

## COMMISSION FOR HIGHER EDUCATION

Friday, November 9, 2012

### DECISION ITEM A-1:

#### **Bachelor of Science in Technical Communication To Be Offered by Purdue University through the IUPUI Campus**

#### **Staff Recommendation**

That the Commission for Higher Education approve the Bachelor of Science in Technical Communication to be offered by Purdue University through the IUPUI campus, in accordance with the background discussion in this agenda item and the *Program Description*.

#### **Background**

All members of the Academic Affairs and Quality Committee have reviewed this program and agree – and in some cases, along with staff, strongly agree – that there is a need for the graduates with the skills reflected in the curriculum. The Committee was divided, however, about whether a separate degree program was needed as opposed to a specialization or concentration in a more general program, such as communications. This led to gathering additional information from Purdue University, which became available just prior to publishing the agenda and is incorporated as an addendum to the *Program Description* (see the last two pages).

**Related Programs in Indiana.** There are no separate degree programs in Indiana – in the public, non-profit, or for-profit sectors – in Technical Communication.

Within the public sector, Purdue University West Lafayette offers a Professional Writing program in the School of Liberal Arts. However, students in the West Lafayette program receive a B.A. in English, and the curriculum does not permit students to pursue nearly as much coursework in technology, science, mathematics, and relevant disciplines that students in the proposed program, which is available through the IUPUI Purdue School of Engineering and Technology, would need to take (see addendum to the *Program Description* for a detailed analysis on this point). All public university campuses, except one, offer baccalaureate in communications programs. Together, these programs enrolled a total of 3,964 headcount students and graduated 758 students in FY2011.

It is unclear how many baccalaureate communications programs are available through Indiana's non-profit sector, although data from the Independent Colleges of Indiana suggest there are at least three. Within Indiana's for-profit sector, five institutions offer baccalaureate degrees in communications. Of these, the

University of Phoenix offers a concentration in Communication and Technology and DeVry University offers a specialization in Technical Communications.

**Related Programs at IUPUI.** At IUPUI, Indiana University currently offers a B.A. in Communication Studies through its School of Liberal Arts, which in FY2011 enrolled 377 headcount students and graduated 66. However, the curriculum of this program does not permit students to pursue nearly as much coursework in technology, science, mathematics, and relevant disciplines that students in the proposed program are required to take (see addendum to the *Program Description* for a detailed analysis on this point).

The Purdue School of Engineering and Technology at IUPUI has been offering a 19-semester hour Technical Communications or TCM Certificate. Over the past ten years (2002-2012), a total of 43 students have earned this Certificate.

## **Supporting Documents**

*Program Description* – B.S. in Technical Communication

## **1. Characteristics of Program**

- a. Indiana University Purdue University Indianapolis
- b. Specific Site
- c. Classroom
- d. Includes Required Internship
- e. Department of Technology and Leadership Communication

## **2. Rationale for Program**

### **a. Institutional Rationale**

The proposed Technical Communication (TCM) B.S. will aid in IUPUI's mission to “advance the State of Indiana and the intellectual growth of its citizens to the highest levels nationally and internationally through research and creative activity, teaching and learning, and civic engagement.” The degree promises to “promote the educational, cultural, and economic development of central Indiana and beyond through innovative collaborations and external partnerships” through the means discussed above and in subsequent sections of this proposal. (<http://www.iupui.edu/about/core.html>)

The proposed degree in Technical Communication is compatible with the campus mission in that it will prepare students for the diverse and ever-changing field of technical communication and related areas, opening a wide variety of careers to graduates. In addition, with its broad perspectives, the degree will prepare students to be engaged citizens of the region. The degree will also prepare students for graduate opportunities on the IUPUI campus as well as at other universities. Because the proposed degree integrates understandings of technology and understandings of communication, it provides rich opportunities for cross-disciplinary intellectual undertakings. For more discussion, see full proposal.

