



# HIGH SCHOOL **COURSE CATALOG** 2026-27

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# Your Future Starts Here!



Dear High School Student,

We are committed to your thriving future at Prince William County Public Schools (PWCS). This includes choosing a meaningful postsecondary path to pave the way for future study and employment. With a clear focus on your learning, we provide you with rich and engaging experiences to help you to make these decisions. New courses have been developed to provide you with opportunities to explore a variety of career areas. Options are available with the potential to earn college credits through increased Advanced Placement (AP), International Baccalaureate (IB), Cambridge, and dual enrollment (DE) offerings. We have created an environment where you will learn about your strengths, how these personal strengths connect with career opportunities, and what preparation is needed to successfully transition to the world beyond high school and **your vision for a thriving future**.

The 2026-27 High School Course Catalog provides you and your family members with information about available courses, support services, and serves as a resource to you throughout the school year. Use this tool to start meaningful conversations with your parents and guardians, siblings, and other trusted adults who walk alongside you during this journey.

Our PWCS school counselors, college and career counselors, teachers, and administrators will work with you to ensure your continued success in meeting graduation requirements and to be certain that your 2026-27 academic program meets your interests and needs. **Your thriving future starts here.** Embrace every opportunity presented to ensure that you will graduate on time with the knowledge, skills, and habits of mind necessary to create a thriving future for yourself and your community.

## Tools for Your Journey

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### Make the Most of Your High School Experience

Making the transition to high school is an exciting and challenging time for students and their families. There are many options to choose from and a number of requirements to meet. In Prince William County Public Schools, we believe that all students should have a rigorous educational experience based on curriculum that builds on what students have

learned at home, in our community, and at school. The high school experience is designed to prepare students for future employment, further study at the college and university level, and to be effective citizens in our local, national, and global community. It consists of high-quality diploma options, a wide choice of specialty programs, core required coursework, an array of elective offerings, and nontraditional options for earning credits. While academic programs form the core of our high school program, it is also important to take advantage of the many opportunities to participate in the rich extracurricular programs at all our high schools.

## Where Do I Start?

Select the **diploma type** you wish to earn. Students entering the 9th grade are strongly encouraged to consider the Advanced Studies Diploma option to maintain the greatest number of options as they progress through their high school career. School counseling services provide regular opportunities for families to evaluate student progress toward diploma requirements and to make adjustments to the type of diploma selected. All PWCS high schools provide diplomas and certificates to meet the needs of students with different interests and needs.

The purpose of this course description catalog is to describe in general terms the courses taught in Prince William County Public Schools high schools, grades 9-12. Students should study this course catalog and consult with their parent/guardian, school counselors, and teachers in planning their individual program of study. It is the responsibility of each student and his/her family to ensure that requirements for an Advanced Studies Diploma or a Standard Diploma are met. Graduation requirements are based on the year a student first enters 9th grade. School counselors can help with planning by reviewing test scores and records of past achievements and by discussing current interests and long-term goals. School counselors also have up-to-date information available about various training programs, schools, colleges, universities, and employment possibilities. School counselors review graduation requirements with students annually, and the school counseling staff at each school is available to assist you. Please work closely with your school counselor in making academic planning decisions.

## Academic Year

The state requires that the regular academic year is at least 180 days, divided into two semesters. Courses are generally one year in length, and students receive a final grade and one standard unit of credit at the end of the school year for each course successfully completed. Some courses; however, are individually designed for one semester only. A one-semester course receives one-half credit, upon successful completion.

## Course Selection

The course selection process in high school is a highly personal task and should be based on the student's aptitude and interests, teacher recommendations, and close collaboration among school, student, and parent/guardian.

Courses listed will be included in the curriculum for the 2025-26 school year if there is sufficient enrollment and available staff. Grade levels listed for courses indicate the grade(s) in which the course is normally taken. All students will be expected to maintain a full-day schedule of classes required to meet the minimum standards necessary for graduation and Virginia Board of Education regulations.

All courses described may not be offered at all schools due to staffing and/or enrollment limitations. School counselors will work very closely with students and parents/guardians to develop academic plans where appropriate substitutions can be made for courses not offered.

When selecting courses for the upcoming school year, students and parents/guardians should choose carefully. The courses selected should be based on the student's ability, past record of academic achievement, interest in the subject, career goal(s), and teacher recommendations. The pursuit of a course of studies leading to entrance into college may include those courses not directly related to college entrance. Visual and Performing Arts (dance, music, theatre, or visual arts) and Career and Technical Education courses offer students the opportunity to explore new areas of study as well as to gain knowledge and skills that may likely prove useful to them in whatever career they choose.

Through careful course selection and close cooperation between the student and the school counselor, a student will be able to pursue their chosen pathway and still have time for other course offerings without excluding any area of study.



This catalog includes a listing of courses taught in Prince William County Public Schools high schools. Not all courses are taught in every high school. Course offerings are contingent on sufficient student interest. This may result in some courses not being available in certain schools even though they are listed for those schools.

A student desiring to take a course offered at a school other than his/her assigned school should contact his/her school counselor for details.

## Driver Education

The classroom driver education course is offered as part of the 10th grade health education curriculum in all high schools. When students successfully complete the classroom phase and have secured a learner's permit, they then may take behind-the-wheel driver instruction. Behind-the-wheel driver instruction in Prince William County Public Schools is offered after school and during the summer. There is a fee for behind-the-wheel driver instruction.

## Placement/Promotion Procedure

Recommendations concerning instructional placement of students are the responsibility of the teacher and other professional staff directly involved with the students. The final decision concerning placement, however, rests with the principal. Promotion at the high school level is based on the following guidelines:

- Students who are promoted from grade 8 will be placed in grade 9.
- Students in high school progress toward graduation on a course-by-course basis. Students take courses based upon academic performance, academic needs, graduation requirements, and previous credits earned.
- Graduation requirements for students shall be those in effect at the time the student entered the 9th grade for the first time.

## Grade Placement

The requirements for membership in grades 9-12 are as follows:

- **9th Grade:** Successful completion of grade eight.
- **10th Grade:** Five units of credit, three of which must be in required courses.
- **11th Grade:** Eleven units of credit, six of which must be in required courses.
- **12th Grade:** Sixteen units of credit, nine of which must be in required courses.

To be classified as a 12th grader, a student must be in a program of studies which will enable the student to acquire the minimum number of standard units of credit and verified units of credit required for graduation by June of the senior year or by the end of summer school following the senior year. All alternative programs require the approval of the principal of the high school from which the student will graduate.

## Course Requirements

All students, regardless of the diploma type or specialty program selected, will have to complete a set of required classes in English language arts, history and social science, mathematics, physical education, science, and other subjects. The [Standard](#) and [Advanced Studies](#) Diploma Charts are designed to help students see what required courses must be completed for each diploma type. Some specialty programs offer courses which may be substituted for required classes. Students and their families need to work closely with their school counselor to explore their available course options.

## Specialty Programs

Specialty programs allow for career exploration, subject area concentration, and college/university preparation. Prince William County Public Schools provide excellent opportunities for students to explore a wide variety of special programs. These "specialty" programs give students the chance to investigate careers ranging from the various building trades to advanced computer science. Students participating in these programs can earn certifications, licenses, or other professional credentials in an area of study.

In addition to career exploration and concentrated study in fields of interest, all our high schools provide rigorous college preparation through the College Board's Advanced Placement (AP) courses, IB, Programme, or Cambridge

Programme (AICE). All three of these programs offer students the possibility of earning college credit for courses completed while in high school. There are also dual enrollment and College and Career Ready Virginia (CCRV) courses available to students in PWCS.

Families can explore the wide range of options available in their neighborhood high school program or consider one of the many options presented at our information nights held annually across the county. You can contact the counseling office of any high school for more information about programs of particular interest to you. Learn more about [PWCS specialty programs](#) to make the best choice.

### Electives

In addition to the core course requirements and specialty programs, all PWCS high schools offer elective course options which extend and enrich the curriculum, and challenge students. Students may choose these electives to customize their educational experience to meet their interests. Some examples are: advanced physical education, astronomy, fine and performing arts, geography, journalism, international relations, theatre, and many more. Speak with your school counselor to learn about the offerings available at your school.

### Why Should I Take Advanced Courses During High School?

#### College Admissions

- **Schedule Strength Matters:** Colleges want to see students challenge themselves to the best of their ability.
- **Preparation for College:** Many students find their college course work to be easier after taking a challenging high school curriculum.
- **Preparation for College Entrance Exams (i.e., SAT, ACT):** Challenging coursework prepares you to perform at high levels on these tests.

#### Challenge Yourself

- **Rigor is Best:** Most colleges want to see students take English, history and social science, math, science, and a world language each year of high school.
- **Lifelong Payoff:** Students who take rigorous courses during high school often do better in college and in turn are able to secure more stable employment.

#### Start a College Transcript

- **Dual Enrollment:** Students start a college transcript in high school when they take an approved dual enrollment course.
- **Head Start:** Students who take college courses, at low or no cost during high school, can save money on college tuition and are more likely to graduate college early or on time.

#### Balance is Best!

Students should make sure to leave plenty of time to participate in extracurricular activities both at school and in the community.

## Graduation Requirements and Your Diploma

The Virginia Board of Education sets forth requirements for students associated with the year the student entered 9th grade for the first time. Students will meet with their school counselor each year to update their Academic and Career Plan (ACP) and diploma type. Prince William County Public Schools Regulation 662-1B, "Graduation Requirements," states that a student must complete all requirements for graduation prior to participation in the graduation ceremony to include earning the required number of standard and verified credits based on the diploma type.

### Standard Diploma

**22 Standard Credits, 5 [Verified Credits](#):** Students who enter 9th grade in 2018-19 and beyond

	Course	Credits	Verified Credits	Notes
	English	4	2	Courses shall include English 9, 10, 11, and 12, or an advanced equivalent.

	Course	Credits	Verified Credits	Notes
<input type="checkbox"/>	Math	3	1	Courses shall include at least two different course selections from among Algebra 1, Geometry, Algebra Functions and Data Analysis, Algebra 2, or other mathematics courses approved by the board to satisfy this requirement. AP Computer Science A or IB Computer Science course credit earned by students may be considered a mathematics course credit.
<input type="checkbox"/>	Science	3	1	Courses completed to satisfy this requirement shall include course selection from at least two different Science disciplines: Earth Sciences, Biology, Chemistry, or Physics, or completion of the sequence of Science courses required for the International Baccalaureate Diploma and shall include interdisciplinary courses that incorporate Standards of Learning (SOL) content from multiple academic areas.
<input type="checkbox"/>	History and Social Science	3	1	Courses shall include U.S. and Virginia History, U.S. and Virginia Government, and one of the following: World History to 1500 and World History from 1500.
<input type="checkbox"/>	Health and Physical Education	2		<p>Courses shall include Health and Physical Education 1 and 2.</p> <p>Students who participate in the JROTC program have the option of an alternate health and physical education sequence.</p> <p><b>First Aid, CPR, and AED Training</b>            *Students will meet the First Aid, CPR, and AED Training requirement while enrolled in Health and Physical Education 1 in Prince William County Public Schools.</p>
<input type="checkbox"/>	Economics/ Personal Finance (Virtual course component included)	1		Students will meet the virtual course graduation requirement after taking and passing this or an approved equivalent course in Prince William County Public Schools.
<input type="checkbox"/>	Electives	6		<p>Students can satisfy the <a href="#">sequential elective</a> requirement with any two credits that demonstrate a progression in the study of a specific field (not two introductory courses) from any discipline.</p> <p>The two sequential electives may be in any discipline as long as the courses are not specifically required for graduation in 8VAC20-131-51 of the standards. Students may take the focused sequence of elective courses in consecutive years or any two years of high school.</p> <p>In addition to the two required sequential elective credits, students will need to satisfy the CTE/Visual and Performing Arts/World Language requirement by taking any of the following combinations:</p> <ul style="list-style-type: none"> <li>• One CTE credit and one Visual and Performing Arts credit.</li> <li>• One CTE credit and one World Language credit.</li> <li>• One Visual and Performing Arts credit and one World Language credit.</li> <li>• Two CTE credits.</li> <li>• Two Visual and Performing Arts credits.</li> </ul>
<input type="checkbox"/>	Other Requirements			<p><b>CTE Credentialing Exam:</b> Students must take and pass a Career and Technical Education credentialing exam that has been approved by the Virginia Board of Education</p> <p><b>Or</b></p> <p><b>Take one advanced course during their high school career.</b> An advanced course can be defined as any AP/Advanced, IB/Pre-IB, AICE/IGSCE course, or dual enrollment.</p> <p><b>Or</b></p> <p><b>Participate in a High-Quality Work-Based Learning experience</b> as defined by the Virginia Department of Education.</p>

## Advanced Studies Diploma

26 Standard Credits, 5 [Verified Credits](#): Students who enter 9th grade in 2018-19 and beyond

	Course	Credits	Verified Credits	Notes
<input type="checkbox"/>	English	4	2	Courses shall include English 9, 10, 11, and 12, or an advanced equivalent.
<input type="checkbox"/>	Math	4	1	Courses shall include at least three different course selections from among Algebra 1, Geometry, Algebra 2, or other mathematics courses above the level of Algebra 2. AP Computer Science A or IB Computer Science course credit earned by students may be considered a mathematics course credit.

