



FACULTY SENATE

Executive Council

March 20, 2017 4:00 – 5:30 p.m.

Waterman 327

Minutes

Present: Professors Almstead, Barnaby, Beckage, Chittenden, Danks, Gurdon, Paris, Toolin

Absent: Professors Burns, Carney, Mehrtens, Pechenick, Prue, Rodgers

Guests: Brian Reed

The meeting was called to order at 4:06 p.m. in Waterman 327

1. **Approval of February 13, 2017 Minutes.** The minutes were approved as written.
Vote: 6 approve, 0 oppose, 0 abstain
2. **Degree Corrections.** Degree corrections were requested from the College of Arts and Sciences, and the College of Nursing and Health Sciences.
Motion: To approve the degree corrections as presented.
Vote: 6 approve, 0 oppose, 0 abstain
3. **Chair's Remarks** - Cathy Paris reported that she received a proposal from Meaghan Emery for a faculty roundtable on free speech. The proposal was spurred by recent events at Middlebury College, and asks the Faculty Senate and the UA to co-sponsor a faculty-led roundtable discussion in April. Resources and timing were discussed. The Senate budget does not include resources to contribute, and April provides a very short planning time. Cathy will distribute the email from Meaghan Emery to the Executive Council members to consider and provide feedback.
4. **Curricular Affairs Report** – The CAC consent agenda included the following:
 - Proposal for a new Certificate of Graduate Study in Agroecology. Submitted by the College of Agriculture and Life Sciences, this program capitalizes on faculty expertise

and initiatives unique to UVM in an area where there is a societal need and student demand.

- Proposal for new Minor in Education for Cultural and Linguistic Diversity. Submitted by the College of Education and Social Services, this new minor will enhance the education of both Education majors who are preparing to teach in PreK-12 schools with English language learners and non-Education majors who will work in professions in diverse settings by providing valuable training in the impact of multiculturalism, language learning issues, and diversity.
- Proposal for Quantitative Reasoning General Education Requirement. The proposal for a University-wide General Education requirement in Quantitative Reasoning was developed by a committee of faculty. If approved, undergraduates entering fall 2017 must meet the QR requirement by completing a course, curriculum, or co-curriculum approved by the Faculty Senate QR Curriculum Review Committee. The QR requirement is intended to assure that graduates of UVM possess the ability to think critically, evaluate information, and reason quantitatively in order to excel in their chosen field and to perform as successful citizens in the world.

Motion: To approve the CAC consent agenda for inclusion on the March 27 Faculty Senate agenda.

Vote: 7 approve, 0 oppose, 0 abstain

5. **Defining the Role of the FPPC** – Andrew Barnaby continued the conversation, which began at the February Executive Council meeting. Andrew provided a handout (attached to these minutes) of notes from the last FPPC meeting, outlining two levels of changes that could enable the FPPC to have a more active and meaningful role. Michael Gurdon provided an historical view of the charge of the FPPC, and noted the importance of the preamble to the Faculty Senate Constitution, highlighting shared governance. Cathy Paris suggested that the current charge of the FPPC is too broad, and that the committee has not been given the latitude to carry it out. Andrew pointed to the handout which lists two categories of potential changes. The items under category #1 could be decided by the Faculty Senate. The items under #2 would require recognition by or cooperation from Central Administration. The Provost is a scheduled guest at the April FPPC meeting. Andrew will report back to the Executive Council at its April meeting, with the goal of having a basic plan in place in May, enabling the next chair of the FPPC to move forward.

6. **Agenda for P&P Meeting Thursday, March 23, 3:00 – 4:00 p.m.**

Two suggestions were made for agenda topics:

- What are the President's thoughts on the federal budget and impact on the University and our students?
- What is the President's sense of what alumni donors would like UVM to be? What do they care about?

7. March 27 Senate meeting agenda

- Minutes of the February 27 meeting *2 min*
- Senate President's Remarks *5 min*
- President and Provost's Remarks *10 min*
- Enrollment Management Goals and Initiatives, Stacey Kostell and Beth Wiser *30 min*
- Sustainability Curriculum Review Committee Report and Update, Laura Hill and Deane Wang *10 min*
- CAC Business *10 min*
- Proposal for new General Education Requirement, Quantitative Reasoning, Laura Almstead *10 min*
- New business *5 min*
- Adjourn

8. New Business

Andrew Barnaby suggested that the Senate explore a series of conversations for next year around the curricular requirements for 21st century students.

