

Fundamentals of Scientific Literature Processing

Course Workload		Assessment form (examination/ graded test/ ungraded test)
ECTS	Hours	
3	108	Ungraded test

This course trains students to critically read, interpret, and evaluate scientific literature in energy-related chemistry fields such as batteries, catalysis, hydrogen production, and carbon capture. Emphasis is placed on identifying methodological flaws, assessing data quality, verifying claims, and understanding reproducibility. Students will develop the skills needed to distinguish credible research from overstated or unreliable findings using chemical knowledge, quantitative reasoning, and scientific judgment.

Course structure:

1. Introduction

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- 1.1. The Role of Scientific Literature in Energy Chemistry
 - 1.2. Anatomy of a Scientific Paper

2. Hypothesis and experimental design

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- 2.1. Evaluating Research Questions and Hypotheses
 - 2.2. Experimental Design in Energy Chemistry

3. Data analysis, presentation, and interpretation

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- 3.1. Data Integrity and Presentation
 - 3.2. Statistics and Uncertainty
 - 3.3. Supplementary Information Deep Dive

4. Critical analysis of scientific literature

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- 4.1. Scientific Misconduct and Questionable Practices
 - 4.2. Comparing Multiple Studies

5. Student presentations

- 5.1. Students present a structured critique of a selected paper that they deem questionable (a bad paper) where they focus on identifying weaknesses and unsupported claims
- 5.2. Students present a structured critique of a selected paper that they deem scientifically rigorous (a good paper) where they identify the merits of the paper
- 5.3. Students compare and contrast their good paper and bad paper and, using the good paper, propose ways in which the bad paper could have been improved