

RHS STEM Department

Introduction:

At its core, STEM is an interdisciplinary approach in which academic concepts are paired with real-world lessons as students apply science, technology, engineering, and mathematics to make connections between school, community, industry, and society.

As a department, we strive to adopt such an interdisciplinary approach in our science, technology, engineering, and mathematics courses with the additional goals of creating opportunities for all learners to engage with rigorous academic concepts, making learning meaningful and fun, and staying current with an ever-evolving STEM landscape.

The interdisciplinary approach and goals are evident in our robust offerings which include core science and mathematics classes as well as focused electives in the sciences such as botany and genetics, in computer science and robotics, in computer-aided drafting and 3D printing, in woodworking and metalworking, and in statistics and discrete math.

Course Recommendation Process:

Teacher recommendation, classroom performance, and diagnostic assessments are the primary criteria for determining appropriate course levels. When making recommendations for courses, teachers consider the following criteria:

Recommending a move to a different level: At least three of the listed indicators should be present.

Moving Up:

- An average of 97 or better
- An apparent ease with assignments
- An ability to grasp concepts quickly
- A capacity for thinking at a deeper level with greater insight
- An interest in the subject matter more appropriate to a higher-level student
- Success in a skills-based test (Mathematics Only)

Moving Down from Honors to an A-level class:

- Averaging a C- or lower
- Struggling or seeming overwhelmed by the work
- An inability to grasp concepts without additional, separate, individual explanation
- Critical thinking and writing skill levels noticeably lower than those of peers
- Lack of motivation to meet the challenges of an accelerated course

Moving Down from A level to a B-level class:

Averaging a D or lower

Struggling or seeming overwhelmed by the work

An inability to grasp concepts without additional, separate, individual explanation

Skill level significantly below the average

Please note that students who have an A in a class may simply be appropriately placed and are able to shine at that level. Having an A average alone does not indicate that a student should move to a more advanced level.

Regarding lack of motivation: If students do not submit work, it is difficult to gauge ability level. Although having difficulties completing homework assignments will naturally impact a student's grade, homework is only a portion of the average. Therefore, it stands to reason if a student is appropriately placed, he/she should be able to maintain a C+ average based on tests, submitted assignments, and participation.

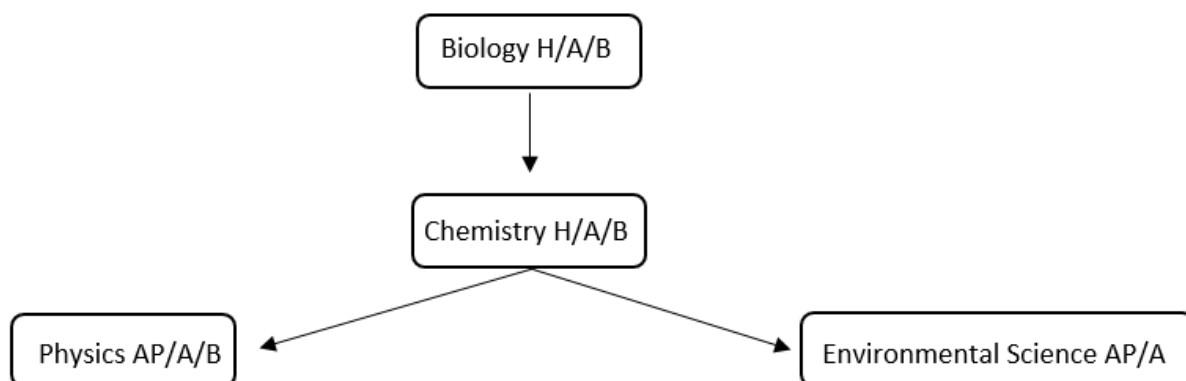
Summer Assignments:

Some courses, especially the AP courses, may require a summer assignment. Any assignment will be available either from the teacher prior to leaving school in June or will be available on the school website. These assignments will be communicated to the students who are enrolled in classes with a summer requirement prior to leaving for summer break.

Science Department

Sequencing:

Students are required to take three years of high school science. At a minimum, students will complete either courses in Biology, Chemistry, and Physics or courses in Biology, Chemistry, and Environmental Science.



Fourth Year/Doubling Up Options:		
Full Year	Semester Courses	
AP Courses (Prerequisites/Co-requisites)	Honors/A Level	A/B Level
AP Biology (Biology H or A)	Genetics	Astronomy
AP Chemistry (Chemistry H or A)	Marine Biology	Forensic Science
AP Physics 2 (AP Physics I or Physics A)	Anatomy & Physiology	Animal Behavior
AP Physics C (AP Physics 1/Calculus)	Organic & Analytical Chemistry I	Environmental
AP Environmental Science (Chemistry H or A)	Organic & Analytical Chemistry II	

Course Title (Code)	Grade Level	Length
+Biology H (SCI200)	9	Full Year
+Biology A (SCI210)	9	Full Year
+Biology B (SCI220)	9	Full Year
+Chemistry H (SCI300)	10	Full Year
+Chemistry A (SCI310)	10	Full Year
+Chemistry B (SCI320)	10	Full Year
Physics A (SCI410)	11	Full Year
Physics B (SCI420)	11	Full Year
Environmental Science (SCI800)	11, 12	Full Year
Animal Behavior (SCI955)	10, 11, 12	Semester
Forensic Science (SCI945)	11, 12	Semester
Marine Biology H (SCI845)	10, 11, 12	Semester
Marine Biology A (SCI855)	10, 11, 12	Semester
Anatomy & Physiology H (SCI875)	10, 11, 12	Semester
Anatomy & Physiology A (SCI865)	10, 11, 12	Semester
Genetics H (SCI885)	10, 11, 12	Semester

Organic & Analytical Chemistry I H (SCI905)	11, 12	Semester
Organic & Analytical Chemistry II H (SCI915)	11, 12	Semester
Astronomy (SCI925)	10, 11, 12	Semester
Botany (SCI840)	11, 12	Full Year
AP Biology (SCI520)	10, 11, 12	Full Year
AP Chemistry (SCI530)	11, 12	Full Year
AP Environmental Science (SCI500)	11, 12	Full Year
AP Physics 1 (SCI420)	11, 12	Full Year
AP Physics 2 (SCI430)	12	Full Year
AP Physics C (SCI510)	12	Full Year

+ indicates required course

Department Introduction:

Science is a human activity through which problems dealing with natural phenomena can be identified and proposed solutions can be tested. In this process, data is collected/analyzed and available knowledge is applied to explaining the results. Through this process, investigators add to the store of knowledge thereby helping people better understand their surroundings. Applications of this knowledge also may bring about changes in society and the cultural order, as well as having a direct impact on the quality of life.

