Committee on Professional Training

CPT Symposium at the Biennial Conference on Chemical Education

University of Northern Colorado
Greeley, CO
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ACS Guidelines for Approved Chemistry Programs – The New Macromolecular, Supramolecular, Mesoscale and Nanoscale Requirement

The 2015 ACS Guidelines for bachelor's degree programs has a new requirement that the curriculum for the certified degree include aspects of the synthesis, analysis and physical properties of macromolecular, supramolecular, mesoscale and nanoscale systems (MSN). Representatives from the Committee on Professional Training will discuss specifics of the new MSN requirement and describe ways that chemistry programs can satisfy the requirement. A portion of the symposium will involve small groups reporting out on the ways in which programs are currently developing MSN topics in their curriculum. Commentary on the suitability of these approaches in meeting the new requirement will be provided.

TALKS

The new macromolecular, supramolecular, mesoscale and nanoscale requirement in the ACS Guidelines for approved chemistry programs
Tom Wenzel, Bates College

The 2015 ACS Guidelines for Bachelor's degree programs has a new requirement that the curriculum for the certified degree include aspects of the chemistry of macromolecular, supramolecular, mesoscale and nanoscale systems (MSN). This new requirement was added because the properties of small molecules give an incomplete picture of the higher order interactions that occur in these larger systems. The Guidelines further state that the preparation, characterization, and physical properties of at least two of the following four systems must be covered: synthetic polymers, biological macromolecules, supramolecular aggregates, meso- or nanoscale materials. There are two ways that chemistry programs may satisfy this requirement. One is through a standalone course. The other is through distributed coverage among several courses necessary for the certified degree. When coverage is distributed among multiple courses, it should constitute the equivalent of approximately one-fourth of a standard semester course. This new requirement and the way in which chemistry programs can meet it will be discussed in this talk. The approach that will be used in the speaker's department will also be discussed.

The new ACS MSN requirement - yet another argument for meaningful communication among 4-year and 2-year institutions

Ron Darbeau, The University of Arkansas-Fort Smith

The new ACS requirement for certified majors to be exposed to coverage of the "scale of chemistry" – nanoscale to supramolecular – is timely and prudent, but is also challenging. Undoubtedly, 4-Year institutions will develop models in which they define content (supra, macro, meso, nano; synthetic and/or natural; examination of synthesis, analysis, physicochemical properties) and distribution (stand-alone course or distributed among courses and years), and it is expected that a spectrum of such coverage models will emerge over the next few years. Yet, given the large, and growing numbers, of science majors who begin their academic careers at 2-year schools, who transfer among 2-year institutions, and from 4-year to 2-year, and back, how do programs collectively create a network that balances accommodating their individual needs and capabilities against allowing students to progress, at their own pace, without being compromised upon transfer(s)? In this talk, we will take a holistic look at some of the challenges involved with meeting this new ACS requirement – particularly as it applies to the 2-year/4-year interface. But, we will also look at the opportunities presented by the new requirement for thoughtful reassessment of content and delivery as well as for meaningful communication between and among 2-year and 4-year institutions. The intent is to forecast challenges and begin framing models that leave institutions prepared while allowing students to navigate the 2-year/4-year educational landscape with minimal turbulence.

Implementing the ACS CPT requirements for macromolecular science

Richard Schwenz, University of Northern Colorado

As departments are looking forward to their periodic review cycle for ACS CPT approval, the new 2015 requirements for inclusion of macromolecular, supramolecular, mesoscale and nanoscale science are forefront in the discussion. Two main options for this inclusion have been suggested by CPT; a standalone course on polymer/macromolecular science or integration of the topics within the existing curriculum. The University of Northern Colorado has elected to address this requirement by modification of the existing courses to include the topics at all levels of the curriculum. We will present specific examples of that implementation in both foundational and in-depth courses and how others can repeat the modifications in their curriculum.

Macalester College efforts to implement the ACS requirement on macromolecular, supramolecular, mesoscale, and nanoscale coverage

Ron Brisbois, Macalester College

The new ACS requirement on macromolecular, supramolecular, mesoscale, and nanoscale coverage offers approved departments an excellent opportunity to provide students curricular and/or laboratory exposure to a variety of conceptual and technical aspects of contemporary molecular science. Continuing the spirit of the 2008 ACS Guidelines revisions, this new requirement in the 2015 Guidelines permits approved departments significant flexibility regarding how they choose to meet the requirement (i.e. through either a dedicated course(s) or through distributed coverage in multiple courses). This presentation will focus on the variety of efforts we have made at Macalester College to meet the new requirement, both prior to and motivated by its creation.

Introducing polymer chemistry into an undergraduate chemistry curriculum

Laura Kosbar, IBM T.J. Watson Research Center

Polymers are ubiquitous in our world, yet most people (including chemists) are not aware of why they have a rather unique set of properties, or how they are made. While the monomers and basic reactions used to synthesize polymers are not uncommon to chemists, the conditions required to achieve molecules with molecular weights of 100K to over a million may be. It may also not be obvious that many of the unique properties of synthetic macromolecules, compared to small molecules, are based far more on size than chemical structure or reactivity. Aspects of polymer chemistry can be incorporated into undergraduate chemistry programs in a variety of ways, and in any or all of the traditional sub-disciplines. In this presentation, some key concepts will be abstracted from a course developed for undergraduate students with a minimum of 1-2 semesters of organic chemistry. Topics that could be included in foundation or in-depth courses in all of the sub-disciplines will be discussed. Examples of labs that require relatively common lab equipment will also be included.