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Dual Enrollment Suggestions for 11th and 12th graders – High school students must be prepared to work very hard

Grove City College offers a [Dual-Enrollment](#) option for many classes. Students in 10th through 12th grade can take advantage of these classes at a substantial reduction in per-credit cost. Please be aware that these are college-level courses and will require a significantly larger amount of time for study and completion of work. Students must be self-motivated and ready for the maturity expected.

Some [dual-enrollment courses](#) are taught online (asynchronous: no specific time for to listen to the lecture as long as student works within the timeline of the course) while others are synchronous (offered at specific times and may involve both on-campus students as well as remote). [Sample syllabi found here](#) are often a good indicator of how the course will be taught.

Some students have been able to accomplish dual-enrolled classes while attending the traditional high school. Others are home-schooled. Still others are able to do a hybrid-education, involving some public/private classes along with dual-enrolled courses.

Below is a list of suggested courses students can consider if they are interested in Electrical Engineering. These courses (other than ROBO 101) are all required classes either associated with the General Education requirements for the College or in the major. Remember students that achieve the best success are those that are highly motivated and able to do well at time-management. Completion of any of these courses will permit the student to either carry few credits or have more opportunities for elective courses.

Currently the College offers three Social Science courses as dual-enrollment options that will fulfill the General Education requirement: SOCI 101 Foundations of Applied Sociology – 3 credits or SOCW 101 Foundations of Social Work – 3 credits or PSYC 101 Foundations of Psychological Science – 3 credits. In addition to these three, the College offers such classes as, HIST 120 Foundations of History, POLS 101 Foundations of Political Science, and four others that will fulfill this requirement. So, students may wish to wait to take this course on campus when there is a larger selection.

The College is continually refining the offering of courses, so diligence to monitor changes must fall on the shoulders of the dual-enrolled student.

Since these courses are taught at a college level, we strongly recommend students take no more than one class per term for the first year of dual-enrollment. Only after students become well acquainted with the workload do we ever consider having high school students take 2 per term.

Finally, a new masters program is being offered in System Engineering. This program entails approximately 12 months of study to accomplish. It will begin immediately upon graduation and



be completed the following spring or summer. Details for this program are found in the document entitled System Engineering Master found in the Masters Program folder.

Suggested Courses – carefully read the course descriptions for prerequisites/corequisites

11th or 12th

<u>Fall</u>	<u>Spring</u>	<u>Summer</u>
ROBO 101	WRIT 101	SOCI 101 or SOCW 101 or PSYC 101
HUMA 102	CHEM 111	CHEM 113
MATH 111*		

12th

<u>Fall</u>	<u>Spring</u>	<u>Early Summer</u>
COMP 141	PHYS 101	MATH 162*
MATH 161*	ELEE 204/252 or MECE 120	

* If your school offers Calculus, we recommend that you take it PRIOR to taking MATH 161 and MATH 162 because past history has demonstrated that students having at least some exposure to calculus concepts before taking college-level calculus produces a better result for the student. HOWEVER, if they are unable to take high school calculus before senior year, we suggest taking MATH 111 Pre-calculus. The 3 credits associated with MATH 111 will count as general elective credits.

Course Descriptions:

CHEM 111: General Chemistry I – The first semester of a year-long introduction to the fundamental principles of chemistry, including stoichiometry, nomenclature, basic reactions (solubility, acid-base and oxidation reduction), gas laws, Laws of Thermodynamics (enthalpy, entropy, Gibb’s free energy and equilibrium constant), electronic structure, bonding, molecular structure, properties of pure liquids and solids, and solutions. Three credit hours.

CHEM 113: General Chemistry Lab I - This course will develop laboratory skills in measurement, use of volumetric glassware and titration. Students will learn to use visible spectrometers, calorimeters, and data probes to record results on their computers. They will be exposed first-hand to concepts in CHEM 111 like solubility, acid-basneutralization, gase laws and colligative properties. One credit hour.

COMP 141: Computer Programming I - This course provides the student with an understanding of hardware and software concepts, structured program design, and programming using Java in an integrated development environment. Topics include Boolean expressions, iteration, standard library classes and methods, arrays, searching and sorting, multidimensional arrays, strings, dynamic memory allocation, programmer-defined classes and methods, and deep copying. This



course, along with Math 161 and 488, fulfills the Information Literacy (IL) requirement for the Mathematics major. Three credit hours.

ELEE 204: Digital Logic Design - An introduction to digital circuit analysis and design methods. Combinational circuit topics include the use of Boolean algebra, map minimization methods, and circuit implementation with logic gates and standard integrated circuits. Sequential circuit design is explored, and implementation with flip-flops and standard integrated circuits is investigated. Programmable logic implementation of both combinational and sequential circuits is introduced. A group design project is required. Three credit hours.

ELEE 252: Digital Circuits Laboratory - A laboratory course intended to acquaint the student with hardware and software tools used for the design and implementation of digital circuits. A variety of digital design techniques are investigated, including gate-level circuits, programmable FPGA devices, and hardware definition languages (VHDL). CAD software, a hardware target system, and lab equipment are used to design, simulate, program, and verify the operation of digital circuits. Computers are used to design and simulate circuits and to program digital devices to implement those designs. One credit hour.

HUMA 102: Civilization and the Biblical Revelation – A study of Christian revelation and how it influenced the course of Western civilization. It focuses on key texts that are foundational for theology, cosmology, epistemology, human nature, society, and ethics. This course contains the second component of the across-the-curriculum Information Literacy (IL) requirement. Three credit hours.

MATH 111: Pre-Calculus – Designed to help prepare students for success in Physics 121 or Calculus I, this course offers a thorough treatment of function theory, analytic geometry, exponential and logarithmic functions, and trigonometry. A basic understanding of high school algebra and analytic geometry is presumed. Three credit hours.

MATH 161: Calculus I – A first course in calculus that assumes no prior study of the subject. Topics include: limits and continuity, differentiation, curve sketching, the fundamental theorem of calculus, definite and indefinite integrals, and applications. This course fulfills in part the Informational Literacy (IL) requirement for the Mathematics major. Prerequisites: High school mathematics including algebra, analytic geometry, and trigonometry. Four credit hours.

MATH 162: Calculus II – A continuation of MATH 161 covering the topics: exponential, logarithmic and inverse trigonometric functions, techniques of integration, parametric equations, sequences, infinite series, and Taylor series. This course fulfills in part the Information Literacy (IL) requirement for the Mathematics major. Prerequisite: MATH 161. Four credit hours.

MECE 120: Numerical Computing for Mechanical Engineers – This course introduces students to applied numerical computation, with an emphasis on solving typical mechanical engineering

problems. Sequential logic programming is taught using MATLAB. Topics include array and scalar operators, program control elements, graphic and text I/O, internal and user-defined functions. Students are introduced to numerical methods such as root finding, solutions to systems of linear equations, linear regression, and numerical integration and differentiation. Corequisites or Prerequisites: MATH 161 and PHYS 101. Three credit hours.

PHYS 101: General Physics I – Engineering – A calculus-based study of mechanics including kinematics, Newton’s laws of motion, work, energy, linear momentum, rotational motion, angular momentum, gravity, equilibrium, fluids, oscillations, traveling and standing waves. Three lectures and one lab per week. Corequisite or Prerequisite: MATH 161. Four credit hours.

ROBO 101: Intro to Robotics – A hands-on introduction to the science of engineering involved in mobile robots. Fundamentals of robot hardware and software are explored and reinforced with weekly hands-on projects culminating in a final project competition. Prerequisite: Algebra I course in high school. One credit hour.

PSYC 101: Foundations of Psychological Science – This course is designed to introduce the student to the field of psychology, which is defined as the scientific study of behavior and mental processes. Like other sciences, psychology seeks to explain, predict, and control the events it studies. Students will be exposed to the important theories, methods, and landmark findings that have helped to shape psychology as a field of inquiry. An integral focus of the course will be a consideration of how psychology can contribute to the synthesis of a consistent Christian worldview. Three credit hours.

SOCI 101: Foundations of Applied Sociology – An introductory study of the major and enduring theoretical ideas, concepts, methods, and debates that have shaped and informed the discipline of sociology from its inception to the current day. Topics include the origins of the discipline, the social conditions under which humans may thrive, social order, religion, and inequality. Attention is also paid to the ways in which the Christian tradition perceives and, in some cases, may challenge contemporary social conditions. Three credit hours.

SOCW 101: Foundations of Social Work – This foundational course introduces students to the rich and diverse discipline of social work and its widespread societal contributions. Students will learn the fundamentals of generalist social work; the ethics, tenets, and history of the profession; as well as an overview of the social welfare system in America. Examination of prominent social work values, philosophical assumptions, and theories occurs throughout the course. Discussions of the diverse populations and settings served by social workers are also discussed. Thoughtfully integrating the core values of social work and Biblical view of human nature is a particular aim of the course. Three credit hours.



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WRIT 101: Foundations of Academic Discourse – A course introducing students to the fundamentals of college composition. Topics include the writing process, rhetorical strategies, basics of critical reading and thinking, and key forms of writing such as informative, evaluative, argumentative, and synthesis. This course serves as a foundation to prepare students to succeed in other academic writing contexts. This course contains the Information Literacy (IL) requirement. Three credit hours.