**GIRLS TOO CODE CURRICULUM**

**1.0 Machine Learning**

### **Introduction**

* Machine learning is the science of getting computers to act without being explicitly programmed. In the past decade, machine learning has given us self-driving cars, practical speech recognition, effective web search, and a vastly improved understanding of the human genome. Machine learning is so pervasive today that you probably use it dozens of times a day without knowing it. Many researchers also think it is the best way to make progress towards human-level AI. In this boot camp, you will learn about the most effective machine learning techniques, and gain practice implementing them and getting them to work for yourself. More importantly, you'll learn about not only the theoretical underpinnings of machine learning but also gain the practical know-how needed to quickly and powerfully apply these techniques to new problems. Finally, you'll learn about some of Silicon Valley's best practices in innovation as it pertains to machine learning and AI.

**Outline:**

This course provides an introduction to machine learning, data mining, and statistical pattern recognition. Topics include:

(i) Supervised learning (parametric/non-parametric algorithms, support vector machines, kernels, neural networks).

(ii) Unsupervised learning (clustering, dimensionality reduction, recommender systems, deep learning).

(iii) Best practices in machine learning (bias/variance theory; innovation process in machine learning and AI).

The course will also draw from numerous case studies and applications so that you'll also learn how to apply learning algorithms to building smart robots (perception, control), text understanding (web search, anti-spam), computer vision, medical informatics, audio, database mining, and other areas.

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### **SKILLS YOU WILL GAIN**

Random Forest

Machine Learning (ML) Algorithms

Machine Learning

R Programming

**2.0 Robotics**

For many years now, people have been improving their tools, studying the forces of nature and bringing them under control, using the energy of nature to operate their machines. Last century is noted for the creation of machines which can operate other machines. Nowadays the creation of devices that interact with the physical world is available to anyone.   
Our course consists of a series of practical problems on making things that work independently: How they make their own decisions, act, move, communicate with each other and people around, and control other devices. We will demonstrate how to assemble such devices and programme them using the Arduino platform as a basis.

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### **WHAT YOU WILL LEARN**

After this course, you will be able to create devices that read the data about the external world with a variety of sensors, receive and forward this data to a PC, the Internet and mobile devices, and control indexing and the movement. The creation of such devices will involve design, the study of their components, the assemblage of circuit boards, coding and diagnostics. Along with the creation of the devices themselves, you will perform visualization on a PC, create a web page that will demonstrate one of your devices, and figure out how an FDM 3D-printer is configured and how it functions.

The course does not require any special knowledge from the participants and is open even to students of upper secondary school. with Programming skills and the level of English allowing you to read technical documentation would be an advantage, but this is not obligatory.

**Learning Objectives**

This curriculum is well-suited for beginners, as it will allow students to engage immediately and begin building core programming and problem-solving skills before undertaking more ambitious open-ended projects later in the course. This curriculum module is scheduled to take approximately 6 weeks.

**• Basic concepts of programming**

**•** Commands

**•** Sequences of commands

**• Intermediate concepts of programming**

**•** Program Flow Model

**•** Simple (Wait For) Sensor behaviours

**•** Decision-Making Structures

**•** Loops

**•** Switches

**•** Variables

**•** Functions

**•** Arrays

**•** Engineering practices

**•** Building solutions to real-world problems

**•** Problem-solving strategies

**•** Teamwork

**TO-DO LIST**

We are going to introduce you to the course, a very important part. Then we shall start our work: getting acquainted with Arduino, the development environment and our first components. You will learn how to assemble circuits on a breadboard and will write your first program and assemble your first device. Don’t forget about the DIY section, which is also very important

**3.0 Web Development**

This is course is designed for learning full-stack web development. Our mission is to provide a comprehensive curriculum to learn web development for free. We help our students learn the skills and build an impressive portfolio of projects in various domains to expand their horizons and makes them job market ready.

The curriculum is divided into distinct courses, each covering the subject language in depth. Each course contains a listing of lessons interspersed with multiple projects. These projects give students the opportunity to practise what they are learning, thereby reinforcing and solidifying the theoretical knowledge learned in the lessons. Completed projects may then be included in the student's portfolio.  
  
Lessons are structured through a combination of original written content and a compilation of carefully curated resources from the web. This is where the contributing happens!

Learn the main languages of the web, HTML & CSS. Our instructors will teach you how a browser understands a web page, and empower you to start building your own.  
  
Web Development 101  
What does all that code on a page mean? Have the intricacies explained in a way that shows you the ropes?  
  
Server vs Client  
Two sides to every coin, right? Some of the work on a webpage happens on another computer, the server, and some happen right in your browser. We teach you what happens where, and why.  
  
Understanding HTTP  
HTTP is the language {protocol} `````your browser uses to request data from the web. Learn to speak it, too!  
  
HTML & CSS  
These are the primary building blocks of webpages. You’ll learn how to structure your pages with HTML and make them look the way you want with CSS.  
  
Cloud-based Dev Environment (Cloud9)  
Using the latest technology, you will get a development environment that you can access anywhere, on any computer.  
  
GitHub  
Based on tools used by the top 40% of developers around the world, our students take advantage of this service to keep track of the development of their projects.  
  
Open Source Technologies  
We offer insight into top open source platforms that are used around the world to power the web and build powerful, dynamic applications.

**Data Mining**

The aim of the course is to prepare students for the application of selected data mining methods, which are used for the retrieval and extraction of interesting and potentially useful information or patterns, stored in large databases, i.e. data warehouses, with the purpose of improving the decision-making process.

**Software Engineering**

**Leadership and Entrepreneurship**