Table of Contents

Welcome from the Vice President.................................................................................................................. 3

About GSSM.................................................................................................................................................. 4

About GSSM Accelerate............................................................................................................................... 4

Program Details ........................................................................................................................................... 4

Technology.................................................................................................................................................. 5

The Facilitator............................................................................................................................................... 6

Dual Enrollment Courses ............................................................................................................................. 6

Curriculum Overview.................................................................................................................................. 7

Course Descriptions ................................................................................................................................. 8

   Engineering............................................................................................................................................... 8

   English....................................................................................................................................................... 10

   Mathematics ........................................................................................................................................... 11

   Science................................................................................................................................................... 12

Online Elective Courses ............................................................................................................................... 13

   Computer Science ................................................................................................................................. 13

   Engineering............................................................................................................................................ 13
Welcome from the Vice President

Dear counselor, principal, or facilitator,

I hope that you are well and having a great school year! Here in Hartsville, SC at the Governor’s School for Science and Mathematics (GSSM), we are having a great year teaching and working with students in schools and communities across the state. We are also excited about, and busy preparing for the 2018-2019 school year!

Thank you for partnering with us so that, together, we can offer an advanced level, dynamic and innovative engineering program for academically motivated students in your community and throughout the state of South Carolina! If you have worked with us before, we look forward to serving your school again in 2018-2019. If this will be your first year partnering with us, we look forward to our new partnership and the opportunity to offer your students a rich STEM curriculum with an engineering focus.

This catalog lists all of the courses available to students in the Accelerate Program:

- **Required**, live Interactive Video Conference (IVC) courses
- **Elective** Online courses

GSSM Accelerate requires students attend a school in one of our partner districts, and to apply for admission and be accepted into the program. Students in the program must take all of the required Accelerate courses for their grade level, and maintain academic excellence throughout the program.

Returning partners may be pleased to see the following changes to our program:

- Additional dual enrollment courses
- New online elective courses in Computer Science, Biomedical Engineering and Mechanical & Aerospace Engineering

I invite your feedback on any aspect of the GSSM Accelerate program. I can be reached at esims@gssm.k12.sc.us or (843) 383-1909.

Sincerely,

Ershela L. Sims, Ph.D.
Vice President for Accelerate Engineering
About GSSM

The Governor’s School for Science and Mathematics was founded in 1988 under the leadership of former Governor Carroll Campbell and Charles W. Coker, then-president of Sonoco Products Company.

The mission of the South Carolina Governor's School for Science & Mathematics (GSSM) is to offer our state's most academically motivated students a unique learning environment that strengthens their ability to think critically, stimulates the joy of learning and fosters the excitement of discovery through hands-on scientific research.

The purpose of GSSM is to positively impact South Carolina's economic development through the cultivation of our current students and alumni, who are our state's future political and business leaders.

GSSM Accelerate Administration
Dr. Hector Flores, GSSM President
Dr. Ershela Sims, Vice President for Accelerate
Dr. Gary Gabel, Accelerate Program Administrator
Dr. Zaria O’Bryant, Accelerate Program Administrator
Dr. Brian Gloor, Accelerate Academic Programs Coordinator

About GSSM Accelerate

To reach high school students beyond those in the residential program, the South Carolina Governor's School of Science & Mathematics Accelerate program offers a live, virtual engineering education to students throughout the state. Educating talented students since 1988, GSSM tailors its Accelerate curriculum to students who receive an integrated set of courses that deliver superior science, engineering and math instruction, along with valuable skills in critical analysis and professional communication taught in a series of English courses. Accelerate provides students opportunities for collaboration, social engagement, as well as research and design that hinge on the program’s model of integration of knowledge across multiple disciplines.

Program Details

All students enrolling in a GSSM Accelerate course must have been accepted into the GSSM Accelerate Engineering program and be currently in good academic standing. Students in the program must take all of the required Accelerate courses for their grade level, and maintain academic excellence throughout the program.

In addition to the IVC courses taken during the academic year, students in GSSM Accelerate also participate in a number of summer and weekend activities as part of
the program. Each summer, students will attend a mandatory one-week residential camp. Their attendance is also required at several Saturday events during each school year. These include, but are not limited to, engineering and science labs on the Hartsville campus, visits to engineering companies around the state, and visits to university engineering departments.

Technology
GSSM Accelerate students attend class, participate in discussions, work on group projects, and get after-class help through GSSM’s innovative, statewide, high-definition (max 1080p30) video conferencing network. For a scalable video platform, GSSM Accelerate uses Vidyo, the technology behind Google Hangouts. This technology provides a top-quality video and sound experience for teachers and students, whether they are using room-size video facilities, computers, tablets, or phones. Each lecture and seminar is recorded and streamed simultaneously. Students who are unable to be in class can watch the live simulcast on their computer, tablet or phone.

Students also use GSSM’s Global Application Infrastructure Network (GAIN) to access modeling and design tools like MATLAB and SolidWorks while at school or at home. GAIN allows students to collaborate and complete assignments from nearly any internet-connected computer or tablet in the world. Files are stored in the cloud and student work is safe from loss due to power outages or computer failures. GSSM uses VMWare to create virtual desktops that Accelerate students can use securely in class, at home, and on nearly any Internet-connected device. VMWare forms the core of GAIN and in addition to providing access to modeling and design tools, it provides access to MS Office as well as instantly available cloud storage.
The Facilitator

Key to the success of the virtual classroom experience is the facilitator. The facilitator is an adult at the school site who works with the students and the GSSM Accelerate instructor to ensure a positive learning environment.

Expectations for facilitators include:
- Maintaining a safe, productive environment for students in the Accelerate virtual classroom.
- Performing certain classroom management functions
- Administering and proctoring tests and quizzes designed by GSSM Accelerate instructors.
- Troubleshooting minor technical issues, such as muted volume, unplugged cables, or pointing and zooming the camera.
- Communicating with the GSSM Accelerate instructors about school closures, schedule changes, or classroom issues that affect student learning.
- Receiving assignment and graded work from GSSM Accelerate instructors.
- Communicating with parents, school counselors, and school administration

The facilitator is not required to be a subject-area teacher, though many schools have subject-area teachers participate as facilitator.

Dual Enrollment Courses

All GSSM Accelerate courses are offered for high school credit, and are Honors or Dual Enrollment, as noted in the course descriptions. Dual enrollment courses allow for both high school and college credit. Credits are contingent upon satisfactory completion of all course requirements.

Courses offered for both college and high school credit will be certified via a master dual enrollment agreement between Coker College and GSSM. Students are enrolled in Coker College as “special students”. College credits are awarded as noted, provided students meet all requirements of both GSSM Accelerate and the appropriate partner college/university. No college credit shall be awarded for grades below C.

Completion of the GSSM Accelerate program does not guarantee admission into any partner college/university. Students must apply to, and be accepted by, the university and department in which they wish to enroll. Admission of the student and the granting of these credits are solely the province of the college/university partner.
# Curriculum Overview

<table>
<thead>
<tr>
<th></th>
<th>10 FALL</th>
<th>10 SPRING</th>
<th>11 FALL</th>
<th>11 SPRING</th>
<th>12 FALL</th>
<th>12 SPRING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MATH</strong></td>
<td></td>
<td>Honors Pre-Calculus for Engineers</td>
<td></td>
<td>MATH 222 Calculus I</td>
<td></td>
<td>MATH 223 Calculus II</td>
</tr>
<tr>
<td><strong>SCIENCE</strong></td>
<td>Chemistry I*</td>
<td>Chemistry I*</td>
<td>CHE 101 and CHE 101L General Chemistry I and Lab</td>
<td>CHE 102 and CHE 102L General Chemistry II and Lab</td>
<td>PHY 203 and PHY 203L Calculus Physics I and Lab</td>
<td>PHY 204 and PHY 204L Calculus Physics II and Lab</td>
</tr>
<tr>
<td><strong>ENGINEERING</strong></td>
<td>Honors Pre-Engineering I</td>
<td>Honors Pre-Engineering II</td>
<td>EGR 102 Engineering Disciplines &amp; Skills</td>
<td>EGR 141 MATLAB Programming</td>
<td>EGR 115 Engineering Design and Modeling</td>
<td>Honors Senior Project</td>
</tr>
<tr>
<td><strong>ENGLISH/LANG ARTS</strong></td>
<td>English II*</td>
<td>English II*</td>
<td>ENG 101 English Composition and Rhetoric I</td>
<td>ENG 102 English Composition and Rhetoric II</td>
<td>ENG 215D Writing in STEM</td>
<td>ENG 220 Truth and Consequence</td>
</tr>
<tr>
<td><strong>ELECTIVES</strong> (optional)</td>
<td>CS 110 Computer Science I (Fall)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Honors Biomedical Engineering (Spring)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Honors Mechanical and Aerospace Engineering (Spring)</td>
</tr>
</tbody>
</table>