	Course	Credits	Verified Credits	Notes
<input type="checkbox"/>	Science	4	1	Courses completed to satisfy this requirement shall include course selections from at least three different Science disciplines from among: Earth Sciences, Biology, Chemistry, or Physics or completion of the sequence of Science courses required for the International Baccalaureate Diploma and shall include interdisciplinary courses that incorporate Standards of Learning (SOL) content from multiple academic areas.
<input type="checkbox"/>	History and Social Science	4	1	Courses shall include U.S. and Virginia History, U.S. and Virginia Government, and both World History to 1500 and World History from 1500. World Geography may be accepted as one of the required World History courses for transfer students.
<input type="checkbox"/>	World Language	3 or 4		Students can satisfy the World Language requirement for the Advanced Diploma with either three years of one language or two years each of two languages.
<input type="checkbox"/>	Health and Physical Education	2		<p>Courses shall include Health and Physical Education 1 and 2.</p> <p>Students who participate in the JROTC program have the option of an alternate health and physical education sequence.</p> <p><b>First Aid, CPR, and AED Training</b>            *Students will meet the First Aid, CPR, and AED Training requirement while enrolled in Health and Physical Education 1 in Prince William County Public Schools.</p>
<input type="checkbox"/>	Economics/ Personal Finance (Virtual course component included)	1		Students will meet the virtual course graduation requirement after taking and passing this course or an approved equivalent course in Prince William County Public Schools.
<input type="checkbox"/>	Electives	3 or 4		<p>Students can satisfy the <a href="#">sequential elective</a> requirement with any two of the three required elective credits that demonstrate a progression in the study of a specific field (not two introductory courses) from any discipline.</p> <p>The two sequential electives may be in any discipline as long as the courses are not specifically required for graduation in 8VAC20-131-51 of the standards. Students may take the focused sequence of elective courses in consecutive years or any two years of high school.</p> <p>Students can satisfy the World Language requirement for the Advanced Diploma with either three years of one language or two years each of two languages.</p> <p>If using World Language courses to meet both the sequential elective requirement and the World Language graduation requirement for an Advanced Studies diploma, students would need a total of five credits in World Language; either five credits of the same language, or (if taking two different languages) two credits of one language and three credits of another language.</p>
<input type="checkbox"/>	Other Requirements			<p><b>CTE Credentialing Exam:</b> Students must take and pass a Career and Technical Education credentialing exam that has been approved by the Virginia Board of Education</p> <p><b>Or</b></p> <p><b>Take one advanced course during their high school career.</b> An advanced course can be defined as any <b>AP/Advanced, IB/Pre-IB, AICE/IGSCE</b> course, or <b>dual enrollment</b>.</p> <p><b>Or</b></p> <p><b>Participate in a High-Quality Work-Based Learning experience</b> as defined by the Virginia Department of Education.</p>

## Sequential Elective Information

### Graduation Information for Students with an Individualized Education Plan (IEP) or 504 Plan

Students with disabilities who have an IEP or 504 plan are encouraged to pursue the Advanced Studies or Standard Diploma. The IEP or 504 team will work with students and their families to determine the appropriate individual path to graduation for the student.

### Credit Accommodations

Students are eligible to pursue an Advanced Studies Diploma, Standard Diploma, or Applied Studies Diploma. Students may use credit accommodations to earn the Standard Diploma if they meet the following eligibility requirements:



1. The student has a current IEP or 504 plan with standards-based content goals;
2. The student has a disability that precludes him or her from achieving and progressing commensurate with grade level expectation, but is learning grade level content;
3. The student needs significant instructional supports to access grade level Standards of Learning (SOL) content and to show progress; and
4. Based on multiple objective measures of past performance, student might not be expected to achieve the required standard and verified units of credit within the standard time frame.

Credit accommodations shall be determined and documented by the student's IEP team or 504 plan committee, including the student where appropriate, at any point after the student's eighth grade year.

### **Applied Studies Diploma (For Students With An IEP)**

Students with disabilities who complete the requirements of their Individualized Education Program (IEP) and do not meet the requirements for other diplomas shall be awarded the Applied Studies Diploma.

### **Transition Services (For Students With An IEP)**

Realizing successful postsecondary outcomes is a goal PWCS has for all students. Depending on the severity of disability and the support services required in adult life, successful transition from high school to adult life may require that planning activities begin in elementary school with students exploring their interests in middle school. Starting the process early prepares students with disabilities to think about what they want to be able to do in adult life. High school transition planning includes exploring postsecondary opportunities and employment options and may include connecting with the adult service agencies that may provide the student with services.

### **Statement Of Needed Transition Services - Beginning No Later Than The First IEP Developed When The Eligible Student Is 14**

Recognizing the need for students with disabilities to engage in effective transition planning, the Individuals with Disabilities Education Act (IDEA) requires that transition planning be part of the Individualized Education Program (IEP). Beginning no later than the first IEP developed when the eligible student is 14, the Team considers the student's need for transition services and documents this discussion. If appropriate, the IEP includes a statement of needed transition services. Such documentation must be reviewed and updated annually thereafter. Students must be invited to all meetings and allowed to participate actively when transition planning is discussed and are encouraged to actively participate.

### **Linkages To Post School Options - Beginning No Later Than The First IEP Developed When The Eligible Student Is 14 And Update Annually**

Beginning no later than the first IEP developed when the eligible student is 14, the IEPs of students should include a post school vision statement as well as identify the transition services necessary to support the vision. IDEA defines transition services as a coordinated set of activities for a student with a disability that:

- A. Is designed to be within a results-oriented process, that is focused on improving the academic and functional achievement of the student with a disability to facilitate the student's movement from school to post-school activities, including postsecondary education, vocational education, integrated employment (including supported employment), continuing and adult education, adult services, independent living, or community participation;
- B. Is based on individual strengths, preferences and interest; and
- C. Includes instruction, related services, community experiences, the development of employment and other post-school adult living objectives, and when appropriate, acquisition of daily living skills and functional vocational evaluation. (P.L. 108-446, Sec 603 (34))

### **Transfer Students**

Students who transfer to Prince William County Public Schools from a public school system within the state of Virginia must meet all graduation requirements set forth by the Virginia Department of Education. Students who transfer to Prince William County Public Schools from a private or out-of-state school will work with their school counselor to make an individualized graduation plan that allows the student some flexibility in meeting graduation requirements as set forth by the Virginia Department of Education. Students who enroll during the school year after the first 20 hours of instruction will be required to meet the following verified unit of credit requirements for graduation:

Students entering 9th grade for the first time during 2018-19 and beyond, Standard or Advanced Studies Diploma.

Year Entering	Verified Credits Required
<input type="checkbox"/> Beginning of or during 9th grade	Student must obtain all five required verified units of credit
<input type="checkbox"/> Beginning of or during 10th grade	Student must obtain all five required verified units of credit
<input type="checkbox"/> Beginning of 11th grade	Student must obtain all five required verified units of credit
<input type="checkbox"/> During 11th grade	Student must obtain two verified units <ul style="list-style-type: none"> <li>• One in English</li> <li>• One student selected*</li> </ul> *One must be earned in mathematics if participation in mathematics testing is required by federal law.
<input type="checkbox"/> Beginning of 12th grade	Student must obtain two verified units <ul style="list-style-type: none"> <li>• One in English</li> <li>• One student selected*</li> </ul> *One must be earned in mathematics if participation in mathematics testing is required by federal law.
<input type="checkbox"/> During 12th grade	Student may apply for a waiver of verified units with the Virginia Board of Education.

Students transferring with weighted credits from other school districts will have those credits assessed and aligned with similar courses in PWCS. Students may also be granted additional flexibility in meeting some of the course requirements for graduation as outlined in the Virginia Standards of Accreditation. Any student or parent with questions about graduation requirements for transfer students should consult with their assigned school counselor. Students whose parents are active duty military may receive additional flexibility as outlined in the Interstate Compact on Educational Opportunity for Military Children. Information for transfer students is available in each school counseling office.

## Diploma Warranty

Prince William County Public Schools provides a two-year warranty for diploma recipients. The diploma warranty guarantees minimum competencies in mathematics, reading, and writing. Students receiving a diploma from Prince William County Public Schools:

- Understand, interpret, and analyze written material;
- Carry out oral and written directions or obtain clarification when necessary;
- Express ideas both orally and in writing, using appropriate vocabulary and proper grammar;
- Locate and obtain needed information from common reference materials, computerized databases, maps and diagrams, and resource people;
- Apply basic computation skills; and
- Use problem-solving strategies in the work environment.

Prince William County Public Schools graduates who are identified by employers as lacking one or more of these minimum competencies may be retrained through Prince William County Public Schools' Evening School program at no expense to the graduate.

## Diploma Seals

Students meeting specific requirements for graduation and demonstrating exemplary performance may receive diploma seals for recognition. Section 8VAC20-131-51 of the Standards of Accreditation establishes the requirements for diploma seals. The Virginia Department of Education provides the following seals to local school divisions.

### Board of Education Seal

The Board of Education Seal is awarded to students who complete the requirements for a Standard Diploma or Advanced Studies Diploma with an average grade of "A".

### Career and Technical Education Seal

The Board of Education's Career & Technical Education Seal is awarded to students who:

- Earn a Standard or Advanced Studies Diploma and complete a prescribed sequence of courses in a career and technical education concentration or specialization that they choose and maintain a "B" or better average in those courses
- Or pass an examination or an occupational competency assessment in a career and technical education concentration or specialization that confers certification or occupational competency credential from a recognized industry, trade or professional association
- Or acquire a professional license in that career and technical education field from the Commonwealth of Virginia.

The Board of Education shall approve all professional licenses and examinations used to satisfy these requirements. Visit [The Path to Industry Certification](#) for the current approved licenses and examinations.

### **Governor's Seal**

The Governor's Seal is awarded to students who complete the requirements for an Advanced Studies Diploma with an average grade of "B" or better, and successfully complete college-level coursework that will earn the student at least nine transferable college credits in Advanced Placement (AP), International Baccalaureate (IB), Cambridge, or dual enrollment courses.

### **Science, Technology, Engineering, and Mathematics (STEM) Seal**

The STEM Seal shall be awarded to students who earn either a Standard Diploma or an Advanced Studies Diploma and satisfy all math and science requirements for the Advanced Studies diploma with a "B" average or better in all course work, and successfully complete a 50 hour or more work-based learning opportunity in a STEM area, and satisfy all requirements for a Career and Technical Education concentration (a concentration is a coherent sequence of two or more state-approved courses as identified in the course listing within the CTE Program Area Guide), and pass one of the following:

- A Board of Education CTE STEM-H credential examination; or
- An examination approved by the Board that confers a college-level credit in a STEM field.

### **Seal for Excellence in Civics Education**

The Board of Education's Seal for Excellence in Civics Education is awarded to students who earn either a Standard Diploma or an Advanced Studies Diploma and meet each of the following criteria:

- Complete U.S. and Virginia History and U.S. and Virginia Government with a grade of "B" or higher; Complete Virginia & United States History and Virginia & United States Government courses with a grade of "B" or higher.
- Have good attendance and no disciplinary infractions as determined by local school board policies.
- Complete 50 hours of voluntary participation in community service or extracurricular activities, such as volunteering for a charitable or religious organization that provides services to the poor, sick or less fortunate; participating in Boy Scouts, Girl Scouts or similar youth organizations; participating in Junior Reserve Officers' Training Corps (JROTC); participating in political campaigns, government internships, Boys State, Girls State or Model General Assembly; or participating in school-sponsored extracurricular activities that have a civics focus. Any student who enlists in the United States military prior to graduation will be deemed to have met this community service requirement.

### **Seal for Excellence in Science and the Environment**

The Board of Education's Seal for Excellence in Science and the Environment is awarded to students who entered the 9th grade for the first time in the 2018-19 year and thereafter, and meet each of the following criteria:

- Earn either a Standard or Advanced Studies Diploma.
- Complete at least three different first-level board-approved laboratory science courses and at least one rigorous advanced-level or postsecondary-level laboratory science course, each with a grade of "B" or higher.
- Complete laboratory or field-science research and present that research in a formal, juried setting.
- Complete at least 50 hours of voluntary participation in community service or extracurricular activities that involve the application of science such as environmental monitoring, protection, management, or restoration.

## Seal of Biliteracy

The Board of Education's Seal of Biliteracy is awarded to students who earn a Board of Education-approved diploma and:

- Pass all required End-of-Course Assessments in English reading and writing at the proficient or higher level; and
- Demonstrate proficiency at the intermediate-mid level or higher in one or more languages other than English, as demonstrated through an assessment from a list to be approved by the Superintendent of Public Instruction. American Sign Language qualifies as a language other than English. Please visit the [Seal of Biliteracy](#) webpage for more information, including the list of assessment options for meeting the foreign language proficiency requirement.

## Expand Your Academic Vocabulary

### Advanced Placement, Cambridge AICE, IB Diploma, and Courses

Certain courses have been designated as AP, Cambridge (AICE), and IB courses. These courses are externally moderated and exceed the expectations of grade-level objectives for a specific subject. Students taking these courses will have a plus sign (+) beside the course title listed on the student report card and on the student transcript. These courses offer weighted credit.

### Career and Technical Education Industry Credentialing

A Career and Technical Education (CTE) credential is a Virginia Board of Education approved competency assessment or industry certification that validates a student's academic and technical knowledge and skills. CTE industry credentials may include occupational competency assessments, industry certification exams from a recognized industry, trade, or professional organization (e.g., CompTIA, ServSafe), stackable industry certifications and entry-level exams (e.g., Automotive Service Excellence, Microsoft Office Specialist), a State-Issued Professional License required for entry into a specific occupation (Licensed Practical Nurse (LPN), Cosmetology), and/or the Workplace Readiness Skills for the Commonwealth assessment, which is most valuable when given in addition to appropriate course specific credentials that demonstrate mastery of valuable CTE Skills. High school students who are enrolled in a second-, third-, or fourth-year CTE course in a state-approved sequence are eligible for the industry credential aligned with the content of the course. These credentialing opportunities are provided to all students enrolled in the course at no cost to the student or family. Students who earn a credential by passing a certification or licensure examination **may** earn verified credits to meet graduation requirements. Earning one or more CTE industry credentials may be required for graduation if the student has not successfully complete an Advanced Placement (AP), International Baccalaureate (IB), or Dual Enrollment (DE) course, or a High-Quality Work-Based Learning (HQWBL) experience.

### Dual Enrolled

Students taking courses from a community college, trade school program, college, or university for a credit, while simultaneously enrolled in Prince William County Public Schools are said to be dual enrolled. Agreements between the college and PWCS must be in place before courses being approved for dual enrolled credit.

### Elective

Electives are additional courses beyond the required courses that are needed to meet the total minimum standard units of credit for graduation.

### Visual and Performing Arts or Career and Technical Education

- Visual and Performing Arts courses include those courses which lead to student's aesthetic education in the areas of visual arts, theatre arts, music, dance, creative writing, journalistic writing, or speech. The course taken to satisfy the visual and performing arts requirement may also serve as one of the two courses required to satisfy the sequential electives requirement.
- Career and Technical Education courses focus on 21st-century career skills presented in a real-world setting. All courses listed under Career and Technical Education, except Economics and Personal Finance; and Office Specialist 1, 2, and 3; and Employ 1 and 2 courses listed under Special Education meet this graduation requirement. The course taken to satisfy the CTE requirement may also serve as one of the two courses required to satisfy the sequential elective requirement.

## First Aid, CPR, and AED Training

The requirements for the Standard and Advanced Diplomas shall include a requirement to be trained in emergency first aid, cardiopulmonary, resuscitation, and the use of automated external defibrillators, including hands-on practice of the skills necessary to perform cardiopulmonary resuscitation. PWCS students will be trained in these skills while enrolled in Health and Physical Education 1.

## Sequential Electives

According to the Virginia Department of Education's Standards of Quality, students who enter the 9th grade for the first time during the 2018-19 school year and beyond who are pursuing either the Standard or Advanced Studies Diploma must complete at least two sequential electives. Students who successfully complete any career and technical education sequence that consists of at least two 36-week courses or semester equivalents that equal two 36-week courses will fully meet this requirement. For students pursuing the Standard Diploma, Career and Technical Education, Visual and Performing Arts, or the World Language course credit may be used to partially satisfy the sequential elective requirement.

For students pursuing the Advanced Studies Diploma who enter the 9th grade during the 2018-19 school year and beyond, the Visual and Performing Arts or Career and Technical Education course credit may be used to partially satisfy the sequential elective requirement.

## Standards of Learning (SOL)

The Standards of Learning for Virginia Public Schools describe the Commonwealth's expectations for student learning and achievement in English, driver education, health and physical education, history and social science, mathematics, science, technology, visual and performing arts, and world language and for grades K-12.

## Standards of Learning Tests (SOL Tests)

SOL tests are End-of-Course (EOC) tests which are required by the Virginia Department of Education (VDOE) to verify attainment of knowledge and skills in specific English, math, science, and history and social science courses. A standard unit of credit is earned when a student passes the course, he/she is taking. If a student passes the SOL test but fails the course, the student does not retake the SOL test. The student must, however, repeat the course. If they pass the course but fail the SOL test for that course, the student may retake the SOL test until he/she passes it. Students passing a course may proceed to the next level of a course without having passed the SOL test in the previous level. If both the course and the SOL test are failed, both must be repeated.

## Standard Unit of Credit

A standard unit of credit for graduation is based on a minimum of 140 clock hours of instruction and successful completion of the requirements of the course. A semester course receives one-half credit.

## Verified Unit of Credit

A verified unit of credit for graduation is based on a minimum of 140 clock hours of instruction, successful completion of the requirements of the course, and achievement of a passing score on the End-of-Course (EOC) Standards of Learning (SOL) test or additional test for that course as approved by the Board of Education. A verified unit of credit is earned when:

1. The course is passed in which a Standards of Learning (SOL) test is administered; and
2. The end-of-course SOL test is passed.

The VDOE has authorized alternate pathways in history and social science. See the section below titled Locally Awarded Verified Unit of Credit for details.

Students must complete five verified units of credit for the Standard and Advanced Studies Diplomas. Students entering a Virginia public school during the 11th grade or at the beginning of the 12th grade have reduced SOL requirements.



## Locally Awarded Verified Unit of Credit

Students pursuing the Standard or Advanced Studies Diploma may earn one locally awarded verified unit of credit toward the five verified credits required to graduate. Students with an IEP or 504 plan who are eligible for credit accommodations may earn all verified units of credit through the local award process.

To be eligible to earn locally awarded verified credits in English, mathematics, science, or history/social science, a student must:

- Pass the high school course;
- Score within a 375-399 scale score range on any administration of the Standards of Learning test after taking the test at least twice; and
- Demonstrate achievement in the academic content through an appeal process administered at the local level.

For history and social science, the Virginia Department of Education (VDOE) allows the substitution of a portfolio of Inquiry Design Model (IDM) learning experiences for the SOL test. The portfolio of IDMs is reviewed by a committee to determine if requirements of the verified credit were met. If yes, the student earns a Locally Awarded Verified Unit of Credit for history and social science. This alternative option is the primary option for students in World History I, World History II, and VAUS History. VDOE requires that students earn verified credit in one of these courses. If a student does not pass the IDM portfolio by the start of 11th grade, students will work on the IDM and will be offered the SOL test as well. The awarding of this verified credit locally does not count against the limit of one for other courses or reasons.

## Weighted Credit

Weighted credit refers to grade point values assigned to:

- Advanced Placement courses
- Cambridge courses
- Certain career and technical education courses
- Designated prerequisite courses
- Dual enrollment courses
- IB courses
- Qualifying college courses

# Earning High School Credits and Grade Point Average

## Ways to Earn Credit

### Traditional Classroom

The vast majority of students experience Prince William County Public Schools through the traditional classroom environment where face-to-face collaboration leads to a deep construction of knowledge with our excellent teaching staff. The classroom environment provides the greatest potential for student interaction. It also creates the opportunity to form lifelong friendships with their classmates over an entire school year.

### Virtual Courses

Virtual courses provide students with greater flexibility regarding the time, pace, path, and place of their learning. Virtual courses are facilitated by teachers that leverage digital technologies as part of instructional design to help students build understanding and apply their learning in meaningful ways. Virtual courses use a learning management system (LMS) and a variety of digital tools and practices, including instructional content, rich-media, interactions (discussion boards, messaging, video communication, etc.), data and assessment systems, and feedback systems to receive timely and rich data used to guide learning tailored to individual student needs.

### Virtual Prince William

Prince William County Public Schools (PWCS) is a pioneer in online learning through our Virtual Prince William (VPW) program. VPW provides an online learning experience, with accelerated (semester-paced) courses taught by highly skilled and certified PWCS teachers. Virtual Prince William offers students the opportunity to take courses online for the completion of graduation requirements, to recover credits, and to balance academic and extracurricular

opportunities. These courses are delivered via Canvas, PWCS' learning management system, and coursework is completed outside school hours. Students and teachers communicate within the learning management system and via PWCS Office 365 email accounts.

VPW courses are both asynchronous and synchronous. Students are expected to be able to work independently and collaborate with their teachers and peers. Asynchronous instruction is designed for students to complete course work independently at a designated pace. While students have some flexibility to choose when they complete asynchronous tasks, they must adhere to course pacing and due dates.

Courses offered in any given school year are dependent on student enrollment and the availability of qualified and appropriately endorsed instructional staff. Students interested in VPW course options should see their school counselor or contact [Virtual Prince William](#).

For additional information, please visit the [Virtual Prince William website](#).

### Virtual Virginia

[Virtual Virginia](#), sponsored by the Virginia Department of Education, provides online courses to students across the commonwealth. Students have the opportunity to enroll in courses outside of their regular school day or take advantage of courses that are not currently available in their school.

