Academic Program Goals and Learning Outcomes

[Revised December 2013]

I. Academic Program Goals

The VMI Academic Program develops graduates who possess

- *an understanding of the responsibilities of American citizenship, including the obligation to defend the principles of democracy on which the United States is founded* [Citizenship (CIT)];

- *the ability to influence human behavior to accomplish organizational goals, recognizing moral issues and applying ethical considerations in decision-making* [Leadership and Human Relationships (LHR)];

- *the ability to communicate effectively, both orally and in writing* [Communication (COM)];

- *the ability to conduct scientific experiments, analyze and interpret data, and understand the fundamental principles in science* [Scientific Inquiry (SCI)];

- *the ability to understand and apply mathematical sciences to solve quantitative problems* [Mathematical Inquiry (MAI)];

- *a knowledge of history and culture and an appreciation of how they may be used to understand human behavior, achievement, and ideas in a global context* [History and Culture (HIC)];

- *the ability to process information for strategic or creative purposes to include evaluative, anticipatory, logical, conceptual, or divergent thinking which results in effective solutions to problems* [Critical and Creative Thinking (CCT)];

- *the confidence to use technology and experiment with technological solutions to problems* [Technological Competence (TEC)];

- *intellectual curiosity and a commitment to lifelong learning* [Lifelong Learning (LLL)];

- *a commitment to physical fitness and wellness* [Health and Wellness (HWL)]; and

- *a commitment to public service* [Public Service (PSV)].

II. Learning Outcomes

The following learning outcomes are addressed through a combination of core curriculum and major program requirements.

Citizenship (CIT)

Examining citizens' involvement in the country's affairs, a recent study by the Brookings Institution concluded that "clearly, all is not well in our civic life" (Macedo). VMI's mission to develop "citizen-soldiers" demands that we address this challenge. Specifically, we must educate students about the responsibilities of citizenship in a democracy and must develop in them an appreciation of why we deem democracy worth defending. Because more than half of VMI graduates will serve in some capacity in the military, we must understand that the core of democracy "assumes that our rights and liberties do not come for free, that unless we assume the responsibilities of citizens we will not be able to preserve them" (Barber). As the Organization of American Historians has stated, we must engage "in a national conversation about the role of history in furthering democracy and civic engagement." This means understanding America's place in history and the opportunities and limits of its power internationally. VMI's academic program responds directly to the charge of Constantine Curris, President of the American Association of State Colleges and Universities: "[W]e need to focus far greater attention not only on democratic principles but also on the meaning and personal responsibilities attendant upon being an American citizen."

Learning Outcomes:

The Academic Program prepares graduates who can

1. Demonstrate an understanding of the classical background and modern emergence of democratic principles, their incorporation into foundational documents such as the United States Constitution, and the establishment of governments based on those principles
2. Demonstrate an understanding of the historical relationships between militaries and the states they are formed to protect, including the modern ideal of the "citizen soldier."

Leadership and Human Relationships (LHR)

Effective and ethical leadership is vital to the success of all organizations. Leadership is defined as "the process of influencing an organized group toward accomplishing its goals" (Roach & Behling). It is possible to differentiate effective from ineffective leaders (and leaders from followers) using the following characteristics in

combination: vision, ability, enthusiasm, emotional stability, concern for others, self-confidence, persistence, vitality, charisma, and integrity (Manning & Curtis). Those in leadership positions are entrusted with power; the mere possession of any kind of power leads, inevitably, to ethical questions about how that power should and should not be used. Since leaders can use power for good or ill, a leader's personal code of ethics and values may be the most important determinants of how power is exercised or constrained (Hughes, Ginnett, & Curphy). Ethics are the standards of right and wrong that influence behavior (Lussier & Achua); however, ethics go beyond the legal requirements. Therefore, leaders must set a moral example to others that becomes the model for the entire group or organization.

Leadership is a process, not a position, and leadership can be developed both through formal education and practical experience. VMI attempts to inculcate these attributes and values in all of its graduates through instruction and opportunities to lead.

Learning Outcomes:

The Academic Program prepares graduates who can

1. Demonstrate a basic knowledge of the leading academic theories and research related to leadership.
2. Develop greater self-awareness of personal leadership strengths and weaknesses.

Communication (COM)

One of the shared goals of colleges and universities nationwide is to prepare students to communicate effectively both in the academy and in their professional and civic lives. Courses that contribute to "communication across the curriculum" efforts are grounded in the common belief that "writing and speaking are central to a wide range of occupations and disciplines, and industry leaders expect graduates to have expertise in both, along all dimensions" (Anson). External stakeholders like the State Council of Higher Education in Virginia (SCHEV) confirm this belief when they designate both written and oral communication as "core competencies" ("Overview"). To ensure the development of strong written communication abilities, VMI embraces the philosophy that "Learning to write is a complex process, both individual and social, that takes place over time with continued practice and informed guidance" ("WPA"), beginning in first-year composition and extended in writing-intensive courses in the disciplines. Building upon the rhetorical principles taught in writing, the Public Speaking course develops students' competencies in oral communication that will enable them "to effectively participate in the workplace and society" (*NPEC*).

