American Chemical Society

Integration of chemistry-based technology programs in ACS guidelines and lessons learned

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SOCED Task Force on *ACS Guidelines for Chemistry in Two-Year College Programs* (2015)

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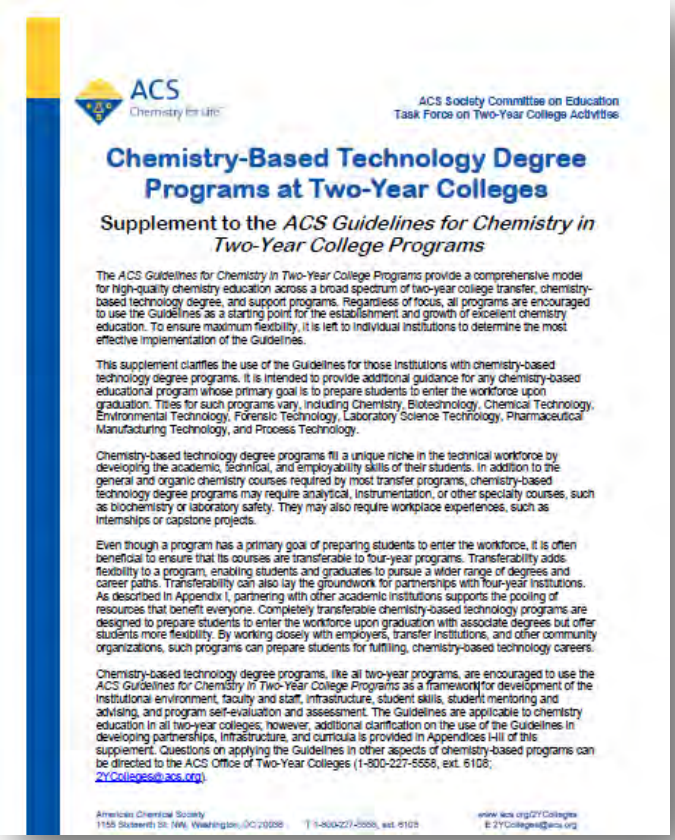
Overview

- Background
- Major changes
- Resources

2009 Guidelines

- Supplement
  - 2009 separate document with appendices
- Need
  - Incorporate into main document
- Approach
  - Infuse language specific to chemistry- based technology degree programs throughout



ACS Chemistry for Life

ACS Society Committee on Education
Task Force on Two-Year College Activities

Chemistry-Based Technology Degree Programs at Two-Year Colleges

Supplement to the *ACS Guidelines for Chemistry in Two-Year College Programs*

The *ACS Guidelines for Chemistry in Two-Year College Programs* provide a comprehensive model for high-quality chemistry education across a broad spectrum of two-year college transfer, chemistry-based technology degree, and support programs. Regardless of focus, all programs are encouraged to use the Guidelines as a starting point for the establishment and growth of excellent chemistry education. To ensure maximum flexibility, it is left to individual institutions to determine the most effective implementation of the Guidelines.

This supplement clarifies the use of the Guidelines for those institutions with chemistry-based technology degree programs. It is intended to provide additional guidance for any chemistry-based educational program whose primary goal is to prepare students to enter the workforce upon graduation. Titles for such programs vary, including Chemistry, Biotechnology, Chemical Technology, Environmental Technology, Forensic Technology, Laboratory Science Technology, Pharmaceutical Manufacturing Technology, and Process Technology.

Chemistry-based technology degree programs fill a unique niche in the technical workforce by developing the academic, technical, and employability skills of their students. In addition to the general and organic chemistry courses required by most transfer programs, chemistry-based technology degree programs may require analytical, instrumentation, or other specialty courses, such as biochemistry or laboratory safety. They may also require workplace experiences, such as internships or capstone projects.