The science requirement for graduation involves students in a systematic study of the earth and space, life, and physical sciences in three laboratory courses. As students study the natural phenomena that govern our world, they will have a greater understanding of the dynamic systems that interact with one another. Students will study biological systems, and the systems that govern matter. They will be expected to model real-world science and demonstrate the thinking/process skills associated with science. Students beyond the ninth grade will have an opportunity to enroll in electives that provide insights into major fields of science. Laboratory activities are included in all science courses.

Randolph's science curricula are aligned to the New Jersey Student Learning Standards in Science.

Course Levels:

All Randolph High School science courses prepare students for college. In general, students at a higher level are expected to be more independent, more self-disciplined, and self-motivated. They will explore content more quickly and to a greater depth with emphasis on the analysis of data and interpretation of results. Their writing is expected to be more fluid and more sophisticated, and their thinking more rigorous and original. All science curricula will foster the development of positive attitudes toward science, better communication and thinking skills, career awareness in science, safety in science investigations, and the use of new technology in those investigations.

The required courses in Biology, Chemistry, and Physics/Environmental Science are offered at several levels to match student needs. Advanced Placement courses are offered in Biology, Chemistry, Environmental Science, and Physics. Honors and non-honors level electives are also offered.

Students are placed in appropriate levels based on teacher recommendations, classroom performance, and performance on diagnostic assessments.

Course Title: Biology H (SCI200), A (SCI210), B (SCI220)	
Level/Grade: 9th	Length: Full Year
NCAA Approved Core Course	Pre-requisites: 8 th grade science teacher recommendation required for honors
<p>Course Description:</p> <p>This course is designed to give students a well-rounded background in key areas of biology. It introduces broad biological concepts and their application to all living systems. Fundamental concepts are discussed in varying degrees of depth depending on the level of the class. A major emphasis is placed on laboratory inquiries that allow the student to investigate various biological concepts and to develop process and analytical skills. Use of technology ranging from computers to laboratory equipment is emphasized. Major topics included are matter and energy as they travel through living systems; structure, function, and differentiation of cells; heredity and genetics from the molecular through the population level, ecosystem dynamics, and the evolution and classification of organisms. For the Honors level class reading and math skills should be excellent, students should be ready for independent self-motivated work, emphasis is placed on application and problem solving, abstract and visualization skills are important, and memorization is insufficient to be successful.</p> <p>This course is required for all Grade 9 students.</p>	

Course Title: Chemistry H (SCI300), A (SCI310), B (SCI320)	
Level/Grade: 10th	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Biology Teacher recommendation required for honors
<p>Course Description:</p> <p>This course provides students with an overview of chemistry and an understanding of the chemistry of matter. Using atomic schematization and structure as a foundation, bonding, chemical formulas, equations, periodicity and stoichiometric relationships will be explored. Gas laws and solubility factors will be employed to illustrate the interaction of pressure, concentration, temperature and reaction rates. Inquiry and process skills, laboratory techniques, and data collection and analysis are practiced and developed throughout the course.</p> <p>Chemistry and Biology may be taken concurrently with supervisor approval.</p>	

Course Title: Physics A (SCI410), B (SCI420)	
Level/Grade: 11	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Chemistry
Course Description: This is an introductory course that will help students understand the universe through the basic laws of physics. Topics to be studied include mechanics, sound, light, electricity, circular motion, work, and energy. Emphasis will be place on problem solving, experimental laboratory work, and application of physics principles to authentic projects.	

Course Title: Environmental Science (SCI800)	
Level/Grade: 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Chemistry
Course Description: Environmental Science is now a full year course designed to show thematic connections between a variety of science disciplines including biology, chemistry, and physics. It gives students a coherent and realistic picture of the applications of scientific concepts as they manifest in our environment. During this course, students will focus on human population growth, natural resources, and ecosystem dynamics. The aim of this course is to increase understanding of the environmental challenges of today, while continuing to cultivate scientific critical thinking skills. This course can serve as one of the three laboratory sciences required for graduation.	

Course Title: Animal Behavior	
Level/Grade: 10, 11, 12	Length: Semester
	Pre-requisites: Biology
Course Description: This course deals with the science of animal behavior on an individual, population, and interspecific basis. Laboratory work includes analytical experiments, field and laboratory observations, and data analysis. Students are expected to communicate their results in formal scientific papers. The major types of innate and acquired behavior will be studied with an emphasis on the evolution of adaptive behavior. Topics include taxis, reflexes, instinctive behavior, conditioned reflexes, imprinting, operant conditioning, observational learning, and reasoning in animals. Consideration will be given to social systems in animals including the concepts of sociobiology. Organisms studied will include protozoans, small invertebrates, fish, birds, and mammals.	

Course Title: Forensic Science	
Level/Grade: 11, 12	Length: Semester
NCAA Approved Core Course	Pre-requisites: Chemistry
Course Description: Forensic science is the application of multiple scientific disciplines to the investigation of criminal or civil questions of the law. In this course we will use biology, chemistry, and physics to analyze and interpret evidence within the realm of our legal system. We will begin with an introduction to scientific inquiry and the process of forensic investigation. We will then apply our knowledge of investigation to the analysis of trace evidence (hair, fiber, etc.), fingerprints, DNA, and blood. We will discuss and analyze the evidence revealed by bodies, crime scenes, and crime scene tools. Students will actively participate in labs and activities relating to the investigation of crime scenes and the analysis of evidence.	

Course Title: Marine Biology H (SCI845), A (SCI855)	
Level/Grade: 10, 11, 12	Length: Semester
NCAA Approved Core Course	Pre-requisites: Biology Teacher recommendation required for honors
Course Description: This course deals with the interrelationships of living things in the marine environment. The ecological dynamics of the estuaries, oceans and bays will be investigated. Laboratory investigations will include field studies of the physical environment and interactions with the organisms of the marine world. The use of technologies such as GPS, SONAR, remote sensing, satellite imagery and chemical water analysis employed by marine scientist will be utilized. The course is designed to give students hands-on experiences to better understand the biological systems of the marine environment.	

Course Title: Anatomy & Physiology H (SCI875), A (SCI865)	
Level/Grade: 10, 11, 12	Length: Semester
NCAA Approved Core Course	Pre-requisites: Biology Teacher recommendation required for honors
Course Description: This course entails the study of the structure and function of the human body, commencing with a brief survey of all systems and how they interact to form the organism. The course will then focus on investigations of the cardiovascular, respiratory, nervous, skeletal, and digestive systems. The significance of histology to the understanding of the systems will also be discussed. Each unit includes anatomical, physiological, and clinical applications to the subject.	

Course Title: Genetics H (SCI885)	
Level/Grade: 10, 11, 12	Length: Semester
NCAA Approved Core Course	Pre-requisites: Biology Honors
Course Description: This hands-on, seminar course will examine a wide range of current topics in genetics as well as expand upon the genetic processes learned in students' biology course. Topics include and are not limited to personal genomics, genetic testing, bioethics, gene editing and therapy, types and benefits of biotechnology as well as review and expansion of prior knowledge learned. Students also participate in online discussions of current events on a regular basis.	

Course Title: Organic & Analytical Chemistry I H (SCI905)	
Level/Grade: 11, 12	Length: Semester
NCAA Approved Core Course	Pre-requisites: Chemistry
Course Description: Students will engage in activities that develop basic organic laboratory skills such as melting point determination, synthesis, distillation and re-crystallization. The concept- oriented course delves into diverse topics such as organic mechanisms, IUPAC nomenclature, and classification of organic families, functional groups and organic reactions. An introduction to principles of analytical chemistry will also be provided such as equilibrium and electrochemistry.	

Course Title: Organic & Analytical Chemistry II H (SCI915)	
Level/Grade: 11, 12	Length: Semester
NCAA Approved Core Course	Pre-requisites: Organic & Analytical Chemistry I H
Course Description: Students will study modern analytical laboratory techniques such as high-performance liquid chromatography, gas chromatography, and spectroscopy. Students will also test their own products and commercial grade equivalents in a laboratory setting. Advanced organic chemistry principles such as stereochemistry and chirality will be incorporated into the class. This course is recommended for students that aspire to careers in science or science related disciplines such as medicine, engineering, environmental science, marine biology, geology, or research.	

Course Title: Astronomy (SCI925)	
Level/Grade: 10, 11, 12	Length: Semester
	Pre-requisites: Biology
Course Description: This course is designed as an investigation of the world "beyond" Earth, highlighting Astronomy as a strictly observational science. Topics of study will include Moon-Earth-Sun relationships, the solar system, stars & their evolution, constellations, galaxies, and the Universe. Special emphasis will be placed on the development of ideas and instrumentation in Astronomy from a historical perspective, and what the future holds.	

Course Title: Botany (SCI840)	
Level/Grade: 11, 12	Length: Full Year
Dual Enrollment with CCM	Pre-requisites: Chemistry
Course Description: This course provides an introductory study of botany including the topics of plant anatomy, growth and development, reproduction, photosynthesis and respiration, and a survey of diversity within the plant kingdom including angiosperms, gymnosperms, bryophytes and ferns. Upon successful completion of this course students will be able to: Identify the anatomical parts of plants and describe their functions; Identify the features of a plant cell and describe their functions; Explain the significance of the photosynthetic reactions; Explain the differences and ecological significance of C3, C4 and CAM pathways of photosynthesis; Compare and contrast the life cycles of seed plants versus non-seed plants; List the plant hormones and describe what influence they play in plant growth and development; List the characteristics of ten flowering plant families; Give at least five examples of plant adaptation to environmental stress.	

Course Title: AP Biology (SCI520)	
Level/Grade: 10, 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Biology Honors; Geometry A or H; Teacher recommendation
Course Description: This Advanced Placement course is designed to be an equivalent of an introductory college course in Biology. The goal of the course is to provide students with the scientific principles, concepts, and methodologies required to understand biological systems. The course stresses scientific principles and includes a strong laboratory component. Students are expected to take the AP Exam and are encouraged to take the SAT Subject Test in biology. Students may be required to complete a summer assignment.	

Course Title: AP Chemistry (SCI530)	
Level/Grade: 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Chemistry Honors; Algebra II; Teacher recommendation
Course Description: <p>This Advanced Placement course is designed to be the equivalent of an introductory college course in chemistry. The course emphasizes the mathematical and theoretical aspects of inorganic chemistry. Laboratory work involves freshman college experiments in inorganic chemistry and semi- micro qualitative analysis. Students are expected to take the AP Exam and are encouraged to take the SAT Subject Test in chemistry.</p> <p>Students may be required to complete a summer assignment.</p>	

Course Title: AP Environmental Science (SCI500)	
Level/Grade: 10, 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Biology; Teacher recommendation
Course Description: <p>This Advanced Placement course is designed to be the equivalent of an introductory college course in environmental science. The goal of the course is to provide students with the scientific principles, concepts, and methodologies required to understand the interrelationships of the natural world, to identify and analyze environmental problems both natural and human-made, to evaluate the relative risks associated with these problems, and to examine alternative solutions for resolving and/or preventing them. Laboratory and field investigations will be drawn from many areas of scientific study, such as biology, ecology, chemistry, physics, geology, meteorology and oceanography. This course stresses scientific principles and analysis and includes a strong laboratory and field investigation component. Students are expected to take the AP Environmental Science Test.</p> <p>Students may be required to complete a summer assignment.</p>	