**BLUE** indicates honors courses  
**GREEN** indicates dual enrollment courses

Courses in Black are offered by and weighted by the local high school.  
*To be taken at the home school during the sophomore year

---

**Standard High School Graduation Requirements**

<table>
<thead>
<tr>
<th>Standard Credit Units (1 year = 1 credit)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math</td>
</tr>
<tr>
<td>Science (incl biology)</td>
</tr>
<tr>
<td>Computer Science</td>
</tr>
<tr>
<td>English/Language Arts</td>
</tr>
<tr>
<td>Foreign Language</td>
</tr>
<tr>
<td>US History</td>
</tr>
<tr>
<td>Government/Economics</td>
</tr>
<tr>
<td>Other Social Studies</td>
</tr>
<tr>
<td>Phys Ed/ROTC</td>
</tr>
<tr>
<td>Electives</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

Applicants must successfully complete Algebra I prior to the beginning of 9th grade, and project successful completion of Algebra II (if available) by the end of 9th grade.  
Prior to the beginning of 11th grade, students should complete:  
- Biology I  
- Chemistry I  
- Geometry  
- English II
Course Descriptions

Engineering

Pre-Engineering 1 (Honors)  
**SCDOE No. 692400HH**  
0.5 HS Credit(units)  
**Fall**

Pre-Engineering 1 offers students an introduction to engineering, discussing careers and highlighting South Carolina-based industries. Introduces professional, ethical, and societal issues appropriate to engineering. Various forms of technical communication are emphasized. This course is integrated with Pre-calculus.

**Prerequisite:** Algebra II

Pre-Engineering 2 (Honors)  
**SCDOE No. 692500HH**  
0.5 HS Credit(units)  
**Spring**

Provides a solid foundation of skills to solve engineering problems. Students demonstrate problem-solving techniques with units and dimensions, use modeling techniques and interpret validity of experimental results, learning “thinking like an engineer”. The course is integrated with Pre-calculus.

**Prerequisite:** Pre-Engineering 1

EGR 102 Engineering Disciplines and Skills (Dual Enrollment)  
**SCDOE No.: 660400EW**  
1.0 HS Credit(units)  
**Fall**  
**College credit:** 3SH

Provides solid foundation of skills to solve engineering problems. Students demonstrate problem solving techniques with spreadsheets, dimensions and units; use modeling techniques and interpret validity of experimental results. Students design projects on multi-discipline teams. Introduces professional and societal issues appropriate to engineering. Various forms of technical communication are emphasized.

**Prerequisite:** Grade of C or better in Honors Pre-Engineering 2

EGR 115 Engineering Design and Modeling (Dual Enrollment)  
**SCDOE No.: 805400EW**  
1.0 HS Credit(units)  
**Fall**  
**College credit:** 3SH

This course is an introduction to engineering graphics and machine design. Students use hand sketching and CAD tools to visualize, communicate, rapid prototype, and analyze engineering problems. SOLIDWORKS software is used.