Even though a program has a primary goal of preparing students to enter the workforce, it is often beneficial to ensure that its courses are transferable to four-year programs. Transferability adds flexibility to a program, enabling students and graduates to pursue a wider range of degrees and career paths. Transferability can also lay the groundwork for partnerships with four-year institutions. As described in Appendix I, partnering with other academic institutions supports the pooling of resources that benefit everyone. Completely transferable chemistry-based technology programs are designed to prepare students to enter the workforce upon graduation with associate degrees but offer students more flexibility. By working closely with employers, transfer institutions, and other community organizations, such programs can prepare students for fulfilling, chemistry-based technology careers.

Chemistry-based technology degree programs, like all two-year programs, are encouraged to use the *ACS Guidelines for Chemistry in Two-Year College Programs* as a framework for development of the institutional environment, faculty and staff, infrastructure, student skills, student mentoring and advising, and program self-evaluation and assessment. The Guidelines are applicable to chemistry education in all two-year colleges; however, additional clarification on the use of the Guidelines in developing partnerships, infrastructure, and curricula is provided in Appendices I-III of this supplement. Questions on applying the Guidelines in other aspects of chemistry-based programs can be directed to the ACS Office of Two-Year Colleges (1-800-227-5558, ext. 6108; 2YColleges@acs.org).

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Key Changes

- Program Definitions
- Faculty & Staff
- Infrastructure
- Curriculum
- Student Research and Scholarly Activities
- Partnerships

Programs Defined

- **Chemistry transfer programs**
  - *Primary purpose:* transfer to baccalaureate chemistry programs
  - Degree: AS or equivalent degree, no degree
- **Chemistry-based technology programs:**
  - *Primary purpose:* immediate employment
  - Degree: AAS or equivalent degree
- **Chemistry-based courses that support programs in other disciplines:**
  - *Primary purpose:* support allied programs and/or general education
  - Degree: no chemistry degree

Faculty & Staff

- Professional Development (3.4)
  - Opportunities for faculty will strengthen faculty's skill in preparing students for the workplace.
  - Examples:
    - Externships
    - Job-shadowing
    - Training

Infrastructure

- Organization of Facilities (4.1)
  - Support student education
  - Align with needs of employers
- Equipment and Instrumentation (4.2)
  - Programs typically require more equipment
  - Specialty equipment may be needed
- Transferring Students (4.7)
  - Prepare students for transfer ***and*** employment

Curriculum

- Employing partners should have input into curriculum development
- Chemistry-based technology courses (5.13)
  - Address skills and knowledge specific to program partners
- Laboratory experience (5.14)
  - Provide significant, relevant hands-on experience
- Frequency of course offerings (5.15)
  - Allow qualified students to complete program in two years.

Undergraduate Research, Internships, and Other Experiential Activities

- Internships and/or co-operative learning experiences (6.2)
  - Critical for chemistry-based technology programs
  - Valued by employers
  - Best provided by the program partners as future employers

Partnerships

- Valuable to all programs for
  - Curriculum development
  - Faculty and institutional support
  - Recruitment and placement of students
- Advisory Boards (10.1)
  - Active members with vested interest in the program
- Employers (10.5)
  - Provide support and experiences that support students' career development

Resources

- Programs & education
  - Funding
  - Partnerships
  - Preparing students for the workplace
  - Chemistry-based technology program resources
- Curriculum Development
  - Instructional materials for chemistry education
  - Chemical safety
  - Professional, student, or soft skills
  - Research and internships
- Faculty Development
  - Externships
- Other?

Go to www.acs.org/2YColleges

Symposium schedule

8:30 a.m.	Introductory remarks
8:35 a.m.	Integration of chemistry-based technology programs in ACS guidelines and lessons learned
8:55 a.m.	**Importance of partnerships in two-year college chemistry programs**
9:15 a.m.	Safety in the 2015 two-year guidelines
9:35 a.m.	Panel discussion I
9:55 a.m.	***Intermission***
10:10 a.m.	Updated student skills in the 2015 *ACS Guidelines for Chemistry in Two-Year College Programs*
10:30 a.m.	Student mentoring and the *ACS Guidelines for Chemistry in Two-Year College Programs*
10:50 a.m.	Fostering alignment between the ACS Guidelines for degree programs at 2-year and 4-year institutions
11:10 a.m.	Panel discussion II
11:30 a.m.	Concluding remarks