### **b. State Rationale**

Within the State of Indiana, no other Bachelor of Science degree in Technical Communication is offered. Purdue University, West Lafayette, offers a B.A. in Professional Writing through the English Department but does not offer a B.S. Indiana Purdue Fort Wayne and the University of Indianapolis offer only Professional Writing Minors. The nearest school offering a B.S. in technical communication is the Illinois Institute of Technology, in Chicago. Another regional institution, Miami University of Ohio, offers an undergraduate B.A., not a B.S.

The proposed degree's scientific/technical focus will be the first of its kind in Indiana. It will appeal to students who are already living and working in Indiana who may not wish to relocate or travel out-of-state to further their educations. Employers who offer tuition compensation would be likely to prefer in-state tuition rates to out-of-state rates, as well as the convenience of a local institution. Appealing to in-state students will make it more likely that they will remain in Indiana and use their degrees to support progress in the state.

In addition, students from out of state may also find this course of study appealing, given that few regional institutions offer a B.S. in technical communication.

### **c. Evidence of Labor Need**

#### **i. National, State, or Regional Need**

Indiana and surrounding states will be served by this proposed degree. Multiple industries have need of technical communicators who are well educated in a broad range of abilities. Locally, many companies employ technical communicators for a variety of functions. A good-sized portion of the anticipated majors may consist of people who have been in the workforce and who will enroll specifically to earn

the TCM B.S., thus enhancing the overall enrollments at IUPUI. This major will probably appeal to a small number of students who declare the major soon after graduating from high school; the curriculum of the degree program is designed to accommodate such students as well as the others who come to it from other situations.

**ii. Preparation for Graduate Programs or Other Benefits**

Requirements for admissions to graduate programs in technical communication and related fields vary, but the broad-ranging nature and the focus on both theory and practice in the TCM B.S. will prepare our students well for admission to a variety of graduate programs.

Upon completion of a B.S. degree in Technical Communication, students will be well prepared to enter graduate programs that emphasize further study of the theory and practice of technical communication and related fields. Regionally, several opportunities for graduate study exist. For instance, the Communication Studies Department at IUPUI offers a Master's Degree in Applied Communication and is in the process of creating a Ph.D. degree in that same area. The English Department at Purdue University, West Lafayette offers a master's degree and a Ph.D. in Rhetoric and Composition with a special area in Professional and Technical Writing. The Illinois Institute of Technology also offers a Master's in Technical Communication. Other educational regional and national opportunities are likely to emerge over the years, and the proposed degree will put students at the forefront of that growth.

Across the United States, at least 14 institutions offer Master of Science degrees and at least 12 offer Master of Arts degrees in technical communication, according to the Society for Technical Communication's Academic Database. <http://www.stc.org/education/academic-database>. For more discussion, see full proposal.

**iii. Summary of Indiana DWD and/or U.S. Department of Labor Data**

At least three highly reputable sources have recently indicated that TCM B.S. graduates are likely to enter careers with expanding prospects and a satisfying level of compensation.

- *The US News and World Report* in 2010 listed technical communication as one of 50 top careers nationally for which growth was projected over the next decade. (<http://money.usnews.com/money/careers/articles/2009/12/28/technical-writer.html>)
- The Occupational Outlook Handbook, 2010-11 Edition, notes that the field is expected to grow 14-18% between 2008 and 2018. (<http://www.bls.gov/oco/ocos319.htm> )
- The Bureau of Labor Statistics lists the mean annual wage for Technical Communicators nationally at about \$65,000 in 2009. (Data for 2010 were not available.) (<http://www.bls.gov/oes/current/oes273042.htm#top>)

**iv. National, State, or Regional Studies—None conducted.**

**v. Surveys of Employers or Students and Analyses of Job Postings**

In interviews with regional technical communicators and supervisors in the fall of 2010, we learned that the field continues to grow and the demand for technical communicators will continue to increase. Specifically, we learned that the following skills are likely to be important for technical communicators.