Virtual Virginia courses utilize both asynchronous and synchronous approaches to instruction, through which students will work independently and collaborate with their teachers and peers. Asynchronous instruction is designed for students to complete course work independently at a designated pace. Examples of asynchronous instruction may include reading content, viewing media, completing assignments, taking a quiz/assessment, or working on a project. Students have flexibility to choose when they complete asynchronous tasks, but they must adhere to the course pacing and due dates.

An essential component of Virtual Virginia instruction is regular interaction between teachers and their students, including email and phone communications and synchronous instructional sessions via video web conferencing. Students can attend daily synchronous instructional sessions led by their teacher. Students will also have the opportunity for daily group and 1-to-1 instruction.

Virtual Virginia courses meet or exceed rigorous curriculum standards, including the Virginia Standards of Learning (SOL) and the College Board Audit Certification for Advanced Placement (AP) courses. All Virtual Virginia courses are staffed by highly qualified Virginia, licensed instructors with virtual office hours posted within the courses. These virtual office hours provide ample opportunities for students to contact their instructor(s) via telephone, using email, or communicating through a live web-based conferencing tool. In addition to the local mentor, students may access the services of the Virtual Virginia Help Desk for technical issues.

While some courses require tuition, students participating in the [Early College Scholars program](#) may have their AP course tuition covered by the Virginia Department of Education. Students who plan to take the AP exam are required to pay the AP exam fee.

**To learn more about Virtual Virginia opportunities, please visit your school counselor.**

### Evening School

A limited number of core and elective courses are available in the evenings during the fall and spring semesters. These are courses required for graduation. Course availability is subject to sufficient course requests. Courses are typically 15 weeks in length and taught by certified content teachers. In-person attendance is mandatory. See your school counselor for a registration form and further information about the Evening School program.

### Summer Programs

PWCS also offers select courses over the summer. Students may retake coursework if they failed the course in order to receive a passing grade. All students taking a summer school course that requires an end-of-course SOL test, must take the SOL test scheduled during summer school, unless the student has already passed the test.

## **Alternative Methods for Granting Standard Units of Credit**

In some instances, currently enrolled students find it necessary to look for other options to earn a standard unit of credit. Students seeking to earn high school credits from educational institutions outside Prince William County Public Schools or the Virtual Virginia program must request permission to take the course. Core, career and technical education or advanced placement courses already approved and offered by one of the Virginia Department of Education Approved Multidivisional Online Providers (MOP) or Virginia Council for Private Education (VCPE) providers need school level approval. Elective courses provided through an approved MOP or VCPE course or courses not available through an approved MOP or VCPE require additional levels of approval. See your school counselor for more information about alternative options for earning standard units of credit.

## **Regional Advanced Academic Schools**

### **The Governor's School @ Innovation Park - Virginia Regional Academic-Year Governor's School**

The Governor's School @ Innovation Park is a science, technology, engineering, and mathematics (STEM) initiative of three school divisions, Prince William County, Manassas City, and Manassas Park, in collaboration with George Mason University. The instructional design of the program integrates strands in biology, chemistry, and physics with mathematics, concepts of engineering and technology, and with laboratory research. Learning experiences focus on real-world research with mentorship opportunities in business, industry, government, and university settings. Rising juniors are eligible to apply for the program. Interested students can access the application online on [The Governor's School](#) website. *Students must have completed Algebra 2/Trigonometry and both Biology 1 and Chemistry 1 by the end of the 10th grade to apply and enter the Biology, Chemistry, or Physics threads. Students must have additionally completed Pre-Calculus and Physics in order to be qualified to enter the Engineering thread.*

### **Thomas Jefferson High School for Science and Technology - Virginia Regional Academic-Year Governor's School**

The Thomas Jefferson High School for Science and Technology accepts Prince William County Public Schools students into its four-year program through an application and testing process. Interested students should ask a designated middle school counselor for an information packet. *Students must complete Algebra 1 by the end of eighth grade, achieve a 3.5 GPA, be enrolled in extended level math and English classes to apply to Thomas Jefferson.* Additional information is available through the Thomas Jefferson Admissions Office at 571-423-3770 or on the [TJHS Admission webpage](#).

## **Nontraditional Education**

### **Independence Nontraditional School**

Independence Nontraditional School offers students in grades K-12 a comprehensive instructional program that merges leadership, career, and social skills necessary for success in the 21st century with existing Prince William County Public Schools curricula.

Students can expect a rigorous curriculum which promotes the development of academic resilience, social responsibility, and self-respect. The innovative education environment provides flexible learning opportunities to support student success. Day and evening programs are offered. Age-appropriate interventions that address effective and affective development, second language acquisition, and special needs are provided in an inclusive manner.

Students are recommended for placement by school administrators, parents/guardians, or the Student Hearings Department. A nontraditional education plan for each student designed collaboratively by Independence Nontraditional staff, parents/guardians, and the student ensures each student meets his/her educational and graduation goals. Multiple instructional options support seamless student transitions to additional academic, extracurricular, and service-learning opportunities.

### **Individual Student Alternative Education Plan**

The Individual Student Alternative Education Plan (ISAE) is a program offered through the Virginia Department of Education, which provides students between the ages of 16-17 years old who are at risk of dropping out of school, an opportunity to work toward a General Educational Development (GED) certificate while developing a vocational or career skill. Students must be referred to the program by the school counseling office, with the permission of the parents/guardians, and must meet the eligibility criteria to be admitted to the program. The ISAE will only be considered for students after all measures to maintain students in a traditional diploma program have been exhausted. Contact the school counseling office for more information regarding the program.

## Adult Education

The adult education program provides educational opportunities for adults, 18 and over, who wish to acquire competencies necessary for further education, employment, or personal enrichment. Classes are provided to residents in Prince William County, Manassas City and Manassas Park. Adult Education offers courses in English language acquisition, high school completion (which includes GED and the National External Diploma Program - NEDP), bridging, Microsoft Office Specialist, Entrepreneurship and Small Business, Guest Service Gold, Community Engagement, Customer Services and Sales, job readiness, and computer workshops. The Adult Learning Center is also a testing center and delivers over 140 tests through Pearson VUE.

## Grade Point Average

### Grade-Point Values

All courses taught for credit in Prince William County Public Schools are assigned grade-point values as follows:

Course Percentage	Letter Grade	Quality Points Standard Course	Grading Scale	Quality Points Weighted at .50	Quality Points Weighted at 1.0
90-100	A	4.0	3.5 - 4.0	4.5	5
87-89	B+	3.4	3.3 - 3.49	3.9	4.4
80-86	B	3.0	2.5 - 3.29	3.5	4.0
77-79	C+	2.4	2.3 - 2.49	2.9	3.4
70-76	C	2.0	1.5 - 2.29	2.5	3.0
67-69	D+	1.4	1.3 - 1.49	1.4	1.4
60-66	D	1.0	.50 - 1.29	1.0	1.0
0-59	F	0	0 - .49	0	0

High school course yearlong grades are calculated based on the Quality Point average for each of the semesters plus the final exam.

- Semester 1 – Quality Point average of 1st and 2nd quarters
- Semester 2 – Quality Point average of 3rd and 4th quarters
- Exam – Quality Point equivalent of exam
  - Yearlong grade - 22.5% for each quarter, 10% exam

Example-Standard Course:

Term	Course Percentage	Grade	Quality Points	
Quarter 1	78	C+	2.4	
Quarter 2	80	B	3.0	
Semester 1			5.4/2 = 2.7	Grade: B
Quarter 3	62	D	1.0	
Quarter 4	92	A	4.0	
Semester 2			5.0/2 = 2.5	Grade: B
Exam	67	D+	1.4	
Yearlong	2.4(.225) + 3.0(.225) + 1.0(.225) + 4.0(.225) + 1.4(.10) = 2.48			Grade: C+

Weighted grade points are used to encourage students to take more challenging course work with less risk to their report card grades. Students and their families should note that colleges and universities routinely remove weighted credits to better compare applicants' performance in rigorous courses across school divisions where weighting practices vary.

## Expunging a Grade for a High School Credit Taken in Middle School

When students successfully complete courses identified as 9th, 10th, 11th, or 12th grade courses prior to entering 9th grade, they will receive standard units of credit toward graduation. Such courses will be used in computing the student's high school GPA.

The Regulations Establishing Standards of Accrediting Public Schools in Virginia provide families with the option of requesting that grades be expunged from a student's transcript for any high school credit-bearing course taken in middle school. Requests to have a high school credit-bearing course grade removed from a student's transcript must be submitted using the form available in the counseling office or on the school division website to the appropriate principal before the deadline established by the school division. Families who elect to have a grade removed from the transcript should be aware that the decision to have the grade removed is binding and that no grade or associated credit will be awarded for the course once the request has been granted.

Learn more on the [Request to Expunge High School Courses Taken in Middle School](#) webpage.

## Schedule Changes

Students are encouraged to stretch and reach to take advanced levels of course offerings when possible. Should a student request to drop an advanced course, the following steps will be taken prior to approval:

- The teacher will talk with the student to determine why they wish to drop the course and ways in which a student may improve their performance in the class.
- The teacher will notify the parent(s) of the request to drop the course and discuss ways in which the student may improve their performance.
- The student's counselor will work with the student to identify supports that could be put into place (e.g., tutoring during flex, tutoring before/after school, etc.).
- The principal or designee will approve or deny the request.

Each high school sets their own schoolwide schedule change procedures and guidelines. Students must comply with the schedule change process established at their school. Should a student elect to change a class, the following rules will apply:

- Students who drop a year-long course before the end of the first quarter or before the end of the first four weeks for a semester-based course, shall not have the attempt recorded on their transcript.
- Students who drop a year-long course after the end of the first quarter or after the end of the first four weeks for semester-based course, shall receive no credit and a notation shall be made on the student's transcript indicating withdraw failing or withdraw passing.
- Students who drop a year-long course after the end of the first semester or after the end of the first quarter for semester-based courses, shall receive no credit and a failing grade for the course.
- The principal (or designee) may, in extenuating circumstances relating to a student's health or well-being, make an exception to the regulation governing the procedures for dropping a course.
- If a student moves from one level to another level of the same course, the grades earned in the initial course will transfer to the second course. This rule applies even in those cases where the student is moving from an advanced level course to a lower-level course within the same subject (e.g., Advanced English 9 to English 9).

# Earning College Credit While in High School

## Dual Enrollment Opportunities for Students

### What is Dual Enrollment?

Dual Enrollment is an enrichment opportunity that allows high school/home instruction students to earn college credits for courses taken through a sponsoring college/university while still being enrolled in high school. As a dual-enrolled student, you are enrolled in both high school (or home instructed) and the sponsoring college/university.

### Who Can Take a Dual Enrollment Course?

High school juniors and seniors, who meet all eligibility requirements established by the sponsoring college/university, are eligible to participate in the dual enrollment courses. Freshmen and sophomores may be granted exceptions on a case-by-case basis.



## Where Do I Take a Dual Enrollment Course and What is the Cost?

Dual enrollment courses through Northern Virginia Community College are taken in a PWCS school or virtually through the NOVA CCRV pathway. Eligible students earn college credit at no tuition cost; however, some courses may have fees required for textbooks or course materials. Students should contact their school counselor for more information about courses and fees that may be associated with Dual Enrollment. Each PWCS high school has a specific CCRV program pathway that aligns with its in person dual enrollment course offerings. Students must take in person classes at their high school if they are offered.

## I am Ready to Take a Dual Enrollment Course! How Do I Get Started?

Indicate your interest in dual enrollment when you meet with your school counselor to discuss course selection prior to the start of your junior year. Your school counselor will guide you through the next steps to include completing a PWCS Dual Enrollment application and the application for the sponsoring college/university.

## Methods for Earning College Credit While in High School

As described above, students may take dual enrollment courses as "contract dual enrollment" by attending their community college classes on PWCS high school campuses and receiving instruction from PWCS teachers who are authorized to teach dual enrollment courses by sponsoring college/university.

