



STEM FOUNDATIONS

GSSM ONLINE DIPLOMA PROGRAM

COURSE CATALOG, 2021-2022

Classes in the STEM Foundations Program will be taught online synchronously via Zoom. Students in this program will take 5 courses each semester together with a seminar series. In their junior year, each student will take biology, chemistry, English, history, and math. In their senior year, students will take computer science, engineering, English, math, and physics. For the lab sciences, students will be provided with materials for safe labs that will be completed at home.

In addition to the typical semester courses, students will participate in an Interim course each year. All students will participate in a mentored research & inquiry experience during their time in the program. More details about the courses, Interim, and the mentored research & inquiry experience are provided below.

Junior Year Courses¹

The following table gives a summary of the courses that students will take each semester, full course descriptions are provided below.

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| Biology | BIO 110/110L & 111/111L Biology & Lab (Dual Enrolled) |
| Chemistry | CHE 101/101L & 102/102L General Chemistry I and II and Labs (Dual Enrolled) |
| English | ENG 111 & 112 English Composition and Rhetoric I & II (Dual Enrolled) |
| History | HIS 101 AP US History |
| Math | MAT 111/112 Pre-Calculus (Honors) -or- MAT 231 Calculus I (Dual Enrolled) |

Senior Year Courses²

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|------------------|---|
| Computer Science | Intro to Computer Science (Dual Enrolled) |
| Engineering | Intro to Engineering and Design (Honors) |
| English | English Literature (Dual Enrolled) |
| Math | MAT 231 Calculus I (Dual Enrolled) -or- MAT 232 Calculus II (Dual Enrolled) |
| Physics | Algebra-Based Physics (Dual Enrolled) |

¹ Dual enrollment agreement is in process for all of these classes. If these classes are not offered as dual enrolled, they will be offered at the AP level.

² Detailed information about senior year classes will be available by spring 2022.

Interim: Interim occurs in January after winter break and before spring semester starts. During interim, students engage with a single creative elective course for 3 weeks. Students in the GSSM STEM Foundations Program will take this class together and help choose the course topic. Depending on the comfort level of all students, interim could involve travel.

Mentored Research & Inquiry Experience: All students participate in a mentored research & inquiry experience. For most students, their experience will take place in the summer between their junior and senior years. Students gain direct experience with research methods and principles through projects mentored by experienced experts. With the support of GSSM faculty and staff, students will complete a research & inquiry portfolio and present their work at the GSSM Annual Research Colloquium. GSSM will facilitate the placement of students into research & inquiry experiences. Research & inquiry experiences may be completed in person or remotely depending on student preferences and availability.

Seminar Series

Students are required to enroll in the following courses in our seminar series. These classes each meet once a week. These classes provide students with support in their transition to GSSM as well as preparation for the college application process. In order to receive their GSSM diploma, students are expected to attend and pass each of the seminar courses.

| | Fall | Spring |
|-----------------|----------------------------------|--|
| Junior Seminars | LLS 101: Life and Leisure Skills | LLS 103: College Planning I |
| | LLS 102: Academic Transition | LLS 107: Preparing for Research (4 weeks long) |
| Senior Seminar | LLS 104: College Planning II | |

JUNIOR COURSE DESCRIPTIONS

BIO 110 & 110L **Core Principles of Organismal Biology and Lab** (FALL Semester)
 Dual Enrolled
 A study of the diversity of organisms, their phylogeny, characteristic architectural features, physiological processes, and human importance. The nature of scientific inquiry will be explored through examples of how biologists acquire and continuously modify the understanding of organismal biology. BIO 111L is a laboratory based study of organismal biology. This course will emphasize the diversity of organisms and the differences and similarities among organismal lineages.

BIO 111 & 111L **Core Principles of Cell and Molecular Biology and Lab** (SPRING Semester)
 Dual Enrolled
 An in-depth introduction to the principles of cell and molecular biology with emphasis in physiology of the cell, biochemistry, molecular biology and molecular genetics. The fundamental principles of thermodynamics and physical chemistry will be reviewed and their relationships to cell structure and function will be studied. The historical progression of discoveries and the framework of the major concepts of cellular and molecular biology will be discussed. BIO 110L accompanies BIO 110 and is a laboratory-based study of cell and molecular biology.

