

*New Course or New Instructional Program Proposal*

**Directions:**

Before completing this form, please discuss this proposal with the appropriate administrator(s) in your school. Complete this proposal form thoroughly, and attach any supporting documentation that would help the District Curriculum and Program Council understand this proposal better. Be sure that you adhere to all deadlines\*, and be certain to acquire all required signatures. The deadline\* for any course or program proposal that has budgetary implications and/or needs to be published in the NFHS *Program of Studies* is October 31, so please plan accordingly to make certain that all approvals of this application can be completed by October 31. All other proposals can be forwarded at any time of the year.

1. Please list the names and identify the school/department of those individuals who are making this proposal? If those making the proposal are not teachers, please explain thoroughly:

Jay Greenberg – Technology/Business Education Department Chair  
Stewart King –Technology Education Teacher

2. Give the title of new course or instructional program. Indicate the department in which this course/program will reside:

AP Computer Science Principles – Technology Education Department

3. Please indicate if the new course or instructional program is a semester or year long, and indicate the applicable grade levels. Please indicate the course level if applicable:

This course will be a full year course for 10<sup>th</sup> through 12<sup>th</sup> graders. This is an AP level course.

4. Please give the rationale for this proposal, and include its relationship to the past, current and future development of curricular offerings in New Fairfield:

This is a new offering from the College Board. It emphasizes a broad range of computer science topics, and not just Java Computer Programming, as in the curriculum of the present AP Computer Science A course now being taught at the high school.

**5. Please indicate the target population for this proposal:**

With a unique focus on creative problem solving and real-world applications, AP Computer Science Principles prepares students for college and career. The AP Program designed AP Computer Science Principles with the goal of creating leaders in computer science fields and attracting and engaging those who are traditionally underrepresented with essential computing tools and multidisciplinary opportunities.

Because AP Computer Science Principles is an AP course that covers a much wider range of topics than the AP Computer Science A course (which only covers Java programming) it will attract students who want a general background in Computer Science and are not necessarily intending to become programmers. This would include students in Engineering, Architecture, Business, Mathematics, Sciences, and other careers.

**6. Please explain if this course or instructional program is an addition or a replacement for an existing course or program.**

This is a new course. It will complement our current AP Computer Science A course and proposed Introduction to Programming course.

**7. List any prerequisite for this course or instructional program:**

This course would be available to all students in grades 10 to 12 who have successfully completed Algebra II with a C or better.

**8. Please write a short description of the new course or instructional program that would be suitable for the high school *Program of Studies* or for a curriculum document:**

AP Computer Science Principles offers a multidisciplinary approach to teaching the underlying principles of computation. In this course, students will develop computational thinking skills vital for success across all disciplines, including business and science, such as using computational tools to analyze and study data and working with large data sets to analyze, visualize, and draw conclusions from trends. The course engages students in the creative aspects of the field by allowing them to develop computational artifacts based on their interests. Students will also develop effective communication and collaboration skills by working individually and collaboratively to solve problems, and will discuss and write about the impacts these solutions could have on their community, society, and the world. Overarching topics include Creativity, Abstraction, Data and Information, Algorithms, Programming, The Internet, and Global Impact.

It is important to understand that while some of the course will include an introduction to programming, it is not primarily a programming course; it is about using computers to solve problems.

**9. Please list (or attach a list) of the long-term course or program goals that define the broad outcomes that this course or program seeks to help students achieve:**

The AP Computer Science Principles course is designed to be equivalent to a first- semester introductory college computing course. In this course, students will develop computational thinking skills vital for success across all disciplines, such as using computational tools to analyze and study data and working with large data sets to analyze, visualize, and draw conclusions from trends. The course engages students in the creative aspects of the field by allowing them to develop computational artifacts based on their interests. Students will also develop effective communication and collaboration skills by working individually and collaboratively to solve problems, and will discuss and write about the impacts these solutions could have on their community, society, and the world.

**10. Please indicate what topics, units, or material will be used to meet the long-term goals listed above.**

The following are the major areas of study, or big ideas, that are foundational to studying computer science:

- **Creativity:** Computing is a creative activity. Creativity and computing are prominent forces in innovation; the innovations enabled by computing have had and will continue to have far-reaching impact.
- **Abstraction:** Abstraction reduces information and detail to facilitate focus on relevant concepts. It is a process, a strategy, and the result of reducing detail to focus on concepts relevant to understanding and solving problems.
- **Data and Information:** Data and information facilitate the creation of knowledge. Computing enables and empowers new methods of information processing, driving monumental change across many disciplines — from art to business to science.
- **Algorithms:** Algorithms are used to develop and express solutions to computational problems. Algorithms realized in software have affected the world in profound and lasting ways.
- **Programming:** Programming enables problem solving, human expression, and creation of knowledge. Programming and the creation of software has changed our lives. It results in the creation of software, and facilitates the creation of computational artifacts, such as music, images, and visualizations.

- **The Internet:** The Internet pervades modern computing. The Internet and the systems built on it have had a profound impact on society. Computer networks support communication and collaboration.
- **Global Impact:** Computing has global impact. Our methods for communicating, collaborating, problem solving, and doing business have changed and are changing due to innovations enabled by computing.

