

Core 2.0 General Curricular Requirements

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Purpose of Core 2.0

As a land-grant university, MSU-Bozeman is charged, through the Morrill Act of 1862, with providing “liberal and practical education...in the several pursuits and professions of life.” In addition, as a member of the Montana University System, MSU is charged with providing programs that “stimulate critical analysis, clear and effective communication, and the creative process.” Students should also “broaden their cultural horizons by contact with the creative arts, sciences and the humanities, and achieve an understanding of the political, social, economic and ethical problems of the contemporary world and the relation of their studies to these problems.”

To this end, the faculty of MSU have developed a common core curriculum, called Core 2.0, for all undergraduate students in an effort to enable students to reach their intellectual potential, to become contributing members of society, and to compete more successfully in our rapidly changing and increasingly complex world.

The purpose of the Core 2.0 curriculum is to ensure a wide-ranging general education of consistent and high quality to all Montana State University students regardless of their major or area of study. Core courses allow students to reaffirm their common experiences, redefine their common goals, and confront their common problems. Core courses emphasize communication and techniques of creative inquiry in a variety of disciplines.

One of the goals of Core is to provide students with the opportunity to develop their creative and intellectual potential. Therefore, Core courses will require students to do the following:

1. Think, speak, and write effectively, and evaluate the oral and written expression of others.
2. Develop learning objectives and the means to reach them, thus developing lifelong patterns of behavior which increase the potential to adapt to and create change.
3. Exercise and expand intellectual curiosity.
4. Think across areas of specialization and integrate ideas from a variety of academic disciplines and applied fields.
5. Use complex knowledge in making decisions and judgments.
6. Make discriminating moral and ethical choices with an awareness of the immediate and long-term effects on our world.
7. Develop a critical appreciation of the ways in which we gain and apply knowledge and understanding of the universe, of society, and of ourselves.
8. Understand the experimental methods of the sciences as well as the creative approaches of the arts.

9. Develop an appreciation of other cultures as well as an understanding of global issues.

Core 2.0 Overview

The Core 2.0 curriculum at Montana State University is designed to enhance students' intellectual experience in all realms of academia, with the express goal of providing students with a broad exposure to and knowledge of multiple and varied methods of scholarship. The Core curriculum consists of required classes that focus on clear verbal and written expression(s) of critical analysis and evaluation of academic fields of study at the heart of human intellectual and artistic inquiry and achievement. Completion of the Core curriculum requirements will introduce students to the theories, methods, and foundations of these academic fields, enable them to critically evaluate information in these subjects, and teach them to present their knowledge clearly in both verbal and written form.

Core 2.0 has two broad categories: Foundation Courses and Ways of Knowing (Inquiry and Research & Creative Experience) Courses.

Courses that apply to specific areas in either of these categories are indicated with a "letter attribute" after the course number which corresponds to the specific Core area. For example, courses that fulfill the Core 2.0 writing requirement are indicated with a "W" (WRIT 101W). A current list of Core 2.0 course offerings can be found in the schedule of Core 2.0 classes (https://atlas.montana.edu:9000/pls/bzagent/bzscore.pw_selterm).

Students must complete the equivalent of one course in each of the **Foundation Course** areas: University Seminar (US), College Writing (W), Quantitative Reasoning (Q), Diversity (D), and Contemporary Issues in Science (CS).

Students must complete at least one 3 credit course in each of the **Ways of Knowing Course** areas: Arts (IA or RA), Humanities (IH or RH), Natural Sciences (IN or RN), and Social Sciences (IS or RS). All students must take at least one 3 credit course in an approved Research & Creative Experience course. Students may take an approved Research & Creative Experience course in one of the four areas mentioned above (indicated with an R) or they may take a separate Research & Creative Experience course in any discipline, including Undergraduate Scholars Program (USP 490R).

Notes:

- Total number of credits: 27 if the Research and Creative Experience requirement is completed as part of the requirements in Arts, Humanities, Natural Sciences or Social Sciences; otherwise 30.
- A grade of C- or better is required in all Core 2.0 courses.
- Completion of at least two approved Natural Science courses with a grade of C- or better satisfies both the Contemporary Issues in Science and the Natural Science Inquiry requirements. Individual substitutions for one requirement of the other are not permissible.

