9 ICT	Introduction To Robotics	TERM 1	2017
HABIT OF MIND	**Thinking Interdependently** • Willing to work with others no matter who they are • Abide by group decisions even if you disagree somewhat • Welcoming ideas and perspectives different from your own		

This topic introduces students to robotics and robots, looking at how they are used in society, why they have become critical in some industries and the attempts to create humanoid helper robots.

The students will then design, build and program a rescue robot using the RoboCup Junior Rescue course and rules to guide their development.

WEEK	LESSON	Activities	Resources	Notes
1	LI: To understand the role that robots and robotics play in society SC: Identify 3 areas in which robots have made a critical difference in established practises SC: Can identify the three laws of robots and why they were established			
	1	Introduce robots and how they are used in society	Robotics Booklet	
	2	Look at the history of robotics development, including the usage of robots in books and film	PowerPoint and film clips Robotics Booklet	
	3	Create a report on the effectiveness of research into robotics, particularly humanoid robots	Word Template	
2	LI: To develop a process for the development of computer systems, in particular the use of the software and systems development cycle SC: Can identify a problem that requires a computer-based solution SC: Uses the software development cycle to specify with accuracy the parameters of the problem that needs to be solved SC: Within the DESIGN phase of a project can use appropriate software and processes to develop a plan that is achievable and within budget			
	1	Create a project document and write a problem description	Word Template	

	2	Start to create the Tribot from the booklets in Digital Designer – class working together to develop an understanding of the tools and their effective use	LEGO DIGITAL DESIGNER	
	3	Continue developing the Tribot in Digital Designer. Discuss the use of CAD in industry to develop any large-scale system (aircraft development).	VIDEO on the DESIGN of the Airbus A380 or similar VIDEO	
3	LI: To use components to build a robot to a plan SC: Can use the DESIGN to accurately build a LEGO NXT Rescue Robot LI: Use a programming language to respond to sensor input SC: Write a program that keeps the robot on the table-top without falling off			
	1	Using the booklets, build the Tribot from a kit	NXT kit, NXT and battery	Record the battery issued
	2	Using the booklets, build the Tribot from a kit	NXT kit, NXT and battery	Name the NXT for each group
	3	Write a basic program that uses the light sensor to keep the robot on the table-top	Tribot	Each team member writes a program and runs it on the robot
4	LI: Using a robot to follow a line, traverse the ramps and avoid obstacles SC: Use NXT-G to modify set programs to work in the individual circumstances faced in the classroom SC: Re-engineer parts of the robot to improve performance over ramps and speed bumps			
	1	Write a program to follow a line using the rescue mat Take readings using the VIEW command to use in the program	NXT Rescue Programming guide Rescue Mat	Remember that the light level settings will change every day
	2	Write a program to follow a line using the rescue mat Take readings using the VIEW command to use in the program	NXT Rescue Programming guide Rescue Mat	Take photos of each teams robot on the course for use in their report
	3	Write a program to go around the water tower	NXT Rescue Programming guide	Note that the timings change depending on

		Use trial and error to get timings correct	Rescue Mat Water Tower	the charge in the battery
5	LI: Using a robot to identify differences in the line, including shortcut markers and rescue zone entry SC: Successfully identify the green squares on both sides of the robot SC: Turn towards the shortcut markers SC: Identify the rescue zone and run a NEW program section once past this marker.			
	1	Modify the program to take the shortcuts, playing the sound GREEN when a shortcut is recognised	NXT Rescue Programming guide Rescue Mat Water Tower	
	2	Modify the program to take the shortcuts, playing the sound GREEN when a shortcut is recognised	NXT Rescue Programming guide Rescue Mat Water Tower	
	3	Write a short program that will run a looped program following a line until the rescue zone entry is identified	NXT Rescue Programming guide Rescue Mat Rescue Victim	
6	LI: Rescue a victim using a method compatible with your robot design SC: To use your program to successfully rescue 80% of the time it enters the rescue zone LI: To write a complete program that works in conjunction with the physical hardware SC: Run through the rescue course on the mat from one rescue zone through to the other SC: Complete the program and report upon it, describing how each part of the program works			
	1	Check that the programs are still working under the new conditions, modify boundary values Write a rescue program to find the victim using the ultrasonic sensor	NXT Rescue Programming guide Rescue Mat Water Tower	

			Rescue Victim	
	2	Rescue the victim program incorporated into the main program Test on the main rescue mat	NXT Rescue Programming guide Rescue Mat	
	3	Write report on complete program and modifications made to the robot to improve performance	Word Template	
7	LI: To see the importance of robots in dangerous fields of endeavour and how society is improved through their use SC: Through the report identify three ways that the NXT rescue robot models the real world application of robots			
	1	Robot Rescue competition day 1 – robots run a course using the tiles	Rescue Tiles, obstacles, and victim	
	2	Robot Rescue competition day 2 – robots run a more complex course using the tiles and obstacles	Rescue Tiles, obstacles, and victim	
	3	Write a report on the design, develop and evaluate process	Word Template MOODLE UPLOAD	
8	YEAR 9 CAMPS			
9	LI: Investigate the storage requirements of LEGO components SC: Pack a full LEGO kit per team by the end of the week			
	1	Pack LEGO resources into kit boxes and store in storeroom	LEGO NXT Kits	
	2	Pack LEGO resources into kit boxes and store in storeroom	LEGO NXT Kits	
	3	REFLECTION TASK – Students to complete reflection on what they have learned, how it was taught, how they worked as a member of a team and how their team-members contributed to the overall success of the robotics task	LEGO NXT Kits MOODLE UPLOAD WebMonkey Survey	
ASSESSMENT		Robot Rescue Report using the Software Development Cycle. Submit as a PDF online	Due before 11:55PM on Friday 15 March	Report should include program code, photos and an evaluation