9. The meeting was adjourned at 5:43 p.m.



The University of Vermont
**COLLEGE OF NURSING
AND HEALTH SCIENCES**

FEBRUARY 14, 2017

MEMORANDUM

To: University Faculty Senate
From: Patricia Prelock, Dean *Patricia Prelock/Dean*
RE: Diploma error

Ashley Breton, whose name was included on the list of Jan 2017 graduates from the College of Nursing and Health Sciences, received her diploma in error.

Her diploma will be retrieved and her name added to the list of candidates to be awarded degrees in May 2017.

OFFICE OF STUDENT SERVICES

002 Rowell Bldg., 106 Carrigan Dr., Burlington, VT 05405
(802) 656-3858
cnhs@uvm.edu • www.uvm.edu/cnhs



The University of Vermont

March 9th, 2017

Faculty Senate President Paris, the College of Arts & Sciences wishes to rescind the degree from May 19, 2016 for the following student with the included rationale.

The College of Arts Sciences strongly sponsors this request.

Bachelor of Arts

Andrea Meyer

Pittsford, NY

This student was put forward in error to graduate without officially receiving a letter grade for her internship credit that was listed on the transcript. The occurrences of ENVS 202 have since been removed from her transcript and her degree should be rescinded for spring 2016.



The University of Vermont

March 9th, 2017

Faculty Senate President Paris, the following candidate from the College of Arts & Sciences has completed all requirements for her degree.

I move that the Senate recommend this candidate to the Board of Trustees for the awarding of the appropriate degree and consider her as a January 2017 graduate. After review of her record, she has completed all necessary graduation requirements. The rationale has been included below for this student.

The College of Arts Sciences strongly sponsors this request.

Bachelor of Science

Darby Moira Frost

Winthrop, ME

This student received a grade change for a previous semester that finished her requirements, and was not realized by our office until after the list was due.

MEMO

To: The UVM Faculty Senate
From: Curricular Affairs Committee of the Faculty Senate, Laura Almstead, Chair
Date: March 3, 2017
Re: Approval of a proposal for a new Certificate of Graduate Study in Agroecology submitted by the College of Agriculture and Life Sciences

At its meeting on March 2, 2017, the Curricular Affairs Committee unanimously approved the action recommended in the following memo.

The Curricular Affairs Committee unanimously approved a proposal for a new Certificate of Graduate Study in Agroecology submitted by the College of Agriculture and Life Sciences. The proposal was also reviewed and approved by the Graduate College Executive Committee in January. The certificate program will be housed in the Department of Plant and Soil Science, tenure home of the certificate's Faculty Director, Ernesto Méndez and his Agroecology and Rural Livelihoods Group (ALRG); and current locus of much of the work in agroecology occurring at UVM. If approved by the Faculty Senate and Board of Trustees, the program will be offered beginning Fall 2017.

Program Description, Rationale, and Evidence for Demand

The newly proposed Certificate of Graduate Study in Agroecology (CGSA) is a low-residency program in the emerging field of Agroecology – a transdisciplinary, participatory and action-oriented approach that seeks viable and sustainable ways to improve our agrifood systems by confronting the social, ecological and production problems and issues they face. The curriculum is designed to encourage students to integrate the natural and social sciences with perspectives and experiences of farmers and other practitioners, and to explore evidence-based, practical solutions to contemporary issues from production to consumption.

The initial target audiences are UVM graduate students from Food Systems, Community Development and Applied Economics, the Rubenstein School of Environment and Natural Resources, and Plant and Soil Science seeking an agroecology complement to their current studies, as well as US-based and international graduate students seeking a comprehensive introduction to the field. The new certificate is also likely to attract food systems, agriculture, and rural development professionals wishing to implement an agroecological approach, and policymakers who want to deepen their understanding of this emerging field.

