Student Course Syllabus –

Information Technology Problem Solving

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| **Course Title: Name** Information Technology: Problem Solving | **Program Name: STEM Curriculum year two** |
| **Course Number:** | **Required Materials:** |

# **Instructor Information:** Name: Luis Hernandez

Contact Information: lhernandez182@gmail.com

Any other appropriate information (e.g., Tutoring Hours): TBD

# **Course Description**

# Information Technology: Problem Solving

# Corporate Classroom Environment:

# In this Career and Technical Education (CTE) course, the classroom culture will be that of a professional workplace, and students will be treated as responsible employees working together to produce quality products – their assignments and projects. Students will be taught business practices and given significant leadership roles in running the class; this will demonstrate the higher level of expectations and distributed management of a real workplace. Collaboration, innovation, and critical thinking as well as safe technology practices will be stressed to ensure students are developing solid 21st Century skills. Detailed classroom standards, procedures and rules will be established together, discussed and clearly posted. Leadership, employability, and technology skills will be appraised as part of this CTE class.

# We will learn about the exciting kinds of diverse problems tackled by computer science. While exploring the field’s most important tool – programming. Our focus will be on developing systematic problem-solving strategies that can be applied to real-world problems. The course will be anchored around projects that will allow us to explore a broad range of fields that leverage programming. Through these, we will study common, reusable algorithms that we will learn to analyze for correctness and speed. This course will cover fundamentals of programming syntax and methodology using the Java and Ruby, widely used programming languages. Java and Ruby are just one example of languages used to create software and we will focus on gaining general skills that can be applied to other common languages. No matter what field you choose to make your career in, this course will provide you with valuable insights into how to solve problems systematically, how computers work and how large projects are managed.

Pre-Requisite: **E.g., Completed Algebra 1; completed or taking Geometry. Information Technology: Problem Solving:** requires continued success in mathematics with at least completion of Algebra I and strong critical-reading skills. No previous programming course or experience needed. As an Advanced Placement college preparation class, students are expected to work independently, being self-driven to complete assignments and projects by due dates, take notes, and devote additional work time at home or after school as needed; 2-4 hours of homework may be necessary each week.

# **Standards and Skills:**

This course is aligned to the following standards:

         Common Core (College and Career Readiness Anchor Standards)

         ISTE NETS (Technology)

         Employability Skills

         CTE Industry Skills

Individual standards and skills will be identified on each lesson.

# **Enduring Understandings and Essential Questions:**

***Enduring Understandings*** *are what students will come to understand about the big ideas of the course. These are the ideas and concepts that students will understand as a result of this course. These are also commonly termed “Performance Outcomes.”*

***Essential Questions*** *are open-ended, provocative questions that guide student inquiry and focus on the important ideas of the content.*

**The following Enduring Understandings and Essential Questions will guide the studies in this course:**

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| Enduring Understandings | Essential Questions |
| 1. Using the WEB in a personalized fashion as a platform to communicate. 2. Applying the appropriate strategies to narrow a search yields more targeted and effective results that support searchers in their task. 3. Studying careers in the areas of Computer Science and IT will provide insights and awareness into the field, pervasiveness and breadth of technology. 4. Problem solving is a process that can be separated into various stages. 5. Teamwork is essential to solving complex problems. 6. Using a computer language a person can provide an algorithm for the computer to follow. 7. Programming allows humans to create software that runs independent of its creator to solve problems, create simulated interactions, entertain or analyze data. 8. Understand how technology could be used to examine and extract meaning or information from data. 9. Computers are electrical machines that operate at the basic level via simple logical rules. | * How can I create a personalized website? * How can I narrow my search to get the best results? * What career opportunities are possible in the area of technology? * How can I solve a problem in an efficient manner? * How can I teach a computer to do something? * How can learning to program make me more productive, powerful and omnipresent? * How does technology help people transform data into information? * How do computers compute? |
| **Students will know…**   * "What the Internet is and elaborate on its uses * What the WWW is and elaborate on its uses * What a digital portfolio is * The process to place content(text and media) on the WWW. * What a URL is" * "Filters: sites with images, related searches, dictionary, reading level, time filtering, translated foreign pages, verbatim * Images search: any size, any color, any type, etc. * Common factors * Operators: OR, quotation marks, minus sign, tilde (~)" * "IT vs CS * Salary, wage, certification, majors, degrees * Computer and IT Occupation Categories" * "Polya problem solving approach * Team roles" * "Code * Blocks * Repeat * conditionals * Run * Functions" * "variables * input, output * conditionals * loops * functions" * "Census, survey * spreadsheet * functions:sum, avg, min, max, count, countif * infographic" * "Boolean AND, OR, NAND, XOR, NOT * input, process, output * Binary addition * Truth tables * Digital circuits | **Students will be able to…**   * "Create a functional customized multipage website using WordPress. * Add/Edit content(text and media) to their site * Communicate to others how to access their site." * "Apply filtering strategies according to research task * Employ operators to achieve targeted results * Identify problems with search results and utilize strategies to correct them" * "Identify sites for career information * Compare and contrast careers based on search criteria * Present findings on careers" * "Implement Polya's problem solving approach * Practice working productvely in teams/partners to solve problems * Express problem solving process " * "Use programming blocks to solve problems * Document and communicate solutions * Find alternative solutions * Identify bugs( syntax and logical) * Use programming blocks to create art" * How can learning to program make me more productive, powerful and omnipresent? * "Ask questions about data * Extract information from sources * Organize data in spreadsheet * Utilize spreadhsheet functions * Interpret information from data * Illustrate data via charts and infographic * Use online tool to create infographic" * "Create truth tables * Compare values * Build virtual digital circuits * Predict and explain function of circuits" |
| **List of Resources**   * Journal * Access to internet * Other (e.g., handouts) | **List of Tools and Supplies**   * Computers * Specific software * Other materials * Etc. |