All interviewees noted that having both strong technical skills and strong communication skills was crucial. The results of these interviews helped to shape the curriculum for the proposed major. For a continued discussion of suggested skills and job postings, see full proposal.

**vi. Letters of Support**

The full proposal includes several letters from regional companies endorsing a high need for this degree program and graduates of the program. The full proposal also includes letters of support from within the University expressing a need for this program.

**3. Cost of and Support for the Program**

**a. Costs**

**i. Faculty and Staff**

Initially, we will offer the program with existing full-time faculty members and selected part-time faculty members. If the new degree program meets its enrollment goals (approximately 30 majors) within the first three years, one new faculty member will be required with expertise in usability and technology for technical communicators. For more discussion and a complete list of faculty, see full proposal. For tables on Direct Program Costs and Out of Pocket Costs, see Appendix A.

**ii. Facilities**

Initially, this new degree will be able to use existing resources; additional ones may be needed as the program grows, but those needs will be relatively modest. The Purdue School of Engineering and Technology and the University Information Technology Services already provide many of the technical resources that students and faculty members will need. In addition, the Technology and Leadership Communication Department is seeking to renovate classroom space to support active, collaborative, problem-based learning in technical communication courses and other areas. (Funding for that renovation will come from a variety of internal sources.)

**iii. Other Capital Costs and equipment—None**

**b. Support**

**i. Nature of Support (New, Existing, or Reallocated)**

Primarily Existing; Small Reallocation

**ii. Special Fees above Baseline Tuition—**

No special fees are attached for admission to this program.

**4. Similar and Related Programs**

**a. List of Programs and Degrees Conferred**

**i. Similar Programs at Other Institutions**

Within the State of Indiana, no other Bachelor of Science degree in Technical Communication is offered. Purdue University, West Lafayette, offers a B.A. in Professional Writing through the English Department but does not offer a B.S. Indiana Purdue Fort Wayne and the University of Indianapolis offer only Professional Writing Minors. The nearest school offering a B.S. in technical communication is the Illinois Institute of Technology, in Chicago. Another regional institution, Miami University of Ohio, offers an undergraduate B.A., not a B.S.

## **ii. Related Programs at the Proposing Institution**

For over a decade, the current TCM Certificate (19 cr.) has served students who wished to earn a credential in technical communication, while earning a Bachelor's degree in another discipline or after having earned a Bachelor's degree. The TCM Program plans to continue to offer the TCM Certificate while also offering a major for those interested in a more in-depth education in the field. If a student begins working toward the TCM Certificate and chooses to switch to the major, the courses already earned will apply to the major as appropriate. Conversely, if the student begins in the TCM Major but elects not to complete it, a TCM Certificate may be awarded if the student has met all its requirements.

In 2010, members of the TCM Program's Industrial Advisory Board participated in revising the existing undergraduate TCM certificate. During this process, participants realized that the Certificate alone was not sufficient to provide students with a broad range of the knowledge, skills, and proficiencies that they would need as technical communication professionals. They urged the TCM program to look into offering a minor, major, and a graduate degree. For continued discussion, see full proposal.

## **b. List of Similar Programs Outside Indiana**

Illinois Institute of Technology; Miami University of Ohio offers a B.A. in the field. In the United States, about 146 institutions offer B.A. degrees in Technical Communication, but only about 20 offer a B.S. in the field (according to the Society for Technical Communication's academic database <http://www.stc.org/education/academic-database>.) The proposed TCM major at IUPUI will lead to a B.S. with a strong background in technology. Such an education will help technical communicators understand technology both as a topic and as a tool that they will employ in contemporary technical communication venues.

## **c. Articulation of Associate/Baccalaureate Programs**

Students will be able to transfer course credits that meet degree requirements from other institutions, especially those with whom IUPUI has articulation agreements. Consistent with IUPUI policy, graduates will need to earn at least 32 credit hours at IUPUI. Existing course articulation agreements between IUPUI and Ivy Tech and other relevant institutions will be honored.

Students who have completed the Ivy Tech requirements for the General Education Transfer Core Certificate and the A.S. in Professional Communication will be able to transfer those courses to apply to the TCM B.S. requirements. The TCM Program has created an articulation agreement with Ivy Tech Community College.

## **d. Collaboration with Similar or Related Programs on Other Campuses**

At this time, we have not established formal collaborations with programs on other campuses, but we anticipate that informal collaborations in the future may be desirable.

# **5. Quality and Other Aspects of the Program**

## **a. Credit Hours Required/Time to Completion**

To earn the B.S. degree in Technical Communication, students will be required to complete a minimum of 120 credit hours, distributed among the following four core areas.

Technical Communication – 53 hours  
Technology/Engineering/Science/Math – 34 hours  
Organizational/Cultural Dynamics – 12 hours  
Humanities/Social Sciences – 21 hours

Students will be required to complete one, 3-credit-hour internship (TCM 42000 or equivalent) near the end of this degree program. Many other courses will offer experiential research and learning opportunities in keeping with the campus Research, International, Service-learning, and Experiential learning (RISE) initiative.

This degree program will allow students to complete the entire degree in three years by taking summer classes. Many students may be preparing for career changes in mid-life, so this three-year plan will allow them to move through the degree efficiently and advance their career goals in a timely manner.

The option to complete the degree in four years is also available to students. To see the three year and four year plans of study, see full proposal.

**b. Exceeding the Standard Expectation of Credit Hours**

This degree program requires 120 hours.

**c. Program Competencies or Learning Objectives**

Specific objectives for graduates include:

*Knowledge:* Upon graduation, students will have a useful understanding of the theories that inform technical communication, especially as these theories are integrated with practice. They will understand principles of 1) verbal and visual communication as expressed orally, in writing, and in electronic formats, 2) collaborative writing and team dynamics, 3) usability and user-centered design, and 4) project management. They will also understand the basics of technology as a topic about which they will typically communicate.

*Values:* Upon completing this degree, students will understand that technical communicators often serve as “user advocates,” using their knowledge about users to create communication products designed to aid users in utilizing sophisticated technology to achieve their goals. Graduates will understand that technical communicators apply their understandings of users’ goals to devise communication products that help users to employ technology successfully. Graduates will also understand options for addressing with integrity the ethical challenges that arise in complex workplace communication contexts.

*Skills:* The skills that graduates of this degree will demonstrate correlate well with the knowledge they will attain. Students will develop written and oral communication skills, including the ability to communicate visually. They will develop skills with technology used to create usable communication products in a variety of environments. They will develop abilities to plan and manage complex communication projects. Finally, they will develop skills in negotiating within organizations in order to accomplish communicative goals. More specifically, they will develop abilities to conduct usability tests and analyze the data to improve products including software applications, websites, and devices; communicate complex technical concepts in a clear manner; successfully collaborate with and train colleagues in best practices; manage all aspects of communication projects from start to finish; use differing style guides appropriately; and communicate effectively with specific audiences using an appropriate approach.

*Other outcomes:* Students will develop an awareness of the situatedness of technical communication, understanding that conventions of communication need to be adapted to the needs of specific users and contexts. Upon completing this degree, they will also understand that effective technical communication will sometimes be internationalized or localized. Finally, because they will earn a B.S. , they may have more credibility in a technical setting than if they had earned a B.A. , according to several individuals who conferred with us in the shaping of this proposal.

All outcomes will demonstrate that students have incorporated the IUPUI Principles of Undergraduate Learning and with the RISE (Research, International, Service-learning, and Experiential Learning) initiative on IUPUI's campus, as discussed in subsequent sections of this proposal.

**d. Assessment**

IUPUI's Principles of Undergraduate Learning will guide the evaluating of student learning outcomes for the B.S. in Technical Communication.

In addition, the TCM Program will collaborate with the Purdue School of Engineering and Technology's Assessment Committee in designing, carrying out, and analyzing assessment practices. As with other degree programs within the school, assessment of the TCM program will have the following components: (1) assessment of student learning through evidence collected for the measurable learning outcomes developed to meet the IUPUI's Principles of Undergraduate Learning, (2) assessment of employer satisfaction using both surveys and focus groups, (3) assessment of alumni satisfaction through feedback using a process similar to the process for employer feedback, and (4) assessment of the program using matriculation rates, graduation rates, employment and graduate study placement rates, and advancements. Information gathered through the assessment process will be used to help determine the effectiveness of the program in meeting its intended learning outcomes and to guide adjustments to help with continuous programmatic improvement.

**e. Licensure and Certification**

No licensure in Technical Communication is available.

**f. Placement of Graduates**

The School of Engineering and Technology provides its students a Career Services office to assist in the professional development and placement of graduates. The office collaborates with companies throughout the world to assist students in locating paid internship, co-op, and career opportunities. In addition, TCM faculty members will assist in this process, especially through their extensive network of community connections. For continued discussion, see full proposal.

**g. Accreditation**

Currently, technical communication as a field is not under the guidance of external accrediting agencies. However, the national Council for Programs in Technical and Scientific Communication does provide resources for programs to use in evaluating themselves for a variety of purposes. We anticipate using those resources at regular intervals in order to improve the degree program.

**6. Projected Headcount and FTE Enrollment and Degrees Conferred**

NEW ACADEMIC DEGREE PROGRAM PROPOSAL SUMMARY									
9-Nov-12									
Institution/Location: Purdue University to be offered through the IUPUI campus									
Program: B.S. in Technical Communication									
				Year 1	Year 2	Year 3	Year 4	Year 5	
				FY2013	FY2014	FY2015	FY2016	FY2017	
Enrollment Projections (Headcount)									
	Full-Time			339	732	1,083	1,191	1,191	
	Part-Time			45	45	63	90	90	
	Total			384	777	1,146	1,281	1,281	
Enrollment Projections (FTE)									
	Full-Time			8	17	24	24	24	
	Part-Time			5	9	14	18	18	
	Total			13	26	38	42	42	
Degree Completions Projection									
				0	0	6	6	15	
CHE Code: 12-25									
Campus Code: 1813									
County: Marion									
Degree Level: Bachelors									
CIP Code: Federal - 090908; State - 090908									

## APPENDIX A

Campus: Indiana University-Purdue University Indianapolis\  
 Program: Bachelor of Science in Technical Communication  
 Date: 27 July 2011

TABLE IA  
 TOTAL DIRECT PROGRAM COSTS AND SOURCES OF PROGRAM REVENUE

	Year 1		Year 2		Year 3		Year 4		Year 5	
	FTE	2012-13	FTE	2013-14	FTE	2014-15	FTE	2015-16	FTE	2016-17

A. Total Direct Program Costs

1. Existing Departmental Faculty Resources	1.2	\$ 108,000	2.2	\$ 198,000	3.3	\$ 297,000	4.4	\$ 396,000	4.4	\$ 396,000
2. Other Existing Resources		22,000		40,000		59,000		79,000		79,000
3. Incremental Resources (Table 1B)		107,300		222,700		327,300		327,300		317,300
<b>TOTAL</b>		<b>\$ 237,300</b>		<b>\$ 460,700</b>		<b>\$ 683,300</b>		<b>\$ 802,300</b>		<b>\$ 802,300</b>

B. Sources of Program Revenue

1. Reallocation	\$	130,000	\$	238,000	\$	356,000	\$	475,000	\$	475,000
2. New-to-campus Student Fees		84,000		174,300		256,100		256,100		256,100
3. Other (Non-State)										
4. New State Appropriations										
a. Enrollment Change Funding		23,300		48,400		71,200		71,200		71,200
b. Other State Funds		0		0		0		0		0
<b>TOTAL</b>		<b>\$ 237,300</b>		<b>\$ 460,700</b>		<b>\$ 683,300</b>		<b>\$ 802,300</b>		<b>\$ 802,300</b>

**TABLE IB**  
 DETAIL ON INCREMENTAL OR  
 OUT-OF-POCKET DIRECT PROGRAM COSTS

	<u>Year 1</u>		<u>Year 2</u>		<u>Year 3</u>		<u>Year 4</u>		<u>Year 5</u>	
	<u>FTE</u>	<u>2012-13</u>	<u>FTE</u>	<u>2013-14</u>	<u>FTE</u>	<u>2014-15</u>	<u>FTE</u>	<u>2015-16</u>	<u>FTE</u>	<u>2016-17</u>
<b>1. Personnel Services</b>										
a.. Faculty	0.8	85,200	1.6	170,400	2.3	245,000	2.3	245,000	2.3	245,000
b. Support Staff	0.3	16,800	0.7	33,600	1.0	48,300	1.0	48,300	1.0	48,300
c. Graduate Teaching Assistants	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Personnel Services		102,000		204,000		293,300		293,300		293,300
<b>2. Supplies and Expense</b>										
a. General Supplies and Expense		3,500		16,100		31,700		31,700		31,700
b.. Recruiting		1,000		1,000		0		0		0
c. Travel		800		1,600		2,300		2,300		2,300
d. Library Acquisition		0		0		0		0		0
Total Supplies and expense		5,300		18,700		34,000		34,000		34,000
<b>3. Equipment</b>										
a. New necessary for program										
b. Routine replacement										
Total Equipment		0		0		0		0		0
<b>4. Facilities</b>		0		0		0		0		0
<b>5. Student Assistance</b>										
a.. Graduate Fee Scholarships		0		0		0		0		0
b. Fellowships		0		0		0		0		0
Total Student Assistance		0		0		0		0		0
<b>Total Incremental Direct Costs</b>		\$ 107,300		\$ 222,700		327,300		327,300		\$ 327,300

To: Ken Sauer,  
Senior Associate Commissioner for Research and Academic Affairs  
Indiana Commission for Higher Education

This document is in response to questions regarding the proposal of a B. S. degree in Technical Communication at IUPUI. Two questions were presented: (1) Should this degree be offered through the existing IUPUI Communication program? and (2) Does the B. A. in Professional Writing at Purdue West Lafayette offer a concentration in Technical Communication?

- (1) The proposed TCM BS has its foundation in E&T perspectives and courses. Because of that feature, it can stand alone as a major, or it can become a double major for someone in a technical field. The approaches in the proposed degree are distinctive from those found in a Liberal Arts perspective.

The TCM BS degree would be best offered through the TCM Program in the Purdue School of Engineering and Technology at IUPUI for the following reasons.

- TCM faculty members have the required expertise and a regional network in Technical Communication, a field distinct from Communication Studies and English.
- Letters from regional academic administrators support locating the TCM BS in the Purdue School of Engineering and Technology.
- The BS degree in TCM is most appropriate in a School of Engineering and Technology rather than a School of Liberal Arts which has a tradition of offering BA degrees.

Following are comments from Dean David Russomanno, Purdue School of Engineering and Technology, IUPUI regarding the TCM program being housed in the School of Engineering and Technology:

- The program responds to the needs of STEM employers by embedding the rigor of the project-based engineering and technology programs into the curriculum
- The program prepares students to effectively communicate technical solutions in a global, economic, environmental, and societal context through shared and tightly coupled curricular experiences with the engineering and technology programs
- The program supports the engineering ABET accreditation criteria which requires outcomes that demonstrate our students' ability to: i) communicate effectively; ii) function on multidisciplinary teams; and iii) use the techniques, skills, and modern engineering tools necessary for engineering practice
- The program effectively and efficiently utilizes existing faculty and staff expertise and resources while not duplicating other programs on campus or within Indiana
- The program is strongly endorsed by deans and other leaders of communications-oriented programs at IUPUI, Purdue, W. Lafayette, and IU-Bloomington

In response to the question of how the proposed IUPUI TCM BS is distinct from other degrees and disciplines such as Communication Studies and English/Professional Writing, the attached chart in Appendix A indicates similarities and differences.