Justification and Evidence for Demand

UVM is perhaps the only university where agroecology, ecological economics, and agrifood system initiatives are thriving and have the potential for a deeper integration. This positions UVM as a leader in this important and timely transdisciplinary confluence. Moreover, land-grant universities, as emphasized in a recent statement by Union of Concerned Scientists, are an appropriate source of much needed public support for agroecology, which is less likely to be supported by the private sector since these farming methods often reduce requirements for purchased inputs.

Evidence of demand includes a reported 50% increase in student inquiries regarding graduate-level work in agroecology at UVM. These potential students are both domestic and international, many with prior research or professional experience in relevant areas. Participants of the 16th Annual International Agroecology Shortcourse in Santa Cruz, California (July, 2016) greeted the idea of a CGSA at UVM with enthusiasm; and voiced strong support for largely online delivery that would not disrupt their own ongoing professional duties. A survey of current UVM graduate students (N = 49) also indicated strong support, with 61% agreeing that a low residency certificate would benefit them academically, and 47% stating an interest in taking online courses in agroecology to complement their current coursework.

Relationship to Existing Programs

The proposed CGSA will be a curricular complement to the Rubenstein School Environmental and Natural Resources (RSENr). Since agroecology provides a framework for linking food production and distribution models with issues related to environmental health and sustainability, graduate students from RSENr working in food and/or agricultural related areas will be eligible, and encouraged, to participate. The proposers also expect to supplement the Food Systems Graduate Program, with the program's primary coursework centered upon participatory action research and transdisciplinary collaboration appealing to students with an interest in the production side of agrifood systems who are looking to apply their food system knowledge via an action oriented approach.

The proposers note that the CGSA has similar pedagogy (low-residency) to and possible content overlap with the low-residency Master of Science in Natural Resources concentration in Leadership for Sustainability (MSLS). The MSLS course NR312: Power, Privilege, and Catalyzing Change shares an exploration of power and food sovereignty, though with differing emphasis (catalyzing change vs. addressing agricultural issues). The proposers see this not as a conflict, but a complement; and the directors of the MSLS are interested in using the proposed agroecology content as part of their elective and/or required coursework. In the future, the CGSA will also incorporate electives from other associated low-residency programs. For example, the proposers have expressed their openness to explore future possibilities for students in this CGSA program taking related courses in the MSLS and FS programs, and supporting the enrollment of students in the MSLS and FS programs in the agroecology courses.

Curriculum

The fifteen-credit curriculum is a sequence of three required core courses and two electives. Five new courses were specifically developed to fit the low-residency model of the certificate program; all five courses have been approved to the level of the registrar's office. At present, there are only two possible elective course options. The proposers fully recognize the importance of adding to the elective options, and have expressed a commitment to doing so. As noted previously, greater variety is anticipated in the near future from collaborating units and departments. New courses are also likely to be developed; topics to be based on student interests and needs. In addition, certain graduate-level seminar courses may be offered as "hot topic" courses.

REQUIRED		CREDITS	PRE-REQUISITES	DELIVERY
PS 311	Introduction to Agroecology. Establishes baseline knowledge of agroecology; fosters collegial rapport with fellow students, instructors and advisors.	3	Graduate standing or instructor permission	Residential
PS 312	The Ecological Foundations of Agroecology Provides tools necessary to evaluate agrifood topics through ecological lens.	3	One semester biological science at the 100-level or Instructor permission.	Online
PS 315	Agroecology Capstone/synthesis project Synthesis exercise/application of agroecological knowledge involving "communication piece exhibiting their understanding of agroecological concepts."	3	PSS 311, PSS 312, PSS 313, PSS 314	Online
ELECTIVES				
PS 313	Participatory Action Research (PAR) and transdisciplinary approaches to Agroecology Provides baseline knowledge in the various fields of agroecology.	3	PSS 311	Online
PS 314	Agroecology, Food Sovereignty and Social Movements Provides baseline knowledge in the various fields of agroecology.	3	Graduate Standing	Online

Admission Requirements and Process

Students must hold an accredited bachelor's degree and meet other Graduate College requirements. International students will need TOEFL scores, and proper documentation is required for the residential course. The proposers are also working to develop an online course tailored to the needs of international students who cannot obtain the necessary documentation, possibly involving local experiential learning in their home country. The admissions committee will be comprised of affiliated faculty, with the Faculty Director serving as the final judge. Retention and graduation will be encouraged by advisory support from Dr. Méndez and the Educational Coordinator.

