Revision of General Education at Virginia Tech

Proposed by The University Curriculum Committee for Liberal Education (UCCLE)[1]

Undergraduate students at Virginia Tech deserve a vibrant, flexible, and meaningful general education program, one that helps them to integrate their learning for use throughout their lifetimes. Over the years, faculty members have studied general education, and students have voiced their concerns. As the culmination of so much input, a new plan has emerged-- Pathways: General Education at Virginia Tech. This proposal describes a model that includes core and integrative learning outcomes to meet the learning needs of all students while also meeting requirements for university accreditation. The plan involves the development of a coherent program comprised of courses reflecting best practices in pedagogy and demonstrating evidence of efficacy.

This document describes the outcomes and learning indicators and includes a description of the proposed transition process and supporting infrastructure. The Pathways curriculum has the potential to become a signature program at Virginia Tech, enhancing the student experience and making this institution a leader among peers in providing a coherent and meaningful general education for undergraduates.

Rationale

Impetus for Change

Nationally, a conversation regarding reform of general education has been ongoing for over a decade. The Association of American Colleges and Universities (AAC&U) has been at the forefront of this dialog with recommendations that include outcomes-based curriculum, access to high-impact practices for all students, development of civic and intellectual capacities, the connection of general education and the major, and integrative learning. AAC&U publications, including employer surveys, and Virginia Tech faculty participation at related workshops have greatly influenced the decision to revise this general education curriculum to align with those strategies that have been identified as best practices.

One consideration more recently defined nationally by AAC&U is the difference between general education and liberal education:

Liberal Education is an approach to learning that empowers individuals and prepares them to deal with complexity, diversity, and change. It provides students with broad knowledge of the wider world (e.g. science, culture, and society) as well as in-depth study in a specific area of interest . . .The broad goals of liberal education have been enduring even as the courses and requirements that comprise a liberal education have changed over the years. Today, a liberal education usually includes a general education curriculum that provides broad learning in multiple disciplines and ways of knowing, along with more in-depth study in a major. (Available at https://www.aacu.org/leap/what-is-a-liberal-education)

A student's integrative education includes the major, general education, and other studies. General education at Virginia Tech should be seen as one part of liberal education and named accordingly.

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[1] The name of this committee will be changed. Any use of "UCCLE" in this document refers to the faculty governance committee that oversees general education and reports to the Commission on Undergraduate Studies and Policies.

At Virginia Tech, the calls for change have emerged from various students, faculty and administrators.

The 2012-2018 Strategic Plan, "A Plan for a New Horizon," includes this projection about general education:

> Given the dynamic and unpredictable nature of the world in which our students will live, it is important to reexamine the effectiveness of our general education program. We must consider radical changes that will meet these goals. . .To this end, Virginia Tech will integratively evaluate and modify the current Curriculum for Liberal Education to embrace alternate pathways to a general education. . .(p. 14)

While the call for change in the Strategic Plan is recent, students and faculty have shared in workshops, surveys, focus groups, and committees for at least 12 years as they looked to revitalize general education. Students question the value of general education because the courses are disconnected and there is little sense of a coherent program. They wonder why they're taking these courses and often choose courses based on open slots in their schedules--not because of interest or desire to complete an integrated set of courses.

Many faculty recognize that the current system includes excellent courses, but they agree with students that those courses are disconnected. The lack of coherence can undermine students' long-term learning.

Additionally, the CLE is impossible to assess so that Virginia Tech can (1) assure and maintain high quality in general education and (2) meet the university's obligations for assessment in order to maintain accreditation.

UCCLE (formerly the University Committee for the Core Curriculum) has spent countless hours organizing workshops, studying general education, and making recommendations. The following list includes examples of faculty involvement over time:

- 2002 -- The Provost funded a working group of faculty to study the Core Curriculum. Recommendations included broader consideration of the purpose, structure, and approach to the Core.
- 2004 – University-wide Mini-Retreat to Review, Refine and Revitalize the Core Curriculum – As a result, pilots were created for the 21st Century Integrative Studies Program.
- 2005 – Ad Hoc Committee on the Core Curriculum--including faculty, department heads and administrators--developed recommendations, described in the report: "Integrating Virginia Tech's General (Liberal) Education into the Undergraduate Curriculum, calling for greater integration and synthesis among educational experiences.
- 2006 – "Pathways" designated as metaphor for the Virginia Tech undergraduate experience in an update to VT's strategic plan
- 2010 –
  - AAC&U Symposium by AAC&U's Susan Albertine, Senior Director of LEAP States initiative: "Trends in General Education for the 21st Century" – attended by 52 faculty from across VT.
  - Student and faculty surveys – Perceptions of General Education – Results reported to VT faculty and presented at AAC&U Conference, Chicago
  - UCCLE submitted recommendations to enhance the CLE and align with AAC&U learning outcomes.