Students may also take "on campus" courses at a sponsoring college/university for dual enrollment credit for those courses identified in the division's annual list of published dual enrollment offerings.

Students wishing to take courses not included in the division's list of dual enrollment course offerings may take "college credit only" offerings with a sponsoring college/university.

In addition, students can earn college credit through no tuition cost CCRV opportunities available in partnership with NOVA.

In all cases, students must meet all eligibility requirements of the sponsoring college/university.

Students may also earn college credit by taking an Advanced Placement (AP), Cambridge (AICE), or International Baccalaureate (IB) course while in high school. Students receive college credit based on the score they receive on the external exam taken at the conclusion of the course or sequence of courses. Below, a summary of all the ways in which students may earn college credit in a PWCS school is provided.

## How Can My High School Course Work Earn Me College Credit?

Type of Course	How Students Earn College Credit
Advanced Placement (AP)	<ul style="list-style-type: none"><li>• Earned exam scores of 3, 4, or 5 may qualify students for 3 or more college credits per AP course.</li><li>• The awarding of college credit for courses taken in high school varies and students should research the specific school they wish to attend.</li></ul>
Cambridge (AICE)	<ul style="list-style-type: none"><li>• Earned exam grades of E or higher may qualify the student to earn college credit.</li><li>• Earned exam grades of A or B on A level exams may qualify students for up to 6 college credits per Cambridge course.</li><li>• The awarding of college credit for courses taken in high school varies and students should research the specific school they wish to attend.</li></ul>
International Baccalaureate (IB)	<ul style="list-style-type: none"><li>• Earned exam score of 4 or higher may qualify the student to earn college credit.</li><li>• Earned exam scores of 5, 6, or 7 may qualify students for up to 9 college credits per one IB course.</li><li>• The awarding of college credit for courses taken in high school varies and students should research the specific school they wish to attend.</li></ul>
Dual Enrollment	<ul style="list-style-type: none"><li>• Many earned credits with a "C" or better transfer to most four-year colleges</li><li>• Courses may fall within a specific subject area or may be considered an elective</li><li>• The awarding of college credit for courses taken in high school varies and students should research the specific school they wish to attend.</li></ul>

Learn more about [receiving college credit for passing AP, Cambridge, and IB exams](#) at a Virginia four-year college.

## Equal Opportunity Schools

Equal Opportunity Schools (EOS) is a PWCS initiative designed to increase all students' access and opportunity to participate in rigorous academic environments such as Advanced Placement, Cambridge, and International Baccalaureate courses. PWCS utilizes EOS to target students in grades 9-12. Once students are enrolled in these courses, the EOS data analysis, outreach, and academic support models are utilized to ensure students realize success. All students have access to Trusted Adults who are familiar with each student's profile.

## College and Career Ready Virginia Dual Enrollment

[College and Career Ready Virginia \(CCRV\)](#) is an initiative that expands access to dual enrollment courses for high school juniors and seniors. Eligible students earn college credits at no tuition cost\* through a partnership between Prince William County Public Schools (PWCS) and Northern Virginia Community College (NOVA).

### Benefits of CCRV

- **Get a jump-start on college** – 11th and 12th grade students can complete up to 32 college credits before they graduate from high school.
- **Save money** – tuition is no-cost to students and families.\*
- **Highly transferable** – NOVA has transfer agreements with all Virginia public colleges and universities.
  - \*There is no tuition cost for students and families for CCRV courses; however, some courses may have fees for required textbooks or course materials.

### Uniform Certificate of General Studies (UCGS)

- Earn 32 transferable college credits.
- Ideal for high school juniors to complete the equivalent of two college semesters of college general education requirements by the time they graduate from high school.
- Learn more about [UCGS](#).

### Passport Program

- Earn 15 transferable college credits.
- Ideal for high school seniors to get a jump-start on college general education requirements.
- Learn more about the [Passport Program](#).

### CCRV and High School Course Credit Information

These courses taken through CCRV provide both high school and college credit. Upon successful completion of a NOVA course, students will earn the corresponding high school credit. All dual enrollment courses count as weighted high school credits.

To learn more about the high school credit that will be earned upon successful completion of a NOVA course see the chart below.

NOVA Course	College Credits	High School Course	High School Credits
ENG 111 College Composition I	3	SOL English College Composition 11 DE	1 English credit
ENG 112 College Composition II	3	or English College Composition 12 DE	
ENG 255 World Literature	3	Survey of World Literature 12 DE	1 English credit
ART 100 Art Appreciation	3	Art Appreciation DE 100	1 elective credit
PSY 200 Principles of Psychology	3	Psychology I DE 200	1 elective credit

NOVA Course	College Credits	High School Course	High School Credits
ENV 121 General Environmental Science I	4	General Environmental Science I DE 121	0.5 elective credit
MTH 154 Quantitative Reasoning	3	Quantitative Reasoning DE 154	1 elective credit
MTH 161 Precalculus I	3	Precalculus I DE 161	0.5 elective credit
HIS 121 United States History to 1877	3	US & VA History DE	1 history and social science credit
HIS 122 United States History Since 1865	3		
ITE 152 Introduction to Digital and Information Literacy and Computer Applications	3	Computer Information Systems DE	1 elective credit

If you have questions or would like more information about CCRV, please speak with your counselor or [visit our website \(link to PWCS website\)](#).

## English Learners

English Learner (EL) students have the right to participate meaningfully and equally in educational programs Under Title VI of the Civil Rights Act of 1964 (Title VI) and the Equal Educational Opportunities Act of 1974 (EEOA). Student schedules provide equitable participation in advanced or accelerated courses and gifted and talented or special education services. English Language Development (ELD) services in the student's schedule should not inhibit EL participation in programs available to all students.

EL students are provided with English Language Development (ELD) instruction and access to core content classes and grade-level curricula. ELs are scheduled in ELD courses based on their English Language Proficiency (ELP) level and take the same required core courses as their non-EL peers, including electives and physical education.

EL students with identified disabilities require services under the Individuals with Disabilities Education Act (IDEA) or Section 504 of the Rehabilitation Act of 1973. They must be provided both the English Language Development services and disability-related services to which they are entitled under Federal law.

Questions about English Learner courses should be discussed with the student's EL case manager and their IEP case manager, as applicable.

# Set Yourself Up for Success

## PWCS Ready to Launch - Pacing for Success

- Students completing the courses and other graduation requirements outlined below will be "Ready to Launch" their thriving future by pursuing postsecondary education at institutions of their choice to include Northern Virginia Community College and four-year universities.
- Students can opt to take a standard level or advanced level (AP, Cambridge AICE, IB, DE) of any required course depending on the program available at their school.
- Students must complete all requirements for their chosen diploma to include earning verified units of credit for courses which have a Standard of Learning (SOL) test attached.
- Students are encouraged to research admission requirements for highly selective colleges and universities during their 9th grade year.

Subject	Grade 9	Grade 10	Grade 11	Grade 12
English	English 9	English 10	English 11	English 12
Math	Algebra 1 or higher	Geometry or higher	Algebra Functions and Data Analysis, Algebra 2, or higher	Algebra 2 or higher *Four years of math recommended for college-bound students (Algebra 2 or higher)
Science	Earth Science 1, Environmental Science, or Biology 1	Biology 1 or Chemistry 1	Chemistry 1 or Physics 1	Higher level science (AP, IB, etc.)
History and Social Science	World History 1	World History 2	U.S. and Virginia History	U.S. and Virginia Government
World Language	Level 1 or higher	Level 2 or higher	Level 3 or higher *Recommended for highly selective colleges	Higher level language (AP, IB etc.) *Recommended for highly selective colleges
Health and Physical Education	Health and Physical Education 1	Health and Physical Education 2		
Electives	Visual and Performing Arts or Career and Technical Education (1 credit)  Sequential Elective (2 credits - Standard Diploma Only) for students who enter 9th grade prior to 2018-19. Required for all students who enter the 9th grade in 2018-19 and beyond.  Other Electives (2 or more credits depending on diploma type)			
Additional Graduation Requirements	<ul style="list-style-type: none"> <li>• CTE Credentialing Exam or one Advanced Course or High-Quality Work-Based Learning experience, as established by VDOE Board guidance on work-based learning</li> <li>• Economics and Personal Finance</li> <li>• First Aid, CPR, and AED Training</li> <li>• Virtual Course</li> </ul>			

See your school counselor for more information about your high school course plan and your postsecondary education plans!

## Academic and Career Planning Tools

Academic and career planning is a process for all students to reflect on their interests, values, and future goals to formulate an evolving plan in support of their future goals and success as contributing citizens. This plan is revisited with each student every year. Additional information and resources are available on the [College and Career Readiness](#) website.

### Academic Career Plan Portfolio - ACPP (kindergarten through 5th grade)

The Academic and Career Plan Portfolio (ACPP) begins in the elementary school years. Students explore different occupations associated with career clusters based on selected areas aligning with personal interests, values such as

dependability & respect, and skills supporting decision making about future goals and interest. Learn more about [Virginia Education Wizard](#). Elementary students learn how to set goals and better understand their own interests and values. They complete career artifacts each year while exploring future career opportunities.

#### **Academic and Career Plan - ACP (6th through 12th grade)**

Middle and high school students each have a personal learning plan and course of study that aligns with the student's academic and career goals. Students utilize Naviance, a personalized platform that includes individual self-discovery assessments, goal setting, career and college planning, financial literacy, and academic course planning. Students access Naviance through the single sign-on, Clever, and their Office 365 credentials. Learn more at [PWCS Naviance](#).

#### **Student Vision Profile - (6th through 12th grade)**

The Student Vision Profile is a document that contains valuable information about planning for life after high school and making the most of their PWCS experience. The Student Vision Profile is designed to help both students and families engage in the postsecondary planning process. It is a useful guide to support student college and career readiness by including self-discovery, career exploration, and post-high school planning. Each year, your parent/guardian will receive a student vision profile that is customized with information about you and your interests. This document is an excellent tool for you to use to reflect on your after high school plan and to discuss your life choices with members of your family. Learn more at [Student Vision Profile](#).



# Career and Technical Education Industry-Recognized Credentials

## Career and Technical Education (CTE) Industry-Recognized Credentials

Industry-recognized credentials (IRCs) are valuable for high school students because they validate a students' knowledge and skills, making graduates more employable and competitive in the job market. They can also provide a head start on college, offer a clear path to specific careers, and increase earning potential.

**PWCS offers IRCs at no cost to the student or family.**

The chart below represents the IRCs currently aligned with CTE coursework. Credentials are subject to change based on the Virginia Department of Education approved credential list.

Course Name	PWCS Course Code	Industry Credentials
Accounting	632020	Workplace Readiness Skills for the Commonwealth Examination
Advanced Design, Multimedia, and Web Technology	663120	Adobe Certified Professional Examinations
Advanced Accounting	632166	Intuit Quickbooks Certified User (QBCU) Certification Test/ Intuit Bookkeeping Professional (TBD)
Advanced Computer Information Systems	661366	Microsoft Office Specialist (MOS) Examinations: Expert Level; Microsoft Office Specialist (MOS) Examinations: Associate Level
Advanced Cybersecurity Systems Technology	862930	A+ Certification Examination
Advanced Fashion Marketing	814566	Customer Service and Sales Certification Assessment (NRF)
Advanced Game Design and Development	840166	Unity Certified User Examinations
Advanced Programming	664166	IT Specialist Certifications
Air Force JROTC 2	791630	Workplace Readiness Skills for the Commonwealth Examination
Air Force JROTC 3	791830	JROTC Leadership and Employability Skills
Air Force JROTC 4	791930	Armed Services Vocational Aptitude Battery Examination
Architectural Drawing/Design/CAD	843720	Autodesk Certified User Examinations
Army JROTC 2	791632	Workplace Readiness Skills for the Commonwealth Examination
Army JROTC 3	791832	JROTC Leadership and Employability Skills
Army JROTC 4	791932	Armed Services Vocational Aptitude Battery Examination
Automotive Technology 2	850720	ASE Entry-Level Certification Tests
Automotive Technology 3	850820	ASE Entry-Level Certification Tests
Aviation Maintenance Technology 2	872930	Workplace Readiness Skills for the Commonwealth Examination
Building Trades 2	851620	Building Construction Occupations Assessment (NOCTI)
Business Law	613120	Workplace Readiness Skills for the Commonwealth Examination
Business Management	613520	Workplace Readiness Skills for the Commonwealth Examination
Cabinetmaking 2	860530	Workplace Readiness Skills for the Commonwealth Examination
Civil Engineering & Architecture (PLTW)	843066	PLTW End of Course (EOC) Assessment and Autodesk Certified User: Revit Architecture
Computer Information Systems	661220	Microsoft Office Specialist (MOS) Examinations: Associate Level
Computer Integrated Manufacturing (PLTW)	844220	PLTW End of Course (EOC) Assessment and Autodesk Certified User: Inventor
Computer Networking Hardware Operations 4	854520	Cisco Certified Networking Associate (CCNA) Examination
Cosmetology 2	874620	Virginia Cosmetology Examination
Criminal Justice 2	870330	Criminal Justice Assessment (NOCTI)
Culinary Arts 1	827520	ServSafe Food Protection Manager Certification

Course Name	PWCS Course Code	Industry Credentials
Culinary Arts 2	827620	ServSafe Food Protection Manager Certification
Cybersecurity Network Systems DE	863087	Security+ Certification Examination
Cybersecurity Operations	630420	Tech+ Certification Examination
Cybersecurity Systems Technology	862820	Tech+ Certification Examination
Design, Multimedia & Web Technology	663020	Adobe Certified Professional Examinations
Digital Electronics (PLTW)	844020	PLTW End of Course (EOC) Assessment
Early Childhood, Education, and Services 1	828520	ParaPro Assessment
Early Childhood, Education, and Services 2	828620	<b>TBD</b>
Economics and Personal Finance	612020	W!SE Financial Literacy Certification Test
Electricity 2	853420	Workplace Readiness Skills for the Commonwealth Examination
Emergency Medical Technician 2	833420	Emergency Medical Technician Examination
Engineering Analysis and Applications 2	845120	Pre-Engineering/Engineering Technology Assessment (NOCTI)
Engineering Drawing/Design/CAD	843620	Autodesk Certified User Examinations
Entrepreneurship	909320	Intuit Entrepreneurship and Small Business (ESB) Examination
Environmental Sustainability (PLTW)	891166	PLTW End of Course (EOC) Assessment
Fashion Marketing	814020	Workplace Readiness Skills for the Commonwealth Examination
Firefighting	870530	Firefighter I Certification Exam
Firefighting 2	870630	Firefighter II Certification Exam
Human Body Systems (PLTW)	838020	PLTW End of Course (EOC) Assessment
IB Business Management (SL)	613550	Workplace Readiness Skills for the Commonwealth Examination
IB Personal & Professional Skills (SL)	909852	Workplace Readiness Skills for the Commonwealth Examination
Intro to Engineering Design (PLTW)	843920	PLTW End of Course (EOC) Assessment
Introduction to Culinary Arts	825020	Workplace Readiness Skills for the Commonwealth Examination
Introduction to Early Childhood Education	823430	Workplace Readiness Skills for the Commonwealth Examination
IT Adv Database Design and Mgt PL/SQL DE	666285	Oracle Certified Foundations Associate Examinations
IT Web Technologies	663030	Adobe Certified Professional Examinations
IT Web Technologies DE	663088	Adobe Certified Professional Examinations
Landscaping 1	803620	Workplace Readiness Skills for the Commonwealth Examination
Landscaping 2	803920	Certified Turfgrass Professional
Marine Corps JROTC 2	791631	Workplace Readiness Skills for the Commonwealth Examination
Marine Corps JROTC 3	791831	JROTC Leadership and Employability Skills
Marine Corps JROTC 4	791931	Armed Services Vocational Aptitude Battery Examination
Marketing	812020	Workplace Readiness Skills for the Commonwealth Examination
Mechatronics 1 DE	855482	<b>TBD</b>
Mechatronics 2 DE	855582	<b>TBD</b>
Medical Coding and Billing 2	838920	Certified Billing and Coding Specialist (CBCS)
Medical Interventions (PLTW)	838120	PLTW End of Course (EOC) Assessment
Medical Terminology	838320	<b>TBD</b>
Navy JROTC 2	791633	Workplace Readiness Skills for the Commonwealth Examination
Navy JROTC 3	791833	JROTC Leadership and Employability Skills
Navy JROTC 4	791933	Armed Services Vocational Aptitude Battery Examination
Opportunities in Global Trade	813520	Workplace Readiness Skills for the Commonwealth Examination
Pharmacy Technician 2	830620	Examination for Certification of Pharmacy Technicians (ExCPT)

Course Name	PWCS Course Code	Industry Credentials
PLTW Capstone	844320	Workplace Readiness Skills for the Commonwealth Examination
Plumbing 2	855220	Workplace Readiness Skills for the Commonwealth Examination
Practical Nursing 2	835830	EKG Technician Certification (ETC) Examination
Principles of Biomedical Sciences (PLTW)	837920	PLTW End of Course (EOC) Assessment
Principles of Engineering (PLTW)	844166	PLTW End of Course (EOC) Assessment
Programming 1	664020	IC3 Digital Literacy Certification Examinations
Software Engineering Essentials (PLTW)	847320	PLTW End of Course (EOC) Assessment
Software Engineering (PLTW)	847066	PLTW End of Course (EOC) Assessment
Sports, Entertainment, and Event Management	817766	<b>TBD</b>
Sports, Entertainment, and Event Marketing	817520	Workplace Readiness Skills for the Commonwealth Examination
Sports Medicine 2	831720	<b>TBD</b>
Strategic Marketing	813066	Workplace Readiness Skills for the Commonwealth Examination
Television & Media Production 2	868920	Adobe Certified Professional Examinations
Travel and Tourism Marketing	813920	Workplace Readiness Skills for the Commonwealth Examination
Turfgrass Management	805120	Workplace Readiness Skills for the Commonwealth Examination
Video and Media Technology	849720	Workplace Readiness Skills for the Commonwealth Examination
Virginia Teachers for Tomorrow 1	906220	ParaPro Assessment
Virginia Teachers for Tomorrow 2	907220	Praxis Core Academic Skills for Educators Tests
Welding 1	867230	SENSE Training Program Certification Examination (Level 1, Entry-Level Welder)
Welding 2	867320	Flux Core Arc Welding (FCAW) Examination
Welding 3	867420	Gas Tungsten Arc Welding (GTAW) Examination

## Participating in Extracurricular Activities

### Eligibility to Participate

The following applies to interscholastic athletics, marching band, and drill team.

- A student must pass five subjects for new credit and earn a "C" or better in two subjects at the end of the first semester, and at the end of the school year to remain eligible for participation.
- The initial determination of eligibility at the beginning of a new semester is made on the first instructional day of the semester.
- Student assistant electives (e.g., lab assistants and office assistants) shall not be counted toward meeting the standards of eligibility.

### Eligibility for Students who Transfer to Another School for a Specialty Program

Students who are granted approval to transfer to a school outside their established attendance area for a Specialty Program shall be eligible to participate in Virginia High School League activities when entering the school as a first-time 9th-grade student, or as a 10th-grade student entering a specialty program for the first time. Any further transferring without a corresponding change of residence will result in a 365-day period of ineligibility.

Only the Superintendent of Schools (or designee) may grant a waiver to the VHSL transfer rule based on a decision made by the school division that requires the transfer of the student, but not for athletic and/or activity purposes. (VHSL Handbook.)

## Virginia High School League Participation

The Virginia High School League rules specify that in order to participate in high school athletics, drama, forensics, debate, scholastic bowl, and any academic or athletic activities involved in the competition between/among schools, a student must have passed five subjects for new credit during the preceding semester and must be enrolled in a minimum of five subjects for new credit during the current semester. In addition to meeting Virginia High School League regulations, students will be required to meet PWCS eligibility standards (requirement) each semester. End of the year grades from the previous school year will determine eligibility for the first semester of the next year.

## NCAA Eligibility

Students planning to participate in intercollegiate athletics at an NCAA Division I or Division II institution must have their academic and amateurism status certified by the NCAA Eligibility Center. The NCAA rules are complex, students and caregivers should ask school counselors for assistance. It is important to let the counselor know if a student plans to seek an athletic scholarship to ensure the course selection process matches NCAA requirements. It is also important to track grade point average as it impacts NCAA athletic scholarship opportunities. More detailed information is available on the [NCAA website](#).

# Realize Your Vision with The Student Vision Profile

## Student Vision Profile - High School



The Student Vision Profile is a document that contains valuable information about planning for life after high school and making the most of their PWCS experience. The Student Vision Profile is designed to help both students and families engage in the postsecondary planning process. It is a useful guide to support student college and career readiness by including self-discovery, career exploration, and post-high school planning. Each year, you and your parent/guardian will receive a student vision profile that is customized with information about you and your interests. This document is an excellent tool for you to use to reflect on your after high school plan and to discuss your life choices with members of your family. Learn more on the [PWCS Student Vision profile information page](#) and in this [course catalog](#).

# High School Programs

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## Career Pathways

Prince William County Public Schools (PWCS) offers a wide variety of rigorous and engaging Career and Technical Education (CTE) courses and programs designed to provide students with authentic, career-focused academic and technical instruction, leadership and networking opportunities, validate knowledge and skills with industry credentials recognized by postsecondary institutions and business/industry, and opportunities to engage in work-based learning (WBL) experiences.

CTE programs prepare students for a variety of high-wage, high-skill and high-demand careers with equitable access to multiple post-secondary options, including postsecondary education enrollment in a two- or four-year college or university, enlisting in military service, and / or gainful employment.

CTE courses and programs are organized by **career clusters** and **career pathways** to align with student interests and regional business and industry. High school students in PWCS can access CTE courses and programs in two ways:

1. **Career Pathways:** Career Pathways are suggested course sequences **available at base schools**. Students express interest during the course selection process and work with school counselors to enroll in elective courses.
2. **Specialty Programs:** Some CTE courses and programs are only available at select locations. All CTE programs are interest-based programs, but a Specialty Program **requires an application**. Students will either transfer to another school or will be transported to another school for one or more courses. Visit the [Specialty Programs](#) website to learn more about the application and timeline.

## Career Clusters

A career cluster is a **group of careers** that share similar features or common themes. CTE courses in PWCS offer students access to 16 career clusters.

## Career Pathways

A career pathway is a **coordinated sequence of high school courses** that leads to a postsecondary career pathway. Students select a program of study, or career pathway, based on academic and career interests. PWCS CTE career pathways also include opportunities to earn relevant industry credentials, which may provide students with increased employment opportunities and/or college credit.

**Note:** Career Pathways are designed to allow students to meet the sequential elective requirement for graduation as the first 2 courses in each career pathway are sequential. To find out which courses are available at your high school, click on the course name within the Career Pathway.

The courses listed in each career cluster and pathway may be available to multiple grade levels.

## Specialty Programs

Prince William County Public Schools (PWCS) is pleased to provide students a wide range of high school program opportunities which focus on career exploration, subject area concentration, and college/university preparation.

Specialty and Career and Technical Education (CTE) Programs provide students with opportunities to earn certifications, licenses, or other professional credentials in an area of study. Students can choose from programs tailored to their strengths and interests as they prepare for postsecondary experiences, whether they plan to enter the workforce directly, seek additional training, or enroll in a postsecondary institution.