Anticipated Enrollment and Impact on Current Programs

Eventual enrollment, after initial fall cohort of at least 8, is anticipated to be 16 to 32 per year, each cohort contributing a minimum of 8 and a maximum of 18 individuals. The proposers expect some 85 students to receive a full certificate in the first five years.

The low-residency program expands the educational reach of CALS, and broadens its impact locally, regionally and abroad, while advancing the college's standing as a leader in innovative pedagogy. The proposed certificate is intended to contribute to the attractiveness of existing programs as a stackable credential where enrolled students can take CGSA courses as electives associated with their own degree program. UVM students not formally in the CGSA may still enroll in selected courses with the approval of program coordinator and course instructor (subject to space limitations). Thus, the CGSA is not expected to affect participation in other UVM graduate programs, but rather provide an option for additional credentials that would support their graduate work.

Advising

Because the CGSA may be taken as either a stand-alone degree or as part of a larger academic program, advisory duties may vary considerably among students. Graduate students pursuing a MS or PhD will continue to receive mentorship from their primary academic advisor housed within their home department, and will follow any committee procedures detailed within the college's student handbook. Any advisory duties pertaining directly to the CGSA will be handled by the CGSA Faculty Director (Dr. Méndez) and/or coordinators unless instructed otherwise by the student's home department. Academic mentorship for certificate-only students will be primarily the role of the Faculty Director and Educational Coordinator.

Assessment Plan

The CGSA will be evaluated via the typical University Academic Program Review (APR). An initial program assessment by program faculty and the Graduate College will take place following the first two cohorts (i.e. the first year). An external review will be scheduled with each APR. Criteria for evaluation of program success will include the number of participating students, course evaluations, and feedback from participating faculty, and non-profit organizations associated with the program (e.g. employers of participating students).

Staffing Plan, Resource Requirements, and Budget

Dr. Méndez will be Faculty Director of the program, overseeing development, evaluation and execution of curriculum, including all scheduling, course coordination, recruitment of necessary faculty; he will also teach one course per year on-load (0.1 FTE), and take a lead role in advising incoming certificate students as needed.

A Program Coordinator (0.25 FTE), reporting directly to Dr. Méndez, will provide administrative, technical and instructional support for all students and faculty participating in the program (including yearly evaluations through faculty, student and staff evaluation methods); the Program Coordinator will also oversee all budgeting and course scheduling.

An Educational Coordinator (0.75 FTE) will track the student progress and provide academic support throughout the program. They will also direct the development of course curricula and outcomes with participating faculty and staff, providing necessary training for adapting face-to-face coursework into an online format, including the Teaching Effectively Online courses and any necessary collaborations with Continuing and Distance Education (CDE) instructional developers.

The direct personnel expenses for the three positions above is expected to range between \$88,770 and \$93,916 per year through 2022. Members of the Agroecology and Rural Livelihoods Group have held preliminary conversations with representatives from the UVM Foundation and several local companies to explore the possibility of seed funds and/or scholarship support for the program. In the event that these funds are not obtained before the start of the program, CALS has agreed to provide the necessary startup costs for the first year of the program. Staff support for marketing and website development provided by CDE.

Evidence of Support

In developing the new CGSA, the proposers communicated with a wide variety of units including the Graduate Program in Food Systems, the Food Systems Initiative, the Gund Institute for Ecological Economics, the Rubenstein School of Environment and Natural Resources (RSENr), the College of Engineering and Mathematical Sciences (CEMS), and the Center for Sustainable Agriculture (CSA). All report enthusiasm for the new program, as shown by numerous letters of support (see below).

Letters of support were provided by the CALS Curriculum Committee, the Graduate College Executive Committee; Deans Vogelmann (CALS), Forehand (Graduate College), Matthews (RSENr), Lantagne (UVM Extension and Director of UVM Food Systems Initiative), and Belliveau (CDE); and by Professors Trubek (Director, Graduate Program in Food Systems), Neher (Chair, PSS), Ricketts (Director, Gund Institute for Ecological Economics), and Berlin (Director, UVM Center for Sustainable Agriculture).