Learning Outcomes:

The Academic Program prepares graduates who can

1. Analyze the audience, occasion, and purpose of a rhetorical situation in order to formulate a response to an idea or problem.
2. Generate ideas through both discovery and consultation of a variety of sources.
3. Develop ideas fully, offering compelling support and evidence for assertions or conclusions.
4. Organize ideas coherently, integrating sources effectively and documenting them appropriately.
5. Edit writing for clarity, precision, and stylistic effectiveness.
6. Proofread writing to ensure grammatical and mechanical correctness.
7. Speak in language that is grammatically correct and appropriate for the particular audience.
8. Speak at an appropriate pace and at sufficient volume, sustain eye contact, and use body language effectively to communicate points.
9. Employ visual aids that are designed and timed to reinforce points.

Scientific Inquiry (SCI)

Experiences in science contribute to the development of well-rounded graduates who can think in interdisciplinary dimensions and who possess the basic knowledge to participate in conversations about our nation's scientific and technological future. Because VMI regards scientific inquiry as one of the cornerstones for the intellectual development of critical thinking and analytical skills, we require that all entering students take two semesters of laboratory-based science. These high-quality introductory courses actively engage students' imagination and creativity and fortify them throughout their upper-division education. Consistent with the National Academy of Science's recommendations for undergraduate education (*Transforming*), we emphasize learning science by doing science and provide active learning experiences in a range of settings.

Learning Outcomes:

The Academic Program prepares graduates who can

1. Demonstrate an understanding of scientific principles through the use of theories or models.
2. Employ appropriate scientific equipment to conduct experiments.
3. Collect, analyze, and interpret data.
4. Demonstrate an understanding of science in our everyday world.

Mathematical Inquiry (MAI)

Mathematics is deeply embedded in everyday life; it is also the language of science and forms a crucial part of the body of knowledge necessary for a scientifically literate society. VMI embraces the Mathematics Association of America's belief that students must learn "to confront, explore, and communicate important ideas of modern mathematics and the uses of mathematics in society." Our curriculum addresses this goal by requiring high-quality introductory mathematics courses, with quantitative problem-rich experiences, that actively engage the students' imagination and creativity. Because VMI regards the mathematical sciences, like scientific inquiry, as a cornerstone for the intellectual development of critical thinking and analytical skills, we require that all entering freshmen, regardless of major, take two semesters of mathematics. Consistent with the objectives of the National Council of Teachers of Mathematics, these courses provide meaningful and appropriate foundations for problem-solving in advanced courses in other disciplines.

Learning Outcomes:

The Academic Program prepares graduates who can

1. Connect ideas of modern mathematics to applications in real-world settings.
2. Understand the relationship between variables and parameters of mathematical models and the patterns or phenomena they represent.
3. Formulate a problem using appropriate mathematical techniques and expressions.
4. Apply mathematical techniques to solve quantitative problems.
5. Communicate a solution in a manner that clearly indicates the line of reasoning.

History and Culture (HIC)

Cultural understanding is essential for VMI graduates to function effectively in the world of the 21st century (Nussbaum; Stearns). Students must study history, languages, and culture in order to relate their own national identity to that of other cultures and global concerns generally; they must "understand other cultures in order to understand their [own] place in the world" (*Case for Change*).

As "citizens of the world" (Nussbaum), VMI graduates must understand both American history and culture and basic patterns of development in other regions of the world. VMI graduates will encounter problems and challenges in their lives that are deeply rooted in patterns of world history, that are global in dimension, and that require global consciousness to solve them. To achieve the outcomes of this goal, students will take courses in the history, languages, and cultures of societies broadly defined (*Education*; Johnson, Shaman, & Zemsky; Narsee).

Learning Outcomes:

The Academic Program prepares graduates who can

1. Demonstrate understanding of the role of the United States and other major powers in the process of globalization.
2. Demonstrate understanding of how history influences the way societies define themselves geopolitically.
3. Demonstrate knowledge of characteristic products or practices of the world's communities, civilizations, or cultures.
4. Reflect on their understanding of a culture or cultures.

Creative and Critical Thinking (CCT)

Due to accelerating change in the world, successful college graduates in the 21st century must possess a high degree of flexibility and adaptability. These skills are often embodied in the ability to think both critically and creatively (*NPEC*). A 1997 national report on higher education provides a comprehensive definition of critical thinking that emphasizes reasoning "in an open-ended manner, with an unlimited number of solutions. The critical thinking process involves constructing the situation and supporting the reasoning behind a solution" (Jones et al.). Although a standard definition for creativity is still not agreed upon, a common thread that runs through all studies involves the notion of producing results "that are both original and appropriate . . . to the cultural context in which the creativity is based" (Sternberg). Creative individuals are usually identified as people "who regularly solved problems, designed products, or define new questions within a domain that was perceived novel" (Gardner). These definitions provided the foundation on which the VMI creative and critical thinking learning outcomes were based.