Students may apply for the specialty program at their base high school, apply to transfer to another high school for a specialty program, or apply to participate in a transport program while remaining at their base school for their academic coursework.



[Learn about specialty program transportation.](#)

## Transfer Programs

Students living within the boundaries of the specialty program school may ride their regular bus to school. Students who reside outside the program school boundaries may utilize the network of express bus stops.

Students participating in Specialty Programs outside of their zoned school receive express bus stops. Out-of-boundary Specialty Program students are students who live outside the host school's boundaries but within the specialty school's boundaries.

Express bus stops will be established at express bus stops where six or more students have selected the stop. If your Specialty Program Coordinator has not contacted you by June regarding the express bus stops established for the following school year, you should contact the Specialty Program Coordinator.

Transportation requests, including the selection of a specific express stop, must be returned to the school with the specialty program application and again for every year the student is enrolled in the program.

Parents have the responsibility to provide transportation to and from express bus stops.

## Transport Programs

Students attend all core and non-program classes and activities at their base school. A PWCS bus transports students between their base school and their program school for all CTE program classes daily, returning in time to ride their regular bus home.

# Governor's School

## Governor's School @ Innovation Park

### Degree Type

Specialty Programs

### Governor's School @ Innovation Park Pathway

The Governor's School @ Innovation Park (GS@IP) provides an alternative learning environment in a university setting designed to meet the needs of academically talented and highly motivated learners. The STEM program provides a uniquely designed integrated science, math, engineering, and technology curriculum with real-world research and application opportunities. Students attending GS@IP will be engaged in multiple opportunities to develop their leadership skills and potential by applying their intellectual design based on research into action proposals. Students attending the partial-day program at The Governor's School will have the opportunity to continue being involved in the social and extracurricular activities offered by their base schools. By providing a dual enrollment program, The Governor's School @ Innovation Park enables college-bound students to be challenged with college-level content while earning both high school and college credits in science and math. Students will also be awarded opportunities to interact with science researchers and learn about possible career opportunities.

### Interdisciplinary Connectivity and Technology Integration

GS@IP faculty collaborates to integrate content knowledge and skills across disciplines. Students are challenged to understand and engage in the process of scientific investigation using state-of-the-art technology and to utilize their technical writing skills to present their findings.

## Program Sequencing

Governor's School @ Innovation Park elective courses may be used to satisfy Virginia's sequential elective requirement.

Additionally, elective courses offered through the Governor's School @ Innovation Park may be applied as the third laboratory science credit for students in the Biology and Chemistry strands, provided the student successfully completes the course in accordance with the Standards of Accreditation.

\*The sequence of Principles of Technology 1 (03153-I) and Principles of Technology 2 (03153-II) will satisfy one (1) standard unit of credit in laboratory science for physics and one (1) elective credit. Students who enroll in the Principles of Technology 1 and 2 sequence for a physics credit must have completed Algebra 1 and two (2) other laboratory science courses as specified by the Standards of Accreditation prior to enrolling in Principles of Technology 1. There are no SOL assessments associated with the Principles of Technology 1 and 2 sequence. School divisions will administer the End-of-Course Biology 1 SOL test when the student has completed the associated SOL content. The Earth Science 1 and Chemistry 1 SOL assessments will be administered when needed to meet verified credit diploma requirements.

**\*BOARD OF EDUCATION APPROVED COURSES TO SATISFY GRADUATION REQUIREMENTS FOR THE STANDARD AND ADVANCED STUDIES DIPLOMAS IN VIRGINIA PUBLIC SCHOOLS**

Subject	11th Grade	12th Grade
Math	GS Pre-Calculus GS Calculus 1 <b>OR</b> GS Calculus 1 GS Calculus 2	GS Calculus 1 GS Calculus 2 <b>OR</b> GS Multivariable Calculus GS Linear Algebra
Science	GS Biology 1 GS Biology 1 Lab GS Chemistry 1 GS Chemistry 1 Lab GS Physics 1 GS Physics 1 Lab	GS Biology 2 GS Biology 2 Lab GS Chemistry 2 GS Chemistry 2 Lab GS Physics 2 GS Physics 2 Lab
Technology/Engineering	GS Practicum in Engineering	GS Statics GS Thermodynamics
Research	Hands-on research in science area of interest	Hands-on research in science area of interest

**Program Type**

Transport

**Schools**

Governor's School @ Innovation Park

## Schedule For Students Enrolling in Pre-Calculus Junior Year

Semester	Strand	11th	12th
Fall	Math	MATH 105 (4 credits)	MATH 116 (3 credits)
	Science	CHEM 211 (4 credits) BIOL 103 (4 credits) PHYS 243 (4 credits) ENGR 107 (2 credits)	CHEM 104 (4 credits) BIOL 124 (4 credits) PHYS 160/161 (4 credits) ME 211 (3 credits)
Spring	Math	MATH 115 (3 credits)	MATH 215 (4 credits)
	Science	CHEM 212 (4 credits) BIOL 104 (4 credits) PHYS 245 (4 credits) ME 151 (2 credits)	CHEM 155 (4 credits) BIOL 246 (3 credits) PHYS 260/261 (4 credits) ME 212 or 221 or 231 (3 credits)

## Schedule For Students Enrolling In GS Calculus Fall/Spring Junior Year

Semester	Strand	11th	12th
Fall	Math	MATH 115 (4 credits)	MATH 215 (3 credits)
	Science	CHEM 211 (4 credits) BIOL 103 (4 credits) PHYS 243 (4 credits) ENGR 107 (2 credits)	CHEM 104 (4 credits) BIOL 124 (4 credits) PHYS 160 (4 credits) ME 211 (3 credits)
Spring	Math	MATH 116 (4 credits)	MATH 203 (3 credits)
	Science	CHEM 212 (4 credits) BIOL 104 (4 credits) PHYS 245 (4 credits) ME 151 (2 credits)	CHEM 155 (4 credits) BIOL 246 (4 credits) PHYS 260 (4 credits) ME 212/221/or 231 (3 credits)

## Governor's School and George Mason University Course Crosswalk

GS Course Names	George Mason University Dual Enrollment Option(s)	AP Exam Option	University Credit Transferability
GS Pre-Calculus	MATH 105	No	No
GS Calculus Fall and Spring	MATH 115 and MATH 116	Yes - Calculus BC	Likely - AP waiver equivalent course
GS Multivariable Calculus and Linear Algebra	MATH 215 and MATH 203	No	Likely - comparable course
GS General Biology 1/Lab	BIOL 103/ BIOL 105	Yes	Possible science elective
GS General Biology 2/Lab	BIOL 104/ BIOL 106	No	Possible science electives
GS Human Anatomy & Physiology	BIOL 124	Yes	Likely - AP waiver equivalent course
GS Microbiology/Lab	BIOL 245	No	Possible science electives
GS General Chemistry 1/Lab and GS General Chemistry 2/Lab	CHEM 211/ CHEM 212	Yes	Likely - AP waiver equivalent course
GS Introduction to Organic Chemistry/Lab	CHEM 104	No	Possible science electives
GS Environmental Chemistry/Lab	CHEM 155	No	Possible science electives
GS College Physics 1/Lab and GS College Physics 2/Lab	PHYS 243/ PHYS 244 and PHYS 245/ PHYS 246	Appropriate AP Physics Exam	Likely - AP waiver equivalent course, possible science elective for non-physics majors
GS University Physics 1/Lab and GS University Physics 2/Lab	PHYS 160/ PHYS 161 and PHYS 260/ PHYS 261	Physics C	Likely - University Physics
Engineering 1	ENGR 107 and ME 151	No	Likely - comparable course
Engineering 2	ME 211 and ME 212 or 221 or 231	No	Likely - comparable course
Junior Year Research	COS 120	No	Possible science elective
Senior Year Research	COS 120	No	Possible science elective

# Courses

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## The Governor's School @ Innovation Park Math

### GS Calculus 1

GS Calculus 1 is an analytic geometry and calculus-based course utilizing Advanced technologies which includes a study of functions, limits, derivatives, maximum and minimum problems, integrals, and transcendental functions. Each topic will be taught with a problem-solving approach emphasizing students' ability to analyze, model and solve real world problems.

**Credits** 0.5

High School credit

**Grades**

11, 12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

[GS Pre-Calculus](#)

**Notes**

GMU MATH 115 - 4 credits

### GS Calculus 2

GS Calculus 2 is an analytic geometry and calculus-based course utilizing Advanced technologies which includes a study of methods of integration, conic sections, parametric equations, infinite series, and power series. Each topic will be taught with a problem-solving approach emphasizing students' ability to analyze, model and solve real world problems. Students will be prepared to take the Advanced Placement Calculus BC exam at the end of this two-course sequence

**Credits** 0.5

High School credit

**Grades**

11, 12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

[GS Pre-Calculus](#)

**Notes**

GMU MATH 116 - 4 credits

### GS Linear Algebra

GS Linear Algebra focuses on the study of systems of linear equations, linear independence, linear transformations, inverse of a matrix, determinants, vector spaces, eigenvalues, eigenvectors, and orthogonalization.

**Credits** 0.5

High School credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

GS Calculus

**Notes**

GMU MATH 203 - 3 credits

### GS Multivariable Calculus

GS Multivariable Calculus follows GS Calculus and includes a study of vectors and vector-valued functions, partial differentiation, multiple integrals, line integrals, surface integrals, and transformation of coordinates.

**Credits** 0.5

High School credit

**Grades**

11, 12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

GS Calculus

**Notes**

GMU MATH 215 - 3 credits

## GS Pre-Calculus

GS Pre-Calculus is a pre-calculus mathematics course utilizing Advanced technologies designed to support the science program and provide a thorough preparation for calculus and other Advanced mathematics courses. The course will include college Algebra and trigonometry with an emphasis on vectors and a comprehensive introduction to calculus.

**Credits** 0.5

High School credit

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

[Algebra 2](#) or [Trigonometry](#)

**Notes**

GMU MATH 105 - 4 credits

## GS Statistics

GS Statistics is an elementary introduction to statistics with applications to all fields of study. Topics include data analysis for one and two variables, probability, estimation and hypothesis testing for proportions and means, correlation, and regression.

**Credits** 0.5

**Length**

Semester

High School Credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

[GS Calculus 1](#)

**Notes**

GMU STAT 250 - 3 credits

## The Governor's School @ Innovation Park Science

### GS Anatomy and Physiology

This course is an introduction to the structure and function of the body's major organ systems. The course will cover basic principles of biology and chemistry required to understand physiology. Students will study the chemical, cellular and tissue levels of organization in the human body and begin a survey of organ systems with a study of the structure and function of the integumentary, skeletal, muscular and nervous systems. Laboratory exercises are designed to reinforce lecture material by providing opportunities for both observation and manipulation of anatomical structures and experiments in physiological principles.

**Credits** 0.5

High School credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Biology 103 and Biology 104

**Notes**

GMU BIOLOGY 124 and LAB - 4 credits

## GS Bioengineering

Surveys the field of bioengineering and the global impact of technology innovation in solving problems in biology and medicine with an emphasis on engineering tools and concepts. Introduces mathematical modeling and analysis of bioengineering problems through the use of standard software packages for simulation. Discusses the history, ethical/social implications, and career paths in Bioengineering. CDS-130 is an introductory course in how to think computationally. Thinking computationally is a problem solving methodology where computational tools (e.g., MATLAB) are used to solve scientific problems. Thinking computationally approaches problem solving by first developing a theoretical model to represent what is happening in a natural event and then converting that model into a computer simulation to solve the problem being investigated.

