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2017-2018 Catalog

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Welcome from the Dean

Dear principal, counselor, or IVC facilitator,

I hope that you are well and having a great school year! Here in Durham, North Carolina at the North Carolina School of Science and Math, we are having a great year teaching and learning from students in schools and communities across the state. We’re also excited about, and busy preparing for the 2017-2018 school year!

Thank you for considering a partnership with us so that, together, we can offer advanced level, high-quality teaching and learning for academically-gifted students in your community and throughout the state of North Carolina!

A key part of our mission at the North Carolina School of Science and Mathematics is to provide high-quality, tuition-free high school courses to North Carolina high schools. This year, we are serving students in 31 different public schools with interactive video conference courses, and an additional 358 students are enrolled in our NCSSM Online program.

If you’ve worked with us before, we look forward to serving your school again in 2017-2018. If your school has not yet participated in NCSSM’s distance education courses, we hope our programs will position your school to offer coursework that isn’t otherwise available, alleviate resource and scheduling difficulties, or build capacity in the areas of mathematics, science, engineering, and Advanced Placement.

This catalog lists all of the courses available to NC public school students through two programs: Interactive Video Conference (IVC), and NCSSM Online. IVC courses are available to any student in any NC public high school who meets the course prerequisites. NCSSM Online courses require students to apply for admission to our program. However, both programs can be used to supplement the offerings at your school for students who seek advanced opportunities in mathematics, science, and some humanities courses.

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

- More IVC enrichment sessions to our catalog of offerings
- New online courses in Agricultural Biotechnology Solutions, Introduction to Systems Thinking: Modeling the Environment, Applied Finite Mathematics

DISTANCE EDUCATION & EXTENDED PROGRAMS
http://www.ncssm.edu/for-educators/nc-public-schools
with Social Science Focus, and Applied Finite Mathematics with Biological Focus

- A new IVC course in Computer Science
- Links to descriptions of our Summer Accelerator course offerings

Please share these tuition-free offerings widely within your school community. I also invite your feedback on any aspect of our program. I can be reached at lathan@ncssm.edu or (919) 416-2721.

Sincerely,

Jamie L. Lathan, Ph.D.

Dr. Jamie Lathan, Dean of Distance Education & Extended Programs
About NCSSM

The North Carolina School of Science and Mathematics (NCSSM) has been a global leader in STEM education for more than 30 years. The school has a mission to serve as a public residential high school educating academically talented North Carolinians to become state, national and global leaders in science, technology, engineering and mathematics; to advance public education in North Carolina; and to inspire innovation for the betterment of humankind.

Since opening its doors in 1980 as the first public residential school with a focus on STEM, NCSSM has become a model for dozens of other schools across the country and globe and is a founding member of the National Consortium for Specialized Secondary Schools of Mathematics, Science, and Technology.

In 2007, NCSSM also became the first high school to become a constituent institution of the University of North Carolina.

NCSSM Distance Education Administration
Dr. Todd Roberts NCSSM Chancellor
Kendall Hageman Director of Distance Education & Extended Programs
Jennifer Betz Online Learning Specialist
Melissa Thibault Vice Chancellor for Distance Education & Extended Programs
Dr. Jamie Lathan Dean of Distance Education & Extended Programs
Karl Coleman Broadcast and Operations Manager
Jen Hill Summer Programs Coordinator

About NCSSM Distance Education

NCSSM began offering distance education courses via the Information Highway in 1994. Since that time, over 10,000 students have participated in video courses for high school credit—many of them in Advanced Placement. While the program initially served rural schools, it has expanded to include all North Carolina schools. As video has become cheaper and broadband access to schools has increased, the program has grown, with new courses being added regularly.

DISTANCE EDUCATION & EXTENDED PROGRAMS
http://www.ncssm.edu/for-educators/nc-public-schools
NCSSM Online welcomed its first cohort, the class of 2010, in 2008. This program, which includes weekly synchronous sessions, on-campus summer Accelerator courses, and residential weekends throughout the school year, welcomes students to the NCSSM experience without requiring that they leave their home communities. Students are provided textbooks and academic counseling, and they are eligible to participate in some NCSSM extracurricular activities, even attending prom at NCSSM.

Students participating in NCSSM Distance Education courses routinely advance to the most prestigious colleges and universities in the country, including UNC-Chapel Hill, NC State University, Duke University, California Institute of Technology, Yale University, the United States Air Force Academy, and others. Participants have received numerous scholarships, including the Morehead-Cain Scholarship and the Park Scholarship.

These programs remain tuition-free to all students.

About Two-Course Sequences:

To fully address the AP curriculum and build appropriate depth, knowledge, and application of the curriculum, NCSSM offers the AP content in a two-semester, year-long curriculum. Fundamental concepts and skills, as well as some in-depth topics are addressed in an honors-level elective course offered in the fall. The elective is a prerequisite and required to enroll in the corresponding AP course in the spring, which continues in-depth topics and prepares students to take the AP test. Students then earn 1 honors credit in the fall and 1 AP credit in the spring.
Interactive Video Conference (IVC) Courses

ABOUT IVC

The North Carolina School of Science and Mathematics (NCSSM) is the premier provider of interactive videoconference (IVC) courses for K-12 schools across North Carolina. Courses are provided tuition-free to schools across the state, providing students with the opportunity to take advanced coursework in a technology-rich environment.

With two-way videoconferencing, students from schools across the state can collaborate in project teams and whole-class discussions, developing the skills required by business and industry. NCSSM IVC teachers monitor the class in real time, assessing student learning and ensuring that students engage with the course materials and with each other.

NCSSM IVC provides a flexible, cost-effective solution for schools looking to:

- Offer courses in hard-to-staff subject areas
- Support STEM goals
- Offer advanced coursework to smaller groups of students

Quick Facts

- NCSSM has offered tuition-free IVC courses to North Carolina schools since 1994.
- All NCSSM instructors have an advanced degree in their subject area.
- NCSSM operates four high definition IVC studios.
- Over 450 students enroll in NCSSM IVC courses annually.
- 22% of all North Carolina LEAs utilize NCSSM IVC courses.
- NCSSM IVC courses have course codes in NC’s PowerSchool implementation.
- Courses are offered in 70-minute blocks throughout the school day. (Students will be expected to work independently for 20 minutes daily.) NCSSM accommodates multiple school calendars.
- Schools enroll the students. There is no student application to NCSSM for IVC courses.
- Classes are capped at 25 students. Enrollment is on a first-come, first-served basis.

DISTANCE EDUCATION & EXTENDED PROGRAMS

http://www.ncssm.edu/for-educators/nc-public-schools
About Interactive Videoconferencing

Two-way videoconferencing allows students to see and hear the instructor and the other class participants, wherever they are in the world, in real time. Once confined to expensive video classrooms, students can now participate in IVC courses if they have a computer, webcam, and software that costs less than $200. Schools can set up basic IVC classrooms by using:

- USB microphone, external speakers, Logitech Laptop Camera, Polycom RealPresence software and a laptop connected to a flat-panel monitor, LCD projector or Smartboard.

- Individual students can now participate with an iPad using a free app from Polycom.

- Schools, for $15 a month, can lease software from MCNC called Movi-Jabber. This software can be loaded on a laptop that is equipped with a camera and microphone which will allow 1 or 2 students to participate this way.

Using IVC technology, NCSSM connects with schools all over the world.

Resources Needed

- Schools provide textbooks, classroom space, and a computer for each student to use during class.

- Schools identify an adult facilitator who proctors exams, supervises the students while they’re in the classroom, and serves as a conduit for communication between NCSSM and the school.

- Schools enter attendance and grades provided by NCSSM into PowerSchool.

DISTANCE EDUCATION & EXTENDED PROGRAMS

http://www.ncssm.edu/for-educators/nc-public-schools
Fixed Broadcast Times for Schedules for IVC Courses

To accommodate as many different North Carolina high school daily schedules as possible and to exemplify blended approaches to teaching and learning, all NCSSM IVC courses will be taught using a maximum of seventy (70) minutes of live, synchronous, time and a minimum of twenty (20) minutes of asynchronous time. With this arrangement, before or after the seventy minutes of teacher-led instruction, students can collaborate with each other or work individually with the teacher using discussion boards, pre-recorded video sessions, online learning tools and games, and project-based lessons and activities.
How to Enroll

Descriptions of the 2017-2018 courses listed in this catalog. Select the courses your school would like to offer to your students. Include the descriptions of these selected courses in your school course registration materials to provide your students to view all course choices.

In January, NCSSM course registration forms for Fall Semester and Spring Semester 2017-2018 will be posted on the NCSSM website (http://www.ncssm.edu/ivc-courses). Complete the registration forms; include the following information:

- Identify each course the students have requested.
- Provide the contact information for the Interactive Video Conference facilitator and a counselor.
- Provide the name and grade level of the student. One form must be completed for each student.

The maximum number that each school may register in an individual course is eight; schools may register up to eight students for as many courses as needed.

Once a course is full, a wait-list will be created.

Within 7 days of completing the registration form, registration will be confirmed.

An additional form is required for students enrolled in Honors Statistics/AP Statistics and Honors Calculus AB/AP Calculus AB. The form includes standardized tests scores (SAT, PSAT, ACT, and or EOC) and the signature of a teacher who has worked with the student and is recommending enrollment. These registration forms are available online.

Students enrolled in Honors Forensic Science or Fundamentals of Multivariable Calculus are required to complete a short pre-test, administered by school personnel, before registration can be confirmed. This test will be automatically sent for any Honors Forensic Science or Fundamentals of Multivariable Calculus requests.

All registration materials are posted at http://www.ncssm.edu/ivc-courses.
Technical Requirements

Once an expensive initiative, Interactive Video Conferencing is now very affordable for schools. Recent developments in laptop-based and mobile device-based clients have created new opportunities for students to participate in NCSSM interactive video conference courses.

IVC courses require broadband internet, and:

- Existing videoconference equipment in the school, such as Cisco-Tandberg or Polycom units. If your school has participated in interactive video courses with NCSSM, this equipment is likely already in place.

—or—

- A classroom equipped with a computer, projector, webcam, speakers, and desktop conference microphone can be converted into a video conference classroom with affordable software available from MCNC or Polycom RealPresence (See https://www.mcnc.org/services/video-soft-client-movi.html for more information.)

—or—

- In cases where a full classroom is not available, individual students may participate by laptop (webcam and headset required; schools must lease software from MCNC) or iPad (via free Polycom app) or purchase Polycom RealPresence software. If individual students are participating, remember that they will need space where they can talk freely, as courses are truly interactive.

NCSSM offers schools support in connecting their video conference classrooms, such as:

- live testing (upon request)

- troubleshooting assistance

- guidance for IT personnel
The Facilitator

Key to the success of the Interactive Video Conference experience is the facilitator—an adult at the school site who works with the students and the NCSSM instructor to ensure a positive learning environment.

Expectations for facilitators include:

• Maintaining a safe, productive environment for students in the Interactive Video Conference classroom.

• Performing some classroom management functions, including entering student attendance into PowerSchool.

• Administering and proctoring tests and quizzes designed by the NCSSM instructor.
  • Troubleshooting minor technical issues, such as muted volume, unplugged cables, or pointing and zooming the camera.

• Communicating with the NCSSM instructor about school closures, schedule changes, or classroom issues that affect student learning.

• Receiving grades from the NCSSM instructor.

• Communicating with parents, school counselors, and school administration about student performance.

The facilitator is not required to be a subject-area teacher, though many schools have subject-area teachers participate as facilitators in order to build content knowledge, pedagogical knowledge, and/or capacity to offer the IVC course as a face-to-face course in the future. NCSSM often provides teacher mentoring for subject-area teachers who serve as IVC facilitators. For more information on IVC mentoring relationships, contact Dr. Jamie Lathan at lathan@ncssm.edu.

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## Fall 2017

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** Indicates a 2-course sequence. Students must register for fall and spring courses in the sequence.
**Indicates a 2-course sequence. Students must register for fall and spring courses in the sequence.**
SCIENCE

Honors Forensic Science (fall and spring)

**PowerSchool Code- 30205X0**
This course focuses on the application of basic biological, chemical and physical science principles and technological practices to the purposes of justice in the study of forensic science as it relates to judicial and civil issues. The class is designed around authentic performance assessments with students working in teams to solve crimes using scientific knowledge and reasoning. Through lab work, students will apply inference and deductive reasoning to the investigation and potential solving of crimes. It involves all areas of science including biology, anatomy, chemistry, physics, and earth science with an emphasis in complex reasoning and critical thinking. In addition, students must incorporate the use of technology, communication skills, language arts, art, family and consumer science, mathematics and social studies. This course requires the ability to write clear and concise lab and investigative reports. Good writing skills are imperative. This course also deals with graphic content. Parents are asked to sign a permission slip at the beginning of the course, but students are expected to be mature when dealing with this content.

**Prerequisites or Suggested Skills**
Completion of Language Arts/ English with a grade of "A", completion of Biology I, completion of Math III, and completion of a Placement Exam with a score of 70 or above. NCSSM will provide a placement test to be administered by the school at the time of registration.

**Grade Level:** 10-12

**Consumables Fees:** A $25 per student consumable materials fee will be invoiced at the start of the semester. For inquiries regarding invoices, please contact Crystal Davis at NCSSM. phone: 919-416-2640 fax: 919-416-2650 davisc@ncssm.edu.

Textbook: Must be provided by the school


**Materials:** Some equipment will be provided on loan from NCSSM; schools are responsible for materials. A list of additional needed materials will be provided.

**Site Requirements:** Facilitator assistance will be required to set up labs and proctor assessments. Instructor will provide a list of educational websites that students must be able to access during class, including but not limited to Google Drive and www.firearmsid.com.

DISTANCE EDUCATION & EXTENDED PROGRAMS
[http://www.ncssm.edu/for-educators/nc-public-schools](http://www.ncssm.edu/for-educators/nc-public-schools)
PowerSchool Code- 30205X0
This upper level science course provides a broad overview of forensic anthropology – an applied field of biological anthropology that seeks to recover, identify, and evaluate human skeletal remains within a medico-legal context. In this course, students will learn to identify the bones of the human skeleton, as well as basic recovery techniques and crime scene investigation. We will then apply this knowledge towards the techniques used by forensic anthropologists to determine sex, age at death, ancestry, and stature; and how to estimate time since death and identification of trauma to bone. Finally, students will explore the role forensic anthropologists play in mass disaster and human rights investigations, as well as the associated ethical responsibilities that come with working with human skeletal remains.

This course requires the ability to write clear and concise lab and investigative reports. Good writing skills are imperative.

Prerequisites or Suggested Skills
Completion of Language Arts/ English with a grade of "A", completion of Biology I, completion of Math III, and completion of Honors Forensic Science with a grade of "C" or above. Students must demonstrate maturity in other classes, be highly motivated, and have a strong background in science.

Grade Level: 10-12

Consumables Fees: A $25 per student consumable materials fee will be invoiced at the start of the semester. For inquiries regarding invoices, please contact Crystal Davis at NCSSM. phone: 919-416-2640 fax: 919-416-2650 davisc@ncssm.edu

Textbook: Must be provided by the school

Materials: Links to articles and academic journals supplied by NCSSM. Some equipment will be provided on loan from NCSSM; schools are responsible for materials. A list of additional needed materials will be provided.
Site Requirements: Facilitator assistance will be required to set up labs and proctor assessments. Students must be able to access and use Google Drive for collaborative assignments.
Honors Genetics and Biotechnology (fall and spring)

PowerSchool Code- 33605X0
What do crime scene investigations, agriculture, medicine, conservation biology and manufacturing have in common? They have all been revolutionized by biotechnology! Almost every day we read about new developments in the rapidly changing fields of genetics and DNA-based biotechnology. In this course, students will first explore classical genetics and then move onto examining the structure and function of DNA and proteins. With state-of-the-art laboratory experiments, students will analyze DNA fingerprints from a crime scene, genetically transform bacteria and investigate their own DNA! Finally, they will survey the applications of biotechnology in many diverse fields and discuss in depth how biotechnology is changing our daily lives and our future. With the decline of traditional manufacturing in North Carolina, biotechnology is positioned to become a vital part of North Carolina’s 21st century economy.

Prerequisites or Suggested Skills
Completion of Biology I with a B or higher and completion of Math III

Grade Level: 9-12

Consumables Fees: A $25 per student consumable materials fee will be invoiced at the start of the semester. For inquiries regarding invoices, please contact Crystal Davis at NCSSM. phone: 919-416-2640 fax: 919-416-2650 davisc@ncssm.edu. Textbook: Must be provided by the school

Site requirements: Students must have computer access to the Internet in the classroom. Facilitator assistance will be required to set up labs.
Honors Physics (fall and spring)

PowerSchool Code- 34305X0

This course is a hands-on, inquiry based introductory course which combines both “conceptual” and “mathematical” approaches to learning physics. The course covers the laws of mechanics and their applications. Students will learn to solve real problems by investigating real systems. Investigations will cover physics topics that are fun and engaging for the students. Students will design experiments, use accurate measuring equipment and construct and test conclusions based on accurate data.

Prerequisite or Suggested Skills
Completion of Math III with a C or higher

Grade Level: 10-12

Consumables Fees: A $25 per student consumable materials fee will be invoiced at the start of the semester. For inquiries regarding invoices, please contact Crystal Davis at NCSSM. phone: 919-416-2640 fax: 919-416-2650 davisc@ncssm.edu

Materials: Each student must have a graphing calculator (TI-83, TI-84 or TI-89) that they may take home.

Textbook: Must be provided by the school

Site Requirements: Students must have computer access to Internet in classroom
Honors Aerospace Engineering-  (fall and spring)

**PowerSchool Code- 34055X0**
This course introduces students to the field of aerospace engineering, engineering design, and the core math and science concepts needed to solve problems related to aerospace and other engineering disciplines. The course is presented with historical context, emphasizing the development of human flight from antiquity through modern aviation and on into current and future exploration of space.

Topics include spatial reasoning, properties of fluids, descriptions of 3-dimensional motion, the mechanics of flight, and basic aero- and thermodynamic principles applied to the design and control of aircraft and spacecraft. Students have opportunities to experiment, calculate, compute, design and build as they explore and solve problems associated with the mechanics of flight, and are encouraged to earn course credit through aerospace-themed projects of their own design.

**Prerequisites or Suggested Skills**
Completion of Math III or Integrated Math III with a B or higher. Students should be able to relate lengths of sides of a triangle to angles using trigonometry.

**Grade Level:** 10-12

**Consumables Fees:** A $25 per student consumable materials fee will be invoiced at the start of the semester. For inquiries regarding invoices, please contact Crystal Davis at NCSSM. phone: 919-416-2640 fax: 919-416-2650 davisc@ncssm.edu

**Materials:** Some equipment on loan from NCSSM; schools are responsible for materials. A list of additional needed materials will be provided. Some free software must be downloaded and installed on all student machines.

**Site requirements:** Students must have computer access to the Internet in the classroom. Google Chromebooks are less preferred as there are incompatibilities with some class software. Facilitator assistance will be required to set up labs.
Honors Computer Science (fall)

PowerSchool Code- 28005X0
In this program, students will be exposed to broad topics of computer science such as Digital Information, Cybersecurity, Big Data as well as a strong laboratory component to help students apply computer science skills to solve real-world problems. They will be engaged in projects that investigate each stage of problem solving. This is a strong conceptual and demonstration based curriculum that will teach not only algorithms and programming, but more importantly, critical-thinking and abstraction. Skills that are in high demand across all industries.

Prerequisites or Suggested Skills
Math II

Grade Level: 11-12

Textbook: None

Materials:

Site requirements: Students must have computer access to the Internet in the classroom. Chromebooks will not work for this course.
MATHEMATICS

Honors Foundations of Multivariable Calculus (spring)

PowerSchool Code- 24005X0

Designed for students who have completed AP Calculus BC, this course will give students a strong foundation for completing multivariable calculus at the college level. This course includes the theory and application of vector functions and partial derivatives. Topics include a vector approach to regression modeling, the TNB-frame, curvature, continuity and differentiability of functions of several variables, gradients and directional derivatives, and classic optimization problems. Numerical methods such as Newton’s Method for solving non-linear systems and modeling with vector-valued functions of scalar and scalar-valued functions of a vector may also be included.

Prerequisites or Suggested Skills
Students must have successfully completed AP Calculus BC and earned a score of 4 or 5 on the AP Calculus BC Exam or received permission from the NCSSM Dean of Distance Education. NCSSM will provide a placement test to be administered by the school at the time of registration.

Grade Level: 11-12

Textbook: Must be provided by the school

Materials: Some equipment will be provided on loan from NCSSM; schools are responsible for materials. A list of additional needed materials will be provided. (The course is taught from the perspective of the TI-84 or 84 Plus and so these calculators are preferred; TI-83 or 83 Plus, TI- Inspire, or TI-89 are acceptable). Site requirements: Students must have computer access to the Internet in the classroom.

DISTANCE EDUCATION & EXTENDED PROGRAMS
http://www.ncssm.edu/for-educators/nc-public-schools
Honors Calculus/AP Calculus AB Course (two-course sequence)

Honors Calculus (fall)

PowerSchool Code- 28005X0

This course is rich in technology and applications, and prepares students for the AP Calculus AB Exam. AP Calculus develops the student’s understanding of the concepts of the Calculus (functions, graphs, limits, derivatives) and provides experience with methods and applications. The course encourages the geometric, numerical, analytical, and verbal expression of concepts, results, and problems. Prerequisite Completion of Precalculus with an “A” and the recommendation of the math teacher. Students should have a strong background in algebra and functions, including polynomial, exponential, logarithmic, and trigonometric. Students should also have knowledge of basic graphing calculator functions ... graphing an equation, determining a Window, use of the built-in Intersect, Maximum, Minimum, Zero, & Value functions. A summer assignment will be sent to enrolled students. The completion of the summer assignment is mandatory. Schools will be asked to supply the following student information: PSAT scores- both Verbal and Mathematical and ACT scores.

Grade Level: 10-12

Materials: Each student must have a graphing calculator that they may take home. (The course is taught from the perspective of the TI-84 or 84 Plus and so these calculators are preferred; TI-83 or 83 Plus, TI-Inspire, or TI-89 are acceptable).

Textbook: Must be provided by the school

Site requirements: Students must have computer access to the Internet in the classroom.
AP Calculus AB (spring)

PowerSchool Code- 2A007X0

The second half of the two-course sequence, AP Calculus continues to develop the student’s understanding of these concepts of the Calculus (functions, graphs, and integrals) and provides experience with methods and applications. With the course curriculum established by The College Board, the course is to be representative of college-level mathematics. The course continues to encourage the geometric, numerical, analytical, and verbal expression of concepts, results, and problems. The semester’s work includes ongoing review of the first semester topics and preparation for the AP exam.

Prerequisite or Suggested Skills
Successful completion of the NCSSM Honors Calculus course, offered in the fall semester. Schools will be asked to supply the following student information: PSAT scores- both Verbal and Mathematical and ACT scores.

Grade Level: 10-12

Materials: See requirements for Honors Calculus

Textbook: Must be provided by the school

Site requirements: Students must have computer access to the Internet in the classroom.
Honors Statistics/AP Statistics (two-course sequence)

Honors Statistics (fall)

**PowerSchool Code- 28005X0**

This first part of a year-long course covers the content of a typical introductory college course in Statistics. In colleges and universities, the number of students who take a Statistics course is almost as large as the number of students who take a Calculus course. (At least one Statistics course is typically required for majors such as engineering, psychology, sociology, health science, mathematics, and business.) The first semester will provide an overview and introduction to Descriptive Statistics, and will introduce students to the major concepts and the tools for collecting, analyzing, and drawing conclusions from data. The completion of the summer assignment is mandatory.

**Prerequisite:** Students must have completed a course beyond Math III with a B average or better and have strong algebra skills. They must also possess strong verbal skills as well as sufficient mathematical maturity and quantitative reasoning ability. A summer assignment will be sent to enrolled students. The completion of the summer assignment is mandatory. Schools will be asked to supply the following student information: PSAT scores- both Verbal and Mathematical and ACT scores.

**Grade Level:** 10-12

**Materials:** Each student must have a graphing calculator that they may take home. (The course is taught from the perspective of the TI-84 or 84 Plus and so these calculators are preferred; TI-83 or 83 Plus or TI-Inspire are acceptable)

**Textbook:** Must be provided by the school

**Site requirements:** Students must have computer access to the Internet in the classroom.
AP Statistics (spring)

PowerSchool Code- 2A037X0

The second half of the two-course sequence, AP Statistics covers the methods of Inferential Statistics, and will introduce students to the major concepts of hypothesis testing and confidence intervals. With the course curriculum established by The College Board, the course is to be representative of college-level mathematics. The semester’s work includes ongoing review of the first semester topics and preparation for the AP exam.

Prerequisite or Suggested Skills:

Successful completion of the NCSSM Honors Statistics course, offered in the fall. Schools will be asked to supply the following student information: PSAT scores—both Verbal and Mathematical and ACT scores.

Grade Level: 10-12

Materials: See Honors Statistics

Textbooks: See Honors Statistics

Site requirements: Students must have computer access to the Internet in the classroom.
This interdisciplinary course provides an introduction to African American history, literature, and culture. Students examine significant social, political, economic, and religious issues as well as issues of identity in the lives of African Americans from the sixteenth to the present. In addition to primary and secondary source readings, students explore texts ranging from slave narratives, folktales, and spirituals to the works of past and contemporary writers, artists, musicians, and filmmakers. Through a variety of assignments and activities, students continue to develop their skills in reading, speaking, and research, with special emphasis on the writing Process.

Prerequisites or Suggested Skills
None

Grade Level: 10-12

Textbook: Must be provided by the school

Site requirements: Students must have computer access to the Internet in the classroom.
Online Courses: NCSSM Online

What is NCSSM Online? NCSSM Online is a unique, tuition-free two-year program of online learning blended with a host of real-time connections and onsite NCSSM residential activities. NCSSM Online offers a host of rigorous online honors or college level courses parallel to those offered in the NCSSM residential academic program. A unique feature of this two-year program is its design to bring students together for onsite collaborative learning experiences—a vital component of the total NCSSM experience.

A student initiates the application to the NCSSM Online program during the sophomore year. NCSSM Online is designed to expand the NCSSM academic experience beyond the boundaries of the Durham campus to more North Carolina high school students in a virtual environment. This program supplements continued enrollment at a local school, and also will provide for a separate NCSSM transcript for the curriculum taken in the NCSSM Online program.

Note: Enrollment in NCSSM Online courses requires the student to apply and meet all acceptance criteria for NCSSM. While students remain enrolled in their public schools, counselors should not enroll them in online courses for credit at the public school until after they have been accepted into the NCSSM Online Program.
How it Works

Notation and Credit Students receive a NCSSM transcript that certifies their work at NCSSM Online, along with an NCSSM GPA. Students can request copies of their NCSSM transcripts be sent separately with any college admission application. Additionally, if needed the NCSSM Online counselor is available to assist students with the college selection and application process.

Additionally, courses can be added (with a school’s permission) to a student’s local school transcript for graduation credit, using the statewide student registration system NC WISE. However, these courses can only receive honors or AP notation on a local school transcript. Schools adding courses to the local transcript are required to provide proctoring for student tests during the course; tests will be provided by the NCSSM instructor.

NCSSM Online Students who have taken NCSSM Interactive Video Conference courses at their public schools may request to have the IVC course included on their NCSSM transcript.

Academic Components NCSSM Online brings students together in a virtual environment; therefore NCSSM Online's courses do not follow a daily schedule like normal high school courses. Junior students take one class during their first semester. Then, students may be able to take more than one class if their local school supports/has facilities for the student to complete the coursework during the school day.

How our Courses Work NCSSM Instructors make themselves available to students at a variety of times during the school day. Each instructor schedules an online web-video conference once a week (in the evening) to allow the entire class to work collaboratively. They are able to communicate with their teachers through various features of NCSSM Online's course management program, as well as through instant message, e-mails, and by phone.

All courses are taught by faculty from NCSSM. Faculty hold a minimum of a master's degree in their field of study; many also hold doctorates. Students meet their teachers when they visit NCSSM's residential campus for the NCSSM Online Orientation Weekend, and during the required on-campus visits each semester. Students can take a sequence of courses towards a concentration, noted on their NCSSM transcript and completion certificate.
If they complete the program requirements, they receive our program’s Chancellor’s medallion and attend our recognition ceremony wearing the gown of their local school.

How our Face-to-Face Components Work A mandatory multi-day NCSSM Orientation Weekend is scheduled on the Durham NCSSM campus in late summer, 2017. In addition, NCSSM Online students are required to come to the NCSSM campus on one or two NCSSM Online and On-campus weekends as part of their course. These Saturdays provide additional opportunities for students to network with their teachers and fellow NCSSM Online students and complete laboratory or collaborative activities. During the November weekend, students will have the opportunity to participate in NCSSM’s Ethics and Leadership Conference.

Rising seniors (and, space permitting, rising juniors) have the opportunity to register for the weeklong Summer Accelerator at the NCSSM campus. Modeled after the NCSSM academic program’s opportunities for extracurricular studies, such as mini-term and independent study options, the Summer Accelerator brings students together for an intensive look at a topic of interest. Students can also competitively apply for NCSSM’s Summer Research Internship program, and work with a mentor or in a research lab near NCSSM while in residence on the NCSSM campus.

DISTANCE EDUCATION & EXTENDED PROGRAMS
http://www.ncssm.edu/for-educators/nc-public-schools
**NCSSM Online Admissions**

Who should apply? NCSSM is looking for high-potential students that want to link together with top students around the state and immerse themselves in academic opportunities unavailable at most local schools.

- Sophomore standing at time of application.
- North Carolina residency (the program is open to students enrolled in public, private, or home high schools)
- A reliable computer that meets the program computer requirements
- Regular access to a reliable high speed internet connection
- Parent/Guardian or responsible party that can transport and drop student off at NCSSM campus for residential components. Online program students can bring a vehicle with advance written permission.

What is the Process? The NCSSM admissions process evaluates the following criteria through multiple application components.

- Student application essay questions
- 9th and 10th grade academic performance
- Rigor of 9th and 10th grade courses
- Sophomore SAT score performance relative to your home county or high school
- Evaluation from a science, English, and math instructor
- Evaluation from a current school counselor.

No campus visit is required during the admissions process for applicants that apply only to the NCSSM Online program.

To apply, visit: [https://apply.ncssm.edu/](https://apply.ncssm.edu/)

NCSSM’s Two Programs NCSSM has two application-based programs:

- The NCSSM Residential program allows students to live on our campus in Durham their junior and senior year of high school and receive a NCSSM diploma
- The NCSSM Online program allows students to stay at their local high school, take 4 to 6 NCSSM courses their junior and senior year, and receive a NCSSM transcript. Students will be asked which program they are applying to when they start the online NCSSM admissions application.
NCSSM Online Courses

MATHEMATICS

Honors Applied Finite Math with Social Science Focus- MA366 (fall)

PowerSchool Code- 28005X0
Applied Finite Mathematics offers students an overview of a number of applications of mathematics, especially in the social and management sciences. Applications and modeling are central to this course of study. Topics covered include fair division of resources and costs, voting methods, apportionment of legislative bodies, power of voting coalitions, graph theory and networks and recursive systems. The course will also extend students’ knowledge of matrices and their use in applications related to the social sciences, as well as probability and univariate data analysis. Students are expected to be involved in formulating and modeling problems, applying the appropriate mathematics to find solutions, and evaluating those solutions. Computers and calculators are incorporated as computational modeling aids. Activities in this course include lectures, regular synchronous class meetings using WebEx, discussions, projects, group activities and assessments. It is important that students fully participate and complete assignments to keep pace with the class.

Weekly Webinar
Thursday at 8:00pm

Weekend at NCSSM (required)
November 4, 2017

Prerequisites or Suggested Skills
B or better in Math II Honors, or an A in Math II.
PowerSchool Code- 28005X0

Applied Finite Mathematics offers students an overview of a number of applications of mathematics to various fields, including the biological sciences. Applications and modeling are central to this course of study. Topics covered include fair division of resources and costs, graph theory and networks, and recursive systems. The course will also extend students’ knowledge of matrices and their use in applications, as well as probability and univariate data analysis. Students are expected to be involved in formulating and modeling problems, applying the appropriate mathematics to find solutions, and evaluating those solutions. Computers and calculators are incorporated as computational modeling aids. Activities in this course include lectures, regular synchronous class meetings using WebEx, discussions, projects, group activities and assessments. It is important that students fully participate and complete assignments to keep pace with the class.

Weekly Webinar
Thursday at 8:00pm

Weekend at NCSSM (required)
March 10, 2018

Prerequisites or Suggested Skills
B or better in Math II Honors, or an A in Math II.
This is the first course in a two-course sequence. This course introduces students to college-level Calculus through topics such as limits and derivatives, methods of differentiation, applications of derivatives, an introduction to integration, and applications of integration. The course covers all topics in The College Board's AP Calculus AB curriculum, and therefore covers a little more than one semester of a college-level Calculus course. Therefore, it is a very intense, quick-paced course to ensure that students complete all the material by mid-April so that time remains for sufficient preparation for the AP Examination. This course is intended for students who have a willingness to learn Calculus at a very rapid pace and exceptionally good study habits. As with most online courses, students need to be self-motivated and self-disciplined so that they can work on their own. Technology will be used to reinforce the relationships among the multiple representations of functions for confirming written work, facilitating exploration, and assisting with interpretation of results. Students will work independently, attend weekly group sessions using web conferencing, and engage in group activities on campus. Evaluations will consist of online quizzes, special problems (Problems of the Week), proctored tests and quizzes, and a final exam. This course will prepare students to sit for the May 2018 administration of the Calculus AB Advanced Placement Exam.

Weekly Webinar
Wednesday at 8:30pm

Weekend at NCSSM (required)
November 4, 2017

Prerequisites or Suggested Skills
• “A” Math I, Math II, Math III, and Pre-Calculus
• The ability to be an independent learner in a high-level mathematics course.
• Strong reading skills.
• Reliable home access to internet and e-mail.
• Regular and reliable access to a scanner, including ability to PDF documents.
• Possession and knowledge of using the TI-83/ TI-83 Plus, TI-84/TI-84 Plus, TI-89, or TI- Nspire calculators. The course is taught from the perspective of the TI-84 series of calculators.
PowerSchool Code- 2A017X0

The is the second course in the sequence. This demanding and challenging course, AP Calculus BC, is the equivalent of a college-level second semester in Calculus. The course covers all topics in The College Board's AP Calculus BC curriculum, developing the important concepts in differential and integral Calculus and then using these fundamentals to polynomial approximations and series, vectors, polar functions, and parametric equations. During the semester, students will explore concepts graphically, numerically, and analytically (algebraically) so as to foster a more complex understanding of the Calculus. This course is intended for students who have a willingness to learn Calculus at a very rapid pace and exceptionally good study habits. As with most online courses, students need to be self-motivated and self-disciplined so that they can work on their own. Technology will be used to reinforce the relationships among the multiple representations of functions for confirming written work, facilitating experimentation, and assisting with interpretation of results. Students will work independently, attend weekly group sessions using web conferencing, and engage in group activities on campus. Evaluations will consist of online quizzes, special problems (Problems of the Week), proctored tests and quizzes, and a final exam. This course will prepare students to sit for the May 2018 administration of the Calculus BC Advanced Placement Exam.

Weekly Webinar
Wednesday at 8:30pm

Weekend at NCSSM (required)
WebEx, April 28, 2018 from 10:00am-2:00pm

Prerequisites or Suggested Skills
• Successful completion of MA416
• The ability to be an independent learner in a high-level mathematics course.
• Reliable home access to internet and e-mail.
• Regular and reliable access to a scanner, including ability to PDF documents.
• Possession and knowledge of using the TI-83/ TI-83 Plus, TI-84/TI-84 Plus, TI-89, or TI- Nspire calculators. The course is taught from the perspective of the TI-84 series of calculators.
This is the first half of a university-level course in multivariable calculus. This course includes the theory and application of vector functions and partial derivatives. Topics include basic operations with vectors and parametric curves in 2- and 3-space, the Frenet Frame and Frenet-Serret equations, continuity and differentiability of functions of several variables, gradients and directional derivatives, and classic optimization problems. Additional topics and projects will be added throughout the course to explore interesting applications of calculus and differential equations.

**Weekly Webinar**
Tuesday at 8:00pm

**Required Weekend Webinars**
Sunday, October 1st, 2017 and Sunday, November 12th, 2017

**Prerequisites or Suggested Skills**
Students must have successfully completed AP Calculus BC and earned a score of 4 or 5 on the AP Calculus BC Exam.
Honors Multivariable Calculus II with Applications (Multivariable Calculus) -MA486 (spring)

**PowerSchool Code- 28005X0**

Students will continue their study of multivariable calculus including multiple integrals, the Jacobian and change of variables, vector fields, line and surface integrals, divergence and curl. Significant time is devoted to the study of Green's Theorem, Stokes' Theorem and the Divergence Theorem. Students will be expected to use formal mathematical proof and to work on extended problem sets. Additional topics and projects will be added throughout the course to explore interesting applications of calculus and differential equations.

**Weekly Webinar**
Tuesday at 8:00pm

**Required Weekend Webinars**
Sunday, February 18th, 2018 and Sunday, April 8th, 2018

**Prerequisites or Suggested Skills**
Successful completion of MA484
PowerSchool Code- None.

This course is not available to dual enroll.
The purpose of the .5 credit seminar is to give students the chance to think creatively about both applied and pure mathematical problems. This is not a typical math class. In most math courses, the focus is on learning a prescribed set of mathematical skills and ideas. In this seminar, the focus will be on learning to use mathematics students already know to tackle interesting and challenging problems.

The first part of the seminar is about mathematical modeling. Students will work in groups to find and present solutions to interesting real-world problems. Along with this, they will learn about agent-based modeling and use the program NetLogo to explore these dynamic kinds of models. As part of the seminar, students will have the opportunity to compete in the High School Mathematical Contest in Modeling. The second part of the course is devoted to exploration of an open research question in pure mathematics. Students will work on a selected problem related to graphs or mathematical games that is interesting enough to challenge mathematicians but accessible enough for high school students. Students will learn to break down complex problems into simpler questions, make conjectures, and write simple proofs. This will give students a small taste of what it is like to do research in pure mathematics.

The seminar is intended for students who enjoy mathematics, enjoy working collaboratively, and are excited by the opportunity to think creatively about interesting mathematics problems.

Weekly Webinar
Tuesday at 7:00pm

Weekend at NCSSM
None

Prerequisites or Suggested Skills
Students must have completed AP Calculus BC and earned a 5 on the AP exam AND/OR have successfully complete MA484 and MA486.

http://www.ncssm.edu/for-educators/nc-public-schools
COMPUTATIONAL SCIENCE

The NCSSM Online program offers one specialized sequence or "track" of courses, designed to prepare students to work in a high performance computing research environment or research lab with a strong computational focus. This sequence is in the computational sciences, also known as "modeling and simulation" or "scientific computing." All of these courses are designed to help the student answer this question: "How are computing and mathematics used to solve interesting and complex problems in the sciences?" While the six courses can be seen as a progression from introductory to highly specialized, each course can be taken independently, as long as the specific pre-requisites have been satisfied. All six courses stress learning and being able to demonstrate confidence and competence in doing computational science. They end with the student doing a small research project or case study, either independently or in a small group. All six courses are heavily based on doing computational lab activities, and there is very little emphasis on traditional multiple-choice/fill in the blank types of assessments.

Honors Introduction to Computational Science- IE340 (fall)

**PowerSchool Code- 30205X0**

This is an honors level introductory course in the technologies, techniques, and tools of computational science. Computational science, not to be confused with "computer science," looks to answer this question: "How can computers and mathematics be used to study interesting problems in science and social science?" Computational science is sometimes known as "modeling and simulation," or "scientific computing," and looks to create and use mathematical models to study complicated and complex problems in all areas of study. Recommended for fall, junior year.

**Weekly Webinar**
Section 1: Tuesday at 8:30pm  
Section 2: Wednesday at 8:30pm

**Weekend at NCSSM (optional)**  
September 30, 2017

**Prerequisites or Suggested Skills**

No prerequisites. This is a computer-intensive course; there are no physical (wet) labs. This course uses a significant amount of specialized software, all of which is provided free of charge, either by NCSSM or by the creators of that software.

DISTANCE EDUCATION & EXTENDED PROGRAMS

[http://www.ncssm.edu/for-educators/nc-public-schools](http://www.ncssm.edu/for-educators/nc-public-schools)
Students must be able to install software on the computers used for these courses, sometimes on short notice! If using a school computer, students must ensure that the school will allow them to install specialized software on a school machine. There are no paper/pencil alternate activities. Students must ensure that a backup machine is available if their primary machine is not available.

**Honors Computational Biology—Bioinformatics—IE380 (spring)**

**PowerSchool Code- 30205X0**
Computational biology – known also as “bioinformatics” – is a hybrid, interdisciplinary course, and is one of the most important new fields of study in science. Computational biology isn’t a biology course per se – it’s the application of computing and mathematics (primarily statistics) to biological data. What biological data? Mostly genetics and genomics data, such as studies of DNA extracted from mice breeding experiments to predict the genetic basis of diseases such as cancer, high blood pressure, and obesity! Do well in this class, and there will be a multitude of opportunities open as an undergraduate researcher and beyond! Recommended for spring, junior year.

**Weekly Webinar**
Wednesday at 8:30pm

**Weekend at NCSSM (optional)**
February 10, 2018

**Prerequisites or Suggested Skills**
Students should have completed Biology or Genetics at the honors or AP level before enrolling in Bioinformatics. This course uses a significant amount of specialized software, all of which is provided free of charge, either by NCSSM or by the creators of that software. Students must be able to install software on the computers used for these courses, sometimes on short notice! If using a school computer, students must ensure that the school will allow them to install specialized software on a school machine. There are no paper/pencil alternate activities. Students must ensure that a backup machine is available if their primary machine is not available.
This course is designed to teach students the technologies, techniques, and tools of computational science. The course will benefit students who are interested in any area of study that uses chemistry (including subjects such as environmental science, medicine, biology, materials science, nanotechnology, etc.). This is essentially a course in quantum chemistry, and is one of the most challenging courses in the sequence. NCSSM is one of the only high schools in the country that teaches a formal course in computational chemistry. This course is typically offered at the upper undergraduate/graduate at most universities, and requires a strong chemistry background and at least 12 to 14 hours/week of dedicated time. Recommended for fall, senior year.

**Weekly Webinar**
Thursday at 8:30pm

**Weekend at NCSSM (optional)**
September 30, 2017

**Prerequisites or Suggested Skills**
Students should have at least one semester of chemistry, preferably at the honors/AP level. Students should have a reasonable mathematics background, preferably at the algebra level or higher. Ability to work in a computing environment is important in doing computational chemistry. Students will spend a considerable number of hours interacting with the computer in this course. This course uses a significant amount of specialized software, all of which is provided free of charge, either by NCSSM or by the creators of that software. Students must be able to install software on the computers used for these courses, sometimes on short notice! If using a school computer, students must ensure that the school will allow them to install specialized software on a school machine. There are no paper/pencil alternate activities. Students must ensure that a backup machine is available if their primary machine is not available.
Honors Computational Medicinal Chemistry- CH414 (spring)

**PowerSchool Code- 30205X0.**

Computational Medicinal Chemistry is the study of how new drugs are developed and tested. Students will learn the basic concepts and methods used by medicinal chemists. In the process of doing so, basic and advanced concepts in chemistry, biology, mathematics, and computing will be learned and applied to one or more medicinal chemistry problems. As such, this is an applied course: students will be expected to apply their knowledge of the basic sciences to medicinal chemistry challenges of increasing difficulty. This course makes significant use of computer modeling (computational chemistry). NCSSM is one of the only high schools in the country that teaches a formal course in medicinal chemistry. Like computational chemistry, this course is typically offered at the upper undergraduate/graduate level, requires a strong chemistry and biology background, and at least 12 to 14 hours/week of dedicated time. Recommended for spring, senior year.

**Weekly Webinar**  
Thursday at 8:30pm

**Weekend at NCSSM (optional)**  
February 10, 2018

**Prerequisites or Suggested Skills**  
Students should have at least one semester of chemistry, preferably at the honors/AP level. For example, successful students need a strong working background of chemical kinetics. Students should also have reasonable mathematics background, preferably at the algebra level or higher. A solid background in biology, particularly protein science, is recommended. Students will spend a considerable number of hours interacting with the computer in this course. This course uses a significant amount of specialized software, all of which is provided free of charge, either by NCSSM or by the creators of that software. Students must be able to install software on the computers used for these courses, sometimes on short notice! If using a school computer, students must ensure that the school will allow them to install specialized software on a school machine. There are no paper/pencil alternate activities. Students must ensure that a backup machine is available if their primary machine is not available.
Honors Computational Physics- PH412 (spring)

**PowerSchool Code- 30205X0**

Students will be introduced to basic methods of numerical analysis and will learn to write programs in the Python programming language to solve and analyze physics problems utilizing these methods. Data from cutting edge physics will be analyzed, including particle physics from CERN, gravitational waves from LIGO, and products of cosmic rays. Students will also create simulations of physics events both numerically and visually using VPython. This course is typically offered at the upper undergraduate/graduate at most universities, and requires a strong physics background and at least 12 to 14 hours/week of dedicated time.

**Weekly Webinar**
Thursday at 8:00pm

**Weekend at NCSSM (optional)**
March 10, 2018

**Prerequisites or Suggested Skills**
Honors or AP Physics, Pre-Calculus. It is recommended that students have either completed AP Calculus AB or take it concurrently with this course.

DISTANCE EDUCATION & EXTENDED PROGRAMS
http://www.ncssm.edu/for-educators/nc-public-schools
Honors Scientific Programming- CS308 (spring)

PowerSchool Code- 30205X0
This is an introductory course in computer programming with a specific focus on problems in science (chemistry, physics, and biology). Upon completion of this course, students will be able to develop small computer programs in several programming languages (Mathematica, R, Python, etc.) for a variety of scientific scenarios. This course builds on basic skills learned in Introduction to Computational Science, but completion of that course, while recommended, is not required. This course provides more in-depth development of skills in fundamental computer science.

Weekly Webinar
Tuesday at 8:30

Weekend at NCSSM (optional)
February 10, 2018

Prerequisites or Suggested Skills
There are no prerequisites for this course, but successful completion of Introduction to Computational Science is strongly recommended. This is a computer-only course, and there are not “wet” (physical) labs. Students should have strong computer literacy skills prior to entering this course, and should be very familiar and comfortable with the operating system (Windows, Mac OS X, and/or Linux) on the computer(s) being used by the student. This course uses a significant amount of specialized software, all of which is provided free of charge, either by NCSSM or by the creators of that software. Students must be able to install software on the computers used for these courses, sometimes on short notice! If using a school computer, students must ensure that the school will allow them to install specialized software on a school machine. There are no paper/pencil alternate activities. Students must ensure that a backup machine is available if their primary machine is not available.
SCIENCE
Honors Introduction to Systems Thinking: Modeling the Environment-IE410 (fall and spring)

PowerSchool Code- 30205X0
Climate change, pandemics, sustainable supply chains and networks, boom and bust in real estate - these all involve dynamics that challenge our ability to think through the consequences because they are part of complex systems with multiple moving parts. In this course students will learn how to build mathematical models to capture key interrelationships, and to use carefully designed simulations to reveal dynamic patterns. Students will use a variety of computational tools from spreadsheets to modeling software, applied to a broad range of environmental, sustainability and business problems. The course assumes no prior knowledge of these tools. Course materials are designed to step students through the mechanics of systems thinking and explore the consequences - often unexpected but usually very helpful - that system thinking models predict.

Weekly Webinar
Wednesday at 8:30pm

Weekend at NCSSM (required)
Fall: November 4, 2017
Spring: March 10, 2018

Prerequisites or Suggested Skills
Math III

DISTANCE EDUCATION & EXTENDED PROGRAMS
http://www.ncssm.edu/for-educators/nc-public-schools
As the human population grows over the next few decades, we will need to produce more food on agriculture’s existing footprint, saving land for biodiversity. This can be done by improving seeds and through better management of farms-- through technological innovation. Agricultural biotechnology is thriving globally, especially in the Research Triangle here in NC as new agriculture companies set up shop to employ and collaborate with our region's’ academic talent. In this course, students will examine how farms around the world are intensifying agriculture and promoting sustainability through plant breeding, transgenic plant and animal development, and soon, gene editing. They will learn about and build automated smart devices like weather stations, sensor motes, robots and drones using the Arduino platform. They will analyze agricultural data to help farmers make better decisions. And finally they will propose and prototype solutions that improve the practices of subsistence farmers and large scale growers around the world. This course meets North Carolina standards for Agriscience and Biotechnology IV: Agricultural Solutions.

Weekly Webinar
Tuesday at 8:00pm

Weekend at NCSSM (required)
March 10, 2018

Prerequisites or Suggested Skills
Students should have completed Molecular Genetics (BI360), Classical Genetics (BI358), or Agriscience and Biotechnology III: Agricultural Biotechnology.
Honors Classical Genetics - BI358 (fall and spring)

**PowerSchool Code- 30205X0**
This course begins with the fundamentals of cell division and focuses on modes of inheritance of traits, beginning with Mendel’s pea plants and stressing extensions and exceptions to Mendel’s principles. The course also covers topics in population genetics and molecular evolution. Problem-solving and critical thinking skills are emphasized. This course meets North Carolina standards for Agriscience and Biotechnology II: Agricultural Genetics.

**Weekly Webinar**
Monday at 8:00pm

**Weekend at NCSSM (required)**
Fall: September 30, 2017
Spring: February 10, 2018

**Prerequisites or Suggested Skills**
Students should have completed a high school biology course.

Honors Climate Change Biology - BI404 (spring)

**PowerSchool Code- 30205X0**
Climate Change Biology is the study of the impact of climate change on natural systems in the environment with emphasis on understanding the interactions between biological systems and the climate system. The goal of climate change biology is the development of management techniques designed to preserve natural systems. Students study past climate-biological systems interactions, currently observed changes, biological theory, and modeling in order to develop an understanding of possible mitigation and management approaches.

**Weekly Webinar**
Tuesday at 8:30pm

**Weekend at NCSSM (required)**
February 10, 2018

**Prerequisites or Suggested Skills**
Students should have studied biology and/or ecology at the high school level before taking this course. AP Environmental Science would be an excellent preparation but is not a formal prerequisite.

DISTANCE EDUCATION & EXTENDED PROGRAMS
[http://www.ncssm.edu/for-educators/nc-public-schools](http://www.ncssm.edu/for-educators/nc-public-schools)
PowerSchool Code- 30205X0

This course will introduce students to key topics in the field of global sustainability. Students will explore how human societies can endure in the face of global change, ecosystem degradation and global resource limitations. The course requires multidisciplinary study of topics linked by their importance to sustainability in the sciences (both natural and social), engineering, economics and will include policy and technical insight into systems and methods used to analyze and understand systems. Students will practice applying analytical skills, often in groups, through case studies, technical and popular science articles, systems thinking models, videos and interactive simulations and an engineering design project.

Weekly Webinar
Tuesday at 8:30pm

Weekend at NCSSM (required)
September 30, 2017

Prerequisites or Suggested Skills
None
As long as humans have existed on this planet, microbes have coexisted with us. They’ve lived in our bodies and thrived in the environment, posing a silent and constant threat. They’ve caused fevers and panic, helped with digestion and immunity. In this introductory course in human microbial disease, students explore the impact that various microbes have had in our lives, identify the characteristics of various pathogens and infectious agents, explain how diseases spread, and construct models, create presentations, and collaborate on projects related to epidemiology. Students learn the principles and methods of disease investigation: investigating patterns of illness in populations, identifying infectious microbes by visual assessment, mode of infection, and symptoms.

Weekly Webinar
Fall: Wednesday at 8:00pm
Spring: Monday at 7:00pm

Weekend at NCSSM (optional)
Fall: September 30, 2017
Spring: February 10, 2018

Prerequisites or Suggested Skills
Students should have at least one semester of biology, preferably at the honors/AP level. Additionally, completion of Math III is required. For example, successful students need a strong working background of basic statistics.

DISTANCE EDUCATION & EXTENDED PROGRAMS
http://www.ncssm.edu/for-educators/nc-public-schools
Forensic Science is an introduction to the analysis of crime scenes that explore the collecting and analyzing of physical evidence. This course is designed to integrate the core scientific disciplines (as outlined in the North Carolina Standard Course of Study for grades 9-12) while giving students both theory and hands-on experience with the skills and knowledge required of a forensic crime scene investigator. This multidisciplinary approach will highlight topics in pathology, DNA, anatomy, chemistry, anthropology, toxicology, entomology, and investigative techniques with supplemental subject matter through case studies, earth science, mathematics, medicine, technology and psychology. In addition, some of the ethical, legal, and social concerns surrounding forensics will be discussed. Process skills will include comparative analysis, critical thinking, deductive reasoning, observation, organization, problem solving, research, communication, and technical reading. Project-based learning through laboratory investigation and discussions/class lecture will serve as the main method of content delivery. Individually and/or in groups, students will perform lab work and apply inference and deductive reasoning to the investigation and potential solving of crimes.

**Weekly Webinar**
Fall and Spring: Monday at 8:00pm

**Weekend at NCSSM (optional)**
Fall: September 30, 2017
Spring: February 10, 2018

**Prerequisites or Suggested Skills**
This course requires the ability to write clear and concise lab and investigative reports. Good writing skills are imperative. This course also deals with graphic content. Parents are asked to sign a permission slip at the beginning of the course, but students are expected to be mature when dealing with this content.
PowerSchool Code- 35015X0

Earth Processes and Materials integrates geology with engineering, sustainability and environmental issues. Students will learn about Earth processes (plate tectonics, cycling of materials, landslides, flood hazards) as well as Earth materials (minerals, energy resources, mined resources). Students will use scientific process and core principles of geology, alongside skills such as data visualization and modeling as they tackle real-world problems. Projects will allow students to focus on scaling problems over time and analyzing numerous variables.

Key projects will focus on:

- applying soil properties to cite a real estate development
- building a system model of raw materials, energy and waste needed to manufacture consumer goods
- creating risk hazard maps for real locations in NC for hazards such as flooding or landslides
- interpreting geologic maps, data and cross sections in construction related geologic or engineering problems

Weekly Webinar
Thursday at 9:00pm

Weekend at NCSSM (required)
Students can choose from the following:
September 30, 2017
November 4, 2017

Prerequisites or Suggested Skills
None
Honors Introduction to Applied Chemistry and Engineering- IE402 (fall)

PowerSchool Code- 30205X0

This is a semester-long interdisciplinary course that focuses on the industrial practice of chemistry. It provides students with a real-world perspective thereby creating an awareness of the relevance of chemistry to their daily lives. For example, students will learn in a chronologically historical sequence about major developments in industrial chemistry, such as ammonia, aluminum, and nylon that have significantly affected people’s lives. Students will engage in individual and group online activities, as well as collaborative lab experiences on campus, such as developing soap or aspirin.

Weekly Webinar
Monday at 9:00pm

Weekends at NCSSM (required)
September 30, 2017

Prerequisites or Suggested Skills
Prior to taking this course, a student should have received at least a B in an Honors Chemistry course.

DISTANCE EDUCATION & EXTENDED PROGRAMS
http://www.ncssm.edu/for-educators/nc-public-schools
Honors Molecular Genetics- BI360 (fall and spring)

**PowerSchool Code- 30205X0**

This course focuses on DNA. Beginning with Watson and Crick’s double-helix model the course focuses on DNA structure, replication, transcription and translation. Current topics in DNA technology, gene cloning, and bioinformatics are discussed in terms of basic research, medical advancement, and for treatment of cancer & HIV. Critical thinking skills and thoughtful data interpretation are stressed. This course meets North Carolina standards for Agriscience and Biotechnology III: Agricultural Biotechnology.

**Weekly Webinar**
Monday at 8:00pm

**Weekend at NCSSM (required)**
Fall: November 4, 2017
Spring: March 10, 2018

**Prerequisites or Suggested Skills**
Students should have completed a high school biology course.

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Honors Nanotechnology and Research- CH430 (spring)

**PowerSchool Code- 30205X0**

This course provides a broad overview of nanotechnology, discussing the fundamental science of nanotechnology and its applications to medicine, energy and environment, defense and security, electronics, and materials. The course provides a background of the understanding, motivation, implementation, impact, future, and implications of nanotechnology. Towards the end of this course, students will participate in Nanotech Journal Club, an online forum that will help students gain practice reading primary scientific literature, writing scientific blogs, and asking analytical questions.

**Weekly Webinar**
Monday at 9:00pm

**Weekend at NCSSM (required)**
March 10, 2018

**Prerequisites or Suggested Skills**
Students should have completed a high school biology course.

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**DISTANCE EDUCATION & EXTENDED PROGRAMS**

[http://www.ncssm.edu/for-educators/nc-public-schools](http://www.ncssm.edu/for-educators/nc-public-schools)
Research Process- SEM100 (November 6- February 16)

**PowerSchool Code- None**

This seminar course is not available to dual enroll. This course builds skills for working on a research project in a business internship or university research setting. New students often enter a lab or summer internship with the scope of a research project already defined; this course focuses on the background knowledge and collaborative skills required to effectively contribute to research project in NCSSM’s Summer Research internship program or in the future as a college student. The three main components are 1) How Research Works and Connecting Your Curiosity to Research 2) Information Literacy and Professional Skills to Engage in Research 3) Summarizing Research Literature in an Area of Interest. Examples in science, humanities, and engineering are covered. This course does not require a student find a mentor or start a research project, does not focus on research methods/techniques, and does not require creating a research proposal.

**Weekly Webinar**
Thursday at 8:00pm

**Weekend at NCSSM**
None

**Prerequisites or Suggested Skills**
None
ENGINEERING & TECHNOLOGY
Honors Aerospace Engineering- EE364 (spring)

PowerSchool Code- 34055X0
This course introduces students to the field of aerospace engineering, engineering design, and the core math and science concepts needed to solve problems related to aerospace and other engineering disciplines. The course is presented in historical context with topics that include spatial reasoning, fluid statics and dynamics, thermodynamics, kinematics and the mechanics of flight. These principles are applied to the design and control of aircraft and spacecraft through small-scale physical design projects and computational modeling examples. Students have opportunities to experiment, calculate, compute, design and build as they explore and solve problems associated with the flight, and are encouraged to earn course credit through aerospace-themed projects of their own design.

Weekly Webinar
Tuesday at 8:30pm
Weekend at NCSSM (required)
February 10, 2018

Prerequisites or Suggested Skills
Completion of Math III or Integrated Math III with a B or higher. Students should be able to relate lengths of sides of a triangle to angles using trigonometry.
Honors Introduction to Computer Science Principles- CS400 (fall)

PowerSchool Code-30205X0

AP Computer Science Principles- CS408 (spring)

PowerSchool Code- 0A027X0
This two-course sequence is for creating educated and productive citizens who are able to thrive in a world where computing is changing how we live and think. Unlike traditional computer science courses, writing code is deemphasized in favor of innovation, impact, and an understanding of how computing is woven into the fabric of everything that we do. Topics include algorithms, networks, crowd-sourcing, internet form and function, and big data concepts such as genomic/person-specific medicine.