Course Title: AP Physics 1 (SCI420)	
Level/Grade: 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Chemistry
Course Description: <p>This course follows the curriculum set forth by the College Board and is equivalent to a first-year algebra-based college Physics course. Students will require a strong algebra background and knowledge of right triangle sine, cosine and tangent trigonometric ratios to be successful in this course. Topics include: kinematics, Newton's Laws of motion, torque, rotational motion and angular momentum, gravitation and circular motion, work, energy, power, linear momentum, oscillations, mechanical waves, sound, and an introduction to electric circuits. There will be a focus on inquiry-based laboratory activities which challenge students to design and carry out experiments targeting certain learning objectives. After the AP exam in May, an additional survey of Electricity and</p>	

Magnetism will be conducted as time permits. It is highly recommended and expected for all students to take the AP Physics 1 exam in May.

Students may be required to complete a summer assignment.

Course Title: AP Physics 2 (SCI430)	
Level/Grade: 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: AP Physics 1 or Physics A with Teacher Recommendation
Course Description: This course follows the curriculum set forth by the College Board and is equivalent to a second-year algebra-based college Physics course. Students will require a strong algebra background and knowledge of right triangle sine, cosine and tangent trigonometric ratios to be successful in this course. Topics include: Fluids, Thermodynamics, Electricity, Magnetism, Optics, and a survey of Modern Physics. There will be a focus on inquiry-based laboratory activities which challenge students to design and carry out experiments targeting certain learning objectives. After the AP exam in May, an additional survey of Modern Physics will be conducted as time permits. It is highly recommended and expected for all students to take the AP Physics 2 exam in May. Students may be required to complete a summer assignment.	

Course Title: AP Physics C	
Level/Grade: 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: AP Physics 1; Calculus co-requisite
Course Description: The AP Physics “C” Level course includes topics in mechanics, electricity, and magnetism. Knowledge of calculus, algebra, and basic trigonometry is necessary for this course. The general areas covered are: kinematics, Newton’s laws of motion, work, energy, power, linear momentum, circular motion & rotation, oscillations & gravitation, electrostatics, electric circuits, magnetic fields, and electromagnetism. This course parallels college physics courses for students in physical sciences, engineering and some applied sciences. Students are expected to take the AP Exam and are encouraged to take the SAT II Subject Test in physics. Laboratory activities will incorporate application of modern computer and electronic technology. Concepts of basic physics will be reinforced and expanded through modern topical presentations in preparation for the AP Physics Test. Students may be required to complete a summer assignment.	

Technology & Engineering Department

Sequencing:

Randolph High School offers a variety of technology and engineering courses within common fields.

Computer Science: Robotics I, Robotics II, AP Computer Science Principles, Programming with Python & Java Honors, AP Computer Science A, App Development Honors, Game Design

Engineering: Drafting & Design, Principles of Engineering, Physics & Engineering Design

Architectural Design: Drafting & Design, Advanced Drafting, Architecture I, Architecture II, Home Improvement, Interior Design

Prototyping and 3D Printing: Drafting & Design, Advanced Drafting, Principles of Engineering, Physics & Engineering Design, Technology & Design

Materials Processing: Basic Woods, Advanced Woods, Problem Solving in Woodworking, Basic Metals

Course Title (Code)	Grade Level	Length
Robotics I (TEC105)	9, 10, 11, 12	Semester
Robotics II (TEC110)	10, 11, 12	Full Year
AP Computer Science Principles (TEC510)	9, 10, 11, 12	Full Year
Programming with Python & JAVA Honors (TEC400)	10, 11, 12	Full Year
AP Computer Science A (TEC500)	11, 12	Full Year
App Development Honors (TEC410)	10, 11, 12	Full Year
Drafting & Design (TEC120)	9, 10, 11, 12	Full Year
Advanced Drafting (TEC130)	10, 11, 12	Full Year
Technology & Design (TEC815)	9, 10, 11, 12	Semester
Principles of Engineering H (TEC170)	9, 10, 11, 12	Full Year
Principles of Engineering A (TEC180)	9, 10, 11, 12	Full Year
Physics & Engineering H (TEC810)	10, 11, 12	Full Year
Physics & Engineering A (TEC830)	10, 11, 12	Full Year
Interior Design (TEC210)	9, 10, 11, 12	Full Year
Architecture I (TEC140)	9,10, 11, 12	Full Year
Architecture II H (TEC160)	10, 11, 12	Full Year
Basic Woods (TEC805)	9, 10, 11, 12	Semester
Advanced Woods (TEC810)	9, 10, 11, 12	Semester
Home Improvement (TEC100)	9, 10, 11, 12	Full Year
Problem Solving in Woodworking (TEC855)	10, 11, 12	Semester
Basic Metals (TEC190)	9, 10, 11, 12	Semester
Game Design (TEC???)	9, 10, 11, 12	Full Year

Department Introduction:

The Technology and Engineering Department at Randolph High School believes students should be creators rather than consumers. With this philosophy in mind, our mix of courses allows students to work with a variety of materials to complete numerous projects. Additionally, courses incorporate the latest technologies including but not limited to 3D printers, laser engravers, virtual reality headsets, and associated design software.

Randolph's technology and engineering curricula are aligned to the 2020 New Jersey Student Learning Standards for Career Readiness, Life Literacies, and Key Skills and for Computer Science & Design Thinking.

Course Levels:

Course Title: Robotics I (TEC105)	
Level/Grade: 9, 10, 11, 12	Length: Semester
	Pre-requisites: None
Course Description: This course is designed to allow you to explore the world of "control", having a device perform a function that a human wants it to do. This concept of control is the basis for most areas of modern technology, and it will help you see that "smart" machines are nothing more than the end result of people incorporating their intelligence into the machine's design. You'll be designing and building models related to the concepts of control.	

Course Title: Robotics II (TEC110)	
Level/Grade: 10, 11, 12	Length: Full Year
	Pre-requisites: Teacher recommendation
Course Description: This course is designed to allow you to explore the world of "control", having a device perform a function that a human wants it to do. This concept of control is the basis for most areas of modern technology, and it will help you see that "smart" machines are nothing more than the end result of people incorporating their intelligence into the machine's design. You'll be designing and building models related to the concepts of control. This course is part of Randolph High School's Computer Science & Programming Pathway.	

Course Title: AP Computer Science Principles (TEC510)	
Level/Grade: 9, 10, 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Algebra I
Course Description: <p>This AP class is designed for any student with a passion for computer technology. Students do not need any background in coding. The objectives of the AP Computer Science Principles course is to introduce students to the central ideas of computer science, instilling the ideas and practices of computational thinking and inviting students to understand how computing changes the world. This course promotes deep learning of computational content, develops computational thinking skills, and engages students in the creative aspects of computer science. The course is unique in its focus on fostering students to be creative.</p> <p>This course is part of Randolph High School's Computer Science & Programming Pathway.</p>	

Course Title: Programming with Python & JAVA Honors (TEC400)	
Level/Grade: 10, 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: AP Computer Science Principles
Course Description: <p>In this course students will develop computer programming techniques and learn the basic structures and syntax of the Python and JAVA programming languages. One semester will be spent writing, debugging, testing, and running programs in Python, and the other in JAVA.</p> <p>This course is part of Randolph High School's Computer Science & Programming Pathway.</p>	

Course Title: AP Computer Science A (TEC500)	
Level/Grade: 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Programming with Python & JAVA Honors
Course Description: <p>In this Advanced Placement course, students will continue to develop computer programming techniques learned in previous classes as well as computer science topics determined by the College Board. College credits may be earned by taking the AP Exam in the spring. Major topics include JAVA programming methodology, features of programming languages, algorithms, computer systems, and responsible use of computer systems. Students are encouraged to take the AP Examination.</p> <p>Note: This course may be taken to fulfill the mathematics graduation requirement of three years of mathematics.</p> <p>This course is part of Randolph High School's Computer Science & Programming Pathway.</p>	

Course Title: App Development Honors (TEC410)	
Level/Grade: 10, 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: AP Computer Science Principles
Course Description: <p>This course is designed to guide students through the process of developing a mobile app of their own design. Students can elect to use either the Swift programming language for iOS app development, or the Java programming language for Android. Many aspects of the course are self-paced, meaning students with little programming experience can take the time to learn the intricacies of their chosen language along the way, while those with more programming experience can review specifics to the tasks at hand and quickly begin the design process. Topics include but are not limited to familiarization with a selected programming language, user interface design, data storage, web connectivity, and app distribution, which students learn while developing several mini-apps along the way. The course culminates in the creation of an app of each student's personal design.</p> <p>This course is part of Randolph High School's Computer Science & Programming Pathway.</p>	

Course Title: Drafting & Design (TEC120)	
Level/Grade: 9, 10, 11, 12	Length: Full Year
	Pre-requisites: None
Course Description: <p>This is a "must" course for anyone interested any engineering. You will be introduced to the language of drafting and become familiar with the different branches of engineering. You will develop fundamental skills including drawing and the use of both 2D and 3D CAD (computer-aided drafting) programs.</p>	

Course Title: Advanced Drafting (TEC130)	
Level/Grade: 10, 11, 12	Length: Full Year
	Pre-requisites: Drafting & Design
Course Description: <p>This is a full year course for any high school student who has completed Drafting and Design and would like to pursue advanced studies in drafting. In this course of study, students will gain a strong knowledge of two-dimensional and three-dimensional engineering CAD operations and design. Additionally, students will experience real world research and communications that are necessary to be successful in an increasingly technological world. Applications of mechanical design, industrial design, and model making will be explored.</p>	

Course Title: Technology & Design	
Level/Grade: 9, 10, 11, 12	Length: Semester
	Pre-requisites: None
Course Description: This course is designed to actively involve you in the solution of technological problems. You will develop critical thinking skills using an interdisciplinary approach to problem solving. You will be involved in designing and the hands-on building of solutions to problems in the areas of energy systems, formulation technology, construction, and manufacturing.	

Course Title: Principles of Engineering H (TEC170), A (TEC180)	
Level/Grade: 9, 10, 11, 12	Length: Full Year
	Pre-requisites: None
Course Description: Principles of Engineering is a course that actively involves students to learn about the fundamentals of design and manufacturing. An understanding of the basic principles of mathematics and science, achieved primarily through hands-on activities, will help students develop solutions that make efficient use of manmade and natural materials. This course will help students realize the interrelatedness of history, economics, philosophy, ethics, and writing, which will prepare them for rigorous study in any of the fields of engineering. For Honors Level: Students will be required to use original and critical thinking while working more independently on activities which incorporate advanced engineering principles.	

Course Title: Physics & Engineering Design H (TECH810), A (TECH830)	
Level/Grade: 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Physics co-requisite
Course Description: This is an introductory course, offered at the Honors and A level that will help students understand the basic laws of physics that govern the universe. Topics to be studied include mechanics, sound, light, electricity, circular motion, work, and energy. Students will apply physics principles to engineering problems that will challenge their critical thinking and problem-solving skills. The content is similar to AP Physics 1 and Physics A, with the main difference being that students design and build most of the projects to be studied. For Honors Level: Students will be expected to provide in-depth review and analysis of course content.	

Course Title: Interior Design (TEC210)	
Level/Grade: 9, 10, 11, 12	Length: Full Year
	Pre-requisites: None
Course Description: The goal of the course is to introduce the student to the profession of interior design. Students will gain an understanding of the elements and principles of residential and commercial interior design. Students will learn to make appropriate selections of colors, fabrics, furnishings, lighting and furniture. Students will develop skills in architectural drafting and space planning through the use of hand and computerized drafting techniques. Students will use measurements to scale rooms and create floor plans for a variety of spaces. Class projects include decorating sample rooms and designing floor plans. Students will also explore potential careers in the interior design and related fields.	

Course Title: Architecture I (TEC140)	
Level/Grade: 10, 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: None
Course Description: Architecture I is designed to provide the basic skills necessary to produce a set of architectural plans for residential construction. A preliminary set includes a plot plan, foundation plan, first and second floor plans, door and window schedules, and a perspective drawing. You will continue to develop your skills using CAD (computer-aided drafting) throughout the year.	

Course Title: Architecture II Honors (TEC160)	
Level/Grade: 11, 12	Length: Full Year
	Pre-requisites: Architecture I
Course Description: In the second year of architectural drawing you will continue and enhance your CAD and table skills. You will continue to develop an individual portfolio of a complete set of architectural working drawings which will contain four elevation drawings, longitudinal and cross-sectional plans, and construction details. Architecture II relies extensively on CAD drawings. Portfolios developed in Architecture I will be the basis to begin the units of study in this course. Students will be required to use original and critical thinking while working more independently on activities which incorporate advanced architecture principles.	

Course Title: Basic Woods (TEC805)	
Level/Grade: 9, 10, 11, 12	Length: Semester
	Pre-requisites: None
Course Description: This semester course deals with the fundamental aspects of woodworking. Students will gain experience in shop safety, reading and preparing shop working drawings, wood identification and classification, using a variety of hand and power tools, basic wood joinery, and a variety of finishing procedures. Students will design and construct several woodworking projects that encompass good design, construction and finishing techniques.	

Course Title: Advanced Woods (TEC810)	
Level/Grade: 9, 10, 11, 12	Length: Semester
	Pre-requisites: None
Course Description: This semester course deals with the fundamental aspects of woodworking. Students will gain experience in shop safety, reading and preparing shop working drawings, wood identification and classification, using a variety of hand and power tools, basic wood joinery, and a variety of finishing procedures. Students will design and construct several woodworking projects that encompass good design, construction and finishing techniques.	

Course Title: Home Improvement (TEC100)	
Level/Grade: 9, 10, 11, 12	Length: Full Year
	Pre-requisites: None
Course Description: This course will provide an overview of many construction, repair, and remediation activities that a homeowner often encounters. You will gain experience in shop safety and basic instruction in the following areas: carpentry, blueprints/design, measurements, sheetrock, painting/wall coverings, plumbing, electrical wiring, permits, tile, flooring, kitchen design, and the safe use of hand and power tools. This hands-on class will provide the future homeowner with the skills to become a knowledgeable consumer.	

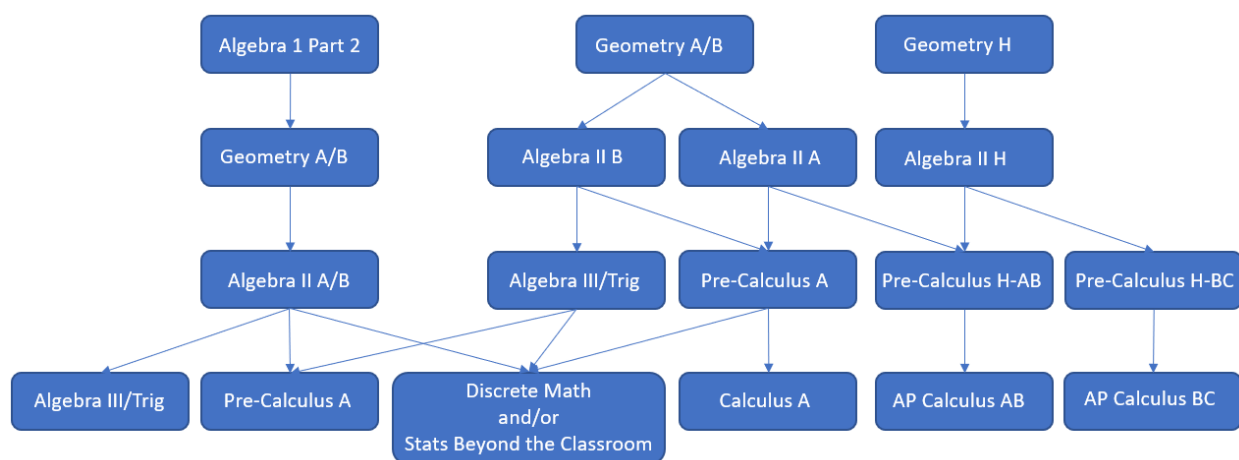
Course Title: Problem Solving in Woodworking (TEC855)	
Level/Grade: 10, 11, 12	Length: Semester
	Pre-requisites: Advanced Woods
Course Description: This course is an opportunity for students who already have woodworking skills to engage in self-directed, sophisticated woodworking. Students will be provided challenging problems and will spend most of their time using a variety of materials, woodworking methods, and problem-solving strategies to create their own designs. Other materials and techniques may also be employed, such as soldering and sandblasting.	

Course Title: Basic Metals (TEC190)	
Level/Grade: 9, 10, 11, 12	Length: Semester
	Pre-requisites: None
Course Description: This course is an opportunity for students to explore manufacturing processes when working with metal. Students will be introduced to the following skills: foundry, sheet metal fabrication, casting, soldering, and brazing. The course is designed to allow all students the opportunity to exercise their creativity, to grow in self-confidence, and to experience the satisfaction that working in a uniquely challenging medium can provide. Students will study the properties of metals and learn how the application of heat and other forces can produce beautifully wrought, durable creations in the medium of metals.	

Course Title: Game Design (TEC220)	
Level/Grade: 9, 10, 11, 12	Length: Full Year
	Pre-requisites: None
Course Description: This course is for anyone who loves gaming and wants to design and build original games. Students will look at the components of a game, including storytelling, characters, and objects in the story. Popular game-development software as well as animation software will be used to create engaging, interactive games in a variety of styles. Students will learn through a variety of software including virtual board games, MS Make Code, Minecraft, Unity and/or Unreal Engine. Further, students will not only experience their games on a traditional computer screen/monitor but will also have opportunities to experience them on a VR headset, where applicable.	

