



SOUTH CAROLINA GOVERNOR'S SCHOOL  
**for Science & Mathematics**

**Course Catalog**  
**2016-2017**

## **Table of Contents**

1. Academic Requirements
2. Additional Graduation Requirements
3. 2016-2017 GSSM Course offerings by semester
4. Academic Concentrations
5. Frequently Asked Questions
6. Rising Junior course selection: Helpful Hints
7. Rising Senior course selection: Helpful Hints
8. Course Descriptions
  - a. Science Division
    - i. Biology
    - ii. Chemistry
    - iii. Physics
  - b. Mathematics, Computer Science and Engineering Division
    - i. Mathematics
    - ii. Computer Science
    - iii. Engineering
  - c. Humanities Division
    - i. English
    - ii. History and Psychology
    - iii. French
    - iv. Spanish
    - v. Chinese
  - d. Economics and Finance Division
  - e. Mentored Summer Research and On-Campus Research
  - f. Junior Seminar Series
9. Accelerate Engineering Program  
(for entering GSSM students who have completed 10<sup>th</sup> grade Accelerate)
10. Independent Study
11. College Credit Hours agreements

## Academic Requirements

GSSM awards both State of South Carolina and GSSM diplomas.

### State of South Carolina High School Graduation Requirements

	Units of Credit
Lab Sciences	3
Mathematics	4
Computer Science (includes keyboarding)	1
English/Language Arts	4
Foreign Language	1
US History	1
US Government	0.5
Economics	0.5
Other Social Studies	1
Physical Education/ROTC	1
Electives	7
<b>Total</b>	<b>24</b>

### GSSM Graduation Requirements

While at GSSM, all students must be working toward earning a GSSM diploma. To earn a GSSM diploma, students must complete a minimum of 13.5 units during their two years at GSSM consisting of the following:

- six units of courses each year (some students will need to take more than the minimum to meet state and/or GSSM graduation requirements)
- one unit of January interim courses (0.5 units for each January interim course)
- 0.5 units for the summer part of the mentored summer research conducted between the junior and senior year (the other 0.5 units for the research is one of the six minimum courses taken during the fall of the senior year)

The table on the following page outlines the minimum number of units that must be completed at GSSM for a GSSM diploma. Students may have to complete more courses in a subject area than the minimum in order to meet requirements explained in the notes.

Subject Area	Min. Units at GSSM	Notes in order to receive a GSSM diploma
Lab Science	2	One credit each in core biology, chemistry, and physics courses. The third course will count as one of the two credits required in the area of <i>STEM and Economics electives</i> below. Credits in all three areas are required while at GSSM unless a student has a prior AP credit in one of the classes. Four total lab science credits are required during a student's four years of high school to graduate with a GSSM diploma.
Mathematics	1.5	Must work toward one unit of calculus. Must be enrolled in a math course each semester. The fourth semester of math (0.5 credit) will count towards a student's General Elective requirement below.
Computer Science	0.5	Students who have a prior AP Computer Science credit can take a computer science course above CSC 101 to fulfill this requirement.
<i>STEM and Economics electives: Science, Math, Computer Science, Engineering, Economics elective</i>	2	Any science, math, computer science, engineering, on-campus research or economics course beyond the required courses above will count toward these electives. The 2.0 credits can be taken in multiple disciplines. Only 1.0 credit can be taken in economics to fulfill this requirement. <b>(* See "GSSM course offerings by semester" for the list of possible courses.)</b>
Mentored Summer Research	1	Required for all students (0.5 units during the summer and 0.5 units during the fall of the senior year).
English	2	Must complete GSSM Junior and Senior English.
Foreign Language	0	Must complete through Level 3 in a foreign language. May be waived if Level 2 is completed and GSSM does not offer Level 3.
Social Studies	0.5	Students who have not taken U.S. History to satisfy the state requirement must take AP U.S. History (HIS 101) during the Junior year at GSSM. Students who have not taken Government and Economics to satisfy the state requirement must take the one semester Gov/Econ (HIS 201) class at GSSM, which satisfies the state requirement by itself, or take AP Government (HIS 202) and either AP Microeconomics (EFI 310) or AP Macroeconomics (EFI 320) to satisfy the state requirement.
January Interim	1	Required for all students.
General Electives	3	These credits will often times be used to complete GSSM or SC graduation requirements in one or more of the areas above. In cases when students have met the GSSM and SC graduation requirements, these electives must be used to take additional courses at GSSM in order for students to have a minimum of six courses per semester.
<b>TOTAL Credits</b>	<b>13.5</b>	

### Additional Graduation Requirements

<b>Junior Seminar Series:</b> One-hour per week per seminar: <i>Life Leisure</i> (Fall and Spring), <i>Entrepreneurial Leadership</i> (Fall), and <i>College Planning Seminar</i> (Spring) during the junior year	Required for all Juniors to attend and pass.
<b>Community Engagement</b>	83 hours per year (166 hours total)
<b>Physical Activity Requirement (PAR)</b>	83 hours per year (166 hours total)

## 2016-2017 GSSM course offerings by semester

(The Course Catalog can be found on our website at:

<http://www.scqssm.org/residential/academics/course-catalog-and-faqs>)

(the \* indicates that any of the courses in that area could be used to fulfill the 2.0 credits of STEM and Economics electives required for graduation)

### Biology core courses

Fall	Spring
201 AP Biology	201 AP Biology
202 AP Biology	202 AP Biology

### \* Biology elective courses

Fall	Spring
303 Molecular Biology (above AP)	301 Vertebrate Biology (above AP)
304 Human Anatomy and Physiology (above AP)	306 Neuroscience (above AP)
309 Biological Evolution (above AP)	307 Advanced Genetics (above AP)
	308 Botany (above AP)

### Chemistry core courses

Fall	Spring
100/101** Principles of Chemistry/Introduction to Chemistry: year-long	
201 AP Chemistry	202 AP Chemistry

### \* Chemistry elective courses

Fall	Spring
302 Organic Chemistry	301 AP Environmental Science
304 Analytical Chemistry	305 Biochemistry

\*\* Students without a year of Chemistry begin in Principles of Chemistry. At the end of the Fall semester, students that can move up to the articulated Introduction to Chemistry course will be moved. AP Chemistry could be considered an elective course if taken as a Senior after Principles of Chemistry or Introduction to Chemistry at GSSM

### Physics core courses

Fall	Spring
101 Fundamentals of Physics	102 Fundamentals of Physics
151 AP Physics 1 – A	152 AP Physics 1 – B
201 AP Physics C:M	202 AP Physics C:EM

### \* Physics elective courses

Fall	Spring
301 Modern Physics (above AP)	203 Fluids, Thermo and Optics
	210 Astronomy

AP Physics could be considered an elective course if taken as a Senior after Fundamentals of Physics or AP Physics I at GSSM

### Mathematics core courses

Fall	Spring
102 Adv Math II	103 Adv Math III
111 Analysis I	112 Analysis II
200 Honors Calculus: year-long	
201 AP Calculus AB	202 AP Calculus AB
203 AP Calculus BC: year-long	
	303 AP Calculus BC

### \* Mathematics elective courses

Fall	Spring
301 Linear Algebra (even years) (above AP)	302 Abstract Algebra (odd years) (above AP)
304 AP Statistics: Probability and Statistics	305 AP Statistics: Applied Statistics
306 Multivariate Calculus (odd years) (above AP)	307 Discrete Structures (even years) (above AP)
308 Regression Analysis (above AP)	310 Number Theory (even years) (above AP)
	312 Ordinary Differential Equations (odd years) (above AP)

### Computer Science core courses

Fall	Spring
101 AP Computer Science A	101 AP Computer Science A

### \* Computer Science elective courses

Fall	Spring
150 Introduction to Computer Graphics Using Python (above AP)	102 Data Structures using Java (above AP)
120 Programming Interaction and Visual Design (above AP)	140 Introduction of Artificial Intelligence (above AP)
201 Application Design and Implementation using C++ and Linux (above AP)	202 Game Design, Prototyping and Production (above AP)
402 Robotics (above AP)	

### Engineering core courses

Fall	Spring

### \* Engineering elective courses

Fall	Spring
205 Introduction to Engineering Design	206 Engineering Mechanics: Statics
207 Engineering: Electronics	208 Engineering: SolidWorks
	208 Engineering: SolidWorks
	210 Engineering: Product Design

### Economics and Finance core courses

Fall	Spring

### \* Economics and Finance elective courses

Fall	Spring
301 Technology Ventures	301 Technology Ventures
310 AP Microeconomics	320 AP Macroeconomics
	320 AP Macroeconomics
	303 Financial Analysis

### Research core courses

Summer and Fall	
401 Mentored Summer Research (above AP)	

### \* Research: On-campus elective courses

Fall	Spring
402 Scientific Investigation I	402 Scientific Investigation I
403 Scientific Investigation II	403 Scientific Investigation II

**English core courses**

Fall	Spring
102 Jr English (AP English Language): year-long	
201 Sr English (AP English Literature): year-long	

**English elective courses**

Fall	Spring
301 Intro to Creative Writing	302 Studies in Creative Writing: Poetry
303 Drama	304 Introduction to Film
308 Intro to Philosophy	307 Christian Literature
309 Topics in Science Fiction: Literature	310 Topics in Science Fiction: Star Trek
311 Natural History and Science Writing	312 Shakespeare's Plays

**History core courses**

Fall	Spring
101 AP US History: year-long	

**History elective courses**

Fall	Spring
306 Irish History	305 WWII
309 Civil War and Reconstruction	315 Medieval
	PSY 301 AP Psychology

**Government and Economics core courses**

Fall	Spring
201 Government/Economics	201 Government/Economics

**Government and Economics elective courses**

Fall	Spring
202 AP US Government	

**French core courses**

Fall	Spring
101 French I: year-long	
201 French II: year-long	
301 French III: year-long	

**French elective courses**

Fall	Spring
401 French IV: year-long	
501 French V: year-long	
601 AP French: year-long	

**Spanish core courses**

Fall	Spring
201 Spanish II: year-long	
301 Spanish III: year-long	

**Spanish elective courses**

Fall	Spring
401 Spanish IV: year-long	
501 Spanish V: year-long	
601 AP Spanish: year-long	

**Chinese core courses**

Fall	Spring
101 Introduction to Chinese I	102 Introduction to Chinese II
201 Intermediate Chinese III	202 Intermediate Chinese IV

*All Chinese courses are for dual credit through Coker College*

**Music**

Fall	Spring
201 AP Music Theory	

**Junior Seminar Series (each seminar meets one-hour per week)**

Fall	Spring
101 Life and Leisure	101 Life and Leisure
102 Entrepreneurial Leadership	103 College Planning Seminar

## Academic Concentrations

GSSM offers students the opportunity to concentrate study in one of several disciplines. In this manner, students may pursue academic areas of particular interest to them. They may bring their pursuit of academics above and beyond Advanced Placement to the attention of colleges and other interested parties. Students are cautioned that in most cases, they will have to have completed some advanced coursework prior to entry to GSSM for a concentration to be feasible. Concentrations are recognized by a special inscription on the GSSM diploma. A student should never pursue a Concentration as a mark of academic excellence; breadth in academic pursuits is fully as desirable as depth, especially for students just beginning their academic careers.

1. **Biology**

An incoming student with no Advanced Placement score will need to earn a grade of B or above in Biology 201 and 202 plus at least two other biology courses at the 300 level. An incoming student with an Advanced Placement score of 5 who skips Biology 201 and 202 will need to earn a grade of B or above in at least three courses at the 300 level.

2. **Physics**

For a GSSM diploma with a physics concentration, a student must take Physics 101-102 or Physics 201-202 in the junior year and at least one of the following each subsequent semester: Physics 203, Physics 204, Physics 210, and Physics 301. A 5 on the Physics C AP test will be accepted in lieu of 201 or 202 as appropriate.