**Prerequisite:** Grade of C or better in EGR 141

EGR 141 Programming and Problem Solving (Dual Enrollment)  
**SCDOE No.: 805300EW**  
1.0 HS Credit(units)  
**Spring**  
**College credit:** 3SH

Students formulate and solve engineering problems using MATLAB; estimate answers for comparison to computed solutions; read, interpret and write programs, instructions and output; iterate, evaluate conditional statements; and debug. Various forms of technical communication are emphasized.

**Prerequisite:** Grade of C or better in EGR 102
Senior Engineering Projects (Honors)  
0.5 HS Credit(units) Spring

The Senior Project course is an engineering capstone course designed for students to work through the engineering design process by selecting, researching and developing a new product or process. The product can be either an invention or innovation and the design process should include the development of a prototype. The process should include new methodology of a technical nature. Students continue applying skills taught and used in EGR 115.

**Prerequisite:** Grade of C or better in EGR 115 or permission of VP for Accelerate
English

ENG 101 English Composition and Rhetoric I (Dual Enrollment) SCDOE No. 301500EW
1.0 HS Credit(units) Fall College credit: 3SH
English 101 is the first half of the required two-course sequence in composition for first-year students. This course introduces students to the modes of writing, with an emphasis on exposition and argumentation. The course also reviews basic processes 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 102 English Composition and Rhetoric II (Dual Enrollment) SCDOE No. 301600EW
1.0 HS Credit(units) Spring College credit: 3SH
English 102 is the second half of the required two-course sequence in composition for first-year students. This course advances students’ critical reading and writing skills by exploring how writing creates knowledge and shapes meaning; 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 102 will explore a specific and unifying theme or question, and may include readings in fiction and non-fiction.

Prerequisite: ENG 101

ENG 215D Writing in STEM (Dual Enrollment) SCDOE No. 403500EW
1.0 HS Credit(units) Fall College credit: 3SH
In this course, students will investigate the circumstances and genres in which STEM professionals write. The course combines readings from scientific, engineering, and mathematics disciplines geared toward general audiences. Such readings will serve as the basis of writing and addressing specific audiences in the disciplines. Students should have completed at least one science course before taking the course or be co-registered for a science course.

Prerequisites: ENG 102 and completion of or concurrently enrolled in a science course

ENG 220 Truth and Consequence (Dual Enrollment) SCDOE No. 403600EW
1.0 HS Credit(units) Spring College credit: 3SH
Literature explores the great moral and ethical questions and this course combines historical and contemporary readings to examine the importance of this inquiry. Students will read works of fiction and non-fiction to explore the ways cultures at particular moments in time have determined what is right, good and appropriate. Moreover, students will explore how writers have addressed the ways individuals and groups have resisted or revered cultural constructions of stigmatized, demonized or vilified behaviors in various contexts and situations.

Prerequisite: ENG 102
Mathematics

Precalculus (Honors)  SCDOE No.: 413100HW

1.0 HS Credit (units)  **Fall/Spring**
This course provides students with foundational knowledge in preparation for the study of calculus. Emphasis will be placed on engineering problem solving. Topics include polynomial and rational functions, quadratic functions and models, polynomial functions and their graphs, exponential and logarithmic functions and trigonometric and inverse trigonometric functions.

**Prerequisites:** Algebra II or PI

MAT 222 Calculus I (Dual Enrollment)  SCDOE No.: 413600EW

1.0 HS Credit (units)  **Fall/Spring**  **College credit:** 4SH
The topics in this course include limits and continuity, the derivative, differentiation of algebraic and trigonometric functions, applications of derivatives, Fundamental Theorem of Calculus.

**Prerequisites:** Honors Precalculus

MAT 223 Calculus II (Dual Enrollment)  SCDOE No.: 413700EW

1.0 HS Credit (units)  **Fall/Spring**  **College credit:** 4SH
The topics in this course include transcendental functions, applications of integration, integration techniques, indeterminate forms, improper integrals, parametric equations, polar coordinates, and infinite series.

