Scientific Research Communication
Standard Course Outline

I. General Information

A. *Course Number:* RSCH 361
B. *Course Title:* Scientific Research Communications
C. *Units:* 3
D. *Course Prerequisites:* Completion of the GE foundation, completion of one explorations course, score of 11 or higher on the GWAR Placement Examination or successfully completed the necessary portfolio course that is a prerequisite for a GWAR Writing Intensive Capstone.
E. *Course Classification*: C-4 Discussion
F. *Faculty*: TBD
G. *Developed by:* Dr. Douglas McAbee (NSCI)
H. *Date of Revision:* Spring/Fall 2015

II. Catalog Description

Scientific Research Communications (3)
Prerequisites. Completion of the GE foundation, completion of one explorations course, score of 11 or higher on the GWAR Placement Examination or successfully completed the necessary portfolio course that is a prerequisite for a GWAR Writing Intensive Capstone. Introduction to technical writing for students pursuing research careers. Accessing and using research literature. Writing technical and research reports for various purposes and audiences. Oral presentation of research and scientific information. Includes intensive writing.

III. Curriculum Justification

RSCH 361 is a new course being developed for the university's Research Infused Curriculum designed to prepare graduates to pursue graduate level research and research careers. We request it fulfill the GE Writing Intensive Capstone requirement.

Effective and clear communication is an indispensable skill that operates at all stages of the research and scientific process. The focus of this course is to provide students instruction and practice in technical writing and oral communication skills appropriate for scientists and engineers. Through various assignments, students will write more than 5000 words as required for the GE Writing Intensive Capstone designation. As outlined below, assignments will focus on types of writing and oral presentation common for essentially all practicing scientists. Throughout, students will learn the central importance of text readability.

This course is part of the proposed CSULB Research Infused Curriculum described below;

The CSULB Research Infused Curriculum:

Among the selling points in pursuing a college education is the idea that graduates will have the skills to discover new solutions to the community's challenges and lay the groundwork for the

industries of the future. Much of this promise is directly supported when students are prepared to become research professionals in their respective fields.

CSULB will support the preparation of its graduates to pursue further research training in graduate programs and entry into research careers through its proposed "Research Infused Curriculum." In this integrated and research career focused curriculum, each course's content supports the other courses and provides the skills necessary to identify long-term research projects, design and implement research plans, prepare fundable research proposals, and communicate the findings of research to experts and the general population.

While individual programs may have courses that fit pieces of the curriculum, many programs don't have a large enough pool of research career focused students to offer discipline specific courses of this type. Through the "Research Infused Curriculum" such training will be made available to the larger population of CSULB students. To address degree unit caps, the proposed courses have been designed to meet general education certification.

The existence of these courses will not preclude programs from running or developing their own more discipline specific courses, and will give course options for those programs wishing to serve their majors desiring to pursue research careers. The curriculum will also help underscore the position of scholarly activity within the training CSULB students receive.

The four courses making up the "Research Infused Curriculum" includes:

Introduction to Research Methods – This sophomore level course begins the training of students to become productive researchers. Although the courses share common elements, two courses have been created to address differences in the Biomedical (ENGR296 & NSCI 296) and Behavioral (CLA 296 & HHS 296) discipline needs in an introductory research methods course.

Interdisciplinary Approaches to Health Disparities – This interdisciplinary course (HHS 207) is designed to provide a showcase for the ways differing disciplines address health challenges faced by subsets of the community and/or the community at large.

Scientific Research Communication – This cross-listed (CLA 361, ENGR 361, HHS 361, NSCI 361) junior level course focuses on the dissemination of research findings and the development of fundable research proposals.

Advanced Research Methods – This senior level course emphasizing the development of a program of research, including proposal development and funding. Although the courses share common elements, two courses have been created to address differences in the Biomedical (ENGR 496 & NSCI 496) and Behavioral (CLA 496 & HHS 496) discipline needs in an advance research methods course.

IV. Measurable Student Learning Outcomes, Evaluation Instruments, and Instructional Strategies for Skill Development

Research professionals must know how to access published information and communicate effectively in both written and oral form. As a rule, professional success and advancement is a direct reflection of a person's ability to communicate well.

Scientific Research Communications (NSCI 361) is a course designed to develop written and oral communication skills applicable to a wide variety of research fields in science and engineering. The course emphasizes development of writing and data presentation skills, but students will also be instructed on how to access scientific literature, how to craft an oral presentation, how to write a basic research proposal, and the basics on development of the scientific poster. Students are expected to have completed the required General Education Foundation courses and have a good grasp of the fundamentals of English composition—rhetorical organization, sentence structure, essential grammar and syntax—as course prerequisites. The course is designed to build on and develop the writing and oral presentation skills students have acquired, but weaknesses in any of these areas will require students to put in extra effort in order to be successful in this course.

GE Student Learning Outcomes emphasized in NSCI 361 focus on the following:

- Written communication
- Oral communication
- Critical thinking
- Information literacy

A. Student Performance Benchmarks

Upon completion of the course, students will have acquired the following experience and skills:

1. Appreciate the central importance of clear effective communication in all aspects and stages of research process. (Assignments 1, 4-8)
2. Know how to acquire and access scientific information (accessing literature/information data bases). (Assignments 2, 5, 8)
3. Understand the structure of the research article. (Assignments 3, 4, 5, 7)
4. Know how to organize and present data in formats (graphs, charts, tables, etc) appropriate to various purposes. (Assignments 4, 5, 7)
5. Understand basic rules of English grammar and syntax so that writing maximizes clarity and understanding. (Assignments 1, 3-8)
6. Understand rhetorical styles that emphasize reader-based texts. (Assignments 1, 3-6)
7. Write for a variety of audiences (e.g., research article, textbook, popular science blog) (Assignments 1, 3-5, 7).
8. Know how to craft an oral presentation of technical information. (Assignments 7, 8)
9. Know how to write persuasively: crafting a simple grant proposal. (Assignments 5-7)

B. Evaluation Instruments

Students will be evaluated through 7 assignments (85%) and a variety of in-class exercises and quizzes ("Assignment 8", 15%). Earliest feedback to students will be week 3 upon completion of assignment #1. The weight of these various elements as a function of the total course grade, approximate word count and week of the semester, and assignment linkage to Student Performance Benchmarks are as follows:

Assignment Description	Linked to SLO	~ Words	% Course Grade	Semester Week
1. Resume/Cover letter	1, 5, 6, 7	500	10	2
2. Literature search/information access	2	300	10	4-5
3. Critical reading of literature	3, 6, 7	600	5	4-5
4. Technical report	1, 3, 4, 5, 6, 7	2000	20	7-8
5. Written proposal	1, 2, 3, 4, 5, 6, 7, 9	2500	20	9-10
6. Proposal review	1, 4, 5, 6, 9	500	10	11-12
7. Oral presentation of proposal	1, 3, 8, 9	n.a.	10	14-15
8. In-class exercises, participation, quizzes	1, 2, 6, 8	n.a.	15	—

C. Instructional Strategies

Generally, class time will include three activities: lectures that provide background and details about effective technical communication as well as a review of expectations and outlines for course assignments (60-70%), and in-class exercises that provide students with examples and practice of good writing skills (30-40%). About 6 class sessions will be devoted to student oral presentations.

Each student will complete assignments 1-4 whereas assignments 5-7 will be done by students working in pairs. The group projects (proposal writing, review, and oral presentation) mimic the collaborative nature of these common research activities as practiced by scientists. In addition, student collaboration has significant pedagogical value because each student will have to write, review, and edit their own draft as well as review and edit their partner's draft to generate a composite document for submission. A portion of the assignment grade will be meeting specific deadlines for proposal idea, general proposal outline, and final proposal draft. Project groups will then critically review written proposals submitted by other groups in the class. Finally, each group will give a 15-20 min in-class presentation of their fellowship proposal.

In-class writing exercises are evaluated by the instructor alone, by another student (peer review), or by open discussion together as a class. Students must provide a topic and an outline for instructor approval in advance for assignments 2, 4, and 5. In addition, students may revise and resubmit assignments 1, 4, and 5. The original and revised drafts will comprise one-third and two-thirds, respectively, of the final score for that specific

assignment. Approximately 80% of instructor office hours will be devoted to one-on-one editing assistance with students.

V. Outline of Subject Matter

An outline of the topics covered in NSCI 361 is provided below. The emphasis and sequence of topics may vary by instructor. (*SLOs linked to specific topics are highlighted.)*

The purpose of scientific writing (*1*)
Routine communications (*1, 5*)
The elements of scientific writing (*1, 3, 4, 6*)
Writing reader-based texts (writing for understanding) (*5, 6*)
Assessing information (library visit and hands-on practice in accessing literature and data from various science data bases) (*2, 7*)
Appropriate graphic presentation of information (*4, 7, 8, 9*)
The process of writing and editing (*3, 5, 6*)
Best practices: news writing (*1, 5, 6, 7*)
Crafting sentences and use of punctuation (*5, 6*)
Reading and analysis of scientific papers (*2, 3*)
Persuasive writing: research proposal writing and peer-review (*9*)
Putting together an oral presentation (*8*)
Putting together a scientific poster (*1, 4, 6, 7*)

VI. Method of Instruction

NSCI 361 will be offered as a face-to-face course only (no hybrid or online course). Generally, class time will be divided into lecture (60-70%) and in-class exercises (30-40%). Lectures provide background and content on the subject at hand, and in-class exercises provide the students with practice at developing their writing and editing skills. Class time focused on research proposal writing and review will include in-class activities that will have students working in groups on these topics. Several class sessions will be devoted exclusively to student oral presentations. Students will be provided with lecture outlines prior to class.

VII. Extent and Nature of Technology Use

Students are required to use Beach Board. In addition, students are required to use on-line data bases for the scientific literature, on-line sources of technical information available through the reference section of the main campus library, and on-line molecular structure data bases. Students will likely use computer software (e.g., PowerPoint, Keynote) for their oral presentations.

VIII. Information about Textbooks/Readings

*Alred GJ, et al (2011) *Handbook of Technical Writing*. 10th ed. Bedford/St. Martin's (Boston)

Anderson PV (2010) *Technical Communication: A Reader-Centered Approach*. 7th ed. Wadsworth (Boston).

Boiarsky C (2014) Will We Ever Learn: Case Studies of Rhetorical Errors and Effective Rhetorical Strategies in Written Communication—From the Challenger Accident to the BP/Horizon Oil Rig Disaster to the 2011 Mississippi Flood.

*Day RA, Sakaduski N, "*Scientific English. A Guide for Scientists and Other Professionals*", 3rd ed., Greenwood (Santa Barbara)

*Likely required textbooks for the class. Students will also be encouraged to have access to a standard college-level handbook on English grammar, dictionary, and thesaurus.

IX. Instructional Policies Requirements

All sections of the course will have a syllabus that includes information required by the syllabus policy adopted by the Academic Senate (PS11-07). Instructors will include information on the interpretation of the withdrawal policy, how students may make up work for excused absences, and how participation will be assessed. Instructors will also include the following statements as part of the syllabus in accordance with the policies of the College of Health and Human Services.

A. Commitment to Inclusion

California State University, Long Beach is committed to maintaining an inclusive learning community that values diversity and fosters mutual respect. All students have the right to participate fully in university programs and activities free from discrimination, harassment, sexual violence, and retaliation. Students who believe they have been subjected to discrimination, harassment, sexual violence, or retaliation on the basis of a protected status such as age, disability, gender, gender identity/expression, sexual orientation, race, color, ethnicity, religion, national origin, veteran/veteran status or any other status protected by law, should contact the Office of Equity and Diversity at (562) 985-8256, University Student Union (USU) Suite 301, http://www.csulb.edu/depts/oed.

B. Statement of Accessibility - Accommodation

Students needing special consideration for class format and schedule due to religious observance or military obligations must provide the instructor with written notice of those needs by the second week of class.

Students who require additional time or other accommodation for assignments must secure verifications/assistance from the CSULB Disabled Student Services (DSS) office located at Brotman Hall 270. The telephone number is (562)985-5401.

Accommodation is a process in which the student, DSS, and instructor each play an important role. Students contact DSS so that their eligibility and need for accommodation can be determined. DSS identifies how much time is required for each exam. The student is responsible for discussing his/her need with the instructor and for making appropriate arrangements. Students who are eligible to receive accommodation

should present an Accommodation Cover Letter and a DSS Student/Teacher Testing Agreement Form to the instructor as early in the semester as possible, but no later than a week before the first test. (It takes one week to schedule taking an exam at the DSS office.) The instructor welcomes the opportunity to implement the accommodations determined by DSS. Please ask the instructor if you have any questions.

C. Cheating and Plagiarism

1. "Plagiarism is defined as the act of using the ideas or work of another person or persons as if they were ones own, without giving credit to the source. Such an act is not plagiarism if it is ascertained that the ideas were arrived at through independent reasoning or logic or where the thought or idea is common knowledge. Acknowledge of an original author or source must be made through appropriate references, i.e., quotation marks, footnotes, or commentary. Examples of plagiarism include, but are not limited to, the following: the submission of a work, either in part or in whole, completed by another; failure to give credit for ideas, statements, facts or conclusions which rightfully belong to another; in written work, failure to use quotation marks when quoting directly from another, whether it be a paragraph, a sentence, or even a part thereof; or close and lengthy paraphrasing of another's writing or programming. A student who is in doubt about the extent of acceptable paraphrasing should consult the instructor. Students are cautioned that, in conducting their research, they should prepare their notes by (a) either quoting material exactly (using quotation marks) at the time they take notes from a source; or (b) departing completely from the language used in the source, putting the material into their own words. In this way, when the material is used in the paper or project, the student can avoid plagiarism resulting from verbatim use of notes. Both quoted and paraphrased materials must be given proper citations."
2. "Cheating is defined as the act of obtaining or attempting to obtain or aiding another to obtain academic credit for work by the use of any dishonest, deceptive or fraudulent means. Examples of cheating during an examination would include, but not be limited to the following: copying, either in part or in whole, from another test or examination; discussion of answers or ideas relating to the answers on an examination or test unless such discussion is specifically authorized by the instructor; giving or receiving copies of an exam without the permission of the instructor; using or displaying notes; "cheat sheets," or other information or devices inappropriate to the prescribed test conditions, as when the test of competence includes a test of unassisted recall of information, skill, or procedure; allowing someone other than the officially enrolled student to represent the same. Also included are plagiarism as defined and altering or interfering with the grading procedures. It is often appropriate for students to study together or to work in teams on projects. However, such students should be careful to avoid use of unauthorized assistance, and to avoid any implication of cheating, by such means as sitting apart from one another in examinations, presenting the work in a manner which clearly indicates the effort of each individual, or such other method as is appropriate to the particular course."
3. " One or more of the following academic actions are available to the faculty member who finds a student has been cheating or plagiarizing. These options may be taken by the faculty member to the extent that the faulty member considers the cheating or

plagiarism to manifest the student's lack of scholarship or to reflect on the student's lack of academic performance in the course. These actions may be taken without a request for or before the receipt of a Report from the Academic Integrity Committee.

a. Review – no action.
b. An oral reprimand with emphasis on counseling toward prevention of further occurrences;
c. A requirement that the work be repeated;
d. Assignment of a score of zero (0) for the specific demonstration of competence, resulting in the proportional reduction of final course grade;
e. Assignment of a failing final grade;
f. Referral to the Office of Judicial Affairs for possible probation, suspension, or expulsion."

D. Campus Behavior

1. "California State University, Long Beach, takes pride in its tradition of maintaining a civil and non-violent learning, working, and social environment. Civility and mutual respect toward all members of the University community are intrinsic to the establishment of excellence in teaching and learning. They also contribute to the maintenance of a safe and productive workplace and overall healthy campus climate. The University espouses and practices zero tolerance for violence against any member of the University community (i.e., students, faculty, staff, administrators, and visitors). Violence and threats of violence not only disrupt the campus environment, they also negatively impact the University's ability to foster open dialogue and a free exchange of ideas among all campus constituencies. To fulfill this policy, the University strives: 1) to prevent violence from occurring; and 2) to enforce local, state, and federal laws, as well as University regulations, regarding such conduct. The University also has established procedures for resolving and/or adjudicating circumstances involving violence, as well as threats of violence. A threat of violence is an expression of intention that implies impending physical injury, abuse, or damage to an individual or his/her belongings. All allegations of such incidents (i.e., acts and threats) will be aggressively investigated. Allegations that are sustained may result in disciplinary action up to and including dismissal from employment, expulsion from the University, and/or civil and criminal prosecution." (CSULB Catalog, AY 2013-2014, p. 837)
2. Classroom Expectations – All students of the California State University system must adhere to the Student Conduct Code as stated in Section 41301 of the Title 5 of the California Code of Regulations as well as all campus rules, regulations, codes and policies. Students as emerging professionals are expected to maintain courtesy, respect for difference, and respect for the rights of others.
3. Unprofessional and Disruptive Behavior – It is important to foster a climate of civility in the classroom where all are treated with dignity and respect. Therefore, students engaging in disruptive or disrespectful behavior in classes will be counseled about this behavior. If the disruptive or disrespectful behavior continues, additional disciplinary actions may be taken.

