

Newton North High School Science & Tech/Engineering

Introductory Physics For Freshmen

Frequently Asked Questions

1. "How are students placed in the two different levels of Introductory Physics?"

Answer:

Course #614, Introductory Physics

- The large majority of NNHS students (approximately 85-90%) take course #614, Introductory Physics. This course is unlevleed . The course is designed to meet the needs of a wide-range of learners in a heterogeneous setting.
- After completing course #614, students can continue on to take honors, curriculum I and/or curriculum II science classes at North.

Course #670, Basic Introductory Physics

- A small number of NNHS students (approximately 10-15%) need more support than the heterogeneous class can provide.
- Almost all students enrolled in course #670 are receiving some form of special education support at NNHS.
- The physics content in course #670 is identical to the physics content of course #614. All students are prepared for, and largely successful with, the Introductory Physics MCAS.
- Almost all students enrolled in course #670 are enrolled in Curriculum II Math classes. Math skills can be one of the major stumbling blocks in Introductory Physics. Course #670 was designed to coordinate with Math courses #541/#571. Mathematical complexity is the major difference between courses #614 and #670.
- Students are NOT placed in course #670 because of their behavior or because they don't like to do homework. We have high expectations for all of our students regarding behavior and completion of homework.
- After completing course #670, students are placed in curriculum I and/or curriculum II science classes for the following year.

Freshmen may also be registered in Pilot Physics (if they are in the Pilot Program) or one of the ELL Science Classes: 644 or 652. See Opportunities for details.

2. "Doesn't physics rely heavily on mathematical problem solving?"

Answer:

Introductory Physics, taught to high school freshmen, does require some mathematical problem solving however the course in not "heavily mathematical." In addition, the math and science departments work together closely to ensure that students can be successful.

- We strongly recommend that freshmen enrolled in math courses #541 or #571 enroll in Introductory Physics course #670. The teachers of these courses work closely together to align the curriculum and to adequately support and scaffold the mathematical demands of the physics course. For example, the two courses study graphing at the same time so that students feel supported, see connections between the content areas, and experience additional reinforcement of difficult concepts.
- The teachers of Introductory Physics course #614 are aware that their students come to physics class with a range of mathematical skills and backgrounds. The course is differentiated and scaffolded so as to challenge as well as support all students appropriately.

3. "What additional supports are available to students?"

Answer:

There are numerous supports for students.

- Students are encouraged to seek extra help from their math and physics teachers.
- The math and science departments collaboratively staff the "Math and Science Help Room." A math and/or science teacher is available just about every block to help any and all students.

Newton North High School Science & Tech/Engineering

Grade 9: Introductory Physics & Math Course Alignment

Physics Course Descriptions

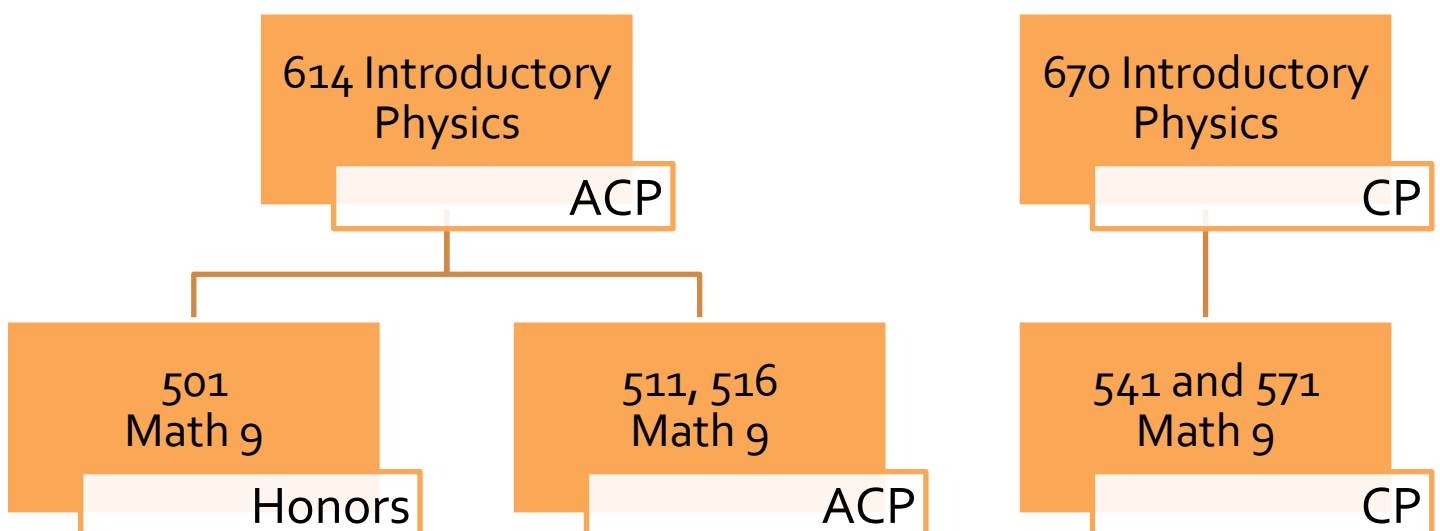
614 Introductory Physics **ACP** **9** **full year** **4 periods** **5 credits**

Students will learn important science related skills including experimental design, accurate measurement using a variety of instruments and technologies, quantitative and qualitative observations, construction and interpretation of data tables and graphs, unit analysis, application of algebra to science problems, and applications of science concepts to the real world. Laboratory experiments will examine forces, motion, electricity, magnetism, waves, light, sound and heat. Energy will be emphasized throughout the entire course. This activities based course will provide the foundation for all future science courses.

670 Introductory Physics **CP** **9** **full year** **4 periods** **5 credits**











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Alignment



Science & Tech/Engineering

Elective Course Offerings for Rising 9th Graders – 2019-2020

- 636 Engineering Technology** **ACP** **9-10-11-12** **full year** **4 periods** **5 credits**
 Students will learn important technological and engineering related skills and concepts. These concepts cover Engineering Design, Construction Technologies, Communication Technologies, and Energy and Power Technologies (Fluid, Thermal and Electrical systems). Students will be designing, building and testing prototype models that cover these concepts. Students will learn product design, accurate measurement using a variety of instruments and technologies, application of algebra to engineering problems, and application of physics concepts to the real world. This course is aligned with the MA State Frameworks and will allow students to choose to take the MCAS test for Technology/Engineering if they wish. Successful completion will meet the physical science graduation requirement.
- 653 Introduction to Sustainability** **no level** **9-10-11-12** **F or S** **2 periods** **1.25 credits**
 This course will introduce students to the three pillars of sustainability: Environmental stewardship + Equity (Social Justice) + Economic development. The course will explore sustainability challenges ranging from local issues (i.e. public transportation) to global issues (i.e. natural disasters, immigration). This course will largely focus on developing students awareness about the challenges and solutions in the field of Sustainability, the vocabulary around sustainable development, and globalization. The United Nations Sustainable Development Goals (UN SDGs) will be used as a framework to introduce our students to responsible global citizenship. This course is an excellent preparation for the more advanced Sustainability course.
- 654 Design for Sustainable Communities** **no level** **9-10-11-12** **F or S** **2 periods** **1.25 credits**
 This course is designed to introduce students to principles of environmental design. Students will develop solutions to environmental and/or sustainability challenges at Newton North High School, the City of Newton, and our greater community. Students will be introduced to environmentally friendly sourcing, sustainable structures, energy solutions, and their impact on human health and well-being. Workshops will provide the balance between guided seminars and hands-on projects. Students will learn shop/lab safety protocols, and will become familiar with basic sustainable technology.
- 963 Exploring Technology 1** **no level** **9-10-11-12** **F** **2 periods** **1.25 credits**
 This course will be taught as a hands-on project-based course where the students will learn about Electrical/Power Technology, Mechanical Technology, and Manufacturing Technology. Through the building and testing of projects, students will learn the concepts behind these technologies.
- 964 Exploring Technology 2** **no level** **9-10-11-12** **S** **2 periods** **1.25 credits**
 This course will be taught using a hands-on approach similar to Exploring Technology I. The students will learn about Transportation Technology, Communications Technology, and Structural Technology by designing, building and testing small projects.
- 965 Robotics 1** **no level** **9-10-11-12** **F or S** **2 periods** **1.25 credits**
967 Robotics 2 **no level** **9-10-11-12** **F or S** **2 periods** **1.25 credits**
 Prerequisite: 965 is a prerequisite for 967
 Robotics is a hands-on building and demonstration course. In small groups the students design, build and program robots to perform specific tasks. The tasks start simple and progressively get more complicated throughout the course. Some of the topics that will be covered are: Simple machines, Gear and Pulley Systems, Transmission Systems, and Computer Programming. We will be using Lab View programming language. Robotics 2 is a continuation of Robotics 1. The projects will get more complicated with the addition of new sensors and programming techniques.
- 976 Fashioneering 1** **no level** **9-10-11-12** **F** **2 periods** **1.25 credits**
 Fashion Engineering "Fashioneering" will be taught as a hands-on project based course where students will apply scientific and engineering principles to the design and production of all aspects of fiber, textile and apparel processes, products and machinery. The use of systematic problem solving engineering principles within the fashion design process will be used extensively throughout the entire course. The students will be creating 3D models, jewelry and accessories.
- 977 Fashioneering 2** **no level** **9-10-11-12** **S** **2 periods** **1.25 credits**
 This course is a continuation of Fashioneering 1. In this course, students will be learning about the design and production of all aspects of fiber, textile and apparel processes, products and machinery. The students will be learning about clothing and footwear fabrication. This will include the design, assembly and large-scale production of such products.
- 972 Computer Repair and Support** **ACP** **9-10-11-12** **full year** **4 periods** **5 credits**
 This is an intensive full year course that will instruct students on the basics of computer hardware and operating systems. Through the use of lecture and hands on activities the students will learn about all aspects of the personal computer (P.C.). Some of the topics include:
 Hardware Basics: Basic electronics, mother boards, computer cases/power supplies, battery backups, system settings: BIOS, IRQ, I/O, and DMA, CPUs, expansion bus architecture, physical memory, data storage, I/O ports and connectors, I/O devices, printers and scanners, system startup sequences, and portable computers. The operating systems that will be covered are DOS, Windows XP, Vista, Windows 7, and Linux.
- 973 Honors Computer Repair and Support** **H** **9-10-11-12** **full year** **4 periods** **5 credits**
 (A+ Certification)
 The Honors level course prepares students to sit for the CompTIA A+ computer certification exams. Students who take this class must be highly motivated and already possess a strong computer background. The course moves at an accelerated pace with emphasis on preparation for the rigorous A+ examination.