- (2) The Professional Writing major at Purdue West Lafayette does offer a concentration in Technical Writing. The Director of that Program, however, notes that the focus at Purdue West Lafayette is on writing and that the program currently offers a very limited number of courses with a technical orientation. He sees the IUPUI program as a possible partner in the delivery of technically oriented courses to Purdue West Lafayette students through summer enrollments or future online delivery methods. He is highly supportive of this proposal.

#### **Appendix A: IUPUI TCM BS' relationship to other programs**

The topics in the left-hand column were selected from the list of competencies that technical communicators need in order to succeed in contemporary technical communication environments. (The list of competencies was drawn from the IUPUI TCM Industrial Advisory Board's input and primary and secondary research during the process of preparing the TCM BS proposal.) Although the Communication Studies BA and the PUWL English Professional Writing BA are making valuable contributions in many ways, overall, we believe that the TCM BS degree will prepare students well for careers in technical communication in ways that differ significantly from the preparation offered by the two other degree programs. **Green** indicates a high level of relevant coursework in the degree program, **yellow** indicates a moderate level, and **red** indicates a low level.

Three regional programs  Competencies for Technical Communicators	Proposed Technical Communication BS (IUPUI)	Communication Studies BA (IUPUI)	Professional Writing/ English Degree (specialty in Technical Writing (PUWL))
<i>Technology/ Science/ Math course work</i>	34 hours. Opportunity to earn a minor or certificate in a technical/scientific field.	9-11 hours of math and science.	12 hours in math and science. Required to earn a minor in another field, a minor that could be in a technical or scientific field.
<i>Courses in Technical Communication and relevant disciplines</i>	53 hours	33 hours in Communication Studies, some not relevant to technical communication.	30 hours in writing and technical/professional writing.
<i>Project/ documentation management</i>	Two required and several elective courses.	None required	None required.
<i>Written communication</i>	Integrated into TCM Core courses.	First-year composition Electives.	Several courses, some tangential to technical communication
<i>Usability</i>	One course, plus integration into several other courses.	None required	Integrated into several courses.
<i>Oral Communication</i>	Introductory speech course. A few electives in formal and informal oral communication.	Many courses in formal and informal oral communication	Introductory speech course.
<i>Editing of technical/ scientific communication</i>	Required course plus integration in other courses.	None required	None required
<i>Training</i>	Electives.	None required	None required
<i>Electronic Communication</i>	Several electives and integrated into other courses.	Several electives in general media.	Integrated into several courses.
<i>Mastery of software for technical communication</i>	One required course in software tools plus integration in other courses.	Several electives, mostly in TV/video/film.	One required course in Computer Aided Publishing.
<i>Research approaches for learning about audience, subject matter, and communication media in the workplace</i>	One required course in workplace, applied research plus integration in other courses.	Two required courses in general communication research methods.	One required course in research in general technical writing.
<i>Theoretical foundations for technical communication</i>	One introductory course with integration into other courses.	Several theoretical courses, but not specific to technical communication	One required course and an option for a course in theories of rhetoric and composition
<i>Organizational/ international/ intercultural dynamics of technical communication</i>	12 credit hours plus an option to complete foreign language courses and courses in project management.	Several electives in organizational communication. One optional course in intercultural communication.	None
<i>Broad, general education.</i>	21 hours in Humanities, Language, and Social Sciences	36 hours in General Education.	30 hours in General Education.