- o Report of the Undergraduate Strategic Plan Task Force addressed general education, recommending celebration of the value of gen ed, alternative paths, transparent funding, administrative structure, and assessment (Goals 30-34).
- 2011 – "Connecting Gen Ed, Liberal Learning, and the Major" – workshop at VT open to all faculty, presented by Paul L. Gaston, former Provost, Kent State University, co-author of AAC&U's *Practical Approaches to General Education and Liberal Learning*
- 2012 – Proposal for Integrative General Education shared with VT faculty. Extensive responses from faculty across campus led to improved process for development of new Pathways plan.
- 2013-14 – Interdisciplinary faculty members of Curricular Planning Teams (Attachment 1) develop learning outcomes and indicators for proposed Pathways curriculum.
- 2014 -- April 21 Open House -- Draft outcomes and indicators shared with the university community. Feedback collected and disseminated to Curricular Planning Teams.
- 2014 – AAC&U's 2014 Institute on General Education and Assessment, Burlington, VT – participation by 8 VT representatives who analyzed progress to date and developed plans to enlarge the circle of participation in the process and planning for approval, transition and implementation.

Over these 12 years–and even since the Core Curriculum was first implemented--many departments have updated their undergraduate degree programs numerous times. After much study and reflection, it became clear that Virginia Tech should demonstrate the same responsiveness in general education to changes in student learning needs, disciplinary emphasis, assessment, and high-impact practices in pedagogy.

Considerations for New General Education

A vision for a more robust and meaningful general education grew with numerous considerations and challenges as part of an eventual plan. A revised program must meet the following criteria:

- Meet accreditation requirements for general education with specified areas of study and evidence of student learning.
- Build a curriculum focused on measurable learning outcomes.
- Create a structure to promote both foundational and integrated learning.
- Infuse learning-centered pedagogies across the curriculum.
- Retain and expand opportunities for exploration by students.
- Maintain access for transfer students, non-traditional students, and students with Advanced Placement, International Baccalaureate, or dual enrollment credit.
- Respect time to degree.
- Ensure flexibility, scalability, and continuous improvement.
- Align with best practices identified by the AAC&U.

The following proposal for a revised general education program meets these criteria and includes a discussion of mission, guiding principles, outcomes, hours, options, the transition and implementation process, and administration and support.

Pathways: General Education at Virginia Tech

Mission

As a central component of the undergraduate experience at Virginia Tech, the Pathways curriculum will guide students to examine the world from multiple perspectives and integrate their knowledge across disciplines and domains of learning through a hands-on, minds-on approach.

Guiding Principles for the Enhancement of General Education

The Pathways curriculum will provide a breadth of learning drawn from various disciplines and will be developed in accordance with the following principles**:**

1. Integration. The promotion of integration in students' learning is crucial to students' ability to create meaning, explore connections, and build knowledge and skills for their academic, professional, civic, and personal lives. Students will meet many of the learning outcomes by taking sequenced courses that build upon one another, adding a dimension of depth to the curriculum. As they participate in one of three paths through general education, undergraduates will have opportunities to make meaning of their general education curriculum through the integration of diverse ways of knowing, recognizing that the whole is truly greater than the sum of its parts. The incorporation of the integrative learning outcomes--Ethical Reasoning and Intercultural and Global Awareness—throughout the curriculum will further enable students to connect the courses and identify various perspectives on these themes. This ability to integrate new learning into their ways of seeing the world will help students build a competency they will need for the rest of their lives.

2. Inclusivity. The Pathways curricular structure will address the needs and challenges of populations of students and acknowledge the diverse paths they have taken to Virginia Tech, including such groups as first-semester freshmen, first-generation college students, transfer students, and veterans. In turn, the Pathways curriculum will prepare these diverse groups of students to become contributors to the global society in which they will live and work. To support this effort, inclusive pedagogies that foster deep learning in all students will be adopted. Extending this principle, all students will be encouraged to examine issues of diversity and inclusion, such as gender, race, socio-economic status, and sexual orientation. This will be accomplished through the integration of outcomes in intercultural and global knowledge across the Pathways curriculum.

3. Relevance. The Pathways curriculum will be relevant to students' personal development, helping them to integrate new learning into their lives for current and long-term application. The curriculum will challenge undergraduates in fundamental areas of learning, which will be relevant to major courses and activities across the undergraduate years and beyond. Students will also develop the skills they will need for success in every area of their lives: communication, problem-solving, critical thinking, ethical behaviors, inquiry, and creativity.

In order to accomplish these principles, the Pathways model will be outcomes-based and will focus on measures of students' learning across disciplinary boundaries. The curriculum will be transparent and explicit in its outcomes, which have been developed through broad

participation by faculty. Such outcomes are widely validated by employers, educators and alumni. To further support the principles, the Pathways curriculum will endorse the incorporation of learning-centered pedagogy and assessment of all courses. The curriculum will be designed with an infrastructure that is responsive to student need, measures of learning, disciplinary changes, and new research related to general education. Robust assessment of the Pathways curriculum at the level of the course and the program is necessary to determine program effectiveness and to identify areas for attention and improvement. The goal of this assessment will be the continuous improvement of student learning. The curriculum will also be responsive to research about student learning that may foster changes in pedagogical approaches to teaching and learning, requiring new calls for faculty development or even changing guidelines.

Learning Outcomes -- Overview

The Pathways curriculum includes five core learning outcomes and two integrative learning outcomes (LOs). The outcomes reflect broad knowledge areas for study, and are supported by indicators of learning. These indicators describe the observable behaviors that students will demonstrate as they pursue breadth and/or depth related to particular outcomes. The core LOs reflect the most traditional distribution model of general education and could be met either at Virginia Tech or with credits earned via transfer, Advanced Placement, or International Baccalaureate credit. The integrative outcomes are those that could be met along with a core LO in a particular course.