Summary

The newly proposed Certificate of Graduate Study in Agroecology capitalizes on faculty expertise and initiatives unique to UVM in an area where there is a societal need and student demand. It will place UVM in a position to a leader in the field of agroecology, and will complement and support current graduate programs. The overwhelming support voiced in the letters received from individuals across the University further demonstrates the recognition of this high-quality program as being a valuable addition to UVM's curricular portfolio.

MEMO

To: The UVM Faculty Senate
From: Curricular Affairs Committee of the Faculty Senate, Laura Almstead, Chair
Date: March 3, 2017
Re: Approval of a proposal for a new Minor in Education for Cultural and Linguistic Diversity submitted by the College of Education and Social Services

At its meeting on March 2, 2017, the Curricular Affairs Committee unanimously approved the action recommended in the following memo.

The Curricular Affairs Committee unanimously approved a proposal for a new Minor in Education for Cultural and Linguistic Diversity submitted by the College of Education and Social Services. If approved by the Faculty Senate and Board of Trustees, the program will be offered beginning Fall 2017.

Program Description, Rationale, and Evidence for Demand

The purpose of the newly proposed Minor in Education for Cultural and Linguistic Diversity (ECLD) is to enhance student understanding, cultural competency, and agency related to the impact of multiculturalism, language learning issues, and diversity in pre-kindergarten through grade 12 (PreK-12) schools and other community and professional settings. The minor curriculum includes courses highlighting US immigration, migration, transnationalism, culture, family-school, and education policy plus cultural and English language learning (ELL).

The development of this minor is in response to the changing landscape of Vermont and the rest of the United States. There are currently 81 million immigrants and their US-born children in this county, equaling 26% of the U.S. population (www.migrationpolicy.org). English Language Learners (ELLs) represent the fastest growing student population, expanding to 60% in the last decade, as compared with 7% growth of the general student population (Grantmakers for Education, 2013). According to the Education Commission of the States (2013), almost 10% of K-12 students in public schools are ELLs, many preschool programs are not adequately equipped to serve the ELL population, and many general classroom teachers receive little to no training to address the needs of these ELL students. The proposed Minor in ECLD will provide students valuable understanding of immigrant students and their communities, the policy impact on their learning, and the help needed to bridge the transition from school to career pathways. The proposed minor also offers UVM students a licensure option that could improve career prospects. Students both within and outside of the Department of Education have

indicated significant interest in courses and programs related to immigrant children and schooling, and a survey of 134 students, in EDTE 056 during spring semester of 2016 indicated that nearly 60% would be interested in completing a program that would provide endorsement in teaching ELLs.

Relationship to Existing Programs

Although there are programs that address working with diverse populations, there are no existing minors that provide the training necessary for students entering careers in PreK-12 education to competently address the needs of ELLs and children with diverse cultural backgrounds. The proposed has the full support and collaborative backing of the departments offering these programs (see Support section). The licensure track of this minor has been in existence since 2016.

Curriculum

The ECLD minor requires three core courses totaling nine credits (EDTE 056 D1: Language Policy, Race and School; EDTE 102/202 undergraduate/graduate Bilingual Education and Policy; and EDTE 205 Home, School and Community Collaboration). Following completion of the three core courses, students choose one of two tracks: **Pathway I** or **Pathway II**. All of the required core courses and course options for both pathways are currently being taught and have capacity for the additional number of students expected to enroll in the minor (see Anticipated Enrollment section)

Pathway I has been in place in the Department of Education since 2016 and includes courses for Education majors who want to pursue additional teaching licensure endorsement for PreK-12 English language learners. Courses for this track include EDTE 201-Teaching English Language Learners; LING 080-Intro to Linguistics and either LING 170-TESOL and Applied Linguistics or LING 177-Second Language Acquisition. Pathway I also requires a 3-credit practicum course (EDTE 295-Practicum for working with English Learners), making the total number of credits required for this pathway 21. This is one credit more than the maximum credits specified in the Standards for Minors, however it was deemed reasonable considering this pathway leads to a teaching licensure endorsement that must meet necessary criteria.