E. Withdrawal Policy

1. Withdrawal Between the 3rd and 12th Weeks of a Semester – Withdrawals during this period semester are permissible only for "***serious and compelling reasons***."
   a. The definition of "serious and compelling reasons" as applied by faculty and administrators becomes narrower as the semester progresses.
   b. Please be advised that doing poorly in a class does ***not*** constitute a serious or compelling reason. The "W" is not intended to be used as a mechanism to escape being awarded the grade that a student has been earning. Thus, the instructor and Department Chair will generally not authorize a withdrawal from this course unless the student seeking to withdraw (a) has been regularly attending classes; (b) has been performing at the level of a "C" or higher in the course; and (c) has a serious and compelling reason for seeking withdrawal.
   c. To withdrawal during this period you will need both the signature of the course instructor ***and*** the signature of the Department Chairperson. Please note that the Department Chair may apply more stringent criteria than your instructor for assessing whether your reasons for seeking to withdraw are "serious and compelling."
2. Withdrawal During the Final 3 Weeks of a Semester – Withdrawals after the 12th week of instruction are not granted absent the most serious and compelling of reasons, such as the documented death of an ***immediate*** (not extended) family member; a documented, serious medical condition that requires withdrawal from all courses; a call from reserve to active military service; etc. The procedures for withdrawal during this period are the same as in above, but also require the approval and signature of the Dean or Associate Dean of the College of Health and Human Services. Moreover, the Office of the Provost will review all such requests before they are formally approved.

X. Distance Learning/Hybrid Courses

Not applicable.

XI. Bibliography

Anholt, RRH (2005) *Dazzle "Em with Style: The Art of Oral Scientific Presentation, 2e*. Academic Press /Elsevier (Waltham, MA).

Casabrande J (2010) *It Was the Best of Sentences, It Was the Worst of Sentences. A Writer's Guide to Crafting Killer Sentences*. Ten Speed Press (Berkeley)

Day RA "*How to Write and Publish a Scientific Paper*", 6th ed. Oryx Press (Phoenix)

Graff G, Birkenstein C (2010) *"They Say/I Say". The Moves That Matter in Academic Writing*, 2nd ed., WW Norton & Co (New York)

Gurak, LJ (1999) *Oral Presentations for Technical Communication*. Longman (Brighton, UK)

Hale C (2001) *Sin and Syntax. How to Craft Wickedly Effective Prose*. Broadway Books (New York)

Heffernan JAW, et al (2000) "*Writing: A College Handbook*", 5th ed, W.W. Norton & Co (New York)

Huckin, Thomas N.(1983) "A Cognitive Approach to Readability." *New Essays in Technical and Scientific Communication: Research, Theory, Practice*. Ed. PV Anderson, RJ Brockmann, CR Miller. Baywood (Farmingdale, NY)

Matthews JR, Matthews RW (2008) *Successful Scientific Writing. A Step-by-Step Guide for the Biological and Medical Sciences,* 3rd ed.,Cambridge University Press (Cambridge)

O'Connor P (1999) *Words Fail Me. What Everyone Who Writes Should Know About Writing*. Harcourt, Inc (Orlando)

Penrose AM, Katz SB (2010) *Writing in the Sciences: Exploring Conventions of Scientific Discourse*, 3rd ed, Pearson-Longman (Boston)

XII. Student Level Assessment

Assignment 1: Cover letter & resume	(10%)
Assignment 2: Literature Assignment	(10%)
Assignment 3: Critical Reading of Literature	(5%)
Assignment 4: Technical Report	(20%)
Assignment 5: Written Proposal	(20%)
Assignment 6: Proposal Review	(10%)
Assignment 7: Oral Presentation of Proposal	(10%)
Class participation, class exercises, quizzes	(15%)

XIII. Course Level Assessment Plan

University policy requires that no single evaluation of student achievement may count for more than one-third of final grade. Appropriate assignments may include:

1. Writing Assignments designed to challenge and hone students' skills in evidence-supported technical composition, with an emphasis on argument-based communication.
2. In-class and take-home exercises to promote application of course materials in real-world contexts and to allow assessment of students' understanding of those materials.
3. Numerous opportunities for peer-review of written assignments to foster development of perpetual analysis of logical rigor and technical precision in all scientific documents.

4. Exam grades will be used to assess student learning of critical, foundational, and research information contained in the SLOs.
5. GE skills will be assessed using rubrics and criteria generated by faculty and based on best practices for those specific types of skills. All instructors will use the same rubrics and criteria for all skill-based assessments.
6. At the close of the each semester, the Faculty Coordinator for the course will convene a meeting of all instructors to conduct an assessment of all rubrics, and any necessary edits will be made at that time.

XIV. Consistency of SCO Standards Across Sections

Course instructors meet twice a semester, once at the beginning and once at the end. They review course assignments, criteria sheets and student outcomes. As a result of the meetings, necessary changes are made in instruction and assignments. All course syllabi are in close alignment with the SCO. All course sections use the same textbook and grading guidelines for assessments.