Core Learning Outcomes
- Discourse
- Quantitative and Computational Thinking
- Reasoning in the Natural Sciences
- Critique and Practice in Design and the Arts
- Reasoning in the Social Sciences
- Critical Thinking in the Humanities

Integrative Learning Outcomes
- Ethical Reasoning
- Intercultural and Global Awareness

Options for Exploration

Students might pursue the Pathways curriculum in one of three options: the traditional distribution model, the Pathways Minor, or the Alternative Pathway. All three of these options were recommended in the 2005 report of the Provost's Ad Hoc Core Committee Steering Committee and have been requested by students and faculty alike. The thematic or more flexible options have been operating in practice to provide students meaningful and cohesive general education experiences. By formally articulating and supporting these options, the University will be positioned to increase access to these programs so that more students can participate.

Pathway I – Distribution Model (traditional)

This model is the one most like Virginia Tech's Curriculum for Liberal Education, one in which students choose a certain number of courses from certain categories. Students transferring from community colleges will find that many of their transferred courses will be equivalent to VT courses and will count toward meeting the core learning outcomes. They may or may not have courses that will help them meet the integrative learning outcomes, but such courses would be available to them at Virginia Tech in the major or in general education.

Pathway II -- Pathways Minors

Cross-disciplinary Pathways minors will enable students to experience the breadth of learning espoused by a general education program as well as depth and integration of learning not easily afforded through discrete courses that address specific general education learning outcomes. Pathways minors offer students a cohesive and/or thematic pathway through a significant portion of their general education curriculum. Earning a minor should provide tangible and recognizable value for a student, particularly when the minor is chosen thoughtfully to complement learning in the student's major field of study. All students undertaking Pathways Minors must still complete the remainder of the Pathways credit hours and outcomes not covered by the minor.

Criteria for Pathways Minors – A Pathways minor will meet the following guidelines:
- Consist of at least 18 credits (at least 6 at the 3000-4000 level).
- Be administered by an academic unit (department or college). Multi-college programs are encouraged and expected to be the norm, but one unit must assume administrative responsibilities for scheduling courses and enrolling students.
- Include required coursework approved to meet at least three different core general education outcomes
- Meet the integrative outcomes of a) ethical reasoning and b) inclusive, intercultural and global awareness
- Present no barriers to admission. All undergraduate students must be eligible to enter the minor.
- Include a capstone/summative experience in which students will apply and reflect upon their general education demonstrating creativity and integration of learning.
- Secure approval by UCCLE as a Pathways minor.

Pathway III-- Alternative Pathways

Students have long called for more flexibility in meeting the goals of general education. Alternative Pathways will afford Virginia Tech undergraduates creative opportunities to meet general education outcomes through integrated experiences that incorporate high-impact learning practices such as study abroad, undergraduate research, internships and service learning. Students who choose an Alternative Pathway must also meet any learning outcomes not addressed by that pathway.

Criteria for Alternative Pathways – An Alternative Pathway must meet the following guidelines:
- Be overseen by a faculty member who reviews student progress toward meeting general education outcomes. For some experiences (e.g. study abroad), the faculty member may be leading a program in which multiple students participate and which may be offered repeatedly.

- Meet at least three different core general education outcomes and the two integrative outcomes.
- Include a capstone/summative experience where students will apply and reflect upon their general education demonstrating creativity and integration of learning.
- Be described in a plan submitted for approval in advance of the learning experience. The Office of General Education will review proposals for Alternative Pathways and forward recommendations to UCCLE. UCCLE will vote on approvals.
- Be verified as completed by the participating faculty member. (This is a similar process as used in an independent study.) Students will share final reports, projects or portfolios with the Office of General Education.

Detailed Learning Outcomes and Indicators

The language of the core learning outcomes and indicators was developed in concert with Curricular Planning Teams and various faculty across campus, including those who might offer related courses and those whose students might be taking those courses. Academy of Teaching Excellence members and Diggs Teaching Scholars comprised a significant part of the membership of the Curricular Planning Teams (36%) as well as the membership of UCCLE (38% of current membership).

The hours determined for each outcome reflect the minimum number of hours that <u>all</u> students will devote to that outcome. Students may certainly choose to take more hours in general education. As part of their majors, students will obviously be required to complete more hours related to certain outcomes. For example, English majors will take more hours in discourse, science and engineering majors will certainly take more hours in the outcome related to the natural sciences.

Considerations for all Learning Outcomes

As always, general education could include courses from any department; consequently, no specific departments or disciplines are listed along with the outcomes below. All departments have the opportunity to participate by submitting courses that will meet the criteria of general education:

- Support the mission and principles of general education
- Meet the learning outcomes and indicators
- Emphasize teaching <u>and</u> learning
- Plan for assessment for university-level program evaluation and also for SCHEV, SACS, and other accrediting bodies

Additionally, the following considerations apply to all LOs:

Advising. Where options are available for ways students might meet the LOs, those options might be defined or suggested by programs in the major and/or advisors.

