

Programming & Prototyping

South Eugene High School

2017-2018

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Room:	9 (Computer Center)
IA time:	Ms. Taylor is always available via email (taylor_m@4j.lane.edu) and by appointment.
Credits:	.5 credit, Applied Arts (elective)
College Credits:	None
Course website:	eugene4j.edmodo.com
Grade updates:	staff.4j.lane.edu/~taylor_m login with last name (username) and student ID number (password)

Course Description

Programming and Prototyping is a course designed for CIS CTE candidates, to directly prepare students for real work in the Lane County technology sector. The "prototyping" part of the course involves 3D modeling and printing, often for the purpose of producing parts for robots created in SERT.

The "programming" part of the course requires that students choose one of two pathways:

1. Web Development - Focusing on coding in programming languages/technologies that are useful across the stack, such as HTML, CSS, & JavaScript (front-end) and NodeJS, Express, etc. (back-end).
2. Mobile Development/Robotics - Focusing on coding in Python and Java (Robotics & Android development) and/or Swift (iOS development).

Students will be exposed to Slack (communications), Git (version control), and Agile software development practices.

Learning Objectives

Learning objectives differ according to which of the two pathways are chosen and, further, according to individual desires and needs. Students identify their learning objectives as goals for programming and prototyping, expressed on their Course Backlog (see "Project Management" below). In addition to detailing the tasks/implements required to meet their goal, students must identify HOW they will accomplish each learning objective (e.g. learn the programming language), or verify that they already know the language and are using class time to create something specific with it.

Students choosing the Web Development path will use a course titled "The Web Developer Bootcamp" via Udemy, through which they are introduced to the following tools and technologies:

HTML5	jQuery	REST
CSS3	Unix(Command Line)	MongoDB
JavaScript	Commands	Database Associations
Bootstrap	NodeJS	Authentication
SemanticUI	NPM	PassportJS
DOM Manipulation	ExpressJS	Authorization

Alternatively, Web Dev-focused students may choose to learn PHP/MySQL instead of the NodeJS etc. for back-end development. In this case, sections of a different Udemy course titled "Become a Certified Web Developer" are utilized.

Students pursuing **programming** for robotics learn and use languages useful for their activities in SERT (South Eugene Robotics Team) – Java, JavaScript & Kotlin.

For the **prototyping** objectives of the class, students learn and use software according to their prototyping goals. For robotics, this could be Autodesk Inventor and/or SolidWorks; for website prototyping, Framer.

Students wishing to gain experience with 3D printing (there are two 3D printers in Room 9) are encouraged to incorporate this with their prototyping goals. Common software applications used for this purpose include Blender and MeshMixer.

Project Management

We use **Agile Project Management** techniques and language to allow students to choose, structure, and report on their work in this class. This means that:

- Students create a **Programming & Prototyping Course Backlog** at the start of the term, with their overall goals for both aspects of the class, and a comprehensive listing of increments that need to be completed to reach these goals.
- Students work in **Sprints**, each with their own **Sprint Backlog** (taken from the Course Backlog, in accordance with what seems best to work on next), and a **Sprint Retrospective** in which they review their process for the sprint. They may choose to complete 12 weekly sprints, 6 two-week sprints, or 4 three-week sprints.
- Students participate in **Daily Scrum Meetings** – five minutes at the start of each period – with a self-selected partner or group to address three questions for each individual:
 1. What did I do yesterday?
 2. What will I do today?
 3. Are there any impediments in my way?

At the end of the term, students verify that the goals were reached and write a reflective essay. There is no Final Exam in P&P; rather, students give a formal presentation to peers, summarizing their project.

Classroom/Behavioral Expectations

1. Students are expected to arrive on time. Attendance is reported within the first 10 minutes of class.
2. Students are expected to use their assigned computer and to report any difficulties to Ms. Taylor.
3. Students are expected to ask for help ANY time a direction is not clear or there is any other hindrance to their learning. It is not acceptable to skip over anything that is not understood.
4. Students are expected to work consistently for the duration of the class; when one lesson is finished, the next one should be started. (Likewise, if a course is finished, another is begun!)
5. Games of any kind are not allowed (except as they are being tested by Game Dev students).
6. Students are expected to save ALL work on in their school server (files1) account, instead of the particular computer (hard drive) where they sit and work. This is a much safer place for the files.
7. Students in this class are not allowed to use the Internet for anything other than completing course activities.
8. Students may not have food (including candy) or drink at the computers, except for water in closed containers. They may keep other drinks, in closed containers, at the computer-less tables, and visit them there.

9. Students are expected to check in with Ms. Taylor if they need to leave the room for a short period of time (bathroom, drink, etc.).
10. Students are expected to take breaks when and if they are needed; staring at a monitor for 70 minutes straight is not encouraged. Simple exercises to relieve eyes, wrists, etc. are encouraged.
11. Students may not socialize (talk) during class, other than to help each other understand the computer concepts at hand.
12. Cell phones should not be seen or heard, with the exception of their use with headphones for providing music, if it helps the student work.

Special Needs

Appropriate modifications and accommodations will be made for students with identified special needs. Identified IEP, 504, and TAG students generally feel at home in this classroom environment, since learning is pursued without comparisons of any sort being made, and distractions are minimized. Each student is encouraged to take the time they need for the activities of this course, which they have elected to take.

Grading Policies

Grading for this course uses the following category weights, to honor the relative importance of various assignment types:

Course Backlog	10%
Weekly Reports with evidence, Sprint Backlogs & Sprint Retrospectives as needed	79%
Start-of-term (syllabus, etc.)	1%
End-of-Term Paper/Presentation	10%

Grading is done on a 1-4 scale (with zero for missing assignments, until they are made up).

The rubric for the **Course Backlog** is:

Level of Mastery/Competence	Indicated by	Score given
Complete	All aspects are completed thoughtfully; the work has been completely visualized and broken down into a logical sequence of tasks that approximate the length of available work time (55 days x 70 mins./day) realistically.	4
Approaching	An aspect of the plan is missing, one or more aspects are unclear.	3
More work needed	Plan needs major work to be useful.	2
Much work needed	Plan is completely unuseable.	1