The course also incorporates computational thinking practices that set clear expectations of what students will do in the course:

- **Connecting Computing** – Students learn to draw connections between different computing concepts.
- **Creating computational artifacts** – Students engage in the creative aspects of computing by designing and developing interesting computational artifacts as well as by applying computing techniques to creatively solve problems.
- **Abstracting** – Students use abstraction to develop models and simulations of natural and artificial phenomena, use them to make predictions about the world, and analyze their efficacy and validity.
- **Analyzing problems and artifacts** – Students design and produce solutions, models, and artifacts, and they evaluate and analyze their own computational work as well as the computational work others have produced.
- **Communicating** – Students describe computation and the impact of technology and computation, explain and justify the design and appropriateness of their computational choices, and analyze and describe both computational artifacts and the results or behaviors of those artifacts.
- **Collaborating** – Students collaborate on a number of activities, including investigation of questions using data sets and in the production of computational artifacts.

**How will technology be utilized to enhance the course or program goals?**

Because this is a Computer Science course, up-to-date computer technology will be used to assist the students in this course. Additionally, directed research using internet databases available through the school library will be a significant component of the course.

**What assessment strategies will be used in this course or program?**

The course is project-based and students will be required to work in teams to complete intensive projects. Each project will have a detailed description of the project (as might be expected in an industry workplace) and a scoring rubric so that students are clear about what is expected of them and how their efforts will be graded. Some of the projects

are student-generated and students will need to develop their own specifications document and scoring rubric before the project starts.

Along the way, they will make frequent presentations of their work to their peers with the opportunity to receive feedback from both the teacher *and* their peers.

**What are the unique components of this course or program content that makes it a worthwhile addition for our students?**

- This is an AP course that the College Board has designed toward addressing the under-represented groups in Computer Science whose enrollment in general has been falling for the past number of years.
- This AP course gives students a rigorous and accessible background in Computing and Computer Science rather than a focused programming course.

**11. Please indicate any special location needs, such as the computer lab:**

This course will be taught in Room 108 at the High School

**12. Please enumerate the resources – both human and financial – that you anticipate will be needed to develop this course or program correctly. Please indicate any special training that will be necessary to implement this course or program, and give the cost of this training:**

It is anticipated that this course will require the creation of one section. Most likely, this will required the reallocation of staff based on student registration numbers. Additionally, training in AP Computer Science Principles through the Taft Educational Center would be beneficial. The anticipated cost of this training is \$950. We are also exploring a grant opportunity through UTeach which will be be expanding access to their College Board–endorsed UTeach CS Principles course in partnership with the CSDE.

**13. Please give the title and cost of the proposed text and attach it, if possible.**

A recommended list of potential textbooks has been provided by the College Board. The recommended text is either *Invitation to Computer Science*, G. Michael Schneider and Judith Gresting, 7, National Geographic/Cengage Learning or *New Perspectives on Computer Science 2016: Comprehensive*, June Parsons, 18, National Geographic/Cengage Learning.

**Indicate any special equipment needs for this course and the anticipated cost of this equipment:**

Computers already present in the high school are sufficient for this course.

**14. Please address the questions below separately, and then attach your responses to this form:**

**a) What impact will this course/program proposal have upon other courses/programs currently being offered in the district?**

- The impact to other courses should be minimal. There may be a slight decline in other elective courses, due to this course being a full year course, as it may draw some students from the semester long electives, as well as from some of the full year elective courses offered in the Technology Education Department.
- This course may cause an increase in enrollment of the AP Computer Science A course presently being taught at the high school, since AP Computer Science Principles is a natural complement for that course.

**b) What impact would this proposal have on scheduling, staffing, and resources?**

- The impact on scheduling should be minimal at first, as this course will more than likely be a singleton.
- Impact on resources will be minimal as there are few consumable supplies, if any, needed to run this course.

**c) Do you anticipate that this course/program will have an impact on feeder programs and follow-up courses/programs currently being offered in the district?**

- This course may lead to an increase enrollment in the AP Computer Science A course as it is a complement to that course and may lead to additional students wanting to pursue programming in JAVA.

**d) What do you anticipate will be the impact – in terms of new print and non-print materials on the library/media center?**

- There will be little to no impact on library resources as the majority of the research material for this course will be available on the internet.

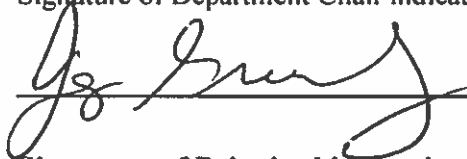
**e) Would adoption of this course/program proposal require specific staff adjustments, such as hiring new staff or retaining veteran staff?**

- The new course would require additional training of current staff

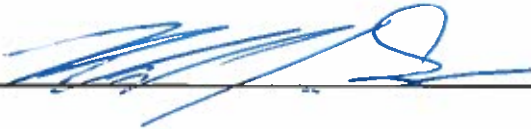
Signatures of those making this proposal: (The signatures indicate that all parts of this proposal have been thoroughly completed.)

 Date: 1/16/18

Signature of Department Chair indicating approval (if applicable):

 Date: 1-16-18

**Signature of Principal indicating approval: (Please note that this proposal must bear the principal's signature before it can be sent to District Curriculum and Program Council.)**

 Date: 1/16/18

**District Curriculum and Program Council Discussion Summary:**

---

---

---

---

---

---

---

**Signature of Assistant Superintendent indicating approval:**

 Date: 1/16/18

**Curriculum Sub-Committee of the Board of Education Discussion Summary:**

---

---

---