Advanced/Applied courses. In the following descriptions of outcomes and indicators, an advanced/applied course is considered to be one at the 2-4000 level that builds on a previous course. For example, a student might take English 1105-1106 at the foundational level and then take a writing or speaking course (2-4000 level) that builds on that knowledge, extends the skillset, and provides practice. The indicators may be met across sets of courses in a curriculum.

Language. Achievement in general education builds on a necessary foundation of English language proficiency. Courses taught in a language other than English and meeting the criteria of general education may be included.

Core Learning Outcomes and Indicators

Discourse is the exchange of ideas in writing or speaking, adapted to specific contexts and developed through discovery, analysis, creation, presentation, and evaluation. A student who is competent in discourse demonstrates the ability to reason, write, and speak effectively for academic, professional, and public purposes. In meeting the Discourse LO, students will demonstrate increasing proficiency over the years. All learning indicators would be met in all courses, but expectations for proficiency would be heightened for advanced/applied courses.
Credit hours: 9 credits--6 foundational + 3 advanced/applied writing and/or speaking courses

Indicators of Learning
1. Discover and comprehend information from a variety of written, oral, and visual sources.
2. Analyze and evaluate the content and intent of information from diverse sources.
3. Develop effective content that is appropriate to a specific context, audience, and/or purpose.
4. Exchange ideas effectively with an audience.
5. Assess the product/presentation, including feedback from readers or listeners.

Quantitative and Computational Thinking is creative engagement with the world by the manipulation of precisely defined symbolic representations. Quantitative thinking is the formulation of questions that can be addressed using mathematical principles, leading to answers that include reliable and usable measures of accuracy. Computational thinking is the ability to conceive meaningful, information-based representations of the world that can be effectively manipulated using a computer. Courses addressing this outcome must meet a majority of the learning indicators. Only the combination and integration of quantitative and computational courses will serve to meet this learning outcome.
Credit hours: 9 credits--6 foundational + 3 advanced/applied

Indicators of Learning
1. Explain the application of computational or quantitative thinking across multiple knowledge domains.
2. Apply the foundational principles of computational or quantitative thinking to frame a question and devise a solution in a particular field of study.
3. Identify the impacts of computing and information technology on humanity.
4. Construct a model based on computational methods to analyze complex or large-scale phenomenon.
5. Draw valid quantitative inferences about situations characterized by inherent uncertainty.
6. Evaluate conclusions drawn from or decisions based on quantitative data.

Reasoning in the Natural Sciences involves the acquisition of the detailed knowledge of one or more of the natural **sciences**, hands-on experience with how science is conducted, what science can and cannot tell us about the universe, and the relationship between science and society. Courses addressing this outcome must meet a majority of the learning indicators.
Credit hours: 6 credits (with an additional 2 lab credits for students in some majors)
 Indicators of Learning
 1. Explain the foundational knowledge of a particular scientific discipline.
 2. Apply principles and techniques of scientific inquiry.
 3. Evaluate the credibility and the use/misuse of scientific information.
 4. Analyze the reciprocal impact of science and society.

Critique and Practice in Design and the Arts involves a hands-on, minds-on approach by which students acquire the intellectual tools for a richer understanding and knowledge of the process, meaning and value of the fine, applied and performing arts and creative design. This outcome recognizes that the creative design process can and should be applied to a broad range of disciplines. Courses addressing this outcome must meet a majority of the learning indicators. To meet this learning outcome, students will study the arts and design thinking in two courses: either 1 design and 1 arts course, or 2 integrated courses.
Credit hours: 6 credits--3 design + 3 arts, or 6 integrated design and arts
 Indicators of Learning
 1. Identify and apply formal elements of design or the arts.
 2. Explain the historical context of design or the arts.
 3. Apply interpretive strategies or methodologies in design or the arts.
 4. Employ skills, tools, and methods of working in design or the arts.
 5. Produce a fully developed work through iterative processes of design or the arts.

Reasoning in the Social Sciences is the utilization of quantitative and qualitative methods to explain the behavior and actions of individuals, groups, and institutions within larger social, economic, political, and geographic contexts. Courses meeting this outcome will help students to understand that they are a small part of a larger global community and to engage with diverse individuals, groups, and ideas that have shaped or continue to shape the worlds they inhabit. Courses addressing this outcome must meet a majority of the learning indicators.
Credit hours: 6 credits
 Indicators of Learning
 1. Identify fundamental concepts of the social sciences.
 2. Analyze human behavior using theories and methods of the social sciences.
 3. Identify interconnections among and differences between social institutions, groups, and individuals.
 4. Analyze the ways in which values and beliefs relate to human behavior and social relationships.

Critical Thinking in the Humanities involves the interpretation and analysis of texts and other created artifacts to understand ideas, values, and identities in various spatial, cultural, and temporal contexts. Courses meeting this outcome will help students to

understand that they are a small part of a larger global community and to engage with diverse individuals, groups, and ideas that have changed and will be changing over time. Courses addressing this outcome must meet a majority of the learning indicators.

Credit hours: 6 credits

> **Indicators of Learning**
> 1. Identify fundamental concepts of the humanities, including reading of complex texts.
> 2. Analyze texts and other created artifacts using theories and methods of the humanities.
> 3. Interpret texts and other created artifacts within multiple historical, intellectual, and cultural contexts.
> 4. Synthesize multiple complex sources and create a coherent narrative or argument.

