**Robotics Course Timetable**

**Day 1:**

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| **Time** | **Activity** | **Who** | **Notes** |
| 0830 | Introduction | HM | Course Introduction, DS Introduction, Motivation, H&S |
| 0840 | Icebreaker | AM | Icebreaker to identify existing expertise – split into 7 teams, group by ability level |
| 0900 | What is an Arduino? | LC | Overview of what the Arduino can do, different pin types, digital, PWM, analogue and Power as well as Arduino powering modes |
| 0930 | Hello World | AM | How to program an Arduino by using the Arduino IDE to write a “Hello World” script on the serial monitor. Cover how code executes, the setup and loop functions, the serial monