**Math**

**MAT 136 Intermediate Algebra (4 credits)**
*Prerequisite: MAT 094E or MAT 094 with a grade of C- or higher or appropriate placement test score*
Includes a study of functions, relations, and graphs; applications; linear functions and inequalities; quadratic and other polynomial functions; exponents and radical expressions; rational expressions and equations; and systems of equations. Department exit assessment is required. Students must earn a C- or higher to move to the next level course, MAT 172.

**MAT 172 College Algebra (3 credits)**
*Prerequisite: MAT 136 with a grade of C- or higher or appropriate placement test score*
TI graphing calculator is required. Topics include concepts of functions; numeric, algebraic, and graphic techniques as applied to the following functions: polynomial, piecewise, rational, radical, exponential, logarithmic; complex numbers; applications; and systems of equations. Topics that might be included are recursively defined functions and topics in analytic geometry. Department exit assessment is required. Students must earn a C- or higher to move to the next level course, MAT 186.

**MAT 186 Pre-Calculus (4 credits)**
*Prerequisite: MAT 172 with a grade of C- or higher or equivalent*
TI graphing calculator required. Topics include concepts of functions; numeric, algebraic, and graphic techniques applied to the following functions: polynomial, radical, rational, exponential, logarithmic, and circular/trigonometric; right triangle trigonometry and applications; trigonometric identities and equations; applications; topics in analytic geometry. Department exit assessment is required. Students must earn a C- or higher to move to the next level course, MAT 254.

**MAT 254 Calculus I (4 credits)**
*Prerequisite: MAT 186 with a grade of C- or higher*
TI graphing calculator required. Topics include limits and continuity; derivatives; techniques of differentiation; applications of differentiation; anti-derivatives; Fundamental Theorem of Calculus and the definite integral; applications of the integral; trapezoidal and Simpsons rules. Department exit assessment is required.

**Communications**

**COM 173 Public Speaking (3 credits)**
*Prerequisites: Eligibility for ENG 101*
The course introduces students to the communication techniques needed to organize and deliver oral messages in a public setting, with emphasis on extemporaneous speeches that inform, demonstrate and persuade. Basic communication theory, including reasoning patterns and logical fallacies, is covered.

**History**

**HIS 201 United States History I (3 credits)**
*Prerequisite: Eligibility for ENG 101*
This survey of American history studies the diverse roots of American politics, society, culture, and the economy. The Colonial period, the American Revolution and the formation of the republic are discussed. The evolution of opposing socioeconomic systems, sectionalism and sectional conflict, the Civil War and Reconstruction are also examined.
HIS 202 United States History II (3 credits)
*Prerequisite: Eligibility for ENG 101*
This course examines the social, economic and political forces that have contributed to the emergence of modern America and centers on the post-Civil War period, the settlement of the West, the industrial revolution, immigration, urbanization, imperialism, the U.S. as a world power, the New Deal and contemporary America.

### Interdisciplinary Studies

**IDS 210 Humanities: The Creative Voice (3 credits)**
*Prerequisite: ENG 102*
Defining art in its broadest sense to include visual, performance and media arts, as well as literature, music and philosophy, this course encourages students to explore the nature of creative expression. Students will learn to identify and evaluate these art forms, and, in the process, they will be asked to see relationships and make connections between various forms of creative expression. In addition to theoretical discussion of the humanities, students will engage in and explore their own creative processes.

**IDS 230 Liberal Arts / Humanities: Great Books (3 credits)**
*Prerequisite: ENG 102*
Recommended for Honors Program Candidates, this interdisciplinary Great Books seminar focuses on a variety of questions that are central to the human condition, such as What is Justice? What is Beauty? and What is Race? The methodology of textual close reading and Socratic discussion is emphasized, including the shared responsibilities of an inquisitive, dialogue-centered learning community and the communication of complex ideas that emerge from the reading of foundational texts. Both professor and students will engage the text through questioning and rigorous discussion.

### Biology

**BIO 121 General Biology I (4 credits)**
*Prerequisites: Eligibility for ENG 101, high school biology recommended*
This course offers a comprehensive study of fundamental biological concepts. The nature of scientific inquiry, water and carbon chemistry, cell structure and function, metabolism, photosynthesis, genetics and evolution are studied. Lab may include dissection of animal species.

### English

**ENG 101 Composition (3 credits)**
*Prerequisites: Placement determined by college entrance exam, completion of ENG 088 with a grade of B (ENG 101 traditional) or with a grade of C- or better for ENG 101/ENG 101W (Workshop), or by recommendation of ESL faculty*
This course develops students' abilities to write effective essays and to reason critically. A review of grammar and syntax, as needed, is included. The goals of unity, coherence and logical development are pursued through analysis of professional and student essays and through practice of pre-writing, writing and revision techniques. Students learn various organizational patterns. Students will write and revise several essays. A portfolio is required.
ENG 102 Literature and Composition (3 credits)
Prerequisite: ENG 101
This composition course is a continuation of work on skills begun in ENG 101. Students receive further instruction in composition and write frequently in and out of class. The analytical and critical essays they produce focus on fiction, drama, and poetry. To prepare for these writing tasks, students learn how to read and appreciate various literary genres, how to interpret literature, and how to explain and support their ideas in writing.

Art

ART 121 Two-Dimensional Design (3 credits)
Prerequisites: Eligibility for ENG 088 or ESL 152 or permission of Art coordinator
This introductory course focuses on the basic elements and principles of design such as line, texture, space, balance, unity and scale. Students are responsible for purchasing supplies.

Graphic Design

GRA 231 Digital Imaging: Adobe Photoshop (3 credits)
Prerequisite: GRA 151 or ART 111, ART 121 or permission of the Graphic Design coordinator
Students expand upon their graphic design skills and knowledge of procedures learned in GRA 151. Through lectures, demonstrations, exercises and real-world projects, the focus will be on Adobe Photoshop. Students will learn to create as well as edit digital images. Students will apply these techniques to solve design problems in print and web environments. Students are required to have basic knowledge of graphic design before registering for this course.

GRA 151 Graphic Design I: Skills and Principles (3 credits)
Prerequisite: Eligibility for ENG 101 and MAT 136 or permission of the Graphic Design coordinator
An introductory course focusing on the fundamental nature, skills and principles of graphic design. Students will learn about composition, communication and technology. Classes consist of lectures, demonstrations, applied practice and critiques. Students are responsible for purchasing supplies.

Computer Science

CSC 108 Introduction to Programming (4 credits)
Prerequisite: Placement in MAT 172
This course covers Fundamentals of programming and program development techniques. Topics include data types, functions, storage class, selection, repetition, pointers, arrays, and file processing. Programming laboratory projects in a closed laboratory environment are supervised by the instructor.

CSC 111 Introduction to Bioinformatics (3 credits)
Prerequisites: CSC 108, MAT 172 OR MAT 201, or permission of the instructor.
Introduction to Bioinformatics is a one-semester course focusing on the pre-existing in silico tools to analyze biological data. This application-based course will introduce how specific types of computational tools can elucidate the identification and function of genetic and protein information. This class is not a programming course per se, and does not require formal programming skills. It is designed for the computer science student to learn how programming is used to elucidate the function of biological macromolecules in relevant, current research questions. The requisite biology will be introduced in this course. Similarly, this course is designed for
the liberal arts and science student who would like to learn how computer science tools are used to interpret biological data.

**CSC 226 Object Oriented Programming Using Java (4 credits)**
*Prerequisites: CSC 108 or CSC 207 or CSC 234 or CST 252 or permission of instructor*

The features and tools of the Java programming language are covered in detail. The Object-Oriented model is used in developing object-based and object-oriented programs. The Java Virtual Machine and environment, classes, arrays, strings, inheritance, graphics, exceptions, I/O streams, and the Java API are discussed. Programming laboratory projects in closed laboratory environment, supervised by the instructor, are assigned.

**CSC 233 Database Development I (4 credits)**
*Prerequisite: Eligibility for ENG 101, CSC 103 or equivalent recommended*

Relational database development including data modeling, database design and database implementation. The student learns to create and alter tables, retrieve, insert, update, and delete data using a fourth-generation language (ORACLE) in a supervised laboratory setting. Uses of database technology, understanding DBMS and RDBMS concepts, normalizing designs, transforming of logical design into physical databases, embedded SQL, and the role of the DBA are also covered.

**CSC 234 Database Development II (4 credits)**
*Prerequisite: CSC 233*

Reinforcement of topics covered in CSC 233 as well as introduction of new topics including PL/SQL; creation of custom forms; functions; reports; additional ORACLE features; advanced calculations and multi-valued dependencies; and some current trends. A case study approach is used to apply concepts, methodologies and the ORACLE tools covered.

**CSC 257 Web Development With PHP (4 credits)**
*Prerequisite: CSC 108 or CSC 207 or permission of Instructor.*

This course will introduce students to web development using PHP. Students will learn how to design web sites according to the MVC model. Object-oriented PHP will serve as the means by which the model component of the MVC-based web application is implemented. Session management will be used to deliver customized content. Students will also use the MySQL database in conjunction with PHP to create dynamic web applications.

3 hours lecture, 2 hours lab.

**CSC 262 Programming Mobile Devices I (3 credits)**
*Prerequisite: CSC 108 or CSC 207*

The course introduces students to the various platforms in use on small and mobile devices. Platforms include Apple iPhone, Google Android OS and others. Students will create applications for each platform using specialized development environments.

**CSC 263 Programming Mobile Devices II (3 credits)**
*Prerequisite: CSC 108*

This course enables the student to specialize in development on a single device. The device is chosen prior to offering the class. All aspects of the development are covered in the context of the device.

**CSC 265 Software Engineering Methods (4 credits)**
*Prerequisite: CSC 226 Object Oriented Programming Using Java OR CSC 262 Programming Mobile Devices I OR CST 252 Web Development and Design II*
This course explores the methods of software application development following the software processes required for the production of high quality software. Techniques for creating documentation and using software development tools will be presented. Students will understand and apply the practices of lean and agile development, including stakeholder feedback, use cases, user stories, iterative development, stable/consumable code, continuous integration, test driven development, and value stream maps.

**Computer Technology**

**CST 121 Operating Systems (4 credits)**  
*Prerequisite: CST 180 or CSC 108 or any 200-level CST or CSC course with a grade of C or higher*  
Operating Systems provides an introduction to Unix based operating systems. The course focuses on basic skills in using a command line operating system. Students learn the characteristics of the common Unix shells, the Unix based file and directory system, file management, permissions, the vi editor, and basic computer networking concepts and commands. Graphical user interface environments and PC operating systems are discussed.

**CST 153 Web Development and Design I (4 credits)**  
*Prerequisite: Eligibility for ENG 101 or*  
This course provides the entry into the fast-moving website development industry. With its heavy hands-on mode of delivery, students will learn XHTML, Cascading Style Sheets, and be exposed to JavaScript. Adhering to standards, specifically from the World Wide Web Consortium (W3C) and the European Computer Manufacturers Association (ECMA), will play a dominant role in the creation of web pages that are both platform and browser independent.

**CST 252 Web Development and Design II (4 credits)**  
*Prerequisite: CST 153*  
As a continuation of the Web Development and Design I class, this course continues the knowledge and skills development of a web developer. The course covers JavaScript in detail. Fundamentals such as data types, functions, arrays, loops, and conditionals are included. AJAX and Web 2.0 programming skills are developed.

**CST 255 XML for the World Wide Web (4 credits)**  
*Prerequisite: CST 252 or CSC 108 or CSC 207*  
The course builds on students’ knowledge of HTML and JavaScript in the rich world of XML. Topics covered include creating well-formed and valid XML documents, Document Type Definitions (DTDs), namespaces, entities, XML Schemas, formatting using Cascading Style Sheets (CSS) and Extensible Style sheet Language (XSL) and transformations using XSL Transformations.

**P-TECH/NCC Degree Options**

Students enter P-TECH, a 9-14 school, in grade nine. They begin college courses as early as the summer of their 9th grade year and gradually work their way through the attainment of an industry-recognized associate degree. Graduation can occur in grade 14, or in the sixth year of the program, or earlier, depending upon the student.

The 9th grade schedule is primarily focused on English, mathematics, Workplace Learning and technical courses, such as Exploring Computer Science. The remaining courses in science, social studies, and
electives round out the 9th grade schedule. To ensure a fully integrated high school experience, students are taught by both P-TECH and NHS teachers.

Beginning in grade 10, the schedule could include both high school courses and college courses, and can be challenging to build. The P-TECH scope and sequence blends the two learning contexts into a seamless whole to allow students to progress and meet the increasing demands of the program. It also provides the pathway for all students to move through the same sequence of courses, but depending on their strengths and needs, at different rates. Some students may accelerate through the program in less than six years, while others may take the entire six years to complete their degree. In each case, the scope and sequence of courses provides the seamless integration of high school and college requirements. P-TECH provides sufficient structure and support for any student to complete his/her degree in six years.

All students graduate high school in four years and are required to complete a minimum of 25 credits. To graduate with the AAS degree from NCC, students are required to complete a minimum of 64 college credits. P-TECH offers applied associate degrees in three areas: Mobile Programming, Software Engineering and Web Development. P-TECH participates in the dual-enrollment program at NCC. Courses taken at the college may be used to satisfy high school graduation requirements.

Each degree includes core requirements in English, math, social science, humanities, and science, as well as major related courses. Degree options, descriptions and courses are on the next page.
Software Engineering

The program emphasizes the complete lifecycle of the software development process. Students learn how to design, develop, test, deploy, and maintain software using rigorous software engineering practices. They are taught how to leverage technology to create flexible and scalable applications and to address the challenges that arise during the development process. The program exposes students to a range of other disciplines, such as the physical sciences, social sciences, and humanities so they gain an understanding of the real world scenarios that make up the software engineering environment.

Possible Careers Paths
Computer Systems Analyst
Software Engineer
Web Architect
Computer Programmer

Norwalk Community Degree Requirements
Web Development
Web Development II
Intro to Programming
Object Oriented Programming
Database Development I
Operating Systems
XML for WWW
Intro to Engineering
Software Engineering
Bio-informatics

College Core
English Composition
Literature and Composition
Public Speaking
Precalculus
Calculus
US History
General Biology
The Creative Voice

Mobile Programming

This degree prepares students for technical positions within the Computer Science field. It provides students with the skills needed to be successful in the emerging field of mobile device programming technologies. The program teaches students fundamental concepts as well as fosters preparation for tomorrow’s programming needs. Course work is focused on programming in heterogeneous platform environments through multiple programming languages, and development of both written and verbal communication skills needed in all areas of the business community.

Possible Careers Paths
Mobile Programmer
Software Developer
Web Developer

Norwalk Community Degree Requirements
Web Development
Web Development II
Web Development with PHP
Intro to Programming
Object Oriented Programming
Database Development I
Operating Systems
XML for WWW
Intro to Engineering
Database Development II
Mobile Devices I
Mobile Devices II
Elective

College Core
English Composition
Literature and Composition
Public Speaking
Precalculus
Calculus
US History
General Biology
The Creative Voice

The Web Developer degree will include courses in the major from the Computer Science, Art, and Architecture and Design departments. Students will be well versed not only in the coding aspects of web development but also in design aspects. The result will be graduates who can work on all facets of web development from design through implementation. The Web Developer degree requires students to take additional credits in Graphic Design as well as the tools used in Graphic Design and Web Development. The typical education needed to become a web developer is an associate’s degree in web design or related field.

Possible Career Paths
Web Developer
Web Designer
UI Developer
UX Developer

Norwalk Community Degree Requirements
Web Development
Web Development II
Web Development with PHP
Intro to Programming
Object Oriented Programming
Database Development I
Programming Mobile Devices I
Programming Mobile Devices II
Digital Imaging – Photoshop
Two Dimensional Design
Graphic Design

College Core
English Composition
Literature and Composition
Public Speaking
College Algebra
Social Science Elective
Humanities Elective
Science Elective