3. **Chemistry**

The student will complete the following chemistry courses while at GSSM: the advanced Chemistry sequence (Chemistry 201 and 202) and at least one of the following: Chemistry 302 (Organic), Chemistry 304 (Analytical Chemistry), or Chemistry 305 (Biochemistry).

4. **Mathematics and Computer Science**

To earn the concentration in Mathematics and Computer Science, a student must make a B or above in the following selection of courses: two of the following mathematics courses (Linear Algebra, Differential Equations, Discrete Structures, or Multivariable Calculus) and at least one course in computer science beyond 101 AP Computer Science.

5. **Economics and Finance**

To earn a concentration in Economics and Finance, a student must earn a B or above in at least three the following courses: Technology Ventures, Financial Analysis, AP Microeconomics, and AP Macroeconomics.

6. **Humanities**

The student will complete four term electives, distributed among or concentrated in the English, Foreign Languages, or History Department. Electives may be chosen only after required courses in the department have been completed.

## Frequently Asked Questions

(The Course Catalog can be found on our website at: <http://www.scgssm.org/residential/academics/course-catalog-and-faq>)

### **1. How many courses do I need each semester?**

All students must have a minimum of six courses per semester. Juniors will also take two one-hour seminar courses per semester. For seniors, Research counts as one of your six courses during the fall semester.

### **2. What if I want to overload on courses?**

Overloading means taking more than six courses in a semester. Juniors are not allowed to overload during the fall semester and may request to overload during the spring semester only if their grades are above 90 and they receive approval from their advisor and the VP for Academic Affairs. Seniors must seek approval from their advisor. When considering an overload, it is important to consider the demands of an additional course. It is very important for college admissions that you perform well in the courses you take. Taking more courses and not performing well in all courses is not advisable.

### **3. What science courses do I need?**

It is important that you have a solid foundation in the core sciences: Biology, Chemistry and Physics. Therefore, you must take a full credit (one year) in each of these three sciences at GSSM. However, if you have taken an AP course in one of these areas prior to enrolling at GSSM, then you may take higher level courses in that area of science or in one of the other two core science areas. You need at least three lab sciences during high school to graduate with a SC diploma and at least two lab sciences during your two years at GSSM to graduate with a GSSM diploma.

### **4. Which Chemistry course should I take, Principles of Chemistry or AP Chemistry?**

You can take either Principles of Chemistry or AP Chemistry as junior or senior. Taking Principles of Chemistry as a junior does not preclude you from also taking AP Chemistry as a senior. If you have already taken one year of high school Chemistry, you may opt to take AP Chemistry. If you have not had any Chemistry prior to enrolling at GSSM, you need to register for Principles of Chemistry. If you have taken Chemistry, but feel that your foundation is not as strong as you would like it to be, you may take Principles of Chemistry at GSSM. For students enrolled in the Principles of Chemistry course, at the end of the fall semester, instructors for that course will determine if a student should move to the articulated Introduction of Chemistry course for the remainder of the year or remain in the Principles of Chemistry course. As a senior, students can enroll in AP Chemistry after finishing either Principles of Chemistry or Introduction to Chemistry as a junior.

### **5. Which Physics course should I take, Fundamentals of Physics AP Physics I or AP Physics C?**

You can take either Fundamentals of Physics, AP Physics I or AP Physics C as a junior, based on your math placement, or senior. Taking Fundamentals of Physics or AP Physics I as a junior does not preclude you from also taking AP Physics C as a senior. Physics has a heavy math component to it. Therefore, to register for Fundamentals of Physics, you must be in MAT111-H or above or receive permission from the instructor, to register for AP Physics I, you must be in MAT111-H or above, and to register for AP Physics C, you must be in MAT201-AP or above. You can enroll in any Physics course without a prior course in Physics as long as you meet the math requirement. As a senior, students can enroll in AP Physics C after finishing either Fundamentals of Physics or AP Physics I as a junior.

### **6. What if I have already taken AP English Language and Composition before enrolling at GSSM?**

All students are required to take GSSM Junior and Senior English. If you have already had an AP course in English, then you will still register for the GSSM Junior or Senior English course, depending on your year at GSSM, and your transcript will reflect the course as GSSM Junior or Senior English.

### **7. Which math course should I take?**

As is the case for all GSSM courses, the courses in mathematics are designed to teach mastery of the subject area. Based on our professional opinion and experience, our goal for students is to place them into the course best suited for each of their individual backgrounds. We want each student in the course that will challenge that student at an appropriate level.

Recognizing that the mathematical ability of students varies greatly despite possibly having taken similar courses, we take proper placement very seriously. Due to the conceptual nature of mathematics, it is possible that once a student is at GSSM he or she could and should be placed in a different level (higher or lower) class. We encourage students to challenge themselves and strive to reach their full potential in all academic areas, and therefore, we will switch a student to a different mathematics class if we see that our initial placement was incorrect. The math department will reassess placements near the beginning of the semester, after the first major assessment, and once again at the mid-term.

During the registration process, all rising juniors are asked to select the math courses, along with their other courses, that they want to take. During New Student Orientation Day, all rising juniors are given placement assessments, which are used in addition to

their placement request, transcripts, PSAT/SAT math scores and previous grades in mathematics, to place them in the proper math courses. The rising seniors are asked to select math courses for their senior year during the spring of their junior year. Actual placements for seniors are determined by their requests and their performance in mathematics during their junior year.

#### **8. Do I need to take a Fine Arts course to fulfill a South Carolina graduation requirement?**

At this point, SC does not require a fine arts credit for graduation. Colleges do like to see a well-rounded applicant, and therefore, many students do take a fine arts course at some point during high school or are involved in a fine arts related club. We offer multiple fine arts course during our January interim for which students receive a 0.5 credit. We also offer numerous fine arts related clubs.

#### **9. What is an independent study and how do I register for one?**

Independent Study is designed to provide additional opportunities for highly motivated students to pursue areas of their special interest. Independent Study courses are student-initiated and allow students to explore areas of interest beyond what is offered in the catalog. It is aimed at enhancing the quality of our program by adding to it a customized course in an area of interest of a student and expertise of the instructor beyond what is already offered. Independent Study Course proposals will only be considered for 0.5 Carnegie unit (equivalent time commitment required as a regular semester-long course) and as overloaded courses (i.e. courses beyond the six course minimum per semester). In some rare cases, Independent Study Courses could be considered for 1.0 Carnegie unit. Independent Study courses must be approved by the Curriculum Committee.

Students wishing to enroll in an Independent Study course must meet at least one of these criteria:

- a) A student wishes to extend knowledge in a discipline where all relevant existing courses have been completed with a grade of 90 or above or at the permission of the instructor and approval of the Curriculum Committee. The Curriculum Committee reserves the right to determine if all relevant courses have been taken in an area of study in order to warrant an Independent Study course. In some cases it will be advised that a student take an existing course instead of an Independent Study.
- b) A student needs to complete a requirement for graduation (normally only in the Spring semester of the Senior year) when there is no course available in the specific subject that the student may schedule or an unavoidable scheduling conflict exists, provided that the Independent Study is not being used to replace a failed regular class. In special circumstances the instructor and student may request an exemption from the Curriculum Committee.

#### **10. If there is more than one teacher for a course, can I select the teacher I want?**

Students do not have the ability to select instructors. It is important to learn how to learn in all situations and from all different teaching styles. Learning from our diverse and talented instructors will prepare you for learning in the college setting and beyond.

#### **11. Why does my schedule change sometimes during the year, especially between semesters?**

In order to provide the best educational experience, we try to balance classes as best possible (i.e. similar number of students in each class). Since a number of our courses are taught in one semester and since we allow students to add and drop courses at the beginning of semesters, there is sometimes a need to rebalance classes for instructors at the beginning of each semester and sometimes after a few weeks into a semester.

#### **12. How does Research count in regards to the classes I take?**

Mentored Summer Research (RES401) counts as one of your required six classes in the fall of your senior year. The final grade and credit for research is not awarded until the end of the spring semester. Research does not count as one of your classes during the spring semester, but will show up on your spring schedule. You will receive one full high school credit for completion of RES401.

Students may also apply to participate in on-campus research during the fall and spring semesters (RES402 and RES403). These courses would count towards a student's STEM elective graduation requirement.

#### **13. What do I need to do if I have not met the Physical Education state graduation requirement prior to coming to GSSM?**

You must complete the GSSM graduation requirement for PAR and the Life and Leisure seminar. The combination of these will suffice for the state PE requirement.

#### **14. If a course is listed in the course catalog will it definitely be offered?**

Ideally, yes. However, depending on student demand for the course and faculty load (i.e. what other courses they are teaching), some courses may not be able to be offered each year. Also, some courses might have to be limited to a certain number of students, and therefore in some cases, not all students who register for a course will be able to take the course. Therefore, when signing-up for courses, you should think about other elective courses you might want to take if your initial choices cannot be met.

#### **15. If I take the one semester Gov/Econ (HIS 201) class at GSSM how does that impact the state requirements?**

If you take the one semester Gov/Econ class at GSSM then that satisfies both the government and economics state requirements, thereby reducing the total state Social Studies requirements from 3 credits (US History – 1.0 credit, Government – 0.5 credit,

Economics – 0.5 credit and one other Social Studies credit – 1.0 credit) to 2.5 credits total (US History – 1.0 credit, GSSM Gov/Econ – 0.5 credit and one other Social Studies credit – 1.0 credit).

**16. Do students and parents have access to grades through PowerSchool like they did in their previous high school?**

GSSM is a high school that operates in a lot of academic ways similar to a college. Classes are on a college schedule, mastery of the subject is the goal which is a process and student ownership of their academic success is promoted. Therefore, we ask that students maintain a record of their grades throughout the course. At any point during a course, a student or parent can inquiry to a teacher about their grade, but ideally, the student would be able to know or have a good idea based on the grades they have received and the grade breakdown provided in the course syllabus. However, we realize that we are not a college, and therefore, mid-semester report cards and end of semester report cards are given to the students and sent home.

## Rising Junior course selection: Helpful Hints

(The Course Catalog can be found on our website at: <http://www.scgssm.org/residential/academics/course-catalog-and-faq>)

- 1) All Juniors must take **six classes** each semester along with the seminars in the Junior Seminar Series.
- 2) All Juniors take GSSM Junior **English**
- 3) All Juniors take the Junior **Seminar Series**: Life and Leisure (fall and spring), Entrepreneurial Leadership (fall) and College Planning Seminar (spring). These seminars are each one-hour long per week. Students do not need to sign-up for the seminars, instead students will be placed into the seminars that fit their schedule.
- 4) You should request a **math** class. On the New Student Orientation day, a math placement assessment will be given to assist in determining the appropriate placement. *Please see FAQ regarding which math course to select.*
- 5) If you have not taken **US History**, you should register to take it during your junior year.
  - i) If you have taken it, but have not taken **Government and Economics**, then you should register to take the one semester GSSM Gov/Econ class which fulfills the state requirement of a semester of Government and a semester of Economics or consider taking AP Government in the fall and AP Macroeconomics in the spring to fulfill this state requirement.
  - ii) If you have taken both US History and Gov/Econ, then select any other elective for which you have the necessary pre-requisites or co-requisites. To meet the GSSM graduation requirements of 0.5 credits in Social Studies, you should also consider registering for one of the history, psychology or economic electives.
- 6) If you have not completed three years of a **foreign language**, select the appropriate level in that foreign language. If you have completed three years in a foreign language, then either select the appropriate next level in that foreign language or any other elective in another academic area for which you have the necessary pre-requisites or co-requisites. The requirement of three years of foreign language will be waived if you have already completed two years in a foreign language that is not offered at GSSM. If this is the case, then select any other elective in another academic area for which you have the necessary pre-requisites or co-requisites.
- 7) Selecting your **science** courses should take some thought on your part. Decide what area of science you like or wish to explore more. You will have the opportunity to take higher level science courses, including courses in computer science and engineering, at GSSM. In order to take full advantage of these courses, selecting your junior courses is important so that you have the necessary pre-requisites in order to take the higher level courses. When registering for courses, take a look at all of the science, computer science and engineering offerings and try to determine which ones you would like to take during your two years at GSSM and then work backwards to determine which ones you should select to take during your junior year. Many of the courses have pre-requisites and/or co-requisites, so please pay particular attention to those details. *Please see FAQ regarding science courses.*
- 8) GSSM offers a **Residential Engineering Program**. The purpose of the Residential Engineering Program is to expose students to a variety of engineering courses, concepts, skills and applications so that if completed the student will have a solid engineering background entering college and eventually the work force. Students in the GSSM Residential Engineering Program may also select the GSSM Engineering Project interim courses during both their junior and senior years and may complete an engineering-based research project for their Mentored Summer Research.
- 9) For GSSM students that have completed the 10<sup>th</sup> grade year of the **Accelerate Engineering Program** at their home high school, they may opt to continue in the engineering courses offered through Clemson while attending GSSM. These engineering courses will be offered in the same way they were offered during their 10<sup>th</sup> grade year. Students will be responsible for following the course schedule for these engineering classes. Their remaining course work will be completed through the residential program and follow the residential schedule.

## Rising Senior course selection: Helpful Hints

- 1) Seniors must take a **minimum of six classes** both semesters. An Independent Study is not counted as one of these six classes. In the fall, research counts as one of the six; however, many students take six other classes beyond research in the fall.
- 2) On the rising senior course selection sheet that is completed early in the spring semester, courses that you need in order to receive a state and GSSM diploma will be listed. You will need to fill in the blanks on the sheet with the other classes that you would like to take.
- 3) Every senior takes **English, math, and research**. **Math placement is determined by you and your current math instructor. In March after midterm grades, you will meet with your math instructor to decide which math course is appropriate for you. Final semester grades will determine your ultimate placement.** Placement is determined by the general guidelines below:
  - i) For students currently enrolled in MAT 102/103, a grade of 90 is needed for MAT 201 (Calculus AB) and 95 for MAT 203 (Calculus BC).
  - ii) For students currently enrolled in MAT 111/112, a grade of 85 is needed for MAT 201 (Calculus AB) and 93 for MAT 203 (Calculus BC).
  - iii) Students who have completed MAT 201/202 as juniors may select the following courses for their senior year:

For the Fall  
MAT 304: AP Stats (Semester 1 of full year course)  
MAT 308: Linear Regression (only for students who have completed AP Statistics)  
MAT 301: Linear Algebra (by Math faculty permission only and offered only in even years)  
MAT 306: Multivariate Calculus (by Math faculty permission only and offered only in odd years)

For the Spring  
MAT 302: Abstract Algebra  
MAT 303: Calculus BC  
MAT 305: AP Stats (Semester 2 of full year course)  
MAT 307: Discrete Structures (by Math faculty permission only and offered only in even years)  
MAT 312: Ordinary Differential Equations (by Math faculty permission only and offered only in odd years)
  - iv) Students who have completed MAT 203 as juniors may select the following courses for their senior year:

For the Fall  
MAT 304: AP Stats (Semester 1 of full year course)  
MAT 308: Linear Regression (only for students who have completed AP Statistics)  
MAT 301: Linear Algebra (offered only in even years)  
MAT 306: Multivariate Calculus (offered only in odd years)

For the Spring  
MAT 302: Abstract Algebra  
MAT 305: AP Stats (Semester 2 of full year course)  
MAT 307: Discrete Structures (offered only in even years)  
MAT 312: Ordinary Differential Equations (offered only in odd years)
- 4) If you want to continue in **foreign language** beyond level 3, please write your choice on the fall and spring semester sides.
- 5) On the course selection sheet, in the blanks that have an asterisk (\*), you must select a **STEM or Economics elective**. Depending on what you have taken, you might need to select one or more semester courses in this elective area. More than one **STEM or Economics elective** can be taken in a given semester despite the location of asterisk (\*) on your selection sheet.
  - i) If you took Principles of Chemistry, Introduction to Chemistry, Fundamentals of Physics or AP Physics I during your junior year, then AP Chemistry or AP Physics C can be selected to meet this elective.

# Course Descriptions

## Order of Courses

1. Science Division
  - a. Biology
  - b. Chemistry
  - c. Physics
2. Mathematics, Computer Science and Engineering Division
  - a. Mathematics
  - b. Computer Science
  - c. Engineering
3. Humanities Division
  - a. English
  - b. History and Psychology
  - c. French
  - d. Spanish
  - e. Chinese
4. Economics and Finance Division
5. Mentored Summer Research and On-Campus Research
6. Junior Seminar Series

## Science Division

### BIOLOGY

#### **BIO201-AP (AP Bio)**

#### **Principles of Biology I (AP Bio)** (may be taken EITHER Semester – 0.5 unit)

This course covers selected topics that are fundamental to an understanding of biology. Important concepts that may have been introduced in other courses will be covered in depth and expanded with laboratory experiences and discussions of relevant research. Units covered in this course will include discussions of inheritance, evolution and mechanisms of selection, speciation, origin of life, diversity of life, animal behavior and ecology. *Includes a 2-3 hour weekly lab. See College Credit Hours Agreements at end of the course descriptions.*

#### **BIO202-AP (AP Bio)**

#### **Principles of Biology II (AP Bio)** (may be taken EITHER Semester\* – 0.5 unit)

This course will examine selected topics that are fundamental to an understanding of biology. Important concepts that may have been introduced in an introductory course will be covered in depth and expanded upon with laboratory and discussions of current research findings in these areas. Units covered in this semester will include discussions of basic biochemistry, cell structure and function, mitosis, meiosis, DNA replication, transcription, translation, regulation of gene expression, and current molecular biology techniques. *Includes a 2-3 hour weekly lab. See College Credit Hours Agreements at end of the course descriptions. PREREQ: \*requires at least one semester of Chemistry. (Please select BIO202-AP in the spring semester if you will be taking CHEM 101 as a Junior.)*

#### **BIO301-H (above AP)**

#### **Vertebrate Biology/Ecology** (SPRING Semester – 0.5 units)

This course will focus on the ecological and evolutionary aspects of vertebrate biology. The emphasis in lecture will be placed upon the evolution, taxonomy, structure, and natural history of the vertebrates. A variety of activities will be undertaken in the laboratory and in the field as we study vertebrate identification, comparative anatomy, and behavioral ecology. Field trips will be an integral part of this course as we investigate vertebrates and their habitats in the southeast. *Includes a 2-3 hour weekly lab. PREREQ: BIO201-AP or completion of AP Biology. See College Credit Hours Agreements at end of the course descriptions.*

#### **BIO303-H (above AP)**

#### **Molecular Biology of the Cell** (FALL Semester – 0.5 units)

The purpose of this course is to acquaint the student with selected topics in the molecular biology of cells with a focus on eukaryotes. The course format is a combination of lectures and discussions of current research articles with student participation as an important element. Laboratory work will emphasize important concepts and techniques used in the study of cellular components and will involve extensive hands-on manipulations. In-class tests and out-of-class problem sets will require an understanding of experimental design and interpretation of data. *Includes a 2-3 hour weekly lab. PREREQ: BIO201-AP and BIO202-AP or completion of AP Biology. See College Credit Hours Agreements at end of the course descriptions.*

- BIO304-H (above AP)**      **Human Anatomy and Physiology (FALL Semester – 0.5 unit)**  
 Students will investigate the functional anatomy and control mechanisms affiliated with the various organs of the human body. Cell structure and tissue specificity will be integrated with the function of these cells in their respective organ systems. Laboratory work will involve experiments designed by and performed on the students. There will be an emphasis on exercise physiology and clinical abnormalities and their effects on whole body homeostasis. The course work includes various case studies to help students understand the application of topics covered in class. New techniques involved in medicine will be studied using web-based curriculum *Includes a 2-3 hour weekly lab. PREREQ: BIO202-AP or completion of AP Biology. See College Credit Hours Agreements at end of course descriptions.*
- BIO 306-H (above AP)**      **Introduction to Neuroscience (SPRING Semester – 0.5 unit)**  
 This course serves as an introduction to the basics of nervous system functions and dysfunctions. This class is open only to students with an A or high B in AP Biology. The course begins with the cellular and molecular biology of neurons and glial cells, including the study of neuronal cell structure, the propagation of nerve impulses and transfer of information between nerve cells (action potentials and synaptic transmission). The course then follows the effect of drugs on this process and the development of nerve cells into the brain and spinal cord as well as how the brain receives and processes sensory information and how it acts on that information through various motor and sensory systems. Other topics covered included how behavior, emotion and memory emerge from brain function. Teaching methods included lectures, discussions, case studies and talks by renowned neuroscientists. This course will also include hands-on as well as virtual labs. *Includes a 2-3 hour weekly lab. PREREQ: BIO202-AP or completion of AP Biology.*
- BIO 307-H (above AP)**      **Advanced Genetics (SPRING Semester– 0.5 unit)**  
 This course builds on the basic understanding of DNA and genetics introduced in Biology 201 and 202. Through class discussion, journal articles, homework problems, and lab experiments students will improve their understanding of inheritance and genomics. Topics to be discussed include patterns of inheritance, eukaryotic chromosomal mapping, gene expression, epigenetic inheritance, mutation and repair, the genetic basis of development, and quantitative genetics. This is a lab course. *Includes a 2-3 hour weekly lab. PREREQ: BIO201-AP and BIO202-AP or completion of AP Biology.*
- BIO 308-H (above AP)**      **Botany (SPRING Semester – 0.5 unit)**  
 This course introduces students to the basics of Botany, including what characterizes a plant and how to identify plants in our local communities. Topics discussed will include plant diversity, structure, physiology, evolution, and ecology. Laboratory work will emphasize plant structure, function, and field identification. Optional field trips to different plant communities will be taken and attendance is encouraged. *Includes a 2-3 hour weekly lab. PREREQ: BIO201-AP or completion of AP Biology.*
- BIO 309-H (above AP)**      **Biological Evolution (FALL Semester– 0.5 unit)**  
 This course will explore the evolutionary process in detail and its place as the cornerstone of modern biology. Laboratory experiences and directed readings will allow the student to make connections with the other biological sciences. Topics include the evidence for evolution, the mechanisms of evolutionary change, the measurement of evolutionary change, speciation, and the analysis of phylogeny. *Includes a 2-3 hour weekly lab. PREREQ: BIO201-AP or completion of AP Biology.*

## **CHEMISTRY**

- CHE100/101-H**      **Principles of Chemistry/Introduction to Chemistry (A Full Year Course – 1.0 unit)**  
 This course will examine selected topics that are fundamental to an understanding of chemistry. Students will investigate the electronic structure of atoms, chemical bonding, chemical formulas, mass/volume relationships in chemical reactions, gas laws, energy changes in chemical reactions, molecular geometry, acid/base/salt reactions, colligative properties, an introduction to organic chemistry and other selected subjects. Hands-on laboratory work will reinforce concepts as well as develop skills in using standard laboratory equipment. At the end of the fall semester, instructors for that course will determine if a student should move to the articulated Introduction of Chemistry course for the remainder of the year or remain in the Principles of Chemistry course. The Introduction of Chemistry course will cover the material more in-depth, at a faster pace and begin to cover portions of the AP Chemistry curriculum. *Includes a 2-3 hour weekly lab. See College Credit Hours Agreements at end of the course descriptions.*
- CHE201-AP (AP Chem)**      **Advanced Chemistry I (AP Chem) (FALL Semester – 0.5 unit)**  
 This course will explore topics in greater depth: quantum mechanics, chemical bonding, molecular geometry, kinetics and chemical equilibrium. Laboratory experiences will include traditional wet lab methods, microscale, and the use of modern electronic instrumentation. *Includes a 2-3 hour weekly lab. PREREQ: One unit in Chemistry. See College Credit Hours Agreements at end of the course descriptions.*

- CHE202-AP (AP Chem)** **Advanced Chemistry II (AP Chem)** (SPRING Semester – 0.5 unit)  
A continuation of Chemistry 201-AP, this course is necessary for a student to take the Advanced Placement Chemistry Test. This course will explore in more depth the topical areas of acid-based chemistry, thermodynamics, oxidation-reduction reactions, electrochemistry and organic chemistry. *Includes a 2-3 hour weekly lab. PREREQ: CHE201-AP. See College Credit Hours Agreements at end of the course descriptions.*
- CHE302-H** **Introduction to Organic Chemistry** (FALL Semester – 0.5 unit)  
This course will provide an introduction to the principles of organic chemistry using functional group approach which organizes important principles around the major classes of organic compounds. Nomenclature, structure and bonding, reaction mechanisms, and stereochemistry are also included. Laboratory experiences are designed to provide a basic understanding of synthetic procedures and the analysis of organic compounds. *Includes a 2-3 hour weekly lab. PREREQ: CHE201-AP, completion of AP Chemistry or permission of the instructor.*
- CHE304-H** **Introduction to Analytical Chemistry** (FALL Semester – 0.5 unit)  
This course will expose students to selected topics in both quantitative and instrumental analysis. The quantitative portion of the course will focus on advanced methods of volumetric analysis as well as statistics commonly used to properly analyze data. The instrumental portion of the course will focus on the theory and implementation of instruments that find widespread use in chemistry. Experiments will allow students to gain experience using various equipment that will likely be found in any standard analytical chemistry laboratory. *Includes a 2-3 hour weekly lab. PREREQ: Completion AP Chemistry or permission of the instructor.*
- CHE305-H** **Introduction to Biochemistry** (SPRING Semester – 0.5 unit)  
This course will examine selected topics which are essential to a basic understanding of Biochemistry. Students will explore biological systems including biosynthesis and metabolism of key biological molecules as well as metabolic cycles, biological catalysis and kinetics, biological equilibrium and energetic, electron transport, and oxidation/reduction systems. Laboratory experiences are designed to support fundamental theories and provide a basis for additional inquiry. *Includes a 2-3 hour weekly lab. PREREQ: CHE 302-H*
- SCI301-AP (AP Env Sci)** **Environmental Science (AP Env Sci)** (SPRING Semester – 0.5 unit)  
This course will provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, and to examine alternative solutions for resolving or preventing them. Topics from geology, biology, environmental studies, chemistry, and geography will be integrated into this course. Students may choose to take the AP environmental science exam. *Includes a 2-3 hour weekly lab. PREREQ: One unit each of any high school biology and chemistry courses. Class limited to 13 students. Seniors given first priority.*

## **PHYSICS**

- PHY101-H** **Fundamentals of Physics I** (FALL Semester – 0.5 unit)  
Part of a non-calculus based series, PHY101-H is an introduction to the methods of thought and understanding that is called physics. The course will follow approximately a topical historical thread in its presentation. Starting with kinematics the necessary mathematical tools will be introduced. These topics will be supplemented by introducing the concepts of force, gravity, energy, and momentum and the laws that govern them. The fundamentals of rotational kinematics and dynamics will then be presented. The course will include contemporary labs focusing on direct applications of the concepts covered in lecture. *Includes a 2 hour weekly lab. COREQ: Initial math placement in MAT111-H or above, or permission of the instructor. See College Credit Hours Agreements at end of the course descriptions.*
- PHY102-H** **Fundamentals of Physics II** (SPRING Semester – 0.5 unit)  
This course is a continuation of PHY101-H. The topics include a continuing emphasis on applying Newton's laws of motion and the conservation laws, a study of oscillatory motion (with an emphasis on simple harmonic motion) and a study of waves. Following this will be an in depth investigation of electrical and magnetic phenomena. Once again, the course will include contemporary labs focusing on direct applications of the concepts covered in lecture. *Includes a 2 hour weekly lab. PREREQ: PHY101-H or PHY151-AP. See College Credit Hours Agreements at end of the course descriptions.*
- PHY151-AP (AP Physics I)** **AP Physics I – A (AP Physics I first semester)** (FALL Semester – 0.5 unit)  
AP Physics 1 is an algebra-based, introductory college-level physics course that explores topics such as Newtonian mechanics (including rotational motion); work, energy, and power; mechanical waves and sound; electrostatics, introductory, simple circuits, and magnetism. Through inquiry-based learning, students will develop scientific critical thinking and reasoning skills. This course will be more rigorous than PHY101 and have a stronger emphasis on in-depth problem solving. *Includes a 2 hour weekly lab. COREQ: Initial math placement in MAT111-H or above.*

- PHY152-AP (AP Physics 1)**      **AP Physics I – B (AP Physics I second semester)** (SPRING Semester – 0.5 unit)  
This course is a continuation of PHY151. To receive a full year of AP credit, both PHY151 and PHY152 must be taken. *Includes a 2 hour weekly lab. PREREQ: PHY151-AP or PHY201-AP.*
- PHY201-AP (AP Physics C)**      **Calculus-Based Physics I (AP Physics C: Mechanics)** (FALL Semester – 0.5 unit)  
An extension of the generally accessible topics covered in PHY101-H. Topics will be discussed which require basic integral and differential calculus, such as particle kinematics and dynamics via Newton's laws of motion, including circular motion; work; kinetic energy; potential energy; energy conservation; power; linear momentum, its conservation, and impulse of particles and systems of particles; rotational Newtonian kinematics and dynamics of rigid bodies; angular momentum and its conservation; equilibrium of a rigid body; gravitation; and oscillation. *Includes a 2-3 hour weekly lab. COREQ: MAT201-AP or above. See College Credit Hours Agreements at end of the course descriptions.*
- PHY202-AP (AP Physics C)**      **Calculus-Based Physics II (AP Physics C: Electricity & Magnetism)** (SPRING Semester – 0.5 unit)  
This course is a continuation of PHY201-AP. Primary topics include electric charge; electric field; Gauss's Law for Electricity; potential; capacitance and dielectrics; conductors and insulators; current; resistance; emf; DC circuits; magnetic field; Gauss's Law for Magnetism; magnetic forces; sources of magnetic field; displacement current and Ampere's Law; electromagnetic induction and Faraday's Law; inductance; and electromagnetism as synthesized in Maxwell's equations. *Includes a 2-3 hour weekly lab. PREREQ: PHY201-AP. See College Credit Hours Agreements at end of the course descriptions.*
- PHY203-H**      **Fluids, Thermodynamics, and Optics** (SPRING Semester - 0.5 unit)  
This course is a third semester of physics meant to compliment the 101/102-H or 201/202-AP tracks. Students will study some of the classical physics topics not emphasized in those courses, namely, fluid mechanics, thermodynamics, and optics. Other topics may include high energy physics and cosmology as time permits. This course also includes a weekly laboratory experience. Only students who have demonstrated mastery and motivation in other physics offerings should enroll for this class. *Includes a 2 hour weekly lab. PREREQ: PHY102-H or PHY202-AP or completion of AP Physics. PHY301-H is also recommended but not required.*
- PHY210-H**      **Astronomy** (SPRING Semester – 0.5 unit)  
This survey course of historical and modern astronomy includes such topics as planetary astronomy, spectroscopy, and stellar structure and evolution. Students will learn to use the school's telescopes, including an eight inch Schmidt-Cassegrain telescope. *Includes a 2 hour weekly lab. PREREQ: PHY101-H, PHY151-AP or PHY201-AP or completion of AP Physics. Class limited to 14 students. Seniors given first priority.*
- PHY301-H (above AP)**      **Modern Physics** (FALL Semester – 0.5 unit)  
This course is a continuation of PHY101-102, PHY 151-152 or PHY 201-202. It focuses on the implications and applications of the topics covered in these courses beyond the Newtonian scale, and introduces some of the extraordinary developments in physics over the last century. Following a historical outline, the topics include special and general relativity, atomic structure, quantum mechanics, and nuclear and particle physics. Although the course is geared to the mathematical ability of the class, some calculus should be expected. *Includes a 2 hour weekly lab. PREREQ: PHY102-H, PHY151-AP or PHY202-AP or completion of AP Physics. See College Credit Hours Agreements at end of course descriptions.*

## Mathematics, Computer Science and Engineering Division

<b><u>MATHEMATICS-</u> All students must take one math class every semester</b>
---

- MAT102-H**      **Advanced Mathematics II - Algebraic Functions and Graphs** (FALL Semester – 0.5 unit)  
The first of a two-semester sequence designed to prepare a student for the study of calculus. The following types of functions and their graphs are covered in detail: linear, polynomial, exponential and logarithmic.
- MAT103-H**      **Advanced Mathematics III - Trigonometry and Discrete Math** (SPRING Semester – 0.5 unit)  
The second of a two-semester sequence designed to prepare a student for the study of calculus. Topics include trigonometry, matrices, vectors and polar graphs. *PREREQ: MAT102-H.*
- MAT111-H**      **Analysis I – Algebraic Functions and Graphs** (FALL Semester – 0.5 unit)  
The first of a two-semester sequence designed to prepare a student for Advanced Placement Calculus. Topics include linear functions, polynomial functions, rational functions, exponential functions, logarithmic functions, function composition and transformations.

- MAT112-H Analysis II – Applications of Functions** (SPRING Semester – 0.5 unit)  
The second of a two-semester sequence. Topics include trigonometry, vectors & matrices, sequences & series, parametric and polar functions. *PREREQ: MAT111-H.*
- MAT200-H Calculus with Applications** (A Full Year Course – 1.0 unit)  
This course in differential and integral calculus is application-oriented. Mastery of fundamental calculus operations and problem-solving techniques are high priorities. Pedagogically, the approach is intuitive with the results informally stated. Students are required to utilize skills in differentiation and integration of various functions and to solve applied problems. *PREREQ: MAT103-H or MAT112-H. See College Credit Hours Agreements at end of the course descriptions.*
- MAT201-AP (AP Calc AB) Calculus I (AP Calc AB)** (FALL Semester – 0.5 unit)  
In Calculus I, the student will be introduced to such topics as limits and continuity, derivatives, max-min theory, optimization and related rates applications, the Mean Value Theorem and Rolle's Theorem, and integration. *PREREQ: MAT103-H, MAT112-H or permission of the instructor. See College Credit Hours Agreements at end of the course descriptions.*
- MAT202-AP (AP Calc AB) Calculus II (AP Calc AB)** (SPRING Semester – 0.5 unit)  
Students will be introduced to Riemann sums, the definite integral, the Fundamental Theorems of Calculus, techniques of integration, numerical methods, and differential equations involving growth and decay and l'Hôpital's Rule. Integral calculus will also focus on the study of area, volume, arc length, and associated applications. The MAT201-AP/202-AP sequence prepares students for the AP Calculus AB exam. *PREREQ: MAT201-AP. See College Credit Hours Agreements at end of the course descriptions.*
- MAT203-AP (AP Calc BC) Calculus I and II (AP Calc BC)** (A Full Year Course – 1.0 unit)  
The content of this course parallels MAT201-AP, MAT-202-AP, and MAT303-AP, but at a considerably faster pace. The course meets four periods each week to allow an in-depth treatment of the topics. Students should have a strong interest in mathematics and demonstrated proficiency in previous mathematics classes. This course prepares students for the AP Calculus BC exam. *PREREQ: MAT112-H or completion of Pre-Calc. and a high score on the initial placement test and permission of the instructor. See College Credit Hours Agreements at end of the course descriptions.*
- MAT301-H (above AP) Linear Algebra** (FALL 2016 offered **even** numbered years – 0.5 unit)  
This course includes solving systems by matrix methods, matrix operations, matrix algebra, determinants, Cramer's rule, vector algebra, the dot and cross products used in projections and geometric applications, lines and planes in 3-space, vector spaces, linear independence, linear transformations, eigenvalues, and eigenvectors. *PREREQ: MAT202-AP, MAT203/303-AP or completion of AP Calculus.*
- MAT302-H (above AP) Abstract Algebra** (SPRING Semester – 0.5 unit)  
This is an introductory course to abstract algebra and will cover sets, groups, equivalence relations, rings and fields with an emphasis on group theory. Students will learn the basics of writing a mathematical proof. Applications will be covered including solving the Rubik's cube, error correcting codes, and cryptography. *PREREQ: Completion of AP Calculus.*
- MAT303-AP (AP Calc BC) Calculus III (AP Calc BC)** (SPRING Semester – 0.5 unit)  
This course covers areas of regions bounded by polar graphs, the calculus of parametric equations, integration using partial fractions and trigonometric substitution and associated applications. Other topics of interest include series and sequences, tests of convergence, absolute and conditional convergence, power series, and the Taylor and Maclaurin series. Graphing calculators are used when appropriate. This course meets four hours each week, prepares students for the AP Calculus BC exam, and may meet with a MAT203-AP class. *PREREQ: MAT202-AP or completion of AP Calculus AB. See College Credit Hours Agreements at end of the course descriptions.*
- MAT304-AP (AP Stat) Probability and Statistics (AP Stat)** (FALL Semester – 0.5 unit)  
An introductory course in probability and statistics. Topics include exploratory data analysis, regression & correlation, design, probability and sampling distributions. This is the first of a two-semester sequence that prepares a student for the Advanced Placement Statistics exam. *COREQ: Must have completed calculus or be taking calculus to enroll. See College Credit Hours Agreements at end of the course descriptions.*
- MAT305-AP (AP Stat) Applied Statistics (AP Stat)** (SPRING Semester – 0.5 unit)  
This course is the second of a two-semester sequence that prepares students for the Advanced Placement Statistics exam. This course focuses on statistical inference. Topics include inference on means and proportions, inference on regression and one-way ANOVA. *PREREQ: MAT 304-AP. See College Credit Hours Agreements at end of the course descriptions.*
- MAT306-H Multivariate Calculus** (FALL 2017; offered **odd** numbered years– 0.5 unit)