Engineering Certificate

Quisque Ipsum

Core Requirements

Complete ALL credits from the following courses

Engineering Core Requirement

965	Robotics 1	1.25 Credits
967	Robotics 2	1.25 Credits
959	Engineering 1	2.5 Credits
960	Engineering 2	2.5 Credits

7.5 Credits

Design Core Requirement

656	Engineering Design	1.25 Credits
OR		
911	Drafting Exploratory	2.5 Credits

Sub Total 1.25-2.5 Credits

Science Core Requirement

614, 670, 644	Introductory Physics	5 Credits
602, 612, 622	Chemistry	5 Credits
611, 621, 641	Biology	5 Credits
603, 607, 613, 623	Physics	5 Credits

Sub Total 20 Credits

Math Core Requirement

501, 511, 516, 581, 541	Math 1	5 Credits
502, 512, 517, 582, 542	Math 2	5 Credits
503, 513, 518, 583, 543	Math 3	5 Credits
504, 514, 519, 584, 544	Math 4	5 Credits

Sub Total 20 Credits

Math/Science/Technology Electives

Choose a minimum of 5 credits from the following courses

Engineering/Technology Electives

636	Engineering Technology	5 Credits
961	Engineering 3	5 Credits
963	Exploring Technology 1	1.25 Credits
964	Exploring Technology 2	1.25 Credits
968	Robotics 3	5 Credits
976, 977	Fashioneering 1, 2	1.25 Credits
657	Engineering Design (advanced)	1.25 Credits

Science Electives

605	AP Biology	5 Credits
606, 608	AP Chemistry	5 Credits
630	Anatomy and Physiology	5 Credits
632	Astronomy	2.5 Credits
633	Modern Physics	2.5 Credits
653	Introduction to Sustainability	1.25 Credits
654	Design for Sustainable Communities	1.25 Credits
634	Sustainability & Envi. Science	5 Credits
635	Marine Biology	5 Credits
637	Forensics	5 Credits
638	Organic Chemistry	5 Credits
639	Science in Society	5 Credits

Computer Science Electives

549	Introduction to Comp. Sci.	2.5 Credits
551, 552	Computer Programing	2.5 Credits
553	Computer Science Principles	5 Credits
868	Website Development	2.5 Credits
864	Interactive Multimedia	2.5 Credits
972,973	Computer Repair and Support	5 Credits

Engineering Certificate Course Requirements

Science Department,
Math Department
&
Career and
Technical Education

Newton North High School



Eligible Student

Name _____

Year of Graduation _____

Counselor _____

Homeroom _____

Email _____

Switch to HR 139 (circle) YES NO

For more information contact:

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