ACS Chemistry for Life™

CPT
Committee on Professional Training

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ACS Guidelines Revision: Moving Forward

During the Committee on Professional Training's meetings in September in Indianapolis, we were able to devote considerable time to discussing the revisions of the 2008 Guidelines, which we expect will be released during the summer of 2014. The proposed changes that were developed during the Committee's deliberations over the past 18 months have been described in the two previous editions of this newsletter. A more detailed summary of the proposed changes was made available in the form of a white paper, which was released to the community in February 2013. All of these documents can be found on the CPT Web page (www.acs.org/cpt). In the present article, we will focus on the changes that have been adopted by the Committee, as well as a proposed inclusion of the requirement of coverage of the properties of macromolecules that has been introduced into consideration since the release of the white paper.

During our sessions in Indianapolis, CPT voted to approve the following changes:

- The maximum number of contact hours for faculty and instructional staff must not exceed 15 contact hours per week. To accommodate occasional fluctuations in instructional responsibilities, up to two individuals may have as many as 18 contact hours in one semester or quarter, provided that the average for each individual during the academic year does not exceed 15 contact hours per week.

  The Committee is still considering the implications of increasing the maximum contact hours for individuals whose primary teaching responsibility is in the laboratory. We have received good input that describes the advantages of the change to some programs as well as the possible problems associated with introducing such a change. The Committee is continuing the discussion on this aspect of the proposed changes to teaching contact hours.
- The Committee approved the introduction of the requirements that programs provide significant hands-on laboratory experience as part of introductory chemistry courses.
- The Committee approved the clarifying language to indicate that the in-depth course offerings must correspond to at least 12 semester or 18 quarter credit hours. The 2008 Guidelines only specified that programs must teach at least four in-depth courses annually, but was silent on the number of credit hours such courses would correspond to. Additional descriptions will be added to help programs better understand what types of courses CPT will consider as in-depth for evaluation purposes. Much of this description is in the white paper.
- The revised Guidelines will include a statement that certified majors should be provided with an integrative experience that requires them to synthesize the knowledge and skills provided across the curriculum. Clarification of the intended nature of this experience will be available shortly after the revised Guidelines have been released. We also plan to hold symposia with presentations on mechanisms for providing students with these experiences and opportunities for

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DGR web | ACS Directory of Graduate Research

2013 ACS Directory of Graduate Research - DGRweb *is released!*

Conduct free online searches at **www.acs.org/dgrweb**

CPT Open Meeting

We invite you to attend the CPT open meeting at the 247th ACS National Meeting in Dallas, Texas, from noon to 1:00pm on Sunday, March 16, 2014. The location is not yet available. Please check the CPT Web page (www.acs.org/cpt) later for details.

Increasing the Effectiveness of Student Transfer

A significant and growing fraction of chemistry majors begins their college education at two-year institutions – many of these students transfer among two-year and four-year programs before earning their BS degrees.[1] These students face unique challenges[2] that, though well documented,[2-4] are rarely addressed effectively or universally by the institutions among which they transfer.

Faculty members can act individually and in conjunction with others on their campus and at partnering institutions to improve the effectiveness of student transfer. As section 5.9 of the ACS Guidelines and Evaluation Procedures for Bachelor's Degree Programs highlights, programs should communicate and coordinate with each other.

Maximizing Your Impact in the World of Student Transfer: A Handbook for Chemistry Faculty (www.acs.org/TransferHandbook) is a source of additional guidance. The objectives of the Handbook are to help the chemistry community:

(1) gain an understanding of the student transfer landscape;

(2) acquire insights into the challenges and opportunities for increasing faculty participation in transfer-related activities and establishing partnerships that enhance student transfer; and

(3) share effective practices for facilitating successful transfer.

The Handbook is based on a workshop held by ChemEd Bridges, an NSF-funded project, and co-sponsored by CPT and other ACS committees. In addition to chemistry faculty participating in the workshop, contributors to the Handbook also included students, personnel from student support services, and administrators.

The importance of developing mutual trust, respect and a shared vision is highlighted in the Handbook. Strategies for effective communication, collaboration, and program integration are included through out the various sections (see sidebar). The Handbook has been disseminated or referenced at multiple venues, including the 2013 NSF-TUES PI conference, ACS Great Lakes and Western Regional Meetings, 2YC3 conferences, and CPT open meetings. Presentations are planned for the spring 2014 ACS national meeting.