Core 2.0 Foundation Courses

University Seminar (US)

Rationale

Courses with the University Seminar (US) core designation are primarily intended for first-year students throughout all curricula to provide a platform for collegiate level discourse. Activities that hone written and oral communication skills are universally incorporated, but the themes represented in individual US core courses vary considerably to reflect the department or program from which the course originates. All US core courses are small in size and rely heavily on seminar-style teaching where course content is delivered by discussion and interaction rather

than by lecture. This learning environment promotes vibrant interactions between first-year students, a faculty member, and in many courses, a more experienced student fellow. US core courses provide a venue where students can enjoy rigorous academic discussions that promote critical thinking, learning, and understanding in a supportive and truly collegiate manner.

Student Learning Outcomes

Through completion of the US Core students will:

- Demonstrate critical thinking abilities
- Prepare and deliver an effective oral presentation
- Demonstrate analytical, critical, and creative thinking in written communication.

College Writing (W)

Rationale

WRIT 101W is a multi-section, three-credit course with an enrollment cap of 25. Classes consist largely of first and second-year students. The course fulfills the written communication requirement of the current core and is taught by adjunct instructors, teaching assistants, and tenure-track faculty. The departmental course design focuses on expository (vs. creative or personal) writing, requires at least four graded paper assignments per term, and calls for sections to be organized around topics/themes of the instructor's choosing. With some variation, typical sections of 101W incorporate a wide range of learning components in support of major paper assignments: the reading of essays, study of writing instruction texts, short compositions in response to reading, in-class writing, small group workshops, peer review of writing, draft conferences, and class discussion.

Student Learning Outcomes

It is intended that students who complete WRIT 101W will have been significantly aided in their ability to:

- Demonstrate themselves to be reflective writers
- Show willingness to take risks in new writing situations
- Collaborate with other writers
- Demonstrate ability to read rhetorical situations
- Demonstrate control of situation-appropriate conventions of writing
- Integrate source material in their writing

Students whose scores meet or exceed any one of the following are exempt from the College Writing requirement:

- ACT English score of 28
- SAT Critical Reading score of 750
- ACT/SAT essay/ writing sub-score of 11

*The credits will have to be made up in other coursework in order to meet the minimum graduation requirements.

Quantitative Reasoning (Q)

Rationale

The ability to reason quantitatively is essential for citizenship in the 21st Century world. An understanding of data and quantity, and how they are presented and interpreted by the press and on the Internet, is invaluable.

Mathematics and logic are used throughout the world as essential tools in many fields, including natural science, engineering, medicine, and the social sciences. In the words of John Allen Paulos, ".... *There are three reasons or, more accurately, three broad classes of reasons to study mathematics. Only the first and most basic class is practical. It pertains to job skills and the needs of science and technology. The second concerns the understandings that are essential*

to an informed and effective citizenry. The last class or reasons involves considerations of curiosity, beauty, playfulness, and perhaps even transcendence and wisdom."

In a Q course, the student will be exposed to the methods employed in the mathematical sciences. This will include the application of mathematical or statistical models to complex problems which can then lead to potential solutions of these problems. There are two types of Q courses: foundation and terminal. The type of course taken is dependent on a student's program of study.

Criteria

- A foundation Q course (e.g. calculus or introductory statistics) provides the mathematical foundation prerequisite for successful completion of courses contained in a student's program of study. Thus, a core goal of the foundation course is to provide the quantitative and logical tools required in subsequent courses that demand a high level of mathematical sophistication and preparedness.
- A terminal Q course stresses mathematical and related foundational methods and concepts over a broad array of topics, and, in particular, mathematical and statistical foundational methods. Mathematical-foundation methods include the understanding of numerical or foundational concepts and the proper expression, proof, and refutation of arguments in the language of mathematics. Statistical-foundation methods include the understanding of quantitative and statistical concepts, the analysis of data, and the critical interpretation of statistical information.
- Mathematical and statistical foundational concepts include properties of numbers (integers, fractions, real numbers, complex numbers,...), problems in higher dimensions, shapes (classical geometric, topological equivalence,...), measures (distance, angles, area, volume, data-based statistics), random variables (distributions, expectations,...), functions of these concepts and their interplay, as well as methods of formal proof in the language of mathematics.
- Q courses enable students to develop those skills that lead to an understanding of quantitatively-based problems related to contemporary society. They provide practical applications that relate to their current daily and future professional lives as consumers of quantitative information. Ultimately, after having developed certain Q skills, they can apply them to make informed decisions in their personal and professional lives.

