

CH169-15 Beyond Science: AI, Sustainability and Global Challenges

26/27

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

Beyond Science: AI, Sustainability and Global Challenges is an optional first-year module for Chemistry students who want to do something genuinely different alongside their core modules. It gives students the opportunity to design and carry out a real research project, not in a lab but out in the world, investigating a question they have chosen themselves, connected to the UN Sustainable Development Goals.

The module sits at the intersection of three things first-year Chemistry students need early exposure to: what research actually looks like outside the laboratory, how AI is shaping the world they are entering, and why sustainability matters to chemists specifically. No other first-year module at Warwick puts those three things together in a student-led research context.

Students work in small groups, supported by a dedicated mentor from outside Chemistry. They use social research methods such as interviewing, surveying, and desk-based analysis to investigate a real-world challenge. At the end of Phase 1, before they begin gathering evidence, every group submits a research plan and ethics application which is reviewed and approved by their mentor and the module convenors. This mirrors the ethics process that researchers go through in practice and ensures students are thinking carefully about their methods and responsibilities before they start.

The module ends with a public research symposium at which students present their findings to an audience of peers, staff, and guests.

This is not a laboratory module. Students will not be doing chemistry experiments. The research is social and applied, and students should choose this module knowing that.

Phase 1 concludes before the Christmas break, meaning students have completed a research plan and gone through an ethics process before URSS applications open in term two. Students who have taken this module are meaningfully better prepared to apply for URSS than those who have not.

Module aims

To give first-year Chemistry students a genuine research experience before more specialist modules have defined how they think about chemistry and their futures.

To introduce students to AI and sustainability as live research questions, not as abstract concepts but as things they investigate themselves through their own projects.

To develop the collaboration, communication, and project management skills that students will need throughout their degree and beyond, in an environment where they have real ownership over what they are working on.

To introduce students to the ethics of research practice through a structured, formative ethics review process at the end of Phase 1, mirroring what researchers actually do before they begin gathering evidence.

To connect students to the wider university earlier than most modules do, through mentors from different disciplines and guest contributors from across Warwick and beyond.

To act as a clear pathway to URSS and other undergraduate research opportunities, with Phase 1 deliberately timed to conclude before URSS applications open in term two.

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: AI, Sustainability and Global Challenges provides students with a structured programme to choose a research challenge they want to investigate as a group, connected to the UN Sustainable Development Goals. Throughout the module, students learn the principles, tools, and mindset needed to design, conduct, and present a group research project, with AI and sustainability as required lenses across all phases of their work.

The module runs across three five-week phases. In Phase 1, groups form, choose their topic, define their research question, and submit a research plan and ethics application before they begin gathering evidence. In Phase 2, groups gather and analyse their evidence using social research methods. In Phase 3, groups synthesise their findings, produce a research poster, and present at a public research symposium.

Students are supported throughout by a dedicated mentor from outside Chemistry, providing research process guidance and a perspective from beyond their discipline. The emphasis for planning and completing the project sits with the students themselves.

Learning outcomes

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

- Design a research question connected to a real-world challenge and identify appropriate methods for investigating it.
- Demonstrate working knowledge of social research methods including interviewing, surveying, and desk-based analysis.
- Explain the ethical dimensions of their chosen research topic, having been through a formal ethics review process, and reflect on the role of AI in their research area.
- Gather, analyse, and synthesise evidence from multiple sources to build a coherent research argument.
- Work effectively within a small team over an extended project, navigating the genuine difficulties of group dynamics and unequal contribution.
- Communicate research findings to a non-specialist audience through an academic poster and a live presentation at the end-of-year symposium.
- Reflect critically on their own contribution to a group project and what they have learned about themselves as a researcher.

Indicative reading list

[Reading lists can be found in Talis](#)

Research element

Students design and execute an original research project using social research methods applied to real-world challenges connected to the UN Sustainable Development Goals. The inclusion of a formal ethics review process means students experience the full research cycle, from question design through ethics approval to evidence gathering, analysis, and public presentation. This provides a structured foundation for undergraduate research opportunities including URSS, ICUR, and BCUR.

Interdisciplinary

Mentors are drawn from non-Chemistry backgrounds deliberately, providing research process support and perspectives from outside the discipline. Guest contributors from across Warwick including Careers, IATL, Wellbeing, and Warwick Innovation contribute to the module. The ethics review process involves mentors from different disciplines as first reviewers. Student research projects engage with social science, policy, technology, and environmental disciplines depending on their chosen SDG challenge.

International

Guest contributors from overseas organisations contribute to module content. A collaboration with Elon University in North Carolina is in active development, with a non-credit bearing URSS-SURE pilot planned for 2026-27 and a formal Collaborative Online International Learning (COIL) model being developed for submission for 2027-28 delivery.

Subject specific skills

Research ethics and responsible research practice, science communication and public engagement, sustainability literacy and application of the UN Sustainable Development Goals, research design and evidence-based reasoning. These skills complement the technical competencies developed elsewhere in the Year One curriculum and align with RSC graduate attributes.

Transferable skills

Research design and execution, research ethics, academic poster design, analysing and synthesising information, communication and collaboration, systems thinking, engagement with industry and society, teamworking, project planning and delivery, time management, AI literacy, ethical reasoning, self-reflection, creativity, learning from failure, science communication, and public engagement.

Study

Study time

Type	Required
Lectures	14 sessions of 1 hour (9%)
Other activity	14 hours (9%)
Private study	50 hours (33%)
Assessment	72 hours (48%)
Total	150 hours

Private study description

Private study encompasses independent research activity including evidence gathering, interviewing, surveying, and desk-based analysis, alongside preparation of the group research plan and ethics application in Phase 1, and reading from the module reading list. Students are expected to use this time to progress their research project between timetabled sessions.

Other activity description

Weekly mentored workshops in which small groups work on their research projects with their assigned mentor present. Sessions are structured around the phase the group is in. Week 10 is

excluded as no session takes place that week.

Costs

Category	Description	Funded by	Cost to student
Other	Cost for mentors - need to be updated if the course changes are approved.	Department	£0.00

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group A2

Assessment component	Weighting	Study time	Eligible for self-certification
Research Poster	60%	30 hours	No
At the end of Phase 3, groups submit their research poster presenting their research question, methods, findings, and implications. The poster must address the AI and ethical dimensions of their topic.			
Reassessment component			
No reassessment			No
Assessment component			
Individual Portfolio	20%	25 hours	Yes (extension)
Two entries of approximately 750 words each, submitted at the end of Phase 2 and Phase 3. Students receive written formative feedback after the Phase 2 entry. The Phase 2 entry reflects on research process and contribution so far. The Phase 3 entry reflects on the project as a whole and what the student has learned about themselves as a researcher.			
Reassessment component			
No reassessment			No

	Weighting	Study time	Eligible for self-certification
Assessment component			
Symposium Presentation	20%	17 hours	No
<p>Each student presents their group's research poster at the end-of-year research symposium. Groups display their poster and are questioned by a rotating panel of guests and staff over a 15-minute slot. Questions are directed at individuals; each student must be able to speak to any part of the poster, not just their own section. Although the poster is a group product, this component is assessed individually. Students who cannot attend due to extenuating circumstances are eligible for self-certification.</p>			

Reassessment component

No reassessment No

Feedback on assessment

Written formative feedback on the Phase 2 Individual Portfolio entry within the standard 20-day turnaround. Verbal feedback available at weekly mentor sessions throughout the module. Feedback on the research plan and ethics application is provided by mentors and module convenors at the end of Phase 1 before students proceed to evidence gathering.

Availability

Courses

This module is Optional for:

- CH169