Assessment Evidence

*Each performance assessment listed below each enduring understanding represents a project, test, paper, etc. that is connected to what students will know and be able to do as a result of taking this course. The due dates for each performance assessment are listed on the course map.*

# **Student Performance Assessments**

**Enduring Understanding #1:** Using the WEB in a personalized fashion as a platform to communicate.

**Performance Assessment(s):** Portfolio Project

**Enduring Understanding #2**: Applying the appropriate strategies to narrow a search yields more targeted and effective results that support searchers in their task.

**Performance Assessment(s):** Google Search Lessons

**Enduring Understanding #3:** Studying careers in the areas of Computer Science and IT will provide insights and awareness into the field, pervasiveness and breadth of technology.

**Performance Assessment(s):** Career Search Project

**Enduring Understanding #4:** Problem solving is a process that can be separated into various stages.

**Performance Assessment(s):** Problem Solving Lessons

**Enduring Understanding #5:** Teamwork is essential to solving complex problems.

**Performance Assessment(s):** Problem Solving Lessons

**Enduring Understanding #6:** Using a computer language a person can provide an algorithm for the computer to follow.

**Performance Assessment(s):** Programming Challenges

**Enduring Understanding #7:** Programming allows humans to create software that runs independant of its creator to solve problems, create simulated interactions, entertain or analyze data.

**Performance Assessment(s):** Javascript Project/Code hs project

**Enduring Understanding #8:** Understand how technology could be used to examine and extract meaning or information from data.

**Performance Assessment(s):** Chicago Traffic Light Project

**Enduring Understanding #9:** Computers are electrical machines that operate at the basic level via simple logical rules.

**Performance Assessment(s):** 1 bit computer Project

Course Map

Students will know the following topics and be able to complete the following performance tasks and assessments as a result of this course.

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| *Week* | *Topic* | *Evidence of Understanding* |
| 1-4  Dates:  Sep 9-Oct 9 | Portfolio  Logic Operators & Internet Search  Career | **Performance Assessments: Portfolio, Internet Searches Activities , Career Presentations**  **Other Evidence: Journal entries/Portfolio Update**  **Additional Requirements: Parent Signed CPS Acceptable Use Policy** |
| 5-8  Dates:  Oct 9 - Nov 6 | Problem Solving | **Performance Assessments: Participation in Problem Solving Activities**  **Other Evidence: Journal Entries/Portfolio Update**  **Additional Requirements: Employability Skills Workshop Assignment** |

**Additional Guidelines**

Each student will need to have a notebook for this class. The notebook will be used to take notes, record journals and complete selected class assignments. Students must come to class prepared every day with pencil and notebook. A thumb/flash drive is optional as students will be taught to utilize their CPS provided email accounts which provides file storage capabilities as a business tool for file management. Failure to attend class prepared will reflect negatively on grades.

# **Course Grading System**

Grades are based on a point system. Students are advised regarding how many points each assignment is worth. Students are evaluated using the following criteria:

* Performance assessments
* Projects
* Quizzes (each quiz has an Oracle standard of 70% accuracy)
* Notebooks (class notes and journal entries)
* Homework (based on completeness, quality and timeliness)
* Class participation (includes being prepared for class, attendance, respect for classmates, group participation)

# **Grade Point Values**

The following is a suggested Chicago Public Schools grading scale; however, each school has the option to adjust the scale.

**A** = 95% - 100% **B** = 88% - 94% **C** = 81% - 87% **D** = 75% - 80% **F** = 74% or less

# **Attendance**

Class attendance is extremely important. Good daily attendance, as well as being on time for class, will positively impact grades. The reverse will be true if a student misses class or comes late.

Students who are absent are expected to make up the work assigned during that class period or any tests that were given. It is the student’s responsibility to see the teacher about make-up opportunities.

If a student cuts class or has poor attendance, parents/guardians will be contacted. If a student has an unexcused absence, make-up opportunities for the work assigned for that day will be subject to the school’s attendance policy regarding cuts and make-up work

# **Honesty Policy**

The traits of a successful CPS Advanced Computer Science student are personal integrity and academic honesty. Academic dishonesty is a serious offense, which includes but is not limited to the following:

* Cheating
* Respecting property of others (classmates, teacher, and computer lab)

Cheating involves copying another student's written work, quiz, test, or exam, or the use of technological devices to exchange or submit information related to course material (class work, homework, quizzes, tests, projects, co-op work, etc.). Such practices and activities will not be tolerated and students associated with the like can have any certifications and / or licenses revoked as well as grade adjustments. Failure to comply with classroom policy and procedure will also result in disciplinary action as outlined in the Chicago Public Schools Code of Conduct.