Topics covered in *Maximizing Your Impact in the World of Student Transfer: A Handbook for Chemistry Faculty*

- The Need for Action: Identifying Opportunities and Developing Strategies
- The Student Transfer Landscape: Knowing the Pathways and Stakeholders
- The Faculty Roles: Framing Responsibilities and Focusing Efforts
- Opportunities for Action:
- Enhancing Academic Support for Transfer Students
  - — Developing a Sense of Belonging to a Community of Learners
  - — Mentoring Transfer Students
  - — Aligning Learning Outcomes among Transferring and Receiving Institutions
- The Community Response: Coordinating Efforts and Leveraging Resources

Addressing the challenges associated with student transfer will have a range of benefits, not only for chemistry students, but for our programs and profession. Thanks to insights and input from the workshop participants and co-sponsoring committees, the chemistry community has a resource to help us maximize our impact.

WORKSHOP CO-SPONSORS AND PLANNING COMMITTEE MEMBERS:

ChemEd Bridges: Harry Ungar, Cabrillo College

ChemEd Bridges: Tom Higgins, Harold Washington College

Committee on Minority Affairs: Lourdes Echegoyen, University of Texas-El Paso

Committee on Professional Training: Ron Darbeau, McNeese State University

Society Committee on Education: Malika Jeffries-El, Iowa State University

Two-Year College Chemistry Consortium: Mark Matthews, Durham Technical Community College

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audience discussion. The first of these is planned for the 23rd Biennial Conference on Chemical Education in Grand Rapids, Michigan, in August 2014.

- The proposed changes to require students to receive instruction in information retrieval and management were approved.
- The modification of the instrumentation requirement to include exposure to at least one instrument from each grouping (optical molecular spectroscopy, optical atomic spectroscopy, mass spectrometry, chromatography and separations, and electrochemistry/electrophoresis) was also approved.
- The regular schedule for submission of periodic reports will be extended to six years instead of the current five-year cycle.

One change CPT discussed, and did not adopt, was the change in the NMR requirement. Approved programs will still be required to have a functioning NMR spectrometer that undergraduates use in instruction and research. The field strength and capabilities of the NMR instrumentation should support the pedagogical and research needs of the program. Whether on-site or through stable arrangement with proximal sites, access to research quality instrumentation is strongly recommended.

The Committee also decided not to move forward on the proposed requirement that lecture courses leading to certification be taught by full-time, permanent faculty.

Many of the other proposed changes that are included in the white paper were also discussed during the CPT meeting, but the Committee recognized that further deliberation would be needed before making a decision of whether or not to approve the remaining proposed changes and additions. These include the proposal that minimum number of full-time, permanent faculty in approved programs be increased from four to five, and the proposed increase in the weekly contact hour limit from 15 to 18 hours for individuals whose primary teaching responsibility is laboratory instruction.

As part of the discussion of the Guidelines revisions, the Committee carefully considered the importance of instruction in the properties of macromolecules. Based on this discussion, we have developed an additional proposed change to the Guidelines:

Because the synthesis, analysis, and physical properties of small molecules give an incomplete picture of the higher order interactions in macromolecules, students must be exposed to the principles of macromolecules across the foundation areas (analytical, biochemistry, inorganic, organic, and physical chemistry).

This proposed change was discussed as part of the CPT open meeting in Indianapolis. Based on the feedback that we received at that meeting and from other communications we have received since the white paper was released in February 2013, the Committee decided to put forward this proposal for an additional change to the Guidelines. If this is adopted, a period of time will be provided for programs to develop this content. To help departments explore ways to include the coverage of macromolecules their courses, a supplement to the Guidelines was released earlier this year that which provides suggestions of where and how discussions of macromolecules could be included in the foundation course work. This supplement is available on the CPT Web page (www.acs.org/cpt).

