



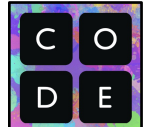

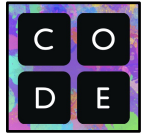


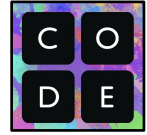



Computer Science with Embedded Robotics Progression Plan

Pre Prep

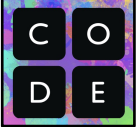




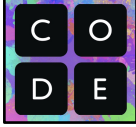










Year	Michaelmas Term		Lent Term		Summer Term	
1						
	Unplugged Coding <ul style="list-style-type: none"> • Programming concepts offline • Sequencing • Algorithms • Debugging 	BeeBots <ul style="list-style-type: none"> • Directions • Sequencing and debugging • Algorithms 	Wonder Workshop Dot Robots <ul style="list-style-type: none"> • Blockly App • Creating music • Sequences • Loops • Debugging 	Scratch Jr <ul style="list-style-type: none"> • Animations • Sequencing • Algorithms • Debugging • Block based programming 	Course A <ul style="list-style-type: none"> • Block programming • Sequencing • Debugging 	Rugged Robots <ul style="list-style-type: none"> • Offroad terrain adventures • Algorithms • Loops • Obstacle detections
2						
	Course B <ul style="list-style-type: none"> • Block programming • Sequencing • Debugging 	Wonder Workshop Dot Robots <ul style="list-style-type: none"> • Blockly App • Sequences • Loops • Events • Conditionals 	Scratch Jr <ul style="list-style-type: none"> • Designed a quiz • Sequencing • Algorithms • Debugging 	Course B <ul style="list-style-type: none"> • Block programming • Sequencing • Debugging 	Wonder Workshop Dash Robots <ul style="list-style-type: none"> • Blockly App • Sequences • Loops • Events • Conditionals 	

Computer Science with Embedded Robotics Progression Plan

Lower Prep

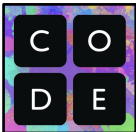



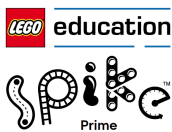






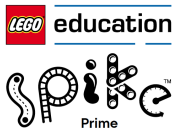





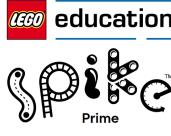



Year	Michaelmas Term			Lent Term	Summer Term
3					
	Course C - Independent Prep <ul style="list-style-type: none"> Block programming Sequencing & debugging Algorithms Creating art with code Binary Loops and events 	Logo <ul style="list-style-type: none"> Introduction to textual programming Loops Subroutines Sequencing Pattern recognition 	Wonder Workshop Dash Robots <ul style="list-style-type: none"> Problem Solving through challenges and puzzles Algorithmic thinking, such as pattern recognition Debugging skill 	Micro:Bit <ul style="list-style-type: none"> Sequencing Repetition in animation 	Dinosaur animation <ul style="list-style-type: none"> Creating Sprites Sprite costume concepts Basic block coding Input and Output
4					
	Course D - Independent Prep <ul style="list-style-type: none"> Sequencing & debugging Events Loops & nested loops If/Else conditionals While and until loops Binary 	Sphero Minis <ul style="list-style-type: none"> Connectivity via Bluetooth Basic control Abstract hardware control via drawing Basic block coding for human computer interactions 	Lego Wedo <ul style="list-style-type: none"> Robot Explorers building and customization Algorithm design for a specific problems Sequencing Repetitions 	Scratch <ul style="list-style-type: none"> Sprites and Backdrops Variables, Sequencings, Repetitions & Debugging If/Else conditionals Collision events 	Micro:Bit <ul style="list-style-type: none"> Algorithms Conditionals Input and output Variables Use of random number generator
5					
	Course E - Independent Prep <ul style="list-style-type: none"> Sequencing Debugging Inputs, Sprites and behaviours Loops and nested loops Conditionals (if, else) 	Lego Wedo: <ul style="list-style-type: none"> Sequencing Debugging Loops 	Micro:Bit <ul style="list-style-type: none"> algorithms Sequencing Conditionals Debugging digital music basics 	Scratch <ul style="list-style-type: none"> Conditionals Input and output Variables Logical operators 	