Integrative Learning Outcomes and Indicators

These learning outcomes are integrative in that they are woven throughout the curriculum. The need for students to have knowledge and skills in these areas is crucial to all aspects of their lives. Students will develop the capacity to recognize these concepts as they apply to any discipline, thus helping them to consider and connect various perspectives.

To support this integration, every Pathways course will address at least one of the Integrative Outcomes. This infusion of the Integrative Outcomes into general education will signal the importance of these concepts to students at Virginia Tech, and the concepts will be further highlighted by discussions that already exists in the majors. Pathways Minors will also address both outcomes.

Many existing courses will be immediately ready to meet one of these outcomes. However, given that this aspect of Pathways may require more significant course redesign for some faculty, there will be a two-year phase-in of this requirement. Courses not initially ready to meet one of these outcomes may be provisionally approved for inclusion in general education so that there will be no interruption in availability of necessary courses to students. By 2018, the courses can be permanently approved with information about ways the courses will meet one of the outcomes.

Faculty will be supported in integrating these outcomes into general education courses through a suite of resources including teaching modules and professional development opportunities.

The language of the integrative learning outcomes is based on the standards of the Association of Association Colleges and Universities as shown in the VALUE Rubrics (available: http://www.aacu.org/value/rubrics).

> **Ethical Reasoning** is a thought process regarding what is right and wrong in human conduct. In today's complex and diverse world, ethical behavior requires more than just the desire to "do the right thing." Foundational learning of ethical theories, issues, and applications will support students in developing strategies for formulating and executing ethical decisions in their professional and personal lives. Courses addressing this outcome must meet a majority of the learning indicators.
> **Credit hours:** This learning outcome will be met in conjunction with Core Outcomes. No extra hours will be necessary.
> **Indicators of Learning**

1. Explain significant ethical theories and which best apply to one's personal beliefs.
2. Identify ethical issues in a complex context.
3. Apply specific ethical perspectives to an issue, identifying the implications of this application.

Intercultural and Global Awareness supports effective and appropriate interaction with a variety of people and different cultural contexts. Considerations of diversity and inclusion are crucial for students in an increasingly complex world. An important application of this learning is the critical analysis of global systems and legacies and their implications for people's lives and the earth's sustainability. Courses addressing this outcome must meet a majority of the learning indicators.

Credit hours: This learning outcome will be met in conjunction with Core Outcomes. No extra hours will be necessary.

Indicators of Learning
1. Identify advantages of diversity and inclusion in communities and organizations.
2. Interpret an intercultural experience from both one's own and another's worldview.
3. Address significant global challenges and opportunities in the natural and human world.

Rationale for Credit Hours Required

The plan for Pathways is projected at 42 hours, which is necessary for students to accomplish the breadth and depth they need for their current lives as students and their future lives as professionals, citizens, and family members. With the new focus on learning outcomes, however, students will be able to meet some of the outcomes in major.

Even in 1992, faculty saw the need for more hours in general education. At that time, the Core Curriculum was updated to add Area 7 and was approved to expand to 42 hours. (See Policy memo #125.) Although this expansion has not yet occurred, a 42-hour general education program is already approved.

In the Pathways curriculum, some course work may meet more than one outcome. Although that double-counting of courses will be possible, the goal of general education will still be to provide a breadth of experience for students across disciplines. A review of current major checksheets indicates that the new requirement for hours will not delay time to degree.

Essentially, the learning outcomes and associated hours assure that every Virginia Tech student has the opportunity to meet these outcomes. Some may already be meeting an outcome in a course required in the major (advanced Discourse, for example), but others may not have that opportunity.

The hours for specific outcomes were developed with the following considerations for the core and integrative learning outcomes.

Discourse (9 credit hours) – This learning outcome was designed to include 2 foundational writing courses and 1 writing or speaking course at the 2-4000 levels. Many students earn credit for those foundational courses through AP, IB, dual enrollment, or other community college credit. In the current CLE, they might never take a class in discourse at VT or above that 1000 level. In 1992, that gap was addressed with a plan for writing-intensive (WI)

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courses (an additional 6 hours – for a total of 12 hours in Writing and Discourse), but that plan was changed in 2004 (Policy Memo #231), when it was determined that some of the WI courses were barely meeting the WI guidelines. The Pathways plan puts the emphasis back on courses that are designed to teach writing or speaking, with opportunities for feedback and practice. Many majors already require such a course; that course would now be integrated with general education and would not require new resources.

Quantitative and Computational Thinking (9 credit hours) – In a similar fashion, the Curricular Planning Teams suggested 2 foundational courses and 1 advanced/applied course. The CLE required 6 credit hours in Quantitative Reasoning, but no course in Computational Thinking. This extension of the requirement is based on recommendations from the Curricular Planning Teams, the strategic plan, and a widespread recognition that access to data and powerful tools for its analysis and manipulation have increased exponentially in every field of study in the years since Virginia Tech's general education curriculum was revised.

Reasoning in the Natural Sciences (6 credit hours for all students + 2 lab hours for students in some majors) – The Pathways curriculum would require 2 courses of all students to meet this outcome. These courses may be lecture, lab or a combination of both, as long as students are engaged in science to meet the indicators of learning. Students in some majors may need an additional 2 hours of lab credit in association with the 6 hours required of all students.