Weekly Webinar
Fall and Spring: Wednesday at 8:30pm

Weekend at NCSSM (required)
Fall: November 4, 2017
Spring: March 10, 2018

Prerequisites or Suggested Skills
B or better in Math II Honors, or an A in Math II.
Honors Biomedical Engineering- EE358 (fall and spring)

**PowerSchool Code**- 30205X0

How are electrical signals from the heart measured outside the body? Is there a way to design high-heel shoes that don’t hurt women’s feet? How do engineers design heart valves that only allow blood to flow one way? This course introduces students to the different sub-specialties of biomedical engineering including bioelectronics and instrumentation, biomaterials, biomechanics, and biochemical. Through homework sets, hands-on lab activities, research article review, and design projects the students explore and experience biomedical engineering principles, the engineering design process, and problem solving and troubleshooting.

**Weekly Webinar**

Fall: Tuesday at 8:00pm  
Spring (section 1): Tuesday at 8:00pm  
Spring (section 2): Monday at 7:00pm

**Weekend at NCSSM (required)**

Fall: November 4, 2017  
Spring (section 1): February 10, 2018  
Spring (section 2): February 10, 2018

**Prerequisites or Suggested Skills**

Math II
PowerSchool Code- 30205X0

This course introduces students to the study and practice of civil and environmental engineering and to math and science concepts needed to solve problems related to these and other engineering disciplines. Topics include engineering design, statics and strength of materials, hydrology, pollutant fate and transport, and environmental modeling. Activities include small-scale laboratory explorations, design projects inspired by the profession, field measurement, online data acquisition and computational modeling.

Weekly Webinar
Fall: Tuesday at 8:30pm
Spring: Tuesday at 7:00pm

Weekend at NCSSM (required)
Fall: November 4, 2017
Spring: March 10, 2018

Prerequisites or Suggested Skills
Completion of Math III or Integrated Math III with a B or higher. Students should be able to relate lengths of sides of a triangle to angles using trigonometry.
Ecocriticism: Literature & Humanism is a course focused on the study of literature and critical theory in examining and interpreting humanistic perspectives and problems in the environmental and ecological world. In thinking on humanistic perspectives, students explore different cross-cultural lenses through which the environment and human meaning can be understood. In focusing on humanistic problems, students address issues that have resulted in irresponsible interactions with the environment because of human interests that involve distinct political implications. Students further examine various cross-cultural manners in which the natural world can be understood and how this questions one’s own sense of identity and society, and contradictions of our own natural animal nature in reflection to otherness in nature. Students re-think problems of globalization and the environment in light of human consciousness and responsibility in regard to the self and other.

Weekly Webinar
Monday at 8:00pm

Weekend at NCSSM (optional)
February 10, 2018

Prerequisites or Suggested Skills
Students should have knowledge of American Literature, experience in writing essays, and background in literary study as well as a B+ or better in English 2.
Honors Introduction to International Relations- SS358 (fall)

PowerSchool Code- 48005X0

Introduction to International Relations presents theoretical approaches to categorizing and understanding how countries relate with each other. This course introduces students to the study of international political questions and issues such as: colonialism, nationalism, genocide, economics, capitalism, globalization, religion, race/ethnicity, identity politics, and cultural conflict and dynamics. This course offers students a conceptual toolbox for framing international interactions and analyzing their causes and consequences. The primary objective is for students to analyze historical and current international relations through contending theoretical perspectives.

Weekly Webinar
Tuesday at 7:00pm

Weekend at NCSSM (optional)
September 30, 2017

Prerequisites or Suggested Skills
None
Honors Introduction to Western Political Thought- SS350 (spring)

PowerSchool Code- 48005X0

Introduction to Political Thought introduces students to the study of political philosophy in exploring ideas and theories on the self/other and identity/existence in questioning one’s perspective of the world in relation to moral and ethical issues. Students further examine and interpret meanings on the self and other in relation to such ideas and problems as: East/West, culture, community, power, economics, gender, justice, the nation-state and nationalism, colonialism, and other dynamics. In addition to discussing varied historical political ideas, this course emphasizes the interpretation and discussion of these ideas in light of contemporary political debates. In this course, students read and analyze significant excerpts from philosophical texts in addition to related critical cultural theory.

Weekly Webinar
Tuesday at 7:00pm

Weekend at NCSSM (optional)
March 10, 2018

Prerequisites or Suggested Skills
Students should have completed 11th Grade English, and be self-motivated and active learners who like to develop their own interpretations.
**PowerSchool Code- 48005X0**

21st Century Media Studies is an interdisciplinary cultural studies course in which students examine and interpret the ways various modes of media influence us. Students study media theory, analyze cultural and historical contexts, aesthetics of a variety of formats, examine how forms have shifted, and investigate the relationship between media and reality, ways that media influences and changes our culture, and how responses to media change over time. The course considers a variety of critical approaches that include: cultural, psychoanalytic, feminist, and others. Through these approaches, students contemplate issues and problems considering such aspects as: technology, representations of reality, human meaning, identity politics, economics, self/other dynamics, gender/race/ethnicity, and community/belonging. This lens of analyses reverberates both within and outside of America.

**Weekly Webinar**
Monday at 8:00pm

**Weekend at NCSSM (optional)**
September 30, 2017

**Prerequisites or Suggested Skills**
Students should be self-motivated and active learners who like to develop their own interpretations.
STEM ENRICHMENTS FOR ELEMENTARY AND MIDDLE GRADES STUDENTS

How It Works

STEM Enrichment sessions enhance core instruction for Elementary and Middle school students as well as provides instruction for teachers in “hard to teach” concepts. Instruction is aligned with the competencies and objectives outlined nationally and by the state of North Carolina. NCSSM offers both live interactive programming and do-it-yourself lessons.

Live sessions are scheduled interactive opportunities that supplement classroom curriculum with hands-on activities. Schools must have either a Polycom or Tandberg hardware or videoconferencing software, camera and a microphone; or a computer, strong internet connection, a web camera, and microphone in order to schedule live videoconferencing sessions with NCSSM. NCSSM does not use Skype or Google Hangouts for enrichment sessions.

For more information on live and do-it-yourself enrichments, visit us at https://www.ncssm.edu/stemenrichments. To schedule live enrichments, contact Crystal Woods: woods@ncssm.edu or (919) 416-2643.

Enrichment Sessions

**M&M Counting Fun Grades K-1 Math**

Students will learn how to count and graph, and reinforce their knowledge of basic colors. The student counts up to 10 or more objects using verbal names and one-to-one correspondence, as well as uses sets of M&Ms to represent quantities given in verbal or written form.

**Balance & Motion Grades 1-2 Science**

Students will have a basic understanding of the concepts of gravity and symmetry by exploring balanced and unbalanced systems. They will also discover ways to manipulate the center of mass of an object.

**Sherlock Holmes Grades 3-4 Science**

The students will learn observation, memory, and critical thinking skills. Students will understand how useful observation and memory skills are in real life situations and the importance of written records. They will also talk about hard evidence that detectives use, fingerprint types, and see their own fingerprints.
Solid, Liquid, Gas Grade 3 Science
The students will learn about three different states of matter (solids, liquids and gasses) and the concept of mass. The hands-on activities involve bagging matter, saturating solutions and creating and observing a chemical overreaction.

Fractions & M&Ms Grades 3-5 Math
In this session, students will learn the concept of fractions, numerators, denominators, and ratios.

Simple Circuits Grade 4 Science
Students will construct parallel and series circuits and explain how each type of circuit works. Students will describe the qualities that define good and poor conductors of electricity and will list at least three of each type of conductor.

Magnetic Effects Grade 4 Science
Students will investigate how and why magnetic compasses work. They will observe the forces exerted by magnets on each other and by magnets on iron objects. Students will learn how magnetic forces get weaker with distance and how these forces can be exerted through non-magnetic substance. Students will build a simple electromagnet to see how electric can be used to make a magnet.

Forces & Motion Grade 5 Science
Students will have a basic understanding of force, inertia, friction, balanced forces, and unbalanced forces. They will build a vehicle that uses the force of air to move. After doing the activities in this video, students should have a basic understanding of force, inertia, friction, as well as balanced and unbalanced forces.

Artificial Heart Grade 5-9 Biomedical Engineering
The heart and circulatory system. Make an artificial heart out of everyday household materials

Prosthetic Engineers Grades 6-9 Engineering
Students will investigate biomedical engineering and the technology of prosthetics. Students create a model prosthetic lower leg using various materials. Each team demonstrates its prosthesis' strength and considers its pros and cons, giving insight into the characteristics and materials biomedical engineers consider in designing artificial limbs.

Force, Motion, & Air Resistance Grades 6-9 Science
Students will learn and understand the effects of gravity, force, motion, air resistance, and terminal speed on the acceleration of a falling object.

DISTANCE EDUCATION & EXTENDED PROGRAMS
http://www.ncssm.edu/for-educators/nc-public-schools
**Bits & Binary Grades 6-9 Science**
Students will understand binary number systems and how they apply to computers and digital technology. Students will write numbers and letters in binary code, decode binary numbers, and develop an understanding of and be able to select and use information and communications technologies. Students will be able to understand scientific inquiry and understand the abilities of technological design. Students will learn how information and communication systems allow information to be transferred from human to human, human to machine, and machine to human.

**Dice & Randomness Grade 7 Mathematics**
The students will enjoy a hands-on determination of mathematical “facts,” followed by a discussion of the theory behind it. Students use a die to “compare” short-term randomness for obtaining a certain number versus long-term probabilities. Students “discover” that they are more likely to roll a seven than an eleven when playing Monopoly, and then talk about the probability behind it.

**The Phone Bill Problem Grade 7-9 Mathematics**
Students will learn how to write an equation of a linear function when given a set of data. They will interpret the meaning of the slope and y-intercept and then use the equation to find other values of x and y. Students will be able to make sense of a set of data and plot it on a graph, find the equation of the line that contains the data points, understand the meaning of the slope and y-intercept, and use the equation to predict other x- and y-values.

**Engineering Catapults Grade 6-9 Engineering**
Students will learn about the engineering design process, the design of catapults, and apply technological design steps to build a catapult that uses allocated materials to launch an object.

