

## SOUTHERN CONNECTICUT STATE UNIVERSITY

**Course Number and Title**    **CHE 301 Preparation of Scientific Documents**  
**Fall 20xx**

<b>Name:</b>	<b>Dr. Lesley</b>
<b>Office:</b>	<b>JE 308</b>
<b>Phone:</b>	<b>392-6262</b>
<b>E-mail:</b>	<b>lesleym1@southernct.edu</b>

<b>Office Hours:</b>
<b>TBA</b>

**COURSE NUMBER**    301            **CREDIT HOURS:**    1            **PREREQUISITES:**    CHE120/121

**COURSE TITLE:**    **Preparation of Scientific Documents for Chemistry**

### **COURSE DESCRIPTION:**

The course will focus on the organization of scientific reports including styles commensurate with the American Chemical Society, Royal Society of Chemistry and additional journal publications, as well as the use of software programs designed specifically for the field of chemistry in the preparation of scientific documents. This includes but is not limited to, ChemDraw, Microsoft Word, Excel and the manipulation of materials between these software programs. This is part of an ongoing revision in the Chemistry department that has begun with the revised outline for the preparation of scientific documents in the General Chemistry sequence. The content of CHE 301 will expand on this knowledge by incorporating an advanced level of teaching commensurate with training for majors as opposed to the general science based student body for which field specific styles may vary. The course content will address basic writing skills and application of these skills to actual writing styles of scientific journal articles through a variety of assignments aimed at progressively enhancing skills. An emphasis will also be placed on the generation of appropriate documents utilizing many of the special features of the software described above.

### **COURSE'S CONTRIBUTION:**

This is the third course in a sequence of 1 credit courses that have been developed to address issues concerning the written and oral abilities of graduating students as well as the safety issues surrounding the field of chemistry and proper use of chemicals that present hazards.

### **LEARNER OUTCOMES & ASSESSMENT**

Students enrolled in this course are expected to learn how to utilize the software programs necessary to prepare scientific reports for courses, publication, etc. in a professional manner. This includes training with the various software programs and demonstrating their proficiency on assignments. Specific objectives are listed below:

- Learn what it means to plagiarize work and how to avoid this. (INTASC 6, 9; NSTA 2, 10; CCCT 1.3, 2.3)
- Learn proper referencing styles commensurate with the American Chemical Society (ACS) guidelines and additional journal guidelines associated with the Royal Society of Chemistry (RSC) and the Chemical Institute of Chemistry (CIC). (INTASC 1, 4, 6; NSTA 3, 10)
- Learn how to use the library resources available for searching the chemical literature. (INTASC 4, 6; NSTA 1, 3, 4, 5, 6, 10; CCCT 1.2, 1.4, 2.5)
- Learn how to report scientific data by accepted professional standards for spectroscopic interpretation of data including NMR (Nuclear Magnetic Resonance) and IR (Infrared) spectroscopy. (INTASC 1, 4, 6; NSTA 1, 4, 10; CCCT 1.2, 1.3, 1.4, 2.6)
- Learn how to use style sheets, set up toolbars, and other formatting techniques (Track Changes) using MS Word. This includes but is not limited to writing proper chemical formulas in reports, formatting and importing

tables of data, spell checking, grammar checking, and utilizing special characters pertinent to the study of chemistry. (INTASC 1, 4, 6; NSTA 5, 10; CCCT 1.3, 1.4)

- Learn the use of Excel software for the presentation of data in graphical formats suitable for interpretation of data. (INTASC 1, 4, 6; NSTA 5, 10; CCCT 1.3, 1.4)
- Learn how to import the data from Excel into other software programs (INTASC 1, 4, 6; NSTA 5, 10; CCCT 1.3, 1.4)
- Learn how to use drawing software specific to the discipline (ChemDraw) in the preparation of professional reports. This includes but is not limited to setting drawing and caption preferences, utilizing toolbars and rulers to prepare drawings suitable for importing into other programs such as MS Word, utilizing templates, formatting drawings for consistency and appearance. (INTASC 1, 4, 6; NSTA 5, 10; CCCT 1.2, 1.3, 1.4, 1.5, 2.6)
- Learn how to write scientific documents in a professional fashion in terms of content and overall presentation quality. (INTASC 1,4, 6; NSTA 5, 10; CCCT 1.3, 1.4)

#### **MODES OF LEARNING**

Lectures, demonstrations, hands-on computing with programs, online use of resources.