Critique and Practice in the Design and the Arts (6 credit hours) – The requirement for this LO expands the former requirement by hours and content. The CLE requirement for Creativity and Aesthetic Experience was a single course of 1 or 3 credit hours. In order to achieve a rigor of learning in this outcome that is parallel to the others, meet the outcomes articulated in the current Virginia Tech strategic plan, and achieve parity with Virginia (SCHEV) approved institutions, the Curricular Planning Team determined that a minimum of 6 credit hours would be necessary. The expanded content is reflected in the "design thinking" that is expected as part of this outcome.

Reasoning in the Social Sciences (6 credit hours) – This learning outcome is similar to the current CLE requirement. Students might meet this outcome with 2 foundational courses in different disciplines or with one foundational and one advanced in the same discipline.

Critical Thinking in the Humanities (6 credit hours) – This learning outcome is similar to the current CLE requirement. Students might meet this outcome with 2 foundational courses in different disciplines or with one foundational and one advanced in the same discipline.

Ethical Reasoning (0 additional credit hours) – This learning outcome would be combined with other Pathways courses and would require no additional credit hours. Clearly, competence in ethical reasoning can't be achieved in just one course. Students who complete their general education requirements at Virginia Tech will receive maximum benefit from the incorporation of this LO with other Pathways courses. Transfer students who may have finished requirements for a distribution model at another institution would have the opportunity to encounter these concepts in an FYE course or in courses in some majors that already focus on ethical reasoning.

Intercultural and Global Awareness (0 additional credit hours) – This learning outcome would be combined with other Pathways courses and would require no additional credit hours. Clearly, competence in intercultural and global awareness can't be achieved in just one course. Students who complete their general education requirements at Virginia Tech will receive maximum benefit from the incorporation of this LO with other Pathways courses. Transfer students who may have finished requirements for a distribution model at another institution would have the opportunity to encounter these concepts in an FYE course or in courses in some majors that already focus on intercultural and global awareness.

<p align="center">**Approvals, Transition and Implementation**</p>

The following time frame is feasible, but certainly depends on the time the proposal needs to move through governance.

2014-2015
- Discussions continue with faculty and students.
- UCCLE drafts and approves formal proposal in fall 2014.
- Traditional governance process follows.

Spring 2015-Summer 2016
During this timeframe, the CLE will be maintained while the development of the Pathways curriculum will continue. All faculty development resources will be available to support the revision of existing courses and the development of new and innovative courses. The Office of General Education will offer workshops and one-on-one consulting for faculty advisors, addressing course proposals, checksheet revisions, and any other issues related to the transition of general education.

Course approvals. UCCLE will develop specific guidelines for course approvals that will be shared with the university community via the 15-day review process. Upon responding to feedback received from the university community, UCCLE will present criteria to the commission (CUSP) for approval. The approval of courses will continue to be made by UCCLE, a faculty committee, as part of traditional University governance during this transition time and beyond. UCCLE will rework the criteria for those proposals based on Pathways learning outcomes and indicators.

Any course that meets general education criteria can be approved for the Pathways curriculum. The approval process will include submission of information about the following:
- The outcomes and indicators addressed in the course
- How the outcomes are interpreted in the specific context of the course
- How students will meet the outcomes (examples of activities and pedagogies)
- How students will be evaluated as having met the outcomes

The process for course approvals will be streamlined so that courses are in place for incoming freshmen in Fall 2016. UCCLE will give the highest priority to the courses that will be required for those incoming freshmen. For CLE courses converting to Pathways, UCCLE can manage the conversion proposals in an expedited fashion. For new courses, there is the potential establishment short-term ad hoc committee, comprised of UCCLE and UCC members, to expedite the approval process.

Fall 2016 – Transition Considerations

Students who enter in Fall 2016 will have access to the new curriculum and the advising resources to help them make appropriate choices.

Students who entered VT previously will be able to complete the CLE. Since the distribution model will continue to exist in a similar format, courses will be available to meet the current areas of the CLE. Courses in Pathways will be identified as substitutions for any classes that are no longer part of general education. The Office of General Education will provide guidelines for students who are trying to finish CLE requirements once Pathways is implemented. Support will be offered to advisors, and a system will be set in place with the Registrar's Office so that students will not be burdened by the change.

Administration and Support

With oversight by UCCLE and the new Office of General Education, supported by the Office of the Provost, the Pathways curriculum will provide continuity, stability, and transparency to maximize opportunities, use resources effectively, and reward the efforts of students and faculty. UCCLE will continue to approve course proposals, to monitor the quality of general education, and to report to CUSP. However, this faculty committee does not have the resources to coordinate the operations of such a large program without support. The Office of General Education and, more specifically, the Coordinator of General Education will offer that support, responding to student questions, tending the website, promoting general education, connecting faculty with resources, and clarifying the path for course proposals. The enhanced infrastructure will assure that the Guiding Principles of Pathways are upheld.

UCCLE does not propose or administer a budget for general education. This plan is built on the understanding that the university will provide sufficient resources for professional development, advising, and instruction to implement the proposed curriculum. Resource analysis should be part of regular assessment.