Math Department

Sequencing:



Note: Statistics or AP Statistics electives may be taken by any student after successfully completing Algebra II.

The state of New Jersey requires three years of high school mathematics. In general, students should expect to follow a sequence of Algebra I, Geometry, and Algebra II, followed by either Algebra III/Trig or Precalculus. Most often, students will stay in the same level through the progression of math courses. There are guidelines posted in the introduction regarding reasons that may precipitate a change.

Note: Students who wish to take a 4th year of math but do not wish to pursue a math/science related field should consider Algebra III/Trig, Statistics A, or a combination of Discrete Math and Statistics Beyond the Classroom. Those who are looking to continue into Calculus or who need to complete an Algebra-based mathematics requirement (college algebra, pre-calculus etc...) should continue with the more traditional course offerings.

Course Title (Code)	Grade Level	Length
Algebra I Part 2 (MAT115)	9	Full Year
Geometry H (MAT200)	9, 10	Full Year
Geometry A (MAT210)	9, 10	Full Year
Geometry B (MAT220)	9, 10	Full Year
Algebra II H (MAT300)	9, 10, 11	Full Year
Algebra II A (MAT310)	10, 11	Full Year
Algebra II B (MAT320)	11	Full Year
Precalculus Honors BC (MAT430)	10, 11	Full Year
Precalculus Honors AB (MAT420)	10, 11, 12	Full Year
Precalculus A (MAT410)	10, 11, 12	Full Year
Algebra III & Trigonometry (MAT330)	11, 12	Full Year
Discrete Math (MAT875)	12	Semester

Statistics Outside the Classroom (MAT885)	12	Semester
Statistics A (MAT840)	11, 12	Full Year
AP Calculus BC (MAT510)	11, 12	Full Year
AP Calculus AB (MAT500)	11, 12	Full Year
Calculus A (MAT440)	11, 12	Full Year
AP Statistics (MAT540)	10, 11, 12	Full Year
Academic Review Math (MAT610)	9	Full Year
SAT Prep Math (MAT865)	10, 11, 12	Semester

+ indicates required course

Department Introduction:

Randolph high school mathematics teachers believe in a student-centered approach. This is evident in our available courses and sequencing and in our classroom practices.

As a school and district, we take pride in our mathematics sequencing. Beginning in middle school, students can customize their mathematics experience based on need and interest. In high school this means students can take core classes from algebra through advanced placement calculus and elective classes in statistics and discrete mathematics. Additionally, with courses at multiple levels and opportunities to take courses concurrently, students can challenge themselves appropriately and progress to A-, Honors-, and AP-level classes.

Our mathematics teachers make every effort to reach students where they are. This is accomplished using various digital tools and formative assessment strategies to capture student work and gauge their understanding of concepts. Additionally, our classrooms are outfitted with ample markerboard space to enhance student collaboration and support mathematical discourse.

Randolph's mathematics curricula are aligned to the New Jersey Student Learning Standards in Mathematics.

Course Levels:

All Randolph High School math courses prepare students for college. In general, students at a higher level are expected to be more independent, more self-disciplined, and more self-motivated. They will explore content matter to a greater depth. The development of positive math attitudes, communication and critical thinking skills, career awareness, and the use of modern technology will be incorporated in the curriculum by infusion into lesson presentations on a regular basis.

Algebra I, Geometry, Algebra II, and Pre-Calculus are offered at several levels, (e.g. Honors, A, and B). (See Course descriptions for specific levels offered). Advanced Placement courses are offered in Calculus, Computer Science, and Statistics. Students are placed in appropriate levels based upon teacher recommendations, classroom performance, and performance on standardized tests.

Randolph's mathematics curricula are aligned to the New Jersey Student Learning Standards for Mathematics.

Course Title: Algebra I Part 2 (MAT115)	
Level/Grade: 9	Length: Full Year
NCAA Approved Core Course	Pre-requisites: None
Course Description: This mathematics course provides the student an opportunity to advance their elementary algebraic skills and apply these skills to problem solving. Topics of study include real number operations, linear equations and inequalities, polynomials, special products and factoring, rational expressions and equations, functions and relations, data analysis, linear systems, the real number system, and quadratic equations. Students may be required to complete a summer assignment.	

Course Title: Geometry H (MAT200), A (MAT210), B (MAT220)	
Level/Grade: 9, 10	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Algebra I; Teacher recommendation required for honors
Course Description: This mathematics course provides the student an opportunity for a study of an axiomatic system and deductive reasoning as applied to Euclidean geometry. Topics to be studied include: lines, angles, triangles, congruence of triangles, parallel lines, transformations, geometric constructions, analytic geometry, polygons, proportions, similarity, circles, surface area, and volume. For the Honors level class math skills should be excellent, students should be ready for independent self-motivated work, emphasis is placed on application and problem solving, abstract and visualization skills are important, and memorization is insufficient to be successful. Students may be required to complete a summer assignment.	

Course Title: Algebra II H (MAT300), A (MAT310), B (MAT320)	
Level/Grade: 9, 10, 11	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Geometry
Course Description: This mathematics course provides the student an opportunity to study mathematical structural theory, gain intermediate algebraic skills, and apply these skills to problem solving. Topics include: polynomials and factoring, rational numbers and expressions, relations and functions, data analysis, irrational numbers and quadratic equations, quadratic relations and systems, exponential and logarithmic functions, and complex numbers. Students may be required to complete a summer assignment. Students may take Geometry and Algebra II concurrently, with supervisor permission.	

Course Title: Precalculus Honors BC (MAT430)	
Level/Grade: 10, 11	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Algebra II & Teacher recommendation
Course Description: Precalculus Honors BC will prepare students for our AP Calculus BC course. Like our Precalculus Honors AB and Precalculus A courses, topics studied include polynomial functions, matrices and vectors, trigonometry, sequences and series, polar coordinates, complex numbers, exponential and logarithmic functions, analytic geometry, economics, limits and derivatives, and probability and statistics but with additional units of study focused on limits and basic differentiation techniques. Students may be required to complete a summer assignment.	