#### **COURSE CONTENT OUTLINE**

Week 1: Discussion on plagiarism. Review of basic report writing formats. Discussion of different journal styles including accepted citation styles for journals, books, and proceedings of conferences using the ACS style guide. Comparison between journal and laboratory report styles.

Week 2: A session will be scheduled for a demonstration of the online resources at Buley Library. Guest lecturer: Chemistry Librarian – Rebecca Hedreen

Week 3: Using Microsoft Word software. Demonstrations of the various tools in the program including defining style sheets, formatting documents, formatting characters, setting up toolbars, inserting and formatting tables of data, using spelling and grammar tools. Discussion of the previous weekly assignment.

Week 4: Using Microsoft Word software continued. Demonstrations including the use of special characters, using the equation editor program, reporting spectroscopic data in laboratory reports. Discussion of the previous weekly assignment.

Week 5: Using Excel software. Demonstrations of spreadsheet formatting, entering formulas, setting styles, and using graphing tools. Discussion of the previous weekly assignment.

Week 6: Using ChemDraw software. Demonstrations of how to set drawing and text preferences, drawing chemical structures using the various tools and templates, formatting files, drawing advanced chemical structures. Discussion of the previous weekly assignment.

Week 7: Using ChemDraw software continued. Advanced drawing techniques. Preparation of reaction schemes such as organic reaction mechanisms, catalytic cycles, and chemical reactivity summaries. Importing ChemDraw files into MS Word. Using the NMR calculators and 3D functions.

Week 8: Final examination due.

#### **REQUIRED TEXTS**

Dodd, J. C. *The American Chemical Society Style Guide*; ACS Press: Boca Raton, 1997. (ISBN: 0841234620)

#### **COURSE REQUIREMENTS**

**Late/Missed Work:** Late assignments/exams will not be accepted for grading unless accompanied by a doctor's note.

**Attendance:** Regular and prompt attendance of scheduled classes is necessary for the student to derive the intended benefit of the hands-on learning experience. **Attendance is mandatory!** Students should arrive 10 minutes early to sign out a computer and login. There will be several demonstrations throughout the lectures that are important for the optimization of student academic progress. Since this course runs for half of the semester, each absence will result in a lowering of the final grade by 10%.

**EVALUATION CRITERIA**

Student evaluations will be determined on the basis of weekly assignments (70%) and a final examination (30%, take-home). Attendance is mandatory and absences will result in the lowering of the final grade as noted below. The weekly assignments will involve a series of exercises using the computer programs discussed in class in conjunction with laboratory reports, spectroscopic data, sample data, and journal articles obtained through on-line services. The final examination will involve writing a scientific report incorporating the use of the scientific software, referencing styles, and content commensurate with journal quality publications.

The following final grade scale will be used:

- A+ = 96 - 100%
- A = 91 - 95%
- A- = 86 - 90%
- B+ = 82 - 85%
- B = 78 - 81%
- B- = 74 - 77%
- C+ = 70 - 73%
- C = 66 - 69%
- C- = 62 - 65%
- D+ = 58 - 61%
- D = 54 - 57%
- D- = 50 - 53%
- F = ≤ 49

The instructor reserves the right to adjust the grading scales for class average at the end of the semester.