Responsive governance

An efficient governance structure will be developed to facilitate timely implementation of new courses and programs and to encourage an influx of new individuals and programs as contributors to general education. The curriculum must also be responsive to research about student learning that may foster changes in pedagogical approaches to teaching and learning, requiring new calls for faculty development or even changing guidelines. Regularly scheduled review of general education will allow more timely response to changing needs.

Scalability

Beyond a pilot phase, the curriculum must be scalable so that all students can partake of the best practices that are under development. Strategies toward scalability include effective large-classroom pedagogies, flipped and hybrid classes, and team/peer-based learning. The New Classroom Building, which will expand the flexible learning capacity on campus, can support these pedagogies for some general education courses.

Learning-Centered Pedagogies

To foster deep, meaningful, and integrated learning within students engaged in the general education curriculum, learning-centered pedagogical approaches to course design, development, and delivery that are supported by empirical research will be emphasized and

encouraged. These learning-centered pedagogical approaches may vary across knowledge domains, course levels, delivery methods, and faculty members, respecting differences in curricular outcomes and student needs; yet, all of these approaches will focus on actively engaging students in the hands on minds on learning process, with the efficacy of the approaches determined by growth in student learning and development, broadly defined.

Faculty development

Those developing and implementing the Pathways curriculum must be not only be informed about inclusive pedagogies that foster deep learning in all students must be adopted, but they much also be informed and appreciative of the diversity of our undergraduate population. Resources related to pedagogy, assessment, and technology will be made available so that faculty are supported in their efforts to provide the most effective courses.

Faculty rewards

Faculty who teach in general education must be provided rich professional development, recognized for their contributions to general education and honored publicly for excellence. A reward structure for those who teach in general education is essential for instilling a sense of value.

Innovation

Pathways Scholars will be supported and celebrated as pioneers for the new curriculum as they develop new offerings in general education. Infrastructure will also be developed to support pilot courses offered by other faculty so that innovative programming has a chance to succeed.

Assessment

The university will offer support for cyclical assessment, review, and updating of general education for consideration by UCCLE and CUSP. While outcomes will be assessed as part of general education courses, this assessment will not duplicate any assessment already conducted in major courses that also meet the LOs of the Pathways curriculum.

Assessment of student learning within the new general education curriculum will leverage best practices associated with a learner-centered paradigm. A learner-centered approach to assessment:

- Acknowledges learning as a complex process that results in a change in knowledge, beliefs, behaviors, and attitudes that unfolds over time;
- Helps students come to understand that learning is not something that is done to them; instead, to become independent lifelong learners, students must take full responsibility for their own learning.
- Not only gathers evidence to monitor student learning, but also promotes student learning through the judicious use of authentic, course-embedded assignments as sources for assessment data;
- Honors the autonomy, academic freedom, and professional judgment of faculty as they are most directly responsible for the construction of the learning environment;
- Gathers information from multiple and diverse sources in order to develop a deep understanding of what students know, understand, and can do with their knowledge as a direct result of their general education experience;

- Utilizes appropriately rigorous methods for collecting data to ensure that the resulting assessment information is accurate, dependable, meaningful, and appropriate; and
- Culminates when results are used to improve subsequent learning.

This type of assessment is already implemented in many of Virginia Tech's academic programs, many of which may serve as exemplars for the new general education curriculum. While the specifics of the assessment process are not yet defined, the following criteria will shape the development of that process:

- The assessment process will be focused on program improvement, transparent in nature, and developed in collaboration with faculty teaching in the general education curriculum.
- To the extent possible, assessment of general education will occur in tandem with faculty grading of student work in order to streamline and connect assessment to the teaching and learning taking place within each general education course.
- Where appropriate – such as within in-major courses that count for general education requirements – assessment of general education outcomes and major/program outcomes may be one in the same to avoid redundancy.
- Where appropriate, those coordinating general education assessment will seek out opportunities to share data in support of external accountability efforts (e.g., professional and/or disciplinary accreditation efforts) and internal continuous improvement cycles (e.g., AQI).
- Course-level assessment data will be aggregated across courses to provide information at general education program outcome level.
- Virginia Tech will provide appropriate technological support and structures to ensure the seamless communication of assessment data from the course level to the program outcome level. This technology will ensure that faculty are not over-burdened by the mechanics or logistics of assessment work, but instead are able to focus on the substantive work of teaching and learning.
- Virginia Tech will provide appropriate professional development support to faculty regarding teaching, learning, and assessment within general education courses with multiple "access" or "entry" points to this support (e.g., web resources, short podcasts, faculty workshops, etc.)

Support for advisors and students

Students and advisors will have access to current information via website and direct contact with the Office of General Education. Resources will be provided, including workshops and lists of approved courses and minors (catalog, website, etc). The new Pathways plan will be mapped against CLE to ease transition and provide information about substitutions. The Office of General Education will also promote general education and its options to incoming students.

Infrastructure quality

The Office of General Education will also maintain an advisory group to facilitate the infrastructure, including representatives from UCCLE and some of the programs listed below.