CHE 101/101L **General Chemistry I and Lab** (FALL Semester)
 A course in basic chemical principles. Topics include: periodicity, stoichiometry, chemical and nuclear reaction types, coordination chemistry, atomic and molecular nomenclature, structure, and properties. CHE

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| Dual Enrolled | 101L General Chemistry Laboratory accompanies CHE 101 and is designed to develop laboratory and mathematical skills through experiments that illustrate chemical concepts. |
| CHE 102/102L Dual Enrolled | General Chemistry II and Lab (SPRING Semester) An introduction to the principles of chemical kinetics and thermodynamics and their application to chemical reactions, with an emphasis on solution chemistry. CHE 102L General Chemistry Laboratory accompanies CHE 102. It is a continuation of CHE 101L, focused on the development of quantitative and analytical laboratory skills. PREREQ: CHE 101 |
| ENG 111 Dual Enrolled | English Composition and Rhetoric I (FALL Semester) English 111 is the first half of the required two-course sequence in composition. This course introduces students to 3 hours of the modes of writing, with an emphasis on exposition and argumentation. The course also reviews basic processes college credit of composing: inventing, planning, drafting, and revising. Students will learn how to develop ideas in a clear and logical manner, communicate their ideas coherently to their intended audience, and write in a correct and effective way. In addition to writing several in-class essays and short papers, students will learn the techniques and conventions of academic research. They will participate in at least one session on library and information technology. Fiction and nonfiction readings will provide discussion material and starting points for their writing. |
| ENG 112 Dual Enrolled | English Composition and Rhetoric II (SPRING Semester) English 112 is the second half of the required two-course sequence in composition. This course advances 3 hours of students' critical reading and writing skills by exploring how writing creates knowledge and shapes meaning; college credit therefore, student writing will involve both print and digital formats. Throughout the semester students will define terms, conduct research, evaluate and synthesize evidence in order to create clearly written, sustained arguments. Readings for each section of ENG 112 will explore a specific and unifying theme or question, and may include readings in fiction and non-fiction. PREREQ: ENG111 |
| HIS 101 AP | AP United States History This full-year advanced placement course traces the major events, trends, and themes of American life from the colonial era to the present. Outside reading assignments, including primary sources, enhance the understanding of America's past while showing its connection to our present time. The fall semester includes a study of the Constitution and the origins and functions of the federal government. |
| MAT 111 & 112 Honors | Concepts for Calculus Part 1, Pre-Calculus A two-semester sequence that is designed to prepare students for the study of calculus. First semester topics include linear functions, polynomial functions, rational functions, exponential functions, logarithmic functions, function composition and transformations. Spring semester topics include trigonometry, parametric and polar equations, and partial fractions. |
| MAT 231 Dual Enrolled | Calculus I Topics include limits and continuity, the derivative, differentiation of algebraic and trigonometric functions, applications of the derivative, indeterminate forms, basic integration techniques, and the Fundamental Theorem of Calculus. PREREQ: Pre-Calculus |

JUNIOR SEMINAR DESCRIPTIONS

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| LLS 101 | Life and Leisure Skills (FALL Semester) This seminar is designed to provide juniors with the necessary skills for making the transition to a school curriculum that is frequently intense. The course formally addresses many of the academic as well as emotional and social demands that are placed on students in this new environment. It provides them with an arena where positive life skills are encouraged and fostered. |
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LLS 102 Academic Transition (FALL semester)

This seminar is designed to assist students with the academic transition to GSSM. Students will be introduced to the resources and opportunities available to them at GSSM and will learn how to develop the skills and mindset necessary to thrive in the fast-paced and challenging GSSM academic environment.

LLS 103 College Planning I (SPRING semester)

The College Planning Seminar I course is designed to teach students how to navigate both the college search and college application processes. The course will emphasize the importance of self-awareness and reflection in the process. Students will also learn how to identify college/universities that match what they are looking to gain in a collegiate experience. The tools and resources shared in the course will allow students to have a thoughtful and guided college search experience.

LLS 107 Preparing for Research Experiences (SPRING Semester for four weeks)

This 4-week seminar series will provide an introduction to skills and concepts central to student research experiences. Students will work with peer-reviewed research papers to learn about scientific process, research narratives, how to read and understand research articles, develop annotated bibliographies, data analysis, basic statistics, and communication.

SENIOR SEMINAR DESCRIPTIONS

LLS 104 College Planning Seminar II (FALL Semester)

The College Planning Seminar II course continues the college application process for the fall of senior year. Students will confirm their college application list, complete college applications and essays, and submit requests to have official documents sent to colleges. Completion of financial aid forms (FAFSA and CSS Profile) will also be covered. This fall seminar focuses on time management skills, organizational skills, submission of college applications and communication with colleges as an applicant. The seminar meets once a week; students may be excused from attending once their applications have been submitted to colleges.