Readings in Chemistry Education Research

Credits: 4 credits
Duration: 16 weeks, one contact session of 3 hours every week + 1 laboratory discussion session (3 hours) every alternate week
Schedule: Starting from August 12, 2016, every Friday Time: 2.30 pm to 5.30 pm
Course Instructors: Savita Ladage and Arvind Kumar (Theory)

Chemistry Education Research (CER) from its inception has addressed issues related to teaching and learning of chemistry at various levels. The goals, norms and methodologies of CER are now fairly standardized and the field draws on from the more established disciplines of chemistry, psychology, sociology, philosophy and education.

CER studies, conducted over the last five decades, have provided valuable insights to teachers and curriculum planners. The main objective of this course is to acquaint participants with major areas of CER with special emphasis on work done in the context of undergraduate chemistry laboratory. The readings will include review papers related to a) History and philosophy of chemistry and chemistry education, b) Misconceptions/conceptual pitfalls in chemistry, and c) Inquiry based learning and assessment in chemistry laboratory.

Assessment
Written summaries (40%), presentations (30%), designing of experiments (30%)

List of Readings

History and philosophy of chemistry and chemistry education


1. Philosophy of Chemistry in Chemical Education: Recent Trends and Future Directions, Sibel Erduran and Ebru Z. Mugaloglu
2. The Place of the History of Chemistry in the Teaching and Learning of Chemistry, Kevin C.de Berg
3. Historical Teaching of Atomic and Molecular Structure, José Antonio Chamizo and Andoni Garritz

Misconceptions/conceptual pitfalls in chemistry

1. The Role of Conceptual Integration in Understanding and Learning Chemistry, Keith S. Taber
2. Learners Ideas, Misconceptions, and Challenge, Hans-Dieter Barke
Inquiry based learning and assessment in chemistry laboratory


5. Practical Work in Higher Level Chemistry Education, Stuart W. Bennett, Michael K. Seery and Doris Sovegjarto-Wigbers

6. Assessment in Higher Level Chemistry Education, Stuart W. Bennett and Iain Wilson


7. Experimental Experiences through Project-based Learning, Jens Josephsen and Soren Hvidt


8. Learning Chemistry in a Laboratory Environment, Mary B. Nakhleh, John Polles and Eric Malina


Miscellaneous


1. Importance of a Theoretical framework for Research, Michael R. Abraham
2. Constructing Good and Researchable questions, Diane M. Bunce
Laboratory Discussion Sessions

Papers related to research in the context of undergraduate chemistry laboratory will be discussed and/or presented by participating students. These papers are primarily from Journal of Chemical Education (JCE, ACS journal) and Chemistry Education Research and Practice (CERP- RSC journal). Tentative list of these papers is as follows-