Learning Outcomes:

The Academic Program prepares graduates who can

1. Identify main ideas and/or themes.
2. Make comparative judgments and draw conclusions from evidence gathered.
3. Determine the validity/credibility and implications of an assumption/hypothesis.
4. Demonstrate creative problem-solving skills.

Technological Competence (TEC)

In the context of this academic program goal, technology is taken to represent *information technology* as defined by the National Research Council's intellectual capabilities component: "the ability to apply information technology in complex and sustained situations, [and] encapsulate higher-level thinking in the context of information technology. Capabilities empower people to manipulate the medium to their advantage and to handle unintended and unexpected problems when they arise. The intellectual capabilities foster more abstract thinking about information and its manipulation" (*Being Fluent*). This captures the essence of VMI's academic program goal for technology.

The American Library Association (ALA) has expanded the concept of intellectual capabilities in information technology to define competency standards for what they term *information literacy* (*Presidential*). They define this as being able to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information." This definition provides a framework for developing learning outcomes or, using the term of the ALA, "competency standards" (*Information*).

Learning Outcomes:

The Academic Program prepares graduates who can

1. Recognize available alternative information technologies and their appropriate applications.
2. Use technology tools to facilitate information management and dissemination.
3. Use technology to formulate and conduct an information search that includes a variety of reference sources.
4. Evaluate information, acquired using technology, in terms of accuracy, authority, bias, and relevance
5. Apply appropriate ethical guidelines in using electronic media and published resources.
6. Apply information technology, in any of its various forms, to test hypotheses (i.e., evaluate cause and effect) and draw conclusions.

Lifelong Learning (LLL)

One scholar recently reported that the volume of human knowledge currently doubles every two years (Pan). Colleges must therefore acknowledge that the capacity for "lifelong learning" is no longer a bonus goal of education; it is an imperative for preparing graduates who can function as self-directed learners and are able to adapt their skills and talents to new and evolving problems, vocational, civic, as well as personal.

In the context of this academic program goal, lifelong learning refers to "a continuous engagement in acquiring and applying knowledge and skills in the context of authentic, self-directed problems" (Fischer). VMI is committed to "equipping [students] with skills and competencies required to continue their own 'self-education' beyond the end of formal schooling" (Candy).

Learning Outcomes:

The Academic Program prepares graduates who can

1. Reflect on their learning processes, including making realistic assessments of their abilities and comprehension of subjects.
2. Recognize when additional information or expertise is necessary.
3. Function as self-directed learners.

Health and Wellness (HWL)

Americans increasingly recognize the need for knowledge about the ways behaviors can affect quality of life. Although most Americans are living longer, the average person spends nearly 12 years in poor health, largely due to lifestyle habits (*Healthy*). The World Health Organization reports that "60-80% of people in the world—from both developed and developing countries—lead sedentary lifestyles, making it one of the more serious, yet insufficiently addressed, public health problems of our time" ("Physical"). VMI's concepts of physical fitness and wellness respond to the World Health Organization's reports ("Message," "Physical") and parallel the national health objectives detailed in the U.S. Department of Health and Human Services' publication, *Healthy People 2010*. Through curricular requirements and co-curricular opportunities, we aim to encourage and promote the adoption of behaviors associated with improving the overall health status of all students and to encourage students to maintain those behaviors for a lifetime of physical fitness and wellness.

Learning Outcomes:

The Academic Program prepares graduates who can

1. Apply a working knowledge of wellness-related behaviors to achieve and maintain a healthy lifestyle.
2. Understand the potential benefits an active lifestyle has on the aging process.
3. Recognize the impact of physical inactivity on health and wellness in a societal context.

Public Service (PSV)

The academy has historically been seen as the institution that marries liberal education to an awareness and commitment to public service. Indeed, this traditional model was described some ninety years ago by John Dewey, who argued that the improvement of the public good, and thus the health of a democracy, requires educated citizens to engage in public service. It follows then that a lack of active commitment to public service places the quality of civic life at risk. Numerous studies have concluded that America faces a growing problem due to an ongoing decline in the level of active commitment to concerns of the public domain (Thomas). Interestingly, recent surveys indicate that some two-thirds of college seniors volunteered or provided community service. But such service does not necessarily translate into long-term commitment of informed action ("Journey").

In response, a growing number of academic institutions are re-thinking the relationship between a liberal education and student civic-mindedness (Rhoads). Given the unique mission of VMI to produce "citizen-soldiers," we have a particular responsibility to address this issue.

Learning Outcomes:

The Academic Program prepares graduates who can

1. Actively seek and identify opportunities to participate in projects that enhance civic life, assuming roles of responsibility whenever possible.
2. Recognize the importance of participating in the public dialogue to enrich community life.
3. Understand the virtues and benefits of volunteer work and public service.
4. Recognize the significance of careers (civilian and military) dedicated to public service.
5. Discuss the significance of contributions made by individuals or groups, working in service of the public good.