Pathway II is a general track for both majors and non-majors who want to develop competency working with culturally and language-diverse communities in a wide variety of professional and community settings. In addition to Education courses, the list of courses from which students pursuing this pathway select includes courses from other departments and programs (Anthropology; Community Development and Applied Economics; Linguistics; Communication Sciences and Disorders; Health Education; Geography; Social Work; Sociology; Human Development and Family Studies). The choice of courses reflects the importance of interdisciplinary and cross-curricular knowledge and skills. Students must select a minimum of three courses from the list for a total of 18 credits (including the nine credits of required coursework).

There are no prerequisites or major restrictions for either pathway.

Admission Requirements and Process

Students will be invited to apply for the minor by completing an application. Admission will be based on a grade of at least a B– in EDTE 056 as well as a written statement of interest. A selection committee of at least two faculty will review applications and make decisions regarding admission into the minor.

Anticipated Enrollment and Impact on Current Programs

It is estimated that 8 to 10 students will be enrolled in Pathway I each academic school year, and 10 to 12 students in Pathway II each semester. Given the small number of students and lack of other minors that provide similar training, impact on current programs is anticipated.

Advising

Dr. Reyes will serve as the secondary advisor to students in the minor. Additionally, faculty will be included to serve in this capacity should the minor exceed expected enrollments (over 50 students).

Staffing Plan, Resource Requirements, and Budget

Given that the minor draws on existing courses, no additional staff, resources, or budget are required.

Evidence of Support

Both Dean Falls of the College of Arts and Sciences and Dean Prelock of the College of Nursing and Health Sciences have expressed their support of the minor. In addition, letters of support were obtained from faculty involved in teaching courses included in the minor.

Summary

The newly proposed Minor in Education for Cultural and Linguistic Diversity will enhance the education of both Education majors who are preparing to teach in PreK-12 schools with English language learners and non-Education majors who will work in professions in diverse settings by providing valuable training in training in the impact of multiculturalism, language learning issues, and diversity. As a result of participation in the ECLD minor, students will become more knowledgeable about culturally and linguistically diverse communities and develop competencies and skills to work in PreK-12 schools and a multicultural society. Given the growing number of immigrants and their US-born children in this country, and corresponding increase in the ELL students in PreK-12 classrooms, this new minor represents a valuable addition to UVM's curricular offerings by providing training, with an option for licensure, in an area of great importance that will also improve chances of employment.

**Curricular Affairs Committee
of the Faculty Senate**

MEMO

To: The UVM Faculty Senate
From: Curricular Affairs Committee of the Faculty Senate, Laura Almstead, Chair
Date: March 3, 2017
Re: Approval of a proposal for a new Minor in Education for Cultural and Linguistic Diversity submitted by the College of Education and Social Services

At its meeting on March 2, 2017, the Curricular Affairs Committee unanimously approved the action recommended in the following memo and attached proposal.

The Curricular Affairs Committee unanimously approved a proposal for a University-wide General Education requirement in Quantitative Reasoning. The proposal, which was developed by a committee of dedicated faculty, puts forth the resolution below. The full proposal is attached to this memo, and describes the development process and specific courses identified as fulfilling the proposed requirement. If approved by the Faculty Senate and Board of Trustees, the requirement will be implemented starting Fall 2017.

Resolution

Be it resolved, that beginning with entering fall 2017 undergraduates, the Quantitative Reasoning proficiencies be made a General Education requirement.

Be it also resolved, that the following language be used in the course catalog:

"Quantitative Reasoning (QR) requirement: Beginning with the entering first-year class in fall 2017, all undergraduates must meet the Quantitative Reasoning General Education requirement for the University of Vermont. To meet this requirement, students must complete a course, curriculum, or co-curriculum prior to graduation that has been approved by the Faculty Senate's Quantitative Reasoning Curriculum Review Committee.