The Committee welcomes your feedback on any of the proposed changes. We are particularly interested in your comments on the proposed change in the requirement for coverage of macromolecules across the curriculum. CPT will be meeting again in early January 2014, and input prior to December 15, 2013, will be most helpful. To ensure their inclusion in the discussion, please send your comments to cpt@acs.org. ■

Student Transfer *continued from page 2*

1. *Transfer & Mobility: A National View of Pre-Degree Student Movement in Postsecondary Institutions*, a Signature Report from the National Student Clearinghouse Research Center and the Project on Academic Success, Indiana University, February 2012.
2. J. L. Wesemann, Undergraduate Transitions: Enhancing Student Success, *J. Chem. Ed.*, Vol. 82, pp. 196–198, February 2005.
3. (a) Paving the Pathways for Tomorrow's Chemistry Students, Part 1, *CPT Newsletter*, Spring 2006, pp. 3-5. (b) Paving the Pathways for Tomorrow's Chemistry Students, Part 2, *CPT Newsletter*, Fall 2006, pp. 3-5. (c) Tapping Student Potential, *CPT Newsletter*, Spring 2009, pp. 1-3. (d) Fostering Excellence in the First Two Years, *CPT Newsletter*, Fall 2010, p. 3.
4. H. A. Ungar, J. L. Wesemann, *Maximizing Your Impact in the World of Student Transfer: A Handbook for Chemistry Faculty* (Preliminary Edition), M. K. Boyd, L. E. Echegoyen, Eds., ChemEd Bridges, 2012. Available at www.acs.org/TransferHandbook.

What Are Approved Programs Doing:

Summary of Findings of the 2011 and 2012 Annual Report Surveys

As part of the 2011 and 2012 annual reports that are filled out by approved chemistry programs, the Committee on Professional Training asked departments to provide information about their current activities in the area of laboratory fees (2012) and online courses and virtual laboratories (2011). These surveys replaced a long-standing survey on building construction and renovation. The results of the two surveys are provided below. In both cases, we noted a general uniformity in practices across institution type and size in terms of the range of responses that were provided.

Online Courses and Virtual Laboratories (2011). Of some 650 responding programs, approximately 100 (16%) reported that they taught some lecture courses entirely online, and in most cases, faculty teaching these courses received teaching credit equivalent to that for a regular course. Of these programs, approximately 40% were bachelors-only granting institutions, approximately 30% were masters-granting institutions, and most were public institutions. A similar number of programs reported that their institutions awarded transfer credit to students for online courses (lectures) taken elsewhere. Very few institutions (4.5%) use virtual labs in general chemistry in place of hands-on labs or offer transfer credit to students who have taken such laboratory courses elsewhere.

Laboratory Fees (2012). Of the 650 programs that responded to this survey, 382 required students to pay a laboratory fee either for their general or for organic chemistry laboratory courses. Of the 270 programs that did not charge a lab fee, very few (27) were restricted from doing so by their institution. Most programs that charged a laboratory fee asked students in general and organic chemistry to pay the same amount of money. The lab fees were reported to range from $4 to $400, with an average fee for general chemistry of $45 and a laboratory fee of $50 representing the average for organic chemistry classes. When there was a difference between the fees charged for the two levels of laboratory classes, organic chemistry students were charged anywhere from several dollars to more than $125 more than the general chemistry students, although the typical difference between the two fees being was found to be between $20 and $25. The majority of the programs reported that 100% of the funds raised by the lab fees were returned to them, with 70% of the programs indicating that the funds that are returned are earmarked for lab equipment or supplies. ■

Announcements

2013 ACS Directory of Graduate Research

The ACS Committee on Professional Training is pleased to announce the release of the 2013 edition of the ACS Directory of Graduate Research (DGRweb).

DGRweb is a free searchable, online database that provides the most comprehensive compilation of information on graduate study in the chemical sciences at universities in North America. DGRweb has a new look and expanded searching capabilities, including downloadable statistical data on graduate programs.

- Facilitates research collaborations in the chemical sciences
- Enables networking across chemical subdisciplines
- Helps students with selecting a graduate program
- Identifies Research Experiences for Undergraduates (REUs)

Conduct free online searches at www.acs.org/dgrweb!

An Invitation: Seeking Presentations for BCCE in 2014

CPT is organizing a symposium on "Enriching Professional Preparation of Students: Vertical Skill Integration and Capstone Experiences" for the next Biennial Conference on Chemical Education. CPT hopes this symposium will stimulate discussion of how the professional development of students can be promoted through these experiences. If your department has developed this type of opportunity for students, CPT invites you to submit an abstract for consideration. Questions may be directed to cpt@acs.org.

Congratulations!