Support for various needs of faculty and departments in general education is also available through existing programs that will work in partnership with the Office of General Education:

- Center for Instructional Development and Research (CIDER)
- Office of Assessment and Evaluation
- University Libraries
- Technology-enhanced Learning and Online Strategies (TLOS) and Networked Learning Initiatives (NLI), a unit within TLOS
- Diversity Development Institute
- Graduate School (in support of graduate students who teach in general education)
- University Academic Advising Center

Conclusion

This proposal for revised general education meets the criteria envisioned early on by so many stakeholders. Students will be engaged in a meaningful program, faculty members will have the opportunity to help students integrate their learning, and Virginia Tech will use the Pathways curriculum as an enticement for new students who will choose this university not only for the high quality of its majors, but also for the high quality of its general education program.

Attachment 1: Select Participants

While people have been working toward a new general education for years, this list includes only those who have most recently shared their expertise to support this effort, including members of the Curricular Planning Teams, UCCLE, and Pathways Scholars. Even currently, other faculty have provided input through various committees and colleges.

Curricular Planning Teams, 2013-14

The teams were comprised of faculty across disciplines, who worked on outcomes related to their own disciplines or related to outcomes their students would need to meet. Faculty were invited to participate due to their involvement in general education, their current participation with UCCLE, and/or their standing as Diggs Scholars (DS) or members of the Academy of Teaching Excellence (ATE). Diggs and ATE faculty have earned university-wide recognition based on their dedication to teaching and learning. The membership also included two members of Faculty Senate (FS). Team members are listed below along with their departments and designations. Names of co-chairs are underlined.

Quantitative Thinking
Peter Haskell (MATH)
Art Keown (FIN), UCCLE, ATE
Mike Ellerbrock (AAEC), ATE
Nicholas Polys (ARC)
Eric Lyon (MUS)
Jane Robertson (STAT)
Don Orth (FIW), UCCLE, DS, ATE, FS

Scientific Reasoning
Richard Walker (BIOL)
John Chermak (GEOS)
Jeannine Eddleton (CHEM), ATE
Mark Barrow (HIST), ATE
Sarah Karpanty (FIW)
David Schmale (PPWS), ATE
Renee Selberg-Eaton (HNFE)
Stephen Biscotte (Gen Ed)

Humanistic and Social Analysis
Anisa Zvonkovic (HD)
Kurt Hoffman (PSYC)
Matthew Gabriele (RLCL)
Kwame Harrison (SOC), DS
Greg Tew (ITDS), ATE
Brian Murphy (FIW), DS
Sheila Carter-Tod (ENGL), UCCLE
Jill Sible, DS, ATE

Critique & Practice in Design & the Arts
Kathryn Albright (ARCH)
Ben Knapp (ICAT)
Alan Weinstein (MUS), ATE
Greg Justice (TA), ATE
Jack Lesko (ENGR)
Kevin Concannon (SoVA)
Barbara Leshyn/Kraft (HORT)
Ed Dorsa (IDS)
Matthew Volmer (ENGL), ATE
Ann-Marie Knoblauch (ART)

Computational Thinking
Barbara Ryder (CS)
Tom Ewing (HIST)
Dennis Kafura (CS)
Liesl Baum (ICAT)
Tom Martin (ECE), DS
Lydia Patton (PHIL)
John Simonetti (PHYS), ATE
Marie Paretti (ENGE), UCCLE
Shelli Fowler (TLOS), DS

Discourse
Marlene Preston (COMM), UCCLE, ATE
Patty Raun (ART)
Quinn Warnick (ENGL)
Willie Jester (PCOB)
Alma Robinson (PHYS)
Vickie Mouras (CEE)
Carolyn Meier (Libraries), UCCLE

University Curriculum Committee for Liberal Education (UCCLE) 2014-15

    Administrative Representatives
        Office of the Provost: Jill Sible, Stephen Biscotte
        Office of Assessment and Evaluation: Steve Culver, Kate McConnell,
        Student Affairs: Rick Ferraro
    Faculty Representatives:
        Sheila Carter-Tod, English
        Aarnes Gudmestad, Liberal Arts and Human Sciences
        Art Keown, Business
        Ann-Marie Knoblauch, Architecture and Urban Studies
        Carolyn Meier, University Libraries
        Bob Oliver, Natural Resources and Environment
        Don Orth, Fish and Wildlife Conservation (Faculty Senate)
        Marie Paretti, Engineering
        Michel Pleimling, Science
        Marlene Preston, Communication
        Renee Selberg-Eaton, Agriculture and Life Sciences
        Rob Stephens, Liberal Arts and Human Sciences (CUSP)
        Dan Thorp, History (Faculty Senate)
    SGA Representatives: Kylie Gilbert, Stephen Hensell,
    Invited Guest: Kimberly Smith, University Studies, University Academic Advising

Pathways Scholars

    Eight faculty members were selected through a university-wide application process as 2014 Pathways Faculty Scholars, a new role that is part of Virginia Tech's initiative to reinvent its general education curriculum.

        John Chermak, associate professor of practice in geosciences, Science
        Sean Conaway, instructor of English, Liberal Arts and Human Sciences
        Ben Jantzen, assistant professor of philosophy, Liberal Arts and Human Sciences
        Dennis Kafura, professor of computer science, Engineering
        Ann-Marie Knoblauch, associate professor of art history, School of Visual Arts,
        Gyorgyi Voros, senior instructor of English, Liberal Arts and Human Sciences
        Alan Weinstein, associate professor of music, Liberal Arts and Human Sciences
        Zac Zimmer, assistant professor of Spanish, Liberal Arts and Human Sciences