**Credits** 0.5

High School credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

None

**Notes**

GMU BENG 101 - 3 credits

## GS College Physics 1

This is a two-semester basic physics course with emphasis on topics of classical and modern physics of particular importance to science majors. Principles of mechanics, heat, electricity, magnetism, optics, and atomic and nuclear physics are discussed.

**Credits** 0.5

High School credit

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

[Algebra 2](#) or [Trigonometry](#); **and** a grade of C or better in Chemistry

**Notes**

GMU PHYS 243 and LAB 244 - 4 credits

## GS College Physics 1 Lab

Enrollment in this lab requires concurrent enrollment in GS College Physics 1.

**Credits** 0.5

High School credit

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

[Algebra 2](#) or [Trigonometry](#); **and** a grade of C or better in Chemistry

**Notes**

GMU PHYS 243 and LAB 244 - 4 credits

## GS College Physics 2

Successful completion of PHYS 243 with a C or better is prerequisite to PHYS 245. Two-semester basic physics course with emphasis on topics of classical and modern physics of particular importance to science majors.

Principles of mechanics, heat, electricity, magnetism, optics, and atomic and nuclear physics are discussed.

**Credits** 0.5

High School credit each

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

[Algebra 2](#) or [Trigonometry](#); **and** a grade of C or better in Chemistry

**Notes**

GMU PHYS 245 and LAB 246 - 4 credits

## GS College Physics 2 Lab

Enrollment in this lab requires concurrent enrollment in GS College Physics 2.

**Credits** 0.5

High School credit

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

[Advanced Algebra 2](#)

A grade of C or better in Chemistry

**Notes**

GMU PHYS 245 and LAB 246 - 4 credits

## GS Computer Science 1

Utilizing JAVA programming language, focuses on problem solving, testing, and debugging; and introduces object-oriented programming. Topics include classes, inheritance, packages, collections, exceptions, and polymorphism. Examples in the course may include the use of basic data structures.

**Credits** 0.5

High School credit

**Grades**

11, 12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

None

**Notes**

GMU CS 112 - 4 credits

## GS Computer Science 2

Introduces the use of computer programming as a problem-solving tool. Topics in procedural programming include expressions, control structures, simple data types, input/output, graphical interfaces, testing, debugging, and programming environments.

**Credits** 0.5

High School credit

**Grades**

11, 12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in CS 112

**Notes**

GMU CS 211 - 4 credits

## GS Computing for Scientists

CDS-130 is an introductory course in how to think computationally. Thinking computationally is a problem solving methodology where computational tools (e.g., MATLAB) are used to solve scientific problems. Thinking computationally approaches problem solving by first developing a theoretical model to represent what is happening in a natural event and then converting that model into a computer simulation to solve the problem being investigated.

**Credits** 0.5

High School credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

None

**Notes**

GMU CDS 130 - 3 credits



## GS Environmental Chemistry

This course in modern chemistry is an introduction to major topics of environmental chemistry. Topics include atmospheric chemistry and air pollution, energy and climate change, water chemistry and water pollution, and select topics on toxic organic compounds. The laboratory component focuses on water chemistry yet includes atmospheric chemistry and analytical chemistry topics.

**Credits** 0.5

High School credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Chemistry 211 and Chemistry 212

**Notes**

GMU CHEM 155 and LAB - 3 credits

## GS Environmental Chemistry Lab

Enrollment in this lab requires concurrent enrollment in GS Environmental Chemistry.

**Credits** 0.5

High School credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Chemistry 211 and Chemistry 212

**Notes**

GMU CHEM 155 and LAB - 3 credits

## GS General Biology 1

Introductory Biology 1 is a focused survey course with objectives centered on the chemistry of life; cells and molecular structure; cell functions; enzymes and their roles and functions; genetics and DNA; and diversity of life and evolution.

**Credits** 0.5

High School credit

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Advanced **or** Honors Biology

**Notes**

GMU BIOLOGY 103 and LAB 105 - 4 credits

## GS General Biology 1 Lab

Enrollment in this lab requires concurrent enrollment in GS General Biology 1.

**Credits** 0.5

High School credit

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Advanced **or** Honors Biology

**Notes**

GMU BIOLOGY 103 and LAB 105 - 4 credits

## GS General Biology 2

Topics in this course include animal (including human) structure, function, homeostatic mechanisms, organ systems, behavior, higher plant systems, and major concepts in ecology.

**Credits** 0.5

High School credit

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Biology 103 and Lab 105

**Notes**

GMU BIOLOGY 104 and LAB 106 - 4 credits

## GS General Biology 2 Lab

Enrollment in this lab requires concurrent enrollment in GS General Biology 2.

**Credits** 0.5

High School credit

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Biology 103 and Lab 105

**Notes**

GMU BIOLOGY 104 and LAB 106 - 4 credits

## GS General Chemistry 1

This course offers basic facts and principles of chemistry, including atomic and molecular structure, gas laws, kinetics, equilibrium, electrochemistry, nuclear chemistry, and properties and uses of the more important elements and their compounds.

**Credits** 0.5

High School credit

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Advanced **or** Honors Chemistry

**Notes**

GMU CHEM 211 and LAB - 4 credits

## GS General Chemistry 1 Lab

Enrollment in this lab requires concurrent enrollment in GS General Chemistry 1.

**Credits** 0.5

High School credit

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Advanced **or** Honors Chemistry

**Notes**

GMU CHEM 211 and LAB - 4 credits

## GS General Chemistry 2

This is a focused survey course with objectives that include physical and chemical changes and properties; interactions of matter; structures of atoms; and intermolecular forces.

**Credits** 0.5

High School credit

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Chemistry 211

**Notes**

GMU CHEM 212 and LAB - 4 credits

## GS General Chemistry 2 Lab

Enrollment in this lab requires concurrent enrollment in GS General Chemistry 2.

**Credits** 0.5

High School credit

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Chemistry 211

**Notes**

GMU CHEM 212 and LAB - 4 credits

## GS Geomatics

Introduces topographic surveying and engineering drawing for civil engineering applications. Topics include surveying, GPS, GIS, digital terrain modeling, design of horizontal and vertical curve geometry for road applications, engineering drawing concepts, and drawing with CAD-based software. Field work required on selected topics.

**Credits** 0.5

High School credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

None

**Notes**

GMU CEIE 203 - 3 credits

## GS Innovations (Non-Mason Equivalent)

As a result of the "Innovations" course, students will have gained an understanding of how to identify problems/issues that are global in nature, develop a thorough understanding of the nature of the problem/issue through research, design creative and innovative solutions to the problem/issue, evaluate the solutions to the problem/issue using cost and value optimization scales, and implement the solution to the problem/issue using marketing strategies.

**Credits** 0.5

High School credit

**Grades**

11, 12

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

None

**Notes**

Students can repeat this course.

## GS Introduction to Engineering

This course introduces student to fundamental disciplines and concepts in engineering. Basic problem solving skills will be developed as applied to various engineering disciplines.

**Credits** 0.5

High School credit

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

None

**Notes**

GMU ENGR 107 - 2 credits

## GS Introduction to Organic Chemistry

This course in modern chemistry is an introduction to the major classes of organic compounds and biomolecules. Topics include structure, nomenclature, chemical and physical properties, and reactions of organic compounds as well as a survey of the biochemistry of proteins, carbohydrates, lipids, and nucleic acids. Students will also complete a laboratory section.

**Credits** 0.5

High School credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Chemistry 211 and Chemistry 212

**Notes**

GMU CHEM 104 and LAB - 4 credits

## GS Introduction to Organic Chemistry Lab

Enrollment in this lab requires concurrent enrollment in GS Introduction to Organic Chemistry.

**Credits** 0.5

High School credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Chemistry 211 and Chemistry 212

**Notes**

GMU CHEM 104 and LAB - 4 credits

## GS Introduction to Research 1 and 2

This course is designed to provide students with an opportunity to apply what they have learned from previous course work. They will design their own active inquiry experience, followed by engaging in research and preparing a technical paper and electronic presentation of their results. Students will have the opportunity not only to collaborate with their peers but with scientists from the industry and academia as well. Students enroll in mentorship research both junior and senior year, and have the option to either continue with the research topic chosen during the junior year for a more extended study during the senior year, or begin a new and more detailed topic of study for the senior year.

**Credits** 0.5

High School credit

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

None

**Notes**

This is for students who want to earn a GMU dual-enrollment credit as part of their strand mentorship research.

GMU COS 120 - 1 credit

## GS Microbiology

The course is an introduction to microbial cell structure, physiology and pathogenicity of various microorganisms including bacteria, viruses, and fungi. Emphasis is on host-parasite relationships, epidemiology, and immunology of infections. The students will also receive a broad coverage of various infectious diseases including etiological agents, modes of transmission, presentations of systems, and treatments and prevention. An environmental aspect will also be included to increase students' understanding of the utilization of microorganisms in environmental processes such as fermentation and waste management.

**Credits** 0.5

High School credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Introductory Biology 103 and Biology 104

**Notes**

GMU BIOLOGY 246 - 4 credits; LAB - only high school credit available

## GS Microbiology Lab

Enrollment in this lab requires concurrent enrollment in GS Microbiology.

**Credits** 0.5

High School credit

**Grades**

12

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Introductory Biology 103 and Biology 104

**Notes**

GMU BIOLOGY 246 - 4 credits; LAB - only high school credit available

## GS Practicum in Engineering

GS Practicum in Engineering course provides students with experiences in algorithmic thinking, visualization and communications of Engineering principals.

**Credits** 0.5

High School Credit

**Grades**

11

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

[GS Introduction to Engineering](#)

**Notes**

For Dual Enrollment: GMU ME 151 - 2 credits

## GS Statics

GS Statics is a course in applied vector mechanics with emphasis on static equilibrium. Topics include forces, moments, couples, equivalent force-couple systems, centroids, distributed forces, and Coulomb friction. The application of the free body diagram in the analysis of static equilibrium of frames, machines and trusses is stressed.

**Credits** 0.5

High School Credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

[GS Practicum in Engineering](#)

**Notes**

For Dual Enrollment: GMU ME 211 – 3 CREDITS

## GS Thermodynamics

Basic thermodynamics is a course in which the first and second laws of thermodynamics are studied primarily from the classical macroscopic viewpoint and applied to both closed and open systems. Working substances include perfect gases, real gases and vapors in addition to solids and liquids.

**Credits** 0.5

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

[GS Statics](#)

**Notes**

For Dual Enrollment: GMU ME 221 – 3 CREDITS

## GS University Physics 1

This is a two-semester calculus-based introductory physics sequence, designed primarily for science and engineering majors.

**Credits** 0.5

High School credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Physics 243 and Physics 246

**Corequisites**

Math 115 and Math 116

**Notes**

GMU PHYS 160 and LAB 161 - 4 credits

## GS University Physics 1 Lab

Enrollment in this lab requires concurrent enrollment in GS University Physics 1.

**Credits** 0.5

High School credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in Physics 243 and Physics 246

**Corequisites**

Math 115 and Math 116

**Notes**

GMU PHYS 160 and LAB 161 - 4 credits

## GS University Physics 2

Successful completion of PHYS 160 with a C or better is a prerequisite to PHYS 260. This is a two-semester calculus-based introductory physics sequence, designed primarily for science and engineering majors.

**Credits** 0.5

High School credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in PHYS 160

**Corequisites**

Math 115 and Math 116

**Notes**

GMU PHYS 260 and LAB 261 - 4 credits

## GS University Physics 2 Lab

Enrollment in this lab requires concurrent enrollment in GS University Physics 2.

**Credits** 0.5

High School credit

**Grades**

12

**Course Designation**

Dual Enrollment (DE),

Weighted (1.0W)

**Schools**

Governor's School @ Innovation Park

**Prerequisites**

A grade of C or better in PHYS 160

**Corequisites**

Math 115 and Math 116

**Notes**

GMU PHYS 260 and LAB 261 - 4 credits