**Box Problem Level 1 Grades 5-7 Mathematics**
Suppose you have a rectangular piece of cardboard that you want to use to make a box for storing marbles. You will make the box by cutting squares from the corners of the cardboard and then fold up the edges. The box will have no top. What size squares should you cut to make the box with the largest volume? Calculators will be needed for computation.
**Box Problem Level 2 Grades 8-9 Mathematics**
Suppose you have a rectangular piece of cardboard that you want to use to make a box for storing marbles. You will make the box by cutting squares from the corners of the cardboard and then fold up the edges. The box will have no top. What size squares should you cut to make the box with the largest volume? Students will investigate this problem using physical models, tables, and graphs. Students will be guided to define a variable representing the size of the square and to write a function for the box volume. Graphing TI-83+ calculators are required to create a table with more values and to graph the function.

**Box Problem Level 3 Grades 10-11 Mathematics**
Students build open top rectangular boxes from a standard sheet of paper by cutting congruent squares from each corner. Data is collected that pairs the length of the side of the cut out square with the volume of the resulting box to create a scatter plot. Students will be guided to define a variable representing the size of the square and to write a function for the box volume. Students learn to describe a clear pattern shown in the scatter plot, and develop a function through analysis of the box design. Based on this function, the length of the side of the square is determined to create a box of maximum volume, and two squares that will produce a box of equal volume. Students will investigate this problem using physical models, tables, and graphs. Graphing TI-83+ calculators are required to create a table with more values and to graph the function.

DISTANCE EDUCATION & EXTENDED PROGRAMS
http://www.ncssm.edu/for-educators/nc-public-schools
ACCELERATOR

About Accelerator

North Carolina School of Science and Mathematics’ Summer Accelerator program extends to a global audience our 30 years of experience offering innovative courses and opportunities to talented students. NCSSM is a constituent and flagship high-school of the University of North Carolina system.

Students are provided the understanding and tools to explore aerospace engineering by designing and launching their own rocket, or to solve crimes through the use of real-world forensic techniques. All Accelerator and Early Accelerator courses are designed to provide students from around the country and the world the opportunity to come together in diverse groups to live and learn together while gaining hands-on experience with intriguing topics in science, technology, engineering and math.

In Summer Accelerator courses, highly skilled faculty focus their talents on building upon the strengths of high-achieving students in advanced science and math topics in the classroom. Student Life Instructors offer a valuable resource and help provide a safe and enjoyable residential experience for students out of the classroom. NCSSM crafts unique high-level academic experiences in a setting designed specifically for younger students.

Admissions

Accelerator and Early Accelerator courses are for exceptional rising 7th through 12th graders. Any student who meets the requirements for the course for which they are applying may apply to that Summer Accelerator course. Applicants do not have to be residents of North Carolina. Students from all over the globe are encouraged to apply. There is no deadline for applications. Applications are accepted for each course until that course is full, at which time we begin a wait-list. You do have the chance to fill in a second choice in case your first choice is full. Applications for Summer 2017 will be accepted beginning December 1, 2016. Students who apply will be notified about their acceptance two to three weeks after they submit their application. Space in each course is limited, so participants are encouraged to apply early. Once accepted into the program, a non-refundable deposit of $250 is due within seven days to reserve a spot. Tuition is due in-full by April 1, 2017.
We award 80 students that are enrolled in NCSSM’s Online program with full tuition awards each summer. Online students who submit their application by March 1, 2017 will be notified of their acceptance by March 15, 2017.

For more information, and to apply, visit: http://www.ncssm.edu/accelerator

Schedule
Each Accelerator course consists of one week of on-site work on NCSSM’s campus. Accelerator courses for rising 10th, 11th and 12th graders are supplemented with two weeks of online work prior to their week onsite (see individual course descriptions for specifics of each class, as exact dates may vary). The online materials introduce, enrich and expand upon the face-to-face learning that happens on campus. This combination of learning experiences has proven successful at NCSSM for STEM education, and distinguishes the Accelerator program from most other programs currently offered for exceptional students. Early Accelerator courses for rising 7th, 8th, and 9th graders do not include the online portion and have an extended break in the afternoon.

Online Preparation (for Accelerator courses only)
Online content typically requires students to complete 15 hours of work during the two weeks before the on-campus portion of the course.
This time includes:
- Time for students to introduce themselves and share common interests (which can help build the cohort before they arrive on campus).
- Time for course readings.
- Time for interactive discussions.
- Time to view video content.
- Time to complete reflection questions.
- Time for inquiry and/or data collection.

Exact requirements vary by course. Some instructors require the group to virtually meet-up at a designated time during the week, while others have their students work entirely independently.

Requirements
We accept students who excel in the areas of science, technology, engineering and mathematics. We do not have a specific GPA requirement. The committee that reviews the applications looks at a number of factors to ensure they will be able to succeed in the rigorous course in which they are applying. Each course has different specific prerequisites, such as Math II or Biology. Please check the course listings for each course’s requirements. Every student is required to fill out the online application themselves in order to be considered for the program.
Evenings and Weekends
Students have the opportunity to choose from a variety of enrichment activities while in residence at NCSSM. These may include visits to local museums, information and demo sessions on cutting-edge technologies such as 3D printing and virtual reality, Durham Bulls baseball games, guest speakers, outdoor movie nights (often featuring films with content related to course concepts), trips to local restaurants, and organized and informal athletic events. We pride ourselves on offering a variety of activities from which to choose every evening and provide a structure where students are free to create their own schedule.

Financial Aid
Students whose families are eligible for the Supplemental Nutrition Assistance Program*, and whom live in Durham, Chapel Hill, Orange, Chatham or Wake counties may apply for financial aid for our summer programs. We will award aid to cover the full amount of tuition to at least nine eligible students in 2017. To apply for aid, please fill out the same application and indicate that you qualify by January 15th. We will review aid applications and make decisions by February 15th.

*This is not the same as the Federal Free and Reduced Lunch Program.
2017 Accelerator Courses

Online Courses

July 10 - 28, 2017

Explorations in Computational Health Sciences

Instructor Robert Gotwals

Computational science, not to be confused with “computer science”, looks to answer this question: “how can computers and mathematics be used to study interesting problems in science and social science?” Computational science is sometimes known as “modeling and simulation” or “scientific computing”, and looks to create and use mathematical models to study complicated and complex problems in all areas of study. This course introduces students to the technologies, techniques, and tools of computational science, and serves as a foundation for advanced work in epidemiology, bioinformatics, medicinal chemistry, data science, and scientific programming. (Computational and Health Services Concentrations)

All students in this course will be required to purchase and install Mathematica. You should be able to access a free 30 day trial.

Amount of work each week expected: approximately 20 hours a week

Times and dates of webinars: Monday, Tuesday, Wednesday, Thursday, Friday: 1:30pm - 3:00pm est.

Pre-reqs: Honors level biology course or above.

DISTANCE EDUCATION & EXTENDED PROGRAMS

http://www.ncssm.edu/for-educators/nc-public-schools
Anthropology: The Science of Being Human

**Instructor Candice Chambers**

Anthropology is the study of humans across time and space. In this course, students will explore the science of being human through the four primary subfields of anthropology: archaeology, physical, cultural, and linguistic anthropology. Students will learn to decipher the various components of our human nature and gain an understanding of the differences and similarities -- both biological and cultural -- in human populations. Topics covered will include diversity of human behavior and nonhuman behaviors, cultural origins, adaptations to the physical environment, language patterns and lineage, and interpretation of cultural material as a product of human activity. (this is part of the Human Health and Life Science Concentration for NCSSM Online Students)

**Amount of work each week expected:** approximately 20 hours each week. Students are expected to work asynchronously through lesson material and assessments with approximately four hours of work each day with deadlines to set the pace on Monday, Wednesday, Friday, and/or Sunday.

**Times and dates of webinars:** Monday, Wednesday, and Friday of each week; 1:00-2:00 pm est. (July 10, 12, 14, 17, 19, 21, 24, 26, 28)

**Pre-reqs:** Effective written and oral communication skills, strong reading comprehension skills

DISTANCE EDUCATION & EXTENDED PROGRAMS
http://www.ncssm.edu/for-educators/nc-public-schools
Durham Campus

**Early Accelerator Dates & Courses** (rising 7 - 9):

**June 11 - 16:** Digital Design | Life, the Cosmos, and Everything | Math Problem Solving | Robotics | Young Builders.

**June 18 - 23:** Digital Design | Engineering Explorations | Epidemiology | Young Builders

**July 9 - 14:** Ecological Research | Engineering for Young Women | Investigative Science | Math Problem Solving

**Accelerator Dates & Courses** (rising 10 - 12):

**June 12 - 23 online; June 25 - 30 on campus:** Advanced Cloning Lab | Epigenetics | Science Communicators | Math for Decision Making

**July 3 - 14 online; July 16 - 21 on campus:** Advanced Cloning Lab | Cryptography | Epigenetics | Mechatronics | Neuroscience

**July 10 - 21 online; July 23 - 28 on campus:** Cryptography | Food Science | Neuroscience | Rocketry

Brevard Campus

In 2017 we will offer the courses below on the campus of Brevard College. Brevard is located in the Western part of the State and the private school campus is not unlike our own in Durham. It houses the same number of students during the school year and is isolated in the hills of the Smoky Mountains. Courses and evening activities will utilize the surrounding natural resources as well as the Pisgah Astronomical Research Institute (PARI).

**Early Accelerator Dates & Courses** (rising 7 - 9):

June 25 - 30: Life, The Cosmos, and Everything: Big History | Investigative Science

**Accelerator Dates & Courses** (rising 10 - 12):


DISTANCE EDUCATION & EXTENDED PROGRAMS

[http://www.ncssm.edu/for-educators/nc-public-schools](http://www.ncssm.edu/for-educators/nc-public-schools)
QUICK LINKS

IVC Enrollment Forms: https://www.ncssm.edu/ivc-courses
NCSSM Online: http://online.ncssm.edu/
NCSSM Online Program—Application for Enrollment: http://www.ncssm.edu/online-program/academics/admissions
Accelerator: https://www.ncssm.edu/summer-programs/accelerator

Catalog updated: January 2017

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