**STANDARDS GUIDELINES**

INTASC [Interstate New Teachers' Assessment & Support Consortium]	Professional Standards	CCCT [CONNECTICUT COMMON CORE OF TEACHING]
<p><b>Scholarship</b></p> <ol style="list-style-type: none"> <li>1. Knowledge of subject matter</li> <li>2. Knowledge of human development &amp; learning</li> <li>3. Instruction adapted to meet diverse learners</li> <li>4. Use of multiple instructional strategies &amp; resources</li> </ol> <p><b>Attitudes and Disposition</b></p> <ol style="list-style-type: none"> <li>5. Effective learning environment created</li> <li>6. Effective communication</li> </ol>	<p><b>National Science Teacher's Association</b></p> <ol style="list-style-type: none"> <li>1. Content - Structure and interpret the concepts, ideas and relationships in science</li> <li>2. Nature of Science - Define the values, beliefs and assumptions inherent to the creation of scientific knowledge within the scientific community</li> <li>3. Inquiry - Formulating solvable problems, constructing knowledge from data, exchanging information for seeking solutions, developing relationships from empirical data</li> </ol>	<p><b>DEMONSTRATIONS OF KNOWLEDGE</b></p> <ol style="list-style-type: none"> <li>1.1 understanding of student learning &amp; development</li> <li>1.2 understanding of need for different learning approaches</li> <li>1.3 proficiency in reading, writing and mathematics</li> <li>1.4 understanding of central concepts &amp; skills, tools of inquiry and structures of discipline(s)</li> <li>1.5 knowledge of how to design and deliver instruction</li> <li>1.6 recognition of need to vary instructional methods</li> </ol> <p><b>APPLICATION OF KNOWLEDGE THROUGH</b></p>

<p>7. Lesson planning</p> <p><b>Integrity</b></p> <p>9. Reflection and professional development</p> <p><b>Leadership</b></p> <p>8. Assessment of student learning to improve teaching</p> <p><b>Service</b></p> <p>10. Partnership with school and community</p>	<p>4. Context of Science - Relate science to daily life: technological, personal, social and cultural values.</p> <p>5. Skills of Teaching - Science teaching actions, strategies and methodologies, interaction with students, effective organization and use of technology.</p> <p>6. Curriculum - Extended framework of goals, plans, materials and resources for instruction.</p> <p>7. Social Context - Social and community support network, relationship of science to needs and values of the community, involvement of people in the teaching of science.</p> <p>8. Assessment - Alignment of goals, instruction and outcomes, evaluation of student learning.</p> <p>9. Environment for Learning - Physical spaces for learning, psychological and social environment, safety in science instruction.</p> <p>10. Professional Practice - Knowledge and participation in the professional community, ethical behavior, high quality of science instruction, working with new colleagues as they enter the profession.</p>	<p>2.1 instructional planning based upon knowledge of subject, students, curriculum &amp; community</p> <p>2.2 selection and/or creation of learning tasks that make subject meaningful for students</p> <p>2.3 establishment and maintenance of appropriate behavior standards and creation of positive learning environment</p> <p>2.4 creation of instructional opportunities supporting students' academic, social and personal development</p> <p>2.5 use of verbal, nonverbal and media communication fostering individual and collaborative inquiry</p> <p>2.6 employment of various instructional strategies in support of critical thinking, problem solving and skills demonstration</p> <p>2.7 use of various assessment techniques to evaluate student learning &amp; modify instruction</p> <p><b>DEMONSTRATION OF PROFESSIONAL RESPONSIBILITY THROUGH:</b></p> <p>3.1 professional conduct in accordance with the Code of Professional Responsibilities for Teachers</p> <p>3.2 shared responsibility for student achievement and well-being</p> <p>3.3 continuous self-evaluation regarding choices &amp; actions on students and school community</p> <p>3.4 commitment to professional growth</p> <p>3.5 leadership in the school community</p> <p>3.6 demonstrations of a commitment to students and a passion for improving the profession</p>
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**TENTATIVE COURSE CALENDAR**  
See "Course Content Outline" above.

**DISABILITY ACCOMMODATION STATEMENT**  
If any student has a particular disability-related need in order to participate in this course they should contact the Disability Resources Office (DRO) as soon as possible to obtain the appropriate documentation. Every effort will be made to accommodate students in this course.