Course Title: Precalculus Honors AB (MAT420)	
Level/Grade: 10, 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Algebra II & Teacher recommendation
Course Description: Precalculus Honors AB will prepare students for our AP Calculus AB course. Like our Precalculus A course, topics studied include polynomial functions, matrices and vectors, trigonometry, sequences and series, polar coordinates, complex numbers, exponential and logarithmic functions, analytic geometry, economics, limits and derivatives, and probability and statistics but with greater depth and rigor. Students may be required to complete a summer assignment.	

Course Title: Precalculus A (MAT410)	
Level/Grade: 10, 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Algebra II
Course Description: Precalculus will prepare students for the study of Calculus at the high school or college level. Topics to be studied include polynomial functions, matrices and vectors, trigonometry, sequences and series, polar coordinates, complex numbers, exponential and logarithmic functions, analytic geometry, economics, limits and derivatives, and probability and statistics. Students may be required to complete a summer assignment.	

Course Title: Algebra III & Trigonometry	
Level/Grade: 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Algebra II
Course Description: <p>This course is for students wanting to continue developing skills from Algebra II and prepare them for the study of Precalculus or College Algebra. Topics to be studied will include a more in-depth look at many of the topics of Algebra II and preview topics seen in Precalculus which can include functions and their graphs, right triangle trigonometry, the trigonometric functions of any angle, graphs of trigonometric functions, laws of sine and cosine.</p> <p>Students may be required to complete a summer assignment.</p>	

Course Title: Discrete Math (MAT875)	
Level/Grade: 12	Length: Semester
NCAA Approved Core Course	Pre-requisites: Algebra II
Course Description: <p>Discrete mathematics affords many students the opportunity to experience success and enjoyment in mathematics classes. Those who have encountered numerous difficulties with computation and the complexities of mathematics in the past can be reached with appealing problems from discrete mathematics that have few formal skills as requisites. This will be the math that doesn't, on first glance, feel like math. Ever wonder if there are different methods for how people are elected? How can you divide up a bag of different types of candy fairly taking preferences and needs into consideration? How do postmen and garbage collectors use math to make their job more efficient? If you would like to explore how math plays a factor in each of these decisions, then consider Discrete Math.</p>	

Course Title: Statistics Outside the Classroom (MAT885)	
Level/Grade: 12	Length: Semester
	Pre-requisites: Algebra II
Course Description: <p>This course introduces students to statistical methods and reasoning as applied to practical problems. Topics include: collecting and analyzing data, descriptive statistics, sampling, surveys, graphs, and use of technology to understand statistics. Ever wonder how a new pharmaceutical drug gets tested? Curious about the reliability and design of the polls used during a political year? What questions should you consider when you read an article involving statistics – in written or graphical form? If you are curious about these questions, consider taking this class.</p>	

Course Title: Statistics A (MAT840)	
Level/Grade: 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Algebra II
Course Description: This Statistics course will prepare students for the study of statistics at the college level. Topics include: descriptive statistics, correlation, regression, probability, binomial and normal distributions, sampling, confidence intervals, analysis and presentation of data, an introduction to experimental design, variability and uncertainty in data, techniques of statistical inference and decision making. Students are expected to use technology to analyze and present data. Course work will also include a project in each semester that includes the collection and analysis of real data. Students are encouraged to incorporate their knowledge and interest in other disciplines into their project work.	

Course Title: AP Calculus AB (MAT500) BC (MAT510)	
Level/Grade: 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Precalculus Honors AB or Precalculus Honors BC
Course Description: These are advanced placement courses in calculus and the curriculum is determined by the College Board. They cover topics including concepts and skills of limits, derivatives, definite integrals, and the Fundamental Theorem of Calculus. Students will learn how to approach calculus concepts and problems represented graphically, numerically, analytically, and verbally. Emphasis will be on an understanding of processes. Offered at both the AB and the BC levels, students who successfully complete the AB test may be given credit for one semester of college calculus while those who successfully complete the BC test may be given credit for two semesters of college calculus. Students are encouraged to take the Advanced Placement Examination. To meet the course objectives, students are encouraged to complete a summer review packet due the first day of school. Students may be required to complete a summer assignment.	

Course Title: Calculus A (MAT440)	
Level/Grade: 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Precalculus
Course Description: As an introductory calculus course for students who have demonstrated an understanding of mathematics, this course contains the concepts of differential and integral calculus. This course is designed to familiarize the students with these topics and their application, so they will be at an advantage when encountering them at the college level. Students may be required to complete a summer assignment.	

Course Title: AP Statistics (MAT540)	
Level/Grade: 10, 11, 12	Length: Full Year
NCAA Approved Core Course	Pre-requisites: Algebra II & Teacher recommendation
Course Description: As an advanced placement course in statistics, this is a college level course designed for students who have demonstrated achievement in Algebra II and interest in statistics. The development of descriptive and inferential statistics follows the recommendations of the College Entrance Examination Board and includes the four major themes: exploratory analysis, planning a study, probability, and statistical inference. Students are encouraged to take the Advanced Placement Examination. Students may be required to complete a summer assignment.	

Course Title: Academic Review Math (MAT610)	
Level/Grade: 9	Length: Full Year
NCAA Approved Core Course	Pre-requisites: District Identification
Course Description: This course is designed to identify and remediate the basic mathematical needs of students at the high school level. Emphasis is placed on understanding concepts of Algebra I, Geometry, and Algebra II as well as the application of skills to problem solving scenarios. An individualized approach is used to prepare students for the New Jersey Student Learning Assessment for Algebra 1. This course does not fulfill the mathematics requirement for graduation. Students who are progressing toward identified goals may be identified and removed from the course after the first semester.	

Course Title: SAT Prep Math (MAT865)	
Level/Grade: 10, 11, 12*	Length: Semester
	Pre-requisites: None
Course Description: The SAT Prep course is designed to help students prepare for the rigors of taking the SAT test offered by the College Board. Our primary goal is to identify and implement test taking strategies using prerequisite knowledge to increase student performance. *SAT prep may be appropriate for some seniors. Speak to your school counselor.	