- (above AP)** This course examines the calculus of real functions of two or more variables. Differential calculus topics include continuity, directional derivatives, tangent planes, and max-min theory. Integral calculus topics will include double integrals in the Cartesian and polar coordinate systems, surface area, and triple integrals in the Cartesian, cylindrical, and spherical coordinate systems. We shall also consider topics in curvilinear motion including velocity, acceleration, and curvature. *PREREQ: MAT202-AP or completion of AP Calculus AB.*
- MAT307-H (above AP)** **Discrete Structures** (SPRING 2018; offered **even** numbered years – 0.5 unit)  
This course is a survey of logic and set theory. Topics include propositional and predicate logic, the algebra of sets including mappings, relations and functions, counting principles and probability, and the introduction of the concept of the mathematical proof including induction. *PREREQ: Completion of AP Calculus or COREQ: MAT202-AP. See College Credit Hours Agreements at end of course descriptions.*
- MAT308-H (above AP)** **Regression Analysis** (FALL Semester – 0.5 unit)  
This advanced course in statistics will provide an overview of regression analysis and its applications. Linear regression and multiple regression models will be studied. First-order and second-order models with multiple independent variables will be examined for estimation and prediction. *PREREQ: Completion of MAT202-AP and AP Statistics or permission of the instructor.*
- MAT312-H (above AP)** **Ordinary Differential Equations** (SPRING 2017; offered **odd** numbered years – 0.5 unit)  
This course includes the study of first order differential equations beginning with separable equations and their applications, exact equations with integrating factors and homogeneous equations. Also investigated are second order linear equations, which include homogeneous equations with constant coefficients and non-homogeneous equations using the method of undetermined coefficients and the method of variation of parameters. *PREREQ: Math 301--H or permission of the instructor.*

### **COMPUTER SCIENCE- Students are required to take 0.5 credits in Computer Science**

- CSC101-AP (AP CS A)** **Introduction to Computer Science (AP CS A)** (EITHER Semester – 0.5 unit)  
General concepts of sequential execution, conditional execution, iterative structures, recursive techniques and algorithm development are introduced in this one-semester course. In addition, general principles of program construction and object-oriented programming, are covered thoroughly. The activities in class include writing algorithms for specific application problems and implementing the code for these projects. The primary focus of outside-of-class work is to write functioning, efficient, well-documented, well-constructed programs.
- CSC102-AP\* (above AP)** **Data Structures Using Java** (SPRING Semester – 0.5 unit)  
A review of arrays, classes, and recursive functions will preface the continuation of the study of computer science in the second semester. The concepts of object oriented programming including class declaration, inheritance, and polymorphism are integral to programming activities in the course. The concept of the abstract data type will be examined by studying different implementations of lists, stacks, queues, and trees. Programs written in the course include direct manipulation of self-referential structures as well as manipulation using the Java language linked list, set, and map classes. Hashing and mapping methods are examined and applied to design programming solutions. Algorithms such as searching and sorting will be studied in order to determine the efficiency (Big (O)) and storage necessary. As with the introductory course, the primary focus of outside work is to write functioning, efficient, well-constructed programs. *PREREQ: CSC101-AP or permission of the instructor. \* (This class goes beyond AP, and completion of the course earns the final 0.5 credit of the 1.0 credit allowable to earn from an AP course.)*
- CSC120-H (above AP)** **Programming Interaction and Visual Design** (FALL Semester – 0.5 unit)  
Students will explore computer graphics, mathematics, and art using the Processing programming language. Processing is an environment for learning the fundamentals of computer programming within the context of the visual arts. Topics include creation of 2d and 3d images, animations, image processing including mathematical and data visualization, and interaction with external devices. *PREREQ: CSC101-AP or completion of AP Computer Science A or permission of the instructor.*
- CSC140-H (above AP)** **Introduction to Artificial Intelligence** (Spring Semester – 0.5 unit)  
This course focuses on the basic algorithms of Artificial Intelligence. Problem modeling methods include data classification, regression analysis, clustering, and time series analysis. Supervised and unsupervised training as well as stochastic and deterministic training will be employed in projects. Teach paper cups to win a simple game based on Nim. Learn several methods for normalization of data and error calculation. Different methods of training are applied to classic problems such as the traveling salesman problem and the knapsack problem. *PREREQ: CSC101-AP or completion of AP Computer Science A or permission of the instructor.*
- CSC150-H** **Introduction to Computer Graphics using Python** (Fall Semester – 0.5 unit)

**(above AP)** This course introduces Python, a modern, powerful scripting language used throughout the technology industry, especially in film and games. Learn how to use Python from writing utility scripts to developing custom 2D and 3D graphics applications. *PREREQ: CSC101-AP or completion of AP Computer Science A or permission of the instructor.*

**CSC201-H (above AP)** **Application Design and Implementation using C++ and Linux** (FALL Semester – 0.5 unit)  
Students will examine the differences between machine code, assembly language, interpreters, and compilers. The students will have hands-on experience of writing the code to simulate machine code and designing and implementing a compiler for a SIMPLE language based on that machine code. Building this compiler includes the following steps: lexical analysis, syntax analysis, data type checking and building a symbol table, machine code generation. Students in this course will work in teams to develop a timeline and code for their design and testing of the system. Students will learn how to program using other computer languages such as C++, PC Scheme, and Python in order to compare these languages with each other and with our SIMPLE language. *PREREQ: CSC102-AP or permission of the instructor.*

**CSC202-H (above AP)** **Game Design, Prototyping, and Production** (SPRING Semester – 0.5 unit)  
This course will focus on the rules and methods of game design, which remain fairly constant regardless of the technology used to develop a game. While technology will play a significant role in the course, technological details will not be the focus. Students will study and design games of all sorts: card games, dice games, athletic games, story games, and video games. Students will craft a game, build a video game prototype, and write a game design document detailing the workings of their creation. *PREREQ: CSC102-AP or permission of the instructor.*

**CSC402-H (above AP)** **Robotics** (FALL Semester – 0.5 unit)  
General principles of engineering design including mechanical, electrical, logic and control subsystems of robotics are applied to building robots. Project planning and team cooperation are critical skills that are developed in the course, including creating timelines, determining critical path, communicating with other team members, and presenting ideas and solutions to a customer or sponsor. Project members learn how to employ team talents to maximize productivity and minimize the time necessary to complete the task. Each robot microcomputer system must be programmed to control the robot's movement and sensors. The main objective for the course is to use engineering and management principles to build a robot to accomplish a set of specific tasks. A student can sign up for the course in their junior or senior year. Juniors who take robotics and would like to continue working with the robotics teams are encouraged to do so as a team member, not a class member in their senior year. *PREREQ: CSC101-AP or completion of AP Computer Science A or permission of the instructor.*

## **ENGINEERING**

GSSM offers a **Residential Engineering Program**. The purpose of the Residential Engineering Program is to expose students to a variety of engineering courses, concepts, skills and applications so that if completed the student will have a solid engineering background entering college and eventually the work force. Students in the GSSM Residential Engineering Program may also select the GSSM Engineering Project interim courses during both their junior and senior years and may complete an engineering-based research project for their Mentored Summer Research. Any residential student may register for the courses below given that the prerequisites are met.

**ENGIN205-H** **Introduction to Engineering Design** (FALL Semester – 0.5 unit)  
This Course is a course that is appropriate for students who are interested in design and engineering. The learning objectives for this course are the following:

- Understand and use the engineering design thinking process
- Create 3D designs using hand drawings, SolidWorks and 3D printing
- Understand physical computing with the Arduino
- Understand some of the global and human impacts of technology by simulating an Internet Fulfillment Center warehouse using Lego robots

*Includes a 2 hour weekly lab.*

**ENGIN206-H** **Engineering Mechanics: Statics** (SPRING Semester – 0.5 unit)  
This course studies the mechanics of static structures. Topics covered in this course include vector force systems, systems in equilibrium, structural analysis of trusses and frames, friction, distributed forces, center of gravity, and moment of inertia. Technical drawing and design skills will be used to build a bridge structure out of bass wood and test its strength. *PREREQ: PHY101-H, PHY151-H, PHY201-AP or permission of the instructor. Includes a 2 hour weekly lab. This course may or may not be offered depending on the availability of an instructor.*

**ENGIN207-H** **Engineering: Electronics** (FALL Semester – 0.5 unit)

Students are introduced to the principles of digital electronics. The material covers a variety of topics including Boolean algebra, basic gates, logic circuits, flip-flops, registers, arithmetic circuits, counters, interfacing with analog devices, and programming an FPGA board. *Includes a 2 hour weekly lab.*

- ENGIN208-H**      **Engineering: SolidWorks** (SPRING Semester – 0.5 unit)  
Students join the 3D printing revolution in learning how to create their designs in SolidWorks, including sketching, part and assembly creations, and creating drawings with which to communicate their ideas. A final project will include 3D printing their design.
- ENGIN210-H**      **Engineering: Product Design** (SPRING Semester – 0.5 unit)  
Students research and develop a new product or process. The product can be either an invention or innovation, and should include the building of a prototype. The process should be a new way of doing something of a technical nature. Students will communicate their solutions to their peers and members of the professional community. *Includes a 2 hour weekly lab. PREREQ: ENGIN205-H or permission of the instructor.*

## **ACCELERATE ENGINEERING PROGRAM**

For GSSM students that have completed the 10<sup>th</sup> grade year of the **Accelerate Engineering Program** at their home high school, they may opt to continue in the engineering courses offered through Clemson while attending GSSM. These engineering courses will be offered in the same way they were offered during their 10<sup>th</sup> grade year. Students will be responsible for following the course schedule for these engineering classes. Their remaining course work will be completed through the residential program and follow the residential schedule.