The Committee congratulates the following schools on their newly ACS-approved bachelor's degree program in chemistry:

Keene State College
Northeastern State University
University of Southern Maine

The current number of ACS-approved programs is 673.

Preliminary Report on 2013 Information Survey Responses

CPT last conducted a survey on library resources in the fall of 2000. As the Committee works to revise the current guidelines, it seemed like an opportune moment to conduct a new survey. In 2000, there were many concerns about the ability of library budgets to keep pace with increasing journal costs and the ability of smaller departments, in particular, to provide adequate access to a sufficiently broad array of current literature to meet the needs of their students and faculty. However, since that time, the means by which chemical literature is accessed and navigated have changed dramatically. The survey conducted in 2013 was expanded to include not only questions of access to the traditional chemical literature but to chemical information resources more generally (including scientific databases, for instance). Most schools now have digital access to a wide array of chemical journals through various consortial arrangements or package deals with individual publishers, the focus of the 2013 survey was shifted away from localized current library holdings and budgets. Current areas of greater concern included access to current and archival chemical literature, access to other chemical information resources (e.g., databases, search engines), and in keeping with the shift in focus of the ACS guidelines, the training that students receive in the skills they need to navigate and work with these resources. These skills include the ability to conduct different types of searches (structure, citation, keyword, CAS number, patent), to organize the information retrieved (bibliographic programs), and to understand and report on the information retrieved (written and oral communication of results, proper citation).

Preliminary Results. The survey was sent to 944 schools (both approved and non-approved), with a 35% response rate. The schools responding were relatively evenly distributed among types of schools (public vs. private, BA/BS institutions vs. MS vs. PhD).

Based on the responses the Committee received, it is clear that the proliferation of digital packages and consortial arrangements mean that access to the current literature is less problematic for schools (particularly smaller ones) than it once was. That said, some schools (particularly smaller ones) do report some concerns over archival access as some digital packages are for current-year access only. There are still concerns over how the continuing rising costs of journal subscriptions and continuing cuts in library and IT budgets at individual schools will impact their access going forward. Roughly half of the responses indicated that the ACS requirement for a minimum number of journals (and the former requirement for access to Chemical Abstracts) helped them maintain access to needed journals as well as the ability to conduct meaningful searches of that literature. With the advent of digital content, interlibrary loan (ILL) has grown far less cumbersome than it once was. Most schools reported that ILL access is generally adequate for their teaching and research needs, both from the perspective of cost – few schools reported practical limitations on their ILL usage – and timeliness of response.

Most institutions consider training students in the use of chemical information and resources important for all their majors, not just their research students. Of the most common subscription-based tools and databases, most institutions have access to *Web of Science, STN,* and *SciFinder* than to other commonly used subscription-based tools such as *Reaxsys, Scopus, Inspec,* and *Compendex*. Though local access to these tools is often limited by numbers of seats or licenses, very few institutions (~2%) reported that the limitations were problematic for either faculty or students. Institutions reported widespread use of these tools, as well as various free resources, by students in course work as well as in research. The most commonly used tools in courses and research were *Google Scholar* (88%/93%), *SciFinder* (88%/91%), *PubMed* (85%/86%), *Web of Science* (57%/61%), *Pubchem* 55%/61%%), and *US Patent On-line* (40%/56%).

Fifty-eight percent of the respondents reported that they explicitly train students in the use of these resources in a stand-alone course or as a significant portion of a designated course. In the majority of these institutions (83%), this course is taught by faculty members, and at most (85%), all chemistry majors are required to take this course. There is, however, a good deal of variation in the moment in their undergraduate years that students receive this training.

Forty-one percent of the institutions do not offer explicit training in the use of chemical information resources. Of these, 71% report that such training is distributed throughout the curriculum and that most students do receive some kind of training. Chemistry programs report a much greater variation in when students are exposed to this information, as well as the quality and thoroughness of the training, with the focus being driven more by research-related interests than curricular needs in the classroom.

Future Work. CPT will provide a more complete report on the results of this survey soon, and will consider whether changes in the guidelines might be warranted that would encourage departments to explicitly consider how well they are training their undergraduates in the skills needed to navigate chemical information resources. ■

ACS Committee on Professional Training 2013

American Chemical Society
Committee on Professional Training
1155 – 16th Street, N.W.
Washington, DC 20036

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