Computer Science with Embedded Robotics Progression Plan

Upper Prep










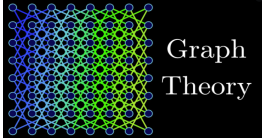

Year	Michaelmas Term			Lent Term		Summer Term	
6							
	Course F: Independent Prep <ul style="list-style-type: none"> • Sprites and behaviours • Inputs and outputs • Loops / nested loops • Variables • Functions • Artificial Intelligence concepts • The Internet 	Micro:Bit <ul style="list-style-type: none"> • Algorithms • Debugging • Sensors • Input and Output • Conditionals • Loops 		HTML and CSS <ul style="list-style-type: none"> • Text tags • Creating Lists • Images • Tables • Hyperlinks • Favicons • CSS – colours, fonts, links 		Sphero Bolt <ul style="list-style-type: none"> • Game Challenge 	Lego Spike Prime <ul style="list-style-type: none"> • Group Project
7							
	Micro:Bit <ul style="list-style-type: none"> • Building blocks kit 	Flowol <ul style="list-style-type: none"> • Algorithms • Flowcharts • Loops • Subroutines 	Python Turtle <ul style="list-style-type: none"> • Concept of modules • Move commands • For / nested loops • Variables • Lists • Subroutines 	Sphero Bolt	App Development <ul style="list-style-type: none"> • Unplugged • Design 	HTML and CSS <ul style="list-style-type: none"> • Skills review • Multi page website • Forms • Incorporating Javascript 	Lego Spike Prime <ul style="list-style-type: none"> • Drawing with Spike
8							
	Flowol <ul style="list-style-type: none"> • Algorithms • Flowcharts • Sub routines 	Python (text) <ul style="list-style-type: none"> • Text editor • Compiling • Debugging • Nested loops • Inputs and Outputs • Conditionals 	App Creation	Micro:Bit (Python editor) <ul style="list-style-type: none"> • Basics • Coding external coloured LEDs 	Understanding Computers <ul style="list-style-type: none"> • Parts of a Computer • Binary 	Lego Spike Prime <ul style="list-style-type: none"> • Sensors • Motors 	Tello Drones (academic year 2022-2023)

Computer Science with Embedded Robotics Progression Plan

Senior



Year	Michaelmas Term		Lent Term		Summer Term	
9						
						
	Python Turtle: <ul style="list-style-type: none"> Variables, their scopes & data types one dimensional array functions with and with parameters conditionals sequencing iteration pattern recognition random number generator 	Game making with Pygame: <ul style="list-style-type: none"> Variables, their scopes & data types one dimensional array functions conditionals, sequencing, iteration, pattern recognition random number generator events and event handling 	Cryptography: <ul style="list-style-type: none"> Plaintext, cyphertext and key Encrypt and decrypt with Caesar cypher using Python Limitations of modern cyphers Cryptanalyses Cyber security and PKI 	Micro:bit: <ul style="list-style-type: none"> Components of a micro computer Control outputs through inputs and logics Control behaviours via an accelerometer Radio connectivity in modern computing Computational thinking Logic operators Loops and conditionals 	Rover: <ul style="list-style-type: none"> Input and output Sensors, motors and feedback loops Events and event handling Logical decision using environment "awareness" Autonomous Robotics Programming using advanced programming constructs 	Phidgets: <ul style="list-style-type: none"> Input and output Physical port connection Sensors and feedback loops Events and event handling Elements of IoTs Programming basic IoTs using advanced programming constructs
10/11 Over two years	2.1 Algorithm design and problem-solving 2.1.1 Problem-solving and design 2.1.2 Pseudocode and flowcharts 2.3 Databases		2.2.1 Programming concepts 2.2 Programming 2.2.2 Data structures; arrays			
	1.1 Data representation 1.1.1 Binary systems 1.1.2 Hexadecimal 1.1.3 Data storage	1.2 Communication and Internet technologies 1.2.1 Data transmission 1.2.2 Security aspects 1.2.3 Internet principles of operation	1.3 Hardware and software 1.3.1 Logic gates 1.3.2 Computer architecture and the fetch-execute cycle 1.3.3 Input devices 1.3.4 Output devices 1.3.5 Memory, storage devices and media 1.3.6 Operating systems 1.3.7 High- and low-level languages and their translators	1.4 Security Pre-release	1.5 Ethics Pre-release	Pre-release

12/13 Over two years	<p>Topic 4: Computational thinking, problem-solving and programming (45 hours) Additional subject content introduced by the annually issued case study(30 hours) Option C: Web science(30/45 hours) Practical application of skills through the development of a product and associated documentation(30 hours) Group 4 project (10 hours)</p>			  
	<p>Topic 1: System fundamentals (20 hours) Topic 5: Abstract data structures (23 hours)</p>	<p>Topic 2: Computer organization (6 hours) Topic 6: Resource management (8 hours)</p>	<p>Topic 3: Networks (9 hours) Topic 7: Control (14 hours)</p>	