Topic: Quantitative Reasoning General Education Requirement

Date: February 18, 2017

Committee Membership:

Joan Rosebush, Mathematics, Committee Chair

Judith Christensen, Psychological Science

Lia Cravedi, Secondary Education

Stephanie Phelps, Microbiology and Molecular Genetics

Larry Rudiger, Psychological Science

Joan Rosebush, Chair and named above, brought the committee together in July 2016.

Charge:

We were tasked with the following:

- 1) Developing learning proficiencies in the area of quantitative reasoning,
- 2) Developing a method for assessing whether a course contributes to the quantitative reasoning requirement, and
- 3) Developing an assessment plan that would be implemented in the future.

Steps Taken by Our Committee:

To meet our charge, we have engaged in the following activities, beginning with our first meeting in July 2016 and culminating in this proposal.

1. We reviewed the General Education goals and definition of Quantitative Reasoning President Sullivan outlined in the October 22, 2014 Issue of Vermont Quarterly.

“At the University of Vermont, our faculty over a course of years has developed six learning outcomes within its general education criteria. These learning outcomes are 1) communication, writing, and information literacy; 2) quantitative reasoning; 3) science, systems, and sustainability; 4) cultures, diversity, and global perspectives; 5) integrating and the application of knowledge; and 6) art, aesthetic and design. These carefully considered learning outcomes, I believe, address almost all of the issues contained in the debate about the purpose of an education and the responsibility of our universities.”

What is Quantitative Reasoning?

(President Sullivan uses “quantitative reasoning,” while The Mathematical Association of America, (MAA), refers to it as “quantitative literacy.”)

According to The Mathematical Association of America (MAA),

“A quantitatively literate college graduate should be able to:

- Interpret mathematical models such as formulas, graphs, tables, and schematics, and draw inferences from them.
- Represent mathematical information symbolically, visually, numerically, and verbally.

- Use arithmetical, algebraic, geometric and statistical methods to solve problems.
- Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives, and select optimal results.
- Recognize that mathematical and statistical methods have limits.”

The MAA guidelines further explain quantitative literacy expectations of college students: “The level of sophistication and maturity of thinking expected of a college student should extend to a capability for quantitative reasoning which is commensurate with the college experience. College students should be expected to go beyond routine problem solving to handle problem situations of greater complexity and diversity, and to connect ideas and procedures more readily with other topics both within and outside mathematics.”

2. We generated a rationale for the Quantitative Reasoning requirement.

The Quantitative Reasoning General Education requirement is intended to assure that graduates of the University of Vermont possess the ability to think critically, evaluate information, and reason quantitatively in order to excel in their chosen field and to perform as successful citizens in the world.

3. We identified expected proficiencies embedded in the identified quantitative reasoning courses.

Each student will be a productively numerate citizen who will be proficient in:

- Interpreting data represented in a variety of ways, such as graphs, tables, and charts;
- Solving problems, through the use of patterns, numbers, and symbols;
- Evaluating the value and validity of provided information;
- Determining if the solution to a quantitative problem makes logical sense in the real world;
- Formulating alternative solutions; and
- Communicating effectively the thought process used to interpret and solve the problem.

Note: We understand that each of the six (6) proficiencies will not be emphasized equally in each course that will fulfill this requirement. We believe that our students will be proficient in at least four of the six areas with any of the courses fulfilling the Quantitative Reasoning requirement.

4. Rebecca Clark in the Registrar’s Office gave us the list of University’s majors and the minimum MATH requirement of each major. (This “MATH” requirement also included courses in CS, PHIL, and STAT.)

The courses in which these proficiencies are evaluated include, but are not limited to:

- MATH numbered 009 or higher,

- STAT numbered 051 or higher,
- CS numbered 008 or higher, or
- PHIL 013*.

**Note: The committee thought that Phil 013 was an appropriate course to include in the above list however; we felt it was important to support this assertion with evidence. Chair Rosebush attended the course and noted the following: “the symbolic representation is similar to that in mathematics. “Math with words” is how many students express PHIL 013. The logical thought required and the symbolic notation used, make it akin to a mathematics course. Also, a student in that class with whom Chair Rosebush spoke told her that with his mathematics learning disability, a MATH course would be “extremely difficult, if not impossible” for him. PHIL 013 makes sense to him since words, instead of numbers, are around the operation symbols.*

5. We addressed the fact that there were three (3) majors that either had no quantitative reasoning requirement or did not include one of our specific quantitative reasoning courses. The majors were Human Development and Family Studies, Art Education, and Music Education. (See Appendix A: Minimum Quantitative Reasoning Requirement by Major.)

