistry (with Intercalated Year)
- UCHA-3 Undergraduate Chemistry 3 Year Variants
 - Year 1 of F100 Chemistry
 - Year 1 of F121 Chemistry with Medicinal Chemistry
- UCHA-F110 Undergraduate Master of Chemistry (with Industrial Placement)
 - Year 1 of F100 Chemistry
 - Year 1 of F110 MChem Chemistry (with Industrial Placement)
 - Year 1 of F112 MChem Chemistry with Medicinal Chemistry with Industrial Placement
- Year 1 of UCHA-F107 Undergraduate Master of Chemistry (with Intercalated Year)
- UCHA-F109 Undergraduate Master of Chemistry (with International Placement)
 - Year 1 of F109 MChem Chemistry (with International Placement)
 - Year 1 of F111 MChem Chemistry with Medicinal Chemistry (with International Placement)
- UCHA-4M Undergraduate Master of Chemistry Variants
 - Year 1 of F100 Chemistry
 - Year 1 of F105 Chemistry
 - Year 1 of F110 MChem Chemistry (with Industrial Placement)
 - Year 1 of F109 MChem Chemistry (with International Placement)
 - Year 1 of F125 MChem Chemistry with Medicinal Chemistry
- Year 1 of UCHA-F127 Undergraduate Master of Chemistry with Medicinal Chemistry (with Intercalated Year)