**Prerequisites:** Calculus I
Science

Chemistry
CHE 101 and 101L General Chemistry I and Lab (Dual Enrollment)  SCDOE No.: 323900EW
1.0 HS Credit (units) Fall  College credit: 4SH
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 101L General Chemistry Laboratory accompanies CHE 101 and carries 1 credit; it is designed to develop laboratory and mathematical skills through experiments that illustrate chemical concepts. Mandatory labs are scheduled on some Saturdays each semester.
Prerequisite: Introduction to Chemistry or PI

CHE 102 and 102L General Chemistry II and Lab (Dual Enrollment)  SCDOE No.: 324000EW
1.0 HS Credit (units) Spring  College credit: 4SH
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 and carries 1 credit. It is a continuation of CHE 101L, focused on the development of quantitative and analytical laboratory skills Mandatory labs are scheduled on some Saturdays each semester.
Prerequisite: CHE 101

Physics
PHY 203 and 203L Calculus Physics I and Lab (Dual Enrollment)  SCDOE No.: 324900EW
1.0 HS Credit (units) Fall  College credit: 4SH
A calculus-based course covering classical mechanics and dynamics. Topics include vector notation, kinematics, statics, dynamics, circular motion, work and energy, linear momentum, and rotational motion. PHY 203L Calculus Physics Laboratory I accompanies PHY 203 and carries 1 credit. Experiments designed to illustrate the principles of physics covered in PHY 203. Mandatory labs are scheduled on some Saturdays each semester.
Prerequisites: MAT 222 (Calculus I)

PHY 204 and 204L Calculus Physics II and Lab (Dual Enrollment)  SCDOE No.: 325000EW
1.0 HS Credit (units) Spring  College credit: 4SH
A calculus-based course covering fluids, vibrations, waves, sound, electricity, magnetism, light, and optics. PHY 204L Calculus Physics Laboratory II accompanies PHY 204 and carries 1 credit. It includes experiments designed to illustrate the principles of physics covered in PHY204. Mandatory labs are scheduled on some Saturdays each semester.
Prerequisites: PHY 203
**Online Elective Courses**

These courses will be delivered in a blended format online course with a weekly interactive teacher led evening webinar. The classes will include a combination of design projects, problem sets, lectures, discussions, group work, labs, demonstrations, and activities.

**Computer Science**

CS 110 Computer Science I (Dual Enrollment)  
1.0 HS Credit(units) **Fall**  
College credit: 4SH

An introduction to computer architecture, computer systems, number systems, logic circuits, and current software applications; fundamentals of computer programming and problem solving using C++ programming language applied to real world examples; basics of program-writing environment, simple data types, expressions, control structures, iteration, functions, arrays, and introduction to object-oriented programming. CS 110 includes a one semester hour laboratory course, with two laboratory hours per week.

**Prerequisite:** Algebra II

**Engineering**

Biomedical Engineering (Honors)  
1.0 HS Credit(units) **Spring**

This course introduces students to the different sub-specialties of biomedical engineering (BME) including bioelectricity, biomedical instrumentation, biomaterials, and biomechanics. Through hands-on labs, design projects, problem sets, and research article review, students explore and experience the engineering design process, problem solving and troubleshooting in the field of BME. Some questions that might be addressed are: “how are electrical signals from the heart measured outside the body?”, “is there a way to design high heel shoes that don’t hurt women’s feet?”, and “how do engineers design heart valves that only allow blood flow in one direction?”.

[Per SCDOE: districts must use a local board approved number for this course.]

Mechanical and Aerospace Engineering (Honors)  
1.0 HS Credit(units) **Spring**

This course introduces students to the fields of mechanical and aerospace engineering. It integrates engineering design, core math and science concepts needed to solve problems related to aerospace and mechanical engineering as well as other engineering disciplines. The course includes historical context and addresses the following topics: statics, thermodynamics, fluid dynamics, materials, and mechanics of flight. Through the use of hands-on labs, design projects, problem sets, and demonstrations students learn how engineers use mathematics and science to design efficient and beneficial devices such as automobiles, power plants, airplanes, machinery, and heating/cooling equipment. Students have opportunities to experiment, calculate, compute, design, and build as they explore and solve problems.

[Per SCDOE: districts must use a local board approved number for this course.]