Prior to bringing this proposal forward for consideration, committee members contacted Larry Shelton from Human Development and Family Studies, Erika White from Art Education, and Patricia Riley from Music Education. All of the three (3) programs are willing to revise their program sequence and advisement processes to ensure each student will have one or more of the above courses on their transcripts at graduation.

6. We contacted a representative group of Quantitative Reasoning instructors and asked them to identify which proficiencies are addressed in their courses.

A survey was sent to the fall 2016 instructors of CS 008, MATH 009, PHIL 013, and STAT 051. The survey included a list of the six (6) proficiencies introduced previously in this proposal (see #3). Instructors, without having seen the proficiencies prior, responded to the question “Which of these proficiencies do you address in your course?” Results were sent to Chair Rosebush, who summarized them. Seven (7) of the eight (8) course instructors surveyed indicated that they address a minimum of four (4) of the six (6) proficiencies. One course instructor reported she addresses three (3) of the six (6) proficiencies.

This proved to be a valuable step in the process, as it provided baseline data about what is already occurring in the target courses. It affirmed that these are appropriate courses in which to assess the Quantitative Reasoning proficiencies.

It is of note that the instructor of MATH 009A, the course in which only three (3) of the six (6) proficiencies were addressed in the fall of 2016, found the proficiencies illuminating. She affirmed that she definitely would include all of the proficiencies in the course the next time she teaches it. (She communicated this in a personal communication with Chair Rosebush.)

7. We wrote a brief description for each of the identified quantitative reasoning courses. (Note that courses with CS, MATH, and STAT prefixes numbered higher than the course indicated below also fulfill the requirement.)

CS 008: Introduction to Web Site Development

This course provides a strong foundation in working with images, beginning web programming, and web design so that students can create a functional web site.

MATH 009: College Algebra

This course covers sets, relations, functions with particular attention to properties of algebraic, exponential, logarithmic functions, their graphs and applications.

PHIL 013: Introduction to Logic

This course covers the basic principles of deductive inference. When does one statement follow from another? When is one statement a logical consequence of another? This course helps students cultivate skills they can put to use to decide whether arguments they encounter in their daily lives really demonstrate the truth of their conclusions. The course will introduce students to the concepts and techniques used in first order logic. The material covered is technical in nature. The aim is to first formalize and then analyze natural English statements using the symbolic language and methods of this first order logic.

STAT 051: Probability With Statistics

This course is an introduction to probabilistic and statistical reasoning, including probability distribution models and applications to current scientific/social issues. The roles of probability, study design, and exploratory/confirmatory data analysis are covered. It covers the basic reasoning used in probability models of the real world, with statistical applications.

8. We checked the historical enrollments in our identified quantitative reasoning courses.

An analysis of historical enrollments for CS 008, MATH 009, PHIL 013, and STAT 051 indicated that there is sufficient room in these courses to accommodate students in the three majors that do not currently include a course meeting the proposed Quantitative Reasoning requirement.

Assessment:

We are able to assert that students have the opportunity to achieve competence in four (4) of the six (6) proficiencies by taking one of the courses listed above. We created a form for tracking student competence in four (4) of the six (6) proficiencies.

Staffing Plan, Resource Requirements, and Budget:

Given that the Quantitative Reasoning requirement draws on existing courses, no additional staff, resources, or budget will be required.

Proposed Motions:

Be it resolved, that beginning with entering fall 2017 undergraduates, the Quantitative Reasoning proficiencies be made a General Education requirement.

Be it also resolved, that the following language be used in the course catalog:

"Quantitative Reasoning (QR) requirement: Beginning with the entering first-year class in fall 2017, all undergraduates must meet the Quantitative Reasoning General Education requirement for the University of Vermont. To meet this requirement, students must complete a course, curriculum, or co-curriculum prior to graduation that has been approved by the Faculty Senate's Quantitative Reasoning Curriculum Review Committee.