## **Economics and Finance Division**

### **ECONOMICS AND FINANCE**

- EFI301-H**      **Technology Ventures** (EITHER Semester - 0.5 unit)  
This course introduces the fundamentals of *technology entrepreneurship*. Technology entrepreneurship, whether in a startup or established company, is a spirited approach to business leadership that involves identifying high-potential, technology-intensive commercial opportunities, gathering resources such as talent and capital, and managing rapid growth and significant risks using principled decision-making skills. Topics introduced in this course are not only relevant to future managers, marketers, and investors, but also to the future engineer and scientist. Through a collection of case studies, lectures, workshops, and projects that cover high-growth ventures in information technology, electronics, life sciences, biotechnology and other industries, this course provides the student with the tools necessary to successfully identify a true business opportunity, and to start and grow a technology enterprise.
- EFI303-H**      **Quantitative Financial Analysis with Excel** (SPRING Semester - 0.5 unit)  
This elective course provides an introduction to the fundamental concepts of accounting and finance in the context of learning quantitative financial analysis with Excel. Important learning objectives include how to read financial statements, spreadsheet-based analysis of corporate performance, financial forecasting, and stock market fundamentals. The capstone lesson of the course requires students to thoroughly analyze a publicly-traded company in order to make a buy, sell or hold recommendation regarding its stock. The course provides a strong foundation in the language of accounting and finance, useful in all fields of work, and is particularly appropriate for students interested in learning more about a career in quantitative financial analysis, such as may be found at a Wall Street investment bank.
- EFI310-AP**      **Microeconomics (AP Micro)** (FALL Semester-0.5 unit)  
**(AP Micro)**  
Microeconomics gives students a thorough understanding of the principles of economics that apply to the functions of individual decision makers, both consumers and producers, within the economic system. It places primary emphasis on the nature and functions of product markets and includes the study of factor markets and of the role of government in promoting greater efficiency and equity in the economy. *COREQ: US History, Gov/Econ. See College Credit Hours Agreements at the end of course descriptions.*
- EFI320-AP**      **Macroeconomics (AP Macro)** (SPRING Semester-0.5 unit)  
**(AP Macro)**  
Macroeconomics gives students a thorough understanding of the principles of economics that apply to an economic system as a whole. Such a course places particular emphasis on the study of national income and price determination, and also develops familiarity with economic performance measures, economic growth, and international economics. *COREQ: US History, Gov/Econ. See College Credit Hours Agreements at the end of course descriptions.*



## Research Division

### **RESEARCH- Students are required to take RES401**

- RES401-H (above AP)**      **Mentored Summer Research** (SUMMER/FALL – 1.0 unit)  
Students spend six weeks involved in intensive research during the summer between the junior and senior years. Students conduct this research in the laboratory or at a field site of a college, university, state or federal agency, or industry under the guidance of a professional scientist. In the fall, students work with GSSM faculty members and their mentors to write formal papers. Formal oral presentations are given at the GSSM Research Colloquium and at the annual meeting of the S.C. Junior Academy of Science (SCJAS). *PREREQ: Successful completion of the junior year at GSSM. This is a GSSM graduation requirement and counts as one of the six required classes that seniors need to take during their fall semester.*
- RES402-H (above AP)**      **Scientific Investigation I** (EITHER Semester – 0.5 unit)  
Students learn to synthesize information from multiple sources, develop their own perspectives in research-based written essays, and design and deliver oral and visual presentations, both individually and as part of a team. Ultimately, the course aims to equip students with the power to analyze and evaluate information with accuracy and precision in order to determine and effectively communicate an important unanswered question. *Completed application and approval by supervising instructor and Mr. Dorsel required.*
- RES403-H (above AP)**      **Scientific Investigation II** (EITHER Semester – 0.5 unit)  
Using the question developed in Scientific Investigation I, students will develop a hypothesis, which they will explore in a semester-long research project. Students will meet weekly with their instructor to develop a hypothesis, design appropriate methods to test this hypothesis, evaluate progress on the research methods selected, and troubleshoot difficulties encountered. Students will perform independent experiments, with appropriate supervision of their instructor to complete the designed experiments. In addition, the student, with guidance from their instructor, will analyze the data, integrate their findings with the broader field of study, and prepare a formal paper and oral presentation of the findings. *PREREQ: RES402-H or permission of the instructor. Completed application and approval by supervising instructor and Mr. Dorsel required.*

## Humanities Division

### **ENGLISH- All students take Junior and Senior English**

- ENG102-AP (AP Eng Lang)**      **GSSM Junior English (AP Eng Lang)** (A Full Year Course - 1.0 unit)  
Junior English focuses on great works and writers of American, British, and world literature as they reflect the currents of historical and modern thought and culture. Emphasis will be placed on class discussions, dramatic and argumentative presentations, various composition techniques, journal writing, and literary analysis. *If prior to attending GSSM, a student has already taken AP English Language and Composition, the student will still enroll in GSSM Junior English. The course listed on the transcript will be GSSM Junior English.*
- ENG201-AP (AP Eng Lit)**      **GSSM Senior English (AP Eng Lit)** (A Full Year Course – 1.0 unit)  
Senior English focuses on great works of Western literature, as they exemplify the characteristics of major periods in the development of Western civilization. In addition, students will practice the skills of speaking, listening, reading, and writing to become better readers, writers, and thinkers. The course will include frequent reading responses and journal entries, as well as several major papers. Students will also work in groups to prepare dramatic and informational presentations to the class. *PREREQ: ENG102-H.*
- ENG301-H**      **Introduction to Creative Writing: Fiction and Poetry** (FALL Semester – 0.5 unit)  
In this course we will study the fundamentals of both short fiction and poetry. Through lecture, imitative exercises, readings, class discussion, and other practices, students will write and revise multiple pieces in both genres. Students will also complete reviews of stories and poems and present their findings to the class. Writing is a discipline that requires commitment. As such, this course emphasizes daily writing and reading. By semester's end, students will have a portfolio of highly polished short stories and poems that they will have the opportunity to share with the community beyond the classroom. *PREREQ: ENG102-H or permission of the instructor.*
- ENG302-H**      **Studies in Creative Writing: Poetry** (SPRING Semester – 0.5 unit)  
In this course we will study the history of poetry in North America with close attention to the diverse approaches we can use in both form and content. As a semester-long inquiry into not only the North American tradition but our own writing as well, students will be expected to write in both received and open forms, be open to major revision

of their poems, write prose analyses of others' poems, and recite their work to an audience. Also present is a significant workshop component where students will have the opportunity to critique their classmates' poems. *PREREQ: ENG102-H or permission of the instructor.*

- ENG303-H Special Topics in Dramatic Literature** (FALL Semester – 0.5 unit)  
Students taking this semester elective learn about drama by putting on several small-scale performances throughout the semester. Students will have the chance to select, direct, and act in several one-act plays. They collaborate on all aspects of producing a play, including practicing acting techniques such as improvisation, College Credit Hours, projection, and pantomime, and they work on stage management, set design, and costuming. *A minimum of four students will be required for this course to be offered.*
- ENG304-H Introduction to Film** (SPRING Semester – 0.5 unit)  
This elective is devoted to the understanding and appreciation of the art of film. Students will watch milestones of cinema history, learning to analyze the various language systems involved such as *mise en scene*, of editing, acting, screenwriting, camera angles, and cinematography, as well as the ideological underpinnings of films. The course is writing intensive and includes a response journal, movie analyses, reviews, a screenplay treatment, and a portion of a screenplay based on an original story idea. Students will become better observers and writers as they gain cineliteracy.
- ENG307-H Christian Literature** (SPRING Semester – 0.5 unit)  
This course covers a number of books by Christian writers from the early history of the church to the recent, from Augustine's *Confessions* to Marilyn Robison's *Gilead*. Other works include *Pilgrim's Progress*, *In His Steps*, and *The Power and the Glory*. Students will write a short paper each week, and then a longer paper at the end of the semester. In addition, students will share their work by email with the other students in the class and write brief weekly responses.
- ENG308-H Introduction to Philosophy** (FALL Semester – 0.5 unit)  
In this course we investigate enduring topics of philosophical inquiry, such as: the distinction between true knowledge and mere opinion; the role of fate, chance, and free will in our lives; the relationship between minds, brains, and computers; and the elements that make for a good and ethical life. Our goal is not only to understand these and other major philosophical debates, but also to form and articulate our own thoughtful and well-reasoned personal philosophies. *PREREQ: ENG102-H or by permission of the instructor*
- ENG309-H Introduction to Science Fiction: Literature** (FALL Semester – 0.5 unit)  
In this class, we will examine the history and influence of science fiction, a genre defined by Robert A. Heinlein as "realistic speculation about possible future events." The class will explore the genre foundation works written by H.G. Wells, H. P. Lovecraft, and George Orwell, and then study novels and short stories that depict post-apocalyptic and cyberpunk themes, dystopias, time travel, alternate history, aliens, and others. In the midst of these readings, we will consider how science fiction often reflects the sociological, philosophical, and environmental concerns of the period in which it was written. Students will keep a journal of reading reactions, make class presentations, and write several short essays.
- ENG310-H Introduction to Science Fiction: Star Trek** (SPRING Semester – 0.5 unit)  
This class will use key episodes and movies in the Star Trek franchise to examine questions in the realms of philosophy, government, literature and culture, and ethics. Some of these questions are age-old metaphysical queries (Do you have an evil twin? How can you know whether you can trust reality?). Some of them are thinly veiled responses to contemporary social issues (How can you end a Cold War between two powerful empires? Can torture be justified for the purposes of military intelligence? How can a society encourage racial equality?). Most importantly, Star Trek asks if changes in technology can allow humanity to live better, more fulfilled lives (What would society look like if there were no scarcity? How could a post-war, post-capitalism society maintain itself? Is Google just a version of the Star Trek computer?). This course will use Star Trek to ask these questions, and ask students to assess Star Trek's answers to them.
- ENG311-H Natural History and Science Writing for the Layperson** (FALL Semester – 0.5 unit)  
In this class students will read a number of engaging works and excerpts about science and nature, aimed at laypeople, ranging from the aesthetic and subjective to more objective and scientific, though not technical. With these examples in the background, students will do some of their own writing about nature and science. Assuming the schedule permits we will take some field trips to nearby parks and natural areas. I plan for us to collaborate with willing science teachers to transform some of the writing in their classes to work appropriate for a lay audience. In addition I encourage students with cameras to experiment with nature and wildlife photography as part of the course. *A minimum of four students will be required for this course to be offered.*
- ENG312-H Shakespeare's Plays** (SPRING Semester – 0.5 unit)  
This course explores several of Shakespeare's plays in depth. We will closely read a selection of his comedies, tragedies, and histories. We will study the historical, cultural, and political context of the Elizabethan theater, watch traditional and contemporary film and stage productions, look at adaptations in a variety of media, and

produce our own dramatic interpretations of key scenes. Students will come away from this course with a deep understanding of several of his richest and most well-loved plays and an appreciation for his enduring legacy. *A minimum of four students will be required for this course to be offered.*