Student Learning Outcomes

Students completing a Core 2.0 Quantitative Reasoning (Q) course should demonstrate an ability to:

- Interpret and draw inferences from mathematical models such as formulas, graphs, diagrams or tables.
- Represent mathematical information numerically, symbolically and visually.
- Employ quantitative methods in symbolic systems such as, arithmetic, algebra, or geometry to solve problems.

Diversity (D)

Rationale

Graduates of Montana State University face an ever-changing and increasingly complex world. A carefully informed understanding of multiple identities and cultures, both within the United States and beyond, helps create a campus community that is committed to intellectual inquiry and prepares students to be members of a diverse global community.

Diversity courses focus on identity (race, ethnicity, class, gender, sexuality, nationality, ability, etc.); the study of languages other than

English; and/or traditionally marginalized or less frequently studied societies, nations, and/or cultures.

Criteria

The course must focus in in-depth analytical and critical attention to difference and to historical, cultural, and/or social contexts, with an emphasis on class discussion and active student engagement.

In addition to this primary criterion, the course will meet one of the following criteria listed below:

- The course examines identity in relation to race, ethnicity, gender, sexuality, class, nationality, ability, and/or other axes of difference.
- The course teaches a language other than English and includes the examination of the culture(s) that speak(s) the language.
- The course examines the historical, political, cultural, and/or social forces that foster systemic disparities based on difference, and critically examines concepts of difference within these systems.

Student Learning Outcomes

Students who successfully complete a Diversity-designated course will demonstrate one or more of the following:

- An analytical and critical understanding of diversity within societies, nations, and cultures.
- Knowledge of a language other than English and the culture(s) that speak(s) that language.
- An analytical and critical understanding of particular, traditionally marginalized, or less frequently studied societies, nations, and/or cultures and an understanding of cultural difference in relation to those societies, nations, and/or cultures.

Contemporary Issues in Science (CS)

Rationale

Contemporary Issues in Science (CS) is a course focused on natural science or technology that examines the ways in which science contributes to the study of significant problems in the contemporary world, and can help individuals and society make informed decisions about these issues.

CS courses explore how knowledge is created in the natural sciences. They have a central goal of providing an understanding of the methods used to discover and create factual and theoretical scientific knowledge. These courses will examine particular scientific or technological issues and at the same time explore the methodological and theoretical foundations of scientific inquiry.

CS courses, for example, might devote some time to examining the history of particular contemporary scientific issues and the ways in which truths or assumptions about these issues have changed over time. They might examine the social and political consequences of scientific and technological discoveries, or ethical issues arising from their use, or how science and scientific methods can aid public, personal, and professional decision-making.

CS, like Inquiry courses, will build on the critical thinking and communication skills developed in other core courses, particularly those of the University Seminar and College Writing courses. By enhancing students' understanding of the process of scientific inquiry, they will enrich students' experience of the core Research and Creative Experience and may incorporate non-traditional teaching methods, including small group learning activities and guided research projects.

Criteria

To receive a CS designation, a course should:

- Have a clearly defined science and/or technology focus, and explore a contemporary science or technology issue.

- Examine ways in which science and/or technology can contribute to the study of a significant problem in the contemporary world, and can help individuals and society make informed decisions about such issues.
- Explore how knowledge is created in science and/or technology (at least one-third of the course should be devoted to this goal).
- Include at least one major, discovery-based learning activity.
- Emphasize critical thinking, writing and oral communication skills.
- Ask students to independently analyze information from multiple sources.
- Develop students' abilities to work effectively in small groups.

Student Learning Outcomes

After completing a Contemporary Issues in Science course, students will:

- Explain how science contributes to analyzing complex problems in the contemporary world.
- Describe the scientific method, the kinds of questions asked by scientists and the methods used to explore those questions.
- Demonstrate critical thinking, writing and oral communication skills.
- Work effectively in small groups.

Students may substitute courses for this requirement. See the Permitted Substitutions near the end of this section.

Core 2.0 Ways of Knowing Courses

All Ways of Knowing Courses emphasize the methods used to discover and create the factual and theoretical knowledge of the discipline. Inquiry courses (indicated with an I) do this primarily through classroom instruction and require at least one major learning activity based on methods of inquiry appropriate to the discipline. Research courses (indicated with an R) require students to have autonomous experience in the research and creative process and to generate a scholarly product. Lower-division R courses are intended to introduce students to the discipline and thus also satisfy a Ways of Knowing area (RA, RI, RN, or RS). Upper-division R course are often intended for majors and do not have a Ways of Knowing designation. These courses are listed separately with an R following the number.

All students must take at least one (1) Inquiry or one (1) Research & Creative Experience course in each of the following areas:

Inquiry (I)

Rationale

The central goal of every Inquiry course is to provide students with an understanding of the methods used to discover and create the factual and theoretical knowledge of the discipline. Each course will examine particular issues in the discipline while exploring its methodological and theoretical foundations.

Inquiry courses, for example, might devote some time to examining the history of the discipline and the ways in which its truths or assumptions have changed over time. They might focus on major paradigm shifts or on contested ethical and interpretive issues within the discipline.

Inquiry courses will build on the critical thinking and communication skills developed in other core courses, particularly those of the University Seminar and College Writing courses. By enhancing students' understanding of the process of academic inquiry, they will enrich students' experience of the core Research and Creative Experience. Inquiry courses are encouraged to incorporate non-traditional teaching methods, including small group learning activities and guided research projects.

Criteria

- A substantial proportion of the course will be devoted to exploring ways in which the discipline (<http://www.montana.edu/newcore/areadescriptions.html>) creates knowledge.
- The course must include at least one major learning activity based on methods of inquiry appropriate to the discipline.

Student Learning Outcomes

Inquiry courses are intended to improve students'

- Understanding of disciplinary methods, including the kinds of questions asked in the discipline and the methods that practitioners use to explore those questions
- Demonstrate critical thinking skills within the field.
- Demonstrate communication skills.

All students must take at **least three credits** in each of the following areas:

- Arts (IA or RA)
- Humanities (IH or RH)
- Natural Sciences (IN or RN)
- Social Sciences (IS or RS)

All students must take at least one (1) approved Research & Creative Experience course. Students may take an approved Research & Creative Experience course in one of these four areas OR they may take a separate Research & Creative Experience course in any discipline, including the Undergraduate Scholars Program (USP 490R).

Notes:

- Total number of courses: 9, if the Research and Creative Experience requirement is completed as part of the requirements in Arts, Humanities, Natural Sciences or Social Sciences; otherwise 10.
- A grade of C- or better is required in all Core courses.
- Completion of at least two approved natural sciences courses with a grade of C- or better satisfies both the Contemporary Issues in Science and the Natural Science Inquiry requirements. Individual substitutions for one requirement or the other are not permissible.
- Completion of UH 202 with a grade of C- or better satisfies the Humanities Inquiry requirement.

Research & Creative Experience (R)

Rationale

The Research & Creative Experience builds on the competencies students have developed in the foundation courses. These experiences will not be limited to a student's major field of study and will incorporate a range of authentic experiences from traditional one-on-one mentoring to group Research and Creative Experience courses. Because research and creative projects vary from one discipline to the next, some general guidelines have been developed to determine what constitutes a Research and Creative Experience.

Criteria

- Students experience the process of research and creative experience as a unique intellectual activity and generate a scholarly product.
- Student autonomy directs the research and creative experience, while faculty and staff provide the framing concepts and contexts.
- Research and Creative Experience courses provide frequent and early benchmarks for student progress to encourage early engagement in the research and creative process.
- The research and creative experience component done individually or in small groups constitutes at least 1/3 of the course. The

remaining part of the course should provide sufficient information about the subject to enable the student to formulate a project as well as provide the student with the tools to do a research and creative project.

- Courses geared toward sophomore level students are particularly encouraged, but Research & Creative Experience courses can be at any level. Research & Creative Experience courses may have prerequisites.
- A course must address the responsible conduct of research.

Student Learning Outcomes

Through the Research and Creative Experience students will:

- Locate relevant information from broad and diverse sources
- Apply critical and creative thinking to synthesize information
- Produce a scholarly product based on both existing information and student effort (e.g., analysis, synthesis, design, etc.)
- Demonstrate the ability to successfully collaborate as a member of a team (when applicable).
- Demonstrate an understanding of the responsible conduct of research.

Permitted Substitutions

Completion of at least two of the following courses with a grade of C- or better satisfies the Contemporary Issues in Science (CS) and the Inquiry Natural Science (IN) requirements. Individual substitutions for one requirement or the other are not permissible.

BIOB 105CS	Introduction to Biotechnology	3
BIOB 110CS	Introduction to Plant Biology	3
BIOB 160	Principles of Living Systems	4
BIOB 170IN	Principles of Biological Diversity	4
BIOB 260	Cellular and Molecular Biology	4
BIOH 201	Human Anatomy and Physiology I	5
BIOH 211	Human Anatomy and Physiology II	4
BIOM 250	Microbiology for Health Sciences: Infectious Diseases	3
BIOO 220	General Botany	3
CHMY 121IN	Introduction to General Chemistry	4
CHMY 123	Introduction to Organic Chemistry and Biochemistry	4
CHMY 141	College Chemistry I	4
CHMY 143	College Chemistry II	4
CHMY 151	Honors College Chemistry I	4
CHMY 153	Honors College Chemistry II	4
CHMY 211	Elements of Organic Chemistry	5
ENSC 245IN	Soils	3
GEO 103CS	Intro to Envrmtl Geology	4
GEO 211	Earth History and Evolution	3
NRSM 240	Natural Resource Ecology	3
PHSX 205	College Physics I	4
PHSX 207	College Physics II	4
PHSX 220	Physics I (w/ calculus)	4
PHSX 222	Physics II (w/ calculus)	4
PHSX 224	Physics III	4
PHSX 240	Honors Gen & Mod Phys I	4
PHSX 242	Honors Gen & Mod Phys II	4

Core 2.0 Credit Policies

1. University Core requirements cannot be satisfied by the CLEP procedure.
2. Advanced Placement credits (AP), if equivalent to MSU Core courses, can be used to fulfill Core requirements.
3. Credit earned in repeatable Core courses may be applied only once to University Core requirements.
4. Some study abroad programs, upon approval, may satisfy the Diversity requirement.
5. Students in good standing in the University Honors Program may fulfill part of their University Core curriculum requirements with designated honors courses. Specific information is available in the Honors Program Office, Quad D.

Core 2.0 Grading Standards

1. College-level competence in all areas of the Core curriculum is necessary for adequate performance in the Core and beyond. A grade of C- or better is required in all University core courses.
2. No University Core course may be taken on a pass/fail basis.

Appeals

Unusual circumstances that warrant an appeal of the established policies and procedures must be initiated by the student and sent through his/her adviser to the Core Equivalency Review Committee (CERC) via the Registrar's Office.

Accommodation for Students with Math Learning Disabilities

Accommodation to the Quantitative Reasoning (Q) Core Curriculum Requirement may be made for students with Math learning problems caused by disabilities. Accommodations, when permitted, apply only to the Core Curriculum Requirement; they do not change requirements in majors, minors, or certificates.

MSU recognizes that some students with specific learning disabilities may experience difficulty completing the Core Quantitative Reasoning requirement. Students with learning disabilities who believe that they need an accommodation to meet the Quantitative Reasoning requirement should contact the office of Disabled Student Services (DSS) to begin the process to certify the disability. Learning Disability documentation must meet established MSU requirements as developed by DSS. This documentation is available from:

Disabled Student Service
P.O. Box 173960
Strand Union, Room 155
Montana State University
Bozeman, MT 59717-3960

Font Notice

This document should contain certain fonts with restrictive licenses. For this draft, substitutions were made using less legally restrictive fonts. Specifically:

Times was used instead of Adobe Garamond Pro.

The editor may contact Leepfrog for a draft with the correct fonts in place.