## **History and Psychology**

- HIS101-AP (AP US His)**      **History of the United States from 1607 to the Present (AP US His)** (A Full Year Course – 1.0 unit)  
This full year survey course traces the major events, trends, and themes of American life with special emphasis upon the development of modern America. Outside reading assignments, including primary sources, enhance the understanding of America's past. The fall semester includes a special emphasis on the Constitution and the origins and functions of the federal government. *If this course has not already been taken, then it must be taken during the Junior year.*
- HIS201-H**      **US Government /Economics** (EITHER Semester – 0.5 unit)  
This one semester course is an overview of the structure of U.S. government and its basic functions. Various theories of government are incorporated into the course curriculum. The primary emphasis of the course is a study of public policy at all levels of government, integrating government and fundamental principles in economics. Specific areas of emphasis include taxation, fiscal policy, monetary policy, and business regulation. *This class will meet the state graduation requirement for both government and economics.*
- HIS202-AP (AP US Gov)**      **AP US Government (AP US Gov)** (FALL Semester – 0.5 unit)  
This course provides students with an analytical perspective on governmental processes and politics in the United States. This course includes both the study of general concepts used to interpret U.S. government and politics and the analysis of specific "real world" examples. The course requires familiarity with the various institutions, groups, beliefs, and ideas that constitute U.S. government and politics. Students will be introduced to a variety of theoretical perspectives and explanations for given behaviors and outcomes relative to public policy. **COREQ:** *HIS101 (AP US History). If a student takes this course and either EFI310 (AP Macroeconomics) or EFI320 (AP Microeconomics) the state graduation requirement for government and economics will be satisfied.*
- HIS305-H**      **Studies In World War II** (Spring Semester – 0.5 unit)  
This class will provide a survey of the background diplomatic/economic causes of WW II and concentrate on the military strategy and leadership of the war. Both the Allied and Axis military and political leaders will be evaluated as well as the long range results of the war which have shaped the modern world. A term paper will be required.
- HIS306-H**      **Irish History** (Fall Semester – 0.5 unit)  
A one-semester course covering the history and "troubles" of Ireland. A brief background of the island's past history prior to 1800 will be covered but the greater concentration will be after the 1801 Act of Union. There will be outside readings, listening, and a term paper.
- HIS309-H**      **The Civil War and Reconstruction** (FALL Semester-0.5 unit)  
This course studies social, economic, cultural, and political forces that led to the Civil War, and how these forces determined the course and outcome of the war. The course intensively studies the successes and failures of the Reconstruction, and how the legacy of the post-war period still affects America. Themes include military strategies and problems, the African-American experience, the role of women, and the home front. Course requirements include extensive reading and discussion of primary documents that help explore related themes and problems. A term paper is required.
- HIS315-H**      **Studies in Medieval History – An examination of the life/culture of the Middle Ages** (Spring Semester – 0.5 unit)  
Outside reading from the period will be required as well as a term paper.
- PSY301-AP**      **Psychology** (SPRING Semester – 0.5 unit) - This class can be taken as a social studies .5 credit or an elective.  
This class will be a basic introduction to the discipline of psychology in the 19th and 20th centuries. Major figures in the development of theories and the evolving of those theories through the years will be discussed. Some case studies may also be used to more effectively focus on the different directions taken by modern psychology.

## **FRENCH**

- FRE101-H**      **French I** (A Full Year Course – 1.0 unit)  
The emphasis in this beginning course is on novice-stage proficiency of communication, basic knowledge of the structure of the target language, and comparisons of cultural awareness. Interpersonal, interpretive and presentational modes of communication are utilized where effective, in accordance with state and national standards. Skills of reading, writing, listening, and speaking are stressed as the student acquires vocabulary and masters usage through communicative activities. In addition to traditional activities in the textbook, presentations,

group work, slides, video, audio, and realia serve as stimuli for further language production. Labs re-emphasize communicative tasks, vocabulary, culture and grammatical constructs by the use of songs, activity sheets, practice in phonetics, question/answer, and creative listening. Students receive daily emails from the instructor suggesting authentic websites and vocabulary boosters. Assessments of students use the best of traditional methods and the best of recent standards-based assessment approaches in an effort to produce a novice-level speaker able to use the language in real-world performance tasks.

**FRE201-H French II (A Full Year Course – 1.0 unit)**

At the intermediate level, emphasis on the four proficiency skills and cultural awareness continues, as the routine established in French I01 is followed and enhanced. Interpersonal, interpretive and presentational modes of communication are again utilized where effective, in accordance with state and national standards. Students become more familiar with the grammatical structure and vocabulary of the target language, and they communicate with each other through group projects, presentations, more advanced authentic reading selections, cultural comparisons and constant use of the target language in class, except where comparison of languages is analyzed. Visual and audio aids are again used. Twice-a-week labs re-emphasize communicative skills, vocabulary and grammatical constructs by the use of songs, activity sheets, practice in phonetics, question/answer and creative listening. Students receive daily emails from the instructor suggesting authentic websites and vocabulary boosters. Assessments of students use the best of traditional methods and the best of recent standards-based assessment approaches in an effort to produce a novice/intermediate-level speaker able to use the language in real-world performance tasks.

**FRE301-H French III (A Full Year Course – 1.0 unit)**

Intensive work with all aspects of language acquisition continues at this advanced level. Students continue to improve their communicative fluency using interpersonal, interpretive and presentational modes of communication in accordance with state and national standards. Vocabulary is significantly expanded, and all major components of language usage are included. Effective communication within the language is expected from the student, except where comparisons of languages are explored. Authentic and classical material comprising selections on contemporary France, the Francophone world, French history, and limited French literature are used. Journals are kept weekly in the target language, and a selected number of book reports are written, also in the target language, from approved literature. The second half of the course explores connections with French and European History, emphasizing the historic and modern personalities who influenced history. Twice-weekly labs re-emphasize communicative skills, vocabulary, cultural and grammatical constructs by use of songs, activity sheets, question/answer, and creative listening. Students receive daily emails from the instructor suggesting authentic websites and interesting news items or vocabulary boosters. Assessments of students use the best of traditional methods and the best of recent standards-based assessment approaches in an effort to produce an intermediate-level speaker able to use the language in real-world performance tasks.

**FRE401-H French IV (A Full Year Course – 1.0 unit)**

While more comprehensive and in-depth work with language acquisition skills are assigned, the major emphasis of this course is a survey combining and comparing the salient features of French culture, art, cuisine and limited literature selections as compared to those components in America. All texts and language use are in French, except when comparisons between English and French are studied; and analysis, synthesis, and evaluation are stressed. Advanced modes of communication (interpersonal, interpretive and presentational) are used in accordance with state and national standards. Clear effective communication within the language is expected from the students. Journals are kept weekly in the target language and a selected number of book reports are written, also in the target language, from approved literature. The second half of the course explores connections with disciplines such as French Art, Cuisine, or literature, including poetry. Twice-weekly labs re-emphasize communicative skills, vocabulary, grammatical and cultural constructs by use of songs, activity sheets, question/answer, speaking activities and creative listening. Students receive daily emails from the instructor suggesting authentic websites and interesting news items or vocabulary boosters. Assessments of students use the best of traditional methods and the best of recent standards-based assessment approaches in an effort to produce an advanced-level speaker able to use the language in real-world performance tasks.

**FRE501-H French V (A Full Year Course – 1.0 unit each)**

A personalized course, depending on individual needs and as agreed upon by the student and the instructor. Communicative activities (interpersonal, interpretive and presentational) are emphasized in accordance with state and national standards. If the student chooses, intensive practice following AP Advanced Placement Guidelines (French language only) can be followed for second semester, but the student in this course has not planned to take the AP test.

**FRE601-AP (AP French) French VI (AP French) (A Full Year Course – 1.0 unit each)**

An advanced, intensive course will be agreed upon by the student and the instructor. Weekly and/or twice weekly meetings will occur but work assigned and time in class will equal that of three meetings a week. Intense practice for the French Language Advanced Placement test (French **language** only) will be the major emphasis for second semester. Requirements from College Board for AP Certification have been met by the instructor and the class will follow those guidelines. All texts and language use are in French; and analysis, synthesis, and evaluation are stressed. Advanced modes of communication (interpersonal, interpretive and presentational) are used in

accordance with state and national standards. Clear effective advanced-level communication within the language is expected from the students. Twice-weekly labs re-emphasize communicative skills, vocabulary, grammatical and cultural constructs by use of songs, activity sheets, question/answer, speaking activities and creative listening. Second semester, students are required to record their voices given AP-style communicative tasks bi-weekly. Students also receive daily emails from the instructor suggesting authentic websites and interesting news items or vocabulary boosters. Several times a month, students are asked to listen to news reports from target-language countries and interpret meaning, using interpersonal skills in discussion and presentational skills to communicate to each other. Students are encouraged to use French outside of the classroom and native speakers are occasionally invited to class or called by telephone or interactive internet to communicate with students. Outside interactive Internet activities in the target language are encouraged. Assessments of students use the best of traditional methods and the best of recent standards-based assessment approaches in an effort to produce an advanced-level speaker able to use the language in real-world performance tasks. Students in the class will take the French AP Language test given by the College Board.

## **SPANISH**

- SPA201-H**      **Spanish II** (A Full Year Course – 1.0 unit)  
 Spanish II provides a review of Spanish I, including vocabulary, verb conjugations, direct and indirect object pronouns, adjectives, adverbs, connecting words and prepositions. Four skills: listening comprehension, speaking, reading, and writing are emphasized in that order of priority. Communication in Spanish is enhanced through directed dialogues, Q/A drills, songs, skits, interviews and recitations. The complete inventory of grammatical expression at an intermediate level is studied. A variety of cultural, historical and some literary material is presented.
- SPA301-H**      **Spanish III** (A Full Year Course – 1.0 unit)  
 Spanish III is designed to continue and solidify the student's command of the language learned in previous years in the four skills: listening comprehension, reading, speaking, and writing. Greater awareness of Hispanic culture and confidence in self-expression will be emphasized. Vocabulary expansion, syntactic analysis and drills coordinated with appropriate reading and textbook exercises will form the basis of daily classwork. Realia and audio visual materials will facilitate conducting the class increasingly in Spanish.
- SPA401-H**      **Spanish IV** (A Full Year Course – 1.0 unit)  
 In Spanish IV, the students' knowledge of the formal aspects of the language acquired in previous courses will be applied at an advanced level to historical, literary and cultural topics. Primary sources, such as magazines, newspapers, video and audio tapes entirely in Spanish as well as textbook material form the basis of the course. The objective is to expand the students' understanding and interest in subjects which currently and historically have held the interest of the Spanish-speaking world. Short oral and written presentations as well as two papers will be assigned. Clear, effective communication commensurate with the difficulty of the particular assignments in Spanish will be expected from the student.
- SPA501-H**      **Spanish V** (A Full Year Course – 1.0 unit)  
 This course meets once or twice a week to study selected, high -interest works by renowned authors from Spanish-speaking countries. The readings are designed to help students understand and foster appreciation for the writer's ideas and expression. The topics will explore the Hispanic perspective of universal themes such as love, friendship, and family; work and play; life and death; technology and global concerns; etc. The goal is to provide the students with valuable literary orientation and cultural exploration.
- SPA601-AP**      **Spanish VI (AP Span Lang)** (A Full Year Course – 1.0 unit)  
**(AP Span Lang)** The goal of this course is to improve written and oral proficiency in the target language through the study, analysis and discussion of a diverse body of authentic contemporary texts selected from throughout the Spanish-speaking world. Primary sources include works of fiction (literature, film, popular sitcoms and music), and nonfiction (newspaper articles, essays and podcasts). The class is divided into six units dealing mostly with cultural identity and contemporary sociopolitical conflicts challenging communities across the globe. All topics discussed in class correlate directly with those evaluated on the AP Spanish Language and Culture Exam. Apart from a very brief, but intense, grammar review at the beginning of each semester, minimal class time will be dedicated to explicit grammar instruction. Students who are in this class are strongly encouraged to take the AP Spanish Language and Culture exam in May. This course is conducted exclusively in Spanish. *PREREQ: Spanish IV or permission of the instructor*

## **CHINESE**

- CHI101-E**      **Introduction to Chinese I** (FALL Semester - 0.5 unit)

- (Dual Credit)** This introductory course stresses speaking, listening, and writing skills. Simple grammatical structures are practiced in innovative ways. Culture is presented to help students understand the many perspectives of the Mandarin Chinese language as well as the growing influence of the Chinese on the global economy.
- CHI102-E**  
**(Dual Credit)** **Introduction to Chinese II** (SPRING Semester - 0.5 unit)  
This class is a continuation of the first semester class. Students who complete Chinese I and II receive 3 hours of college credit from Coker College. *PREREQ: CHI101 or previous Chinese credits.*
- CHI201-E**  
**(Dual Credit)** **Intermediate Chinese III** (FALL Semester - 0.5 Credits)  
Intermediate course with more emphasis on communication skills and structure. Teaching methods include reading and writing practice without phonetic aids; oral practice in and outside the class, paying special attention to idiomatic usage; introduction to cultural perspectives through readings and cultural activities. *PREREQ: CHI II or permission of the instructor.*
- CHI202-E**  
**(Dual Credit)** **Intermediate Chinese IV (Spring Semester - 0.5 credit)** Continuation of CHIN III. Students who complete Chinese III and IV receive 3 hours of college credit from Coker College. *PREREQ: CHIN III or permission of the instructor.*

## **MUSIC**

### **MUS201-AP**

#### **AP Music Theory** (A Full Year Course – 1.0 unit)

This is a yearlong course that covers a broad range of basic to advanced musical concepts. Students will learn and enhance their skills in composition, and will learn how to analyze music using harmonic analysis along with other various concepts of analysis. Aural skills including rhythmic and harmonic dictation and sight-singing will also be covered. This course will give students the opportunity to broaden their skills and understanding of music, and deepen their appreciation for music as an expression and academic. After completing this course, students will also have the knowledge to sharpen their performance skills. *PREREQ: Must be able to read musical notation and must obtain permission from instructor.*

## **Junior Seminar Series**

### **Junior Seminar Series**

#### **LLS101**

#### **Life and Leisure Skills** (FALL and SPRING Semester, Graduation Requirement)

This seminar is designed to provide juniors with the necessary skills for making the transition to residential living and 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 their new environment. It provides them with an arena where positive life skills are encouraged and fostered. This seminar meets once a week.

#### **LLS102**

#### **Entrepreneurial Leadership** (FALL Semester, Graduation Requirement)

The Entrepreneurial Leadership seminar aims to help students develop the mindset and knowledge to more quickly become leading contributors in society. The seminar balances teaching very applied skills, such as personal finance and business communications, with those that are more personal and abstract, such as defining one's own definition of success. Through both introspective as well as interactive exercises, students will develop a deeper self-awareness in order to more fully appreciate and apply their unique strengths and talents to future pursuits. Other topics range from opportunity recognition and smart risk taking to effective teambuilding and business etiquette. Students will also improve public speaking and persuasive abilities by being required to routinely use these skills in class. The seminar challenges participants to become entrepreneurial leaders— inventors, creators, builders, doers—who work to actively shape the future for both greater personal fulfillment and to make our world a better place. This seminar meets once a week.

#### **LLS103**

#### **College Planning Seminar** (SPRING Semester, Graduation Requirement)

The College Planning Seminar 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. This seminar meets once a week.

## Independent Study

### Guidelines for Independent Study

**Purpose:** Independent Study at the South Carolina Governor's School for Science and Mathematics is designed to provide additional opportunities for highly motivated students to pursue areas of their special interest. Independent Study courses are student-initiated and allow students to explore areas of interest beyond what is offered in the catalog. It is aimed at enhancing the quality of our program by adding to it a customized course in an area of interest of a student and expertise of the instructor beyond what is already offered. Independent Study Course proposals will only be considered for 0.5 Carnegie unit (equivalent time commitment required as a regular semester-long course) and as overloaded courses (i.e. courses beyond the six course minimum per semester). In some rare cases, Independent Study Courses could be considered for 1.0 Carnegie unit.

Independent Study courses must be approved by the Curriculum Committee.

Students wishing to enroll in an Independent Study course must meet at least one of these criteria:

- ✓ A student wishes to extend knowledge in a discipline where all relevant existing courses have been completed with a grade of 90 or above or at the permission of the instructor and approval of the Curriculum Committee. The Curriculum Committee reserves the right to determine if all relevant courses have been taken in an area of study in order to warrant an Independent Study course. In some cases it will be advised that a student take an existing course instead of an Independent Study course.
- ✓ A student needs to complete a requirement for graduation (normally only in the Spring semester of the Senior year) when there is no course available in the specific subject that the student may schedule or an unavoidable scheduling conflict exists, provided that the Independent Study is not being used to replace a failed regular class. In special circumstances the instructor and student may request an exemption from the Curriculum Committee.

#### **Please note:**

- Faculty members are under no obligation to teach an Independent Study.
- No faculty member may teach more than two independent study courses per academic semester.
- Independent Study courses are student-initiated and are considered to be a contract between the student and professor to complete a course of study.

#### **Procedure to follow for approval of an Independent Study:**

1. To receive approval for an Independent Study, the Independent Study instructor and student will provide the Curriculum Committee with an *Independent Study Proposal Form* (found on the following page) which includes the course description, course syllabus and a student's individual academic information.
2. The Curriculum Committee will evaluate the request along with the other course requests for that semester and will give pre-approval, deny the request or seek additional information in order to make a decision.
3. Final approval of an Independent Study is contingent on final student grades for the semester prior to when the Independent Study will occur and the final schedule for the instructor and student for that semester.

**Independent Study Request Form**

**Student's Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**I request to take the following course as an independent study:** \_\_\_\_\_

**Instructor's Name:** \_\_\_\_\_ **Semester:** \_\_\_\_\_

**Course Information:** Please attach the course description and syllabus which should include information regarding expectations of the student, meeting times, method of evaluation and grading policy at a minimum.

**Student justification for requesting to take the Independent Study course which includes listing which criteria is met to seek consideration for an Independent Study course:** \_\_\_\_\_

Please list all courses taken with grades in the discipline in which the Independent Study is sought. As a general rule, students must have taken the foundational courses in the discipline as determined by the academic discipline's department to be considered for an Independent Study (**Section A below**). Also, please include a list of other courses that will be taken at the same time as the proposed Independent Study (**Section B below**).

<u>A. Previous Courses taken in the discipline</u>	<u>Semester</u>	<u>Grade</u>	<u>B. Other courses concurrently enrolled in</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

\_\_\_\_\_  
**Student Signature** **Date**

\_\_\_\_\_  
**Instructor Signature** **Date**

.....  
\_\_\_\_ Pre-approved for 0.5 Carnegie unit  
\_\_\_\_ Denied. Reason: \_\_\_\_\_

\_\_\_\_\_  
**Curriculum Committee** **Date**

\_\_\_\_ **Final Approval by Curriculum Committee** \_\_\_\_\_ **Date**  
cc: Student, Instructor, Division Chair, Academic Advisor, Registrar, Student File

## **College Credit Hours at Clemson University, the College of Charleston and the University of South Carolina for Coursework Taken at the South Carolina Governor’s School for Science and Mathematics**

GSSM has memorandums of understanding with Clemson University, College of Charleston (anticipated in 2016-2017) and the University of South Carolina to grant college credit for university approved GSSM courses that are closely aligned with the university's courses. Students must earn at least a B in the GSSM course and a passing grade on the challenge exam which will serve as the final exam for the course in order to receive college credit if admitted to the university. Some courses in the agreement are in the Advanced Placement (AP) program while others are beyond this level. Students may continue to take the AP exams where applicable and are encouraged to do so. The following tables specify the course equivalencies and credits granted by each university. Note that the tables are not the same for each university because the credit is based on matching GSSM courses with equivalent courses at the respective universities.

### **Agreement with Coker College on Chinese Credits**

Students receive college credit for both levels of Chinese taken at GSSM, awarded only if they complete both semesters (fall and spring). They receive six (6) hours for Chinese 101/102 and 6 hours for Chinese 201/201.

**Course Equivalencies**  
**For Course Credit for GSSM Graduates who attend Clemson University**

<b>Clemson Course</b>	<b>Credits</b>	<b>GSSM Course<sup>1</sup></b>
<b>Biology</b>		
Principles of Biology I and Lab (BIOL 1100/1101)	5	BIO 201 and BIO 202
Vertebrate Biology and Lab (BIOL 3030/3070)	4	BIO 301
<b>Chemistry</b>		
General Chemistry I and Lab (CH 1010/1011)	4	CHE 101
General Chemistry I/II and Labs (CH 1010/1020)	8	CHE 201 and CHE 202
<b>Economics</b>		
Principles of Microeconomics (ECON 2110)	3	EFI 310
Principles of Macroeconomics (ECON 2120)	3	EFI 320
<b>Mathematics</b>		
Calculus of One Variable I (MATH 1060)	4	MAT 201 and MAT 202
Calculus of One Variable I/II (MATH 1060/1080)	8	MAT 203
Calculus of One Variable II (MATH 1080)	4	MAT 303
Elementary Statistical Inference (STAT 2300)	3	MAT 304 and MAT 305
<b>Physics</b>		
General Physics I and Lab (PHYS 2070/2090)	4	PHY 151 and 152
Physics with Calculus I and Lab (PHYS 1220/1240)	4	PHY 201
Physics with Calculus II and Lab (PHYS 2210/2230)	4	PHY 202

<sup>1</sup> Students must earn at least a B in the GSSM course and a passing grade on the challenge exam which will serve as the final exam for the course in order to receive college credit if admitted to the university.

**Course Equivalencies**  
**For Course Credit for GSSM Graduates who attend University of South Carolina**

USC Course	Credits	GSSM Course <sup>1</sup>
<b>Biology</b>		
Biological Principles I (BIOL 101)	4	BIO 202 and BIO 303
Biological Principles II (BIOL 102)	4	BIO 201, BIO 304 and BIO 308
<b>Computer Science</b>		
Algorithmic Design I (CSC 145)	3	CSC 102
<b>Mathematics</b>		
Calculus I (MATH 141)	4	MAT 201 and MAT 202
Calculus I and II (MATH 141 and 142)	8	MAT 203
Calculus II (MATH 142)	4	MAT 303
<b>Physics &amp; Astronomy</b>		
General Physics I and Lab (PHYS 201)	4	PHY 101 or PHY 151
General Physics II and Lab (PHYS 202)	4	PHY 102 or PHY 152
Essential Physics I and Lab (PHYS 211)	4	PHY 201
Essential Physics II and Lab (PHYS 212)	4	PHY 202
<b>Statistics</b>		
Elementary Statistics (STAT 201)	3	MAT 304 and MAT 305

<sup>1</sup> Students must earn at least a B in the GSSM course and a passing grade on the challenge exam which will serve as the final exam for the course in order to receive college credit if admitted to the university.

**Course Equivalencies (anticipated for 2016-2017)  
For Course Credit for GSSM Graduates who attend College of Charleston**

<b>College of Charleston Course</b>	<b>Credits</b>	<b>GSSM Course<sup>1</sup></b>
<b>Biological Sciences</b>		
Introduction to Cell and Molecular Biology (BIOL 111 and Lab)	4	BIO 201 and BIO 202
<b>Chemistry</b>		
General Chemistry (CHEM 101 and Lab)	4	CHE 101
Organic and Biological Chemistry (CHEM 102 and Lab)	4	CHE 201 and CHE 202
<b>Computer Science</b>		
Computer Programming II (CSCI 221)	3	CSC 102 <sup>2</sup>
<b>Mathematics</b>		
Introductory Calculus (MATH 120)	4	MAT 200
Introductory Calculus (MATH 120)	4	MAT 201 and MAT 202
Calculus II (MATH 220)	4	MAT 203
Statistical Methods I (MATH 250)	3	MAT 304 and MAT 305
Discrete Structures I (MATH 207)	3	MAT 307
<b>Physics</b>		
Introductory Physics I (PHYS 101 and Lab)	4	PHY 101
Introductory Physics II (PHYS 102 and Lab)	4	PHY 102
General Physics I (PHYS 111)	4	PHY 201
General Physics II (PHYS 112)	4	PHY 202

<sup>1</sup> Must earn a grade of A or B in each listed course. It is anticipated that students graduating in 2017 or after will also need to earn a passing grade on the challenge exam which will serve as the final exam for the course in order to receive college credit if admitted to the university.

<sup>2</sup> Requirement for CSCI 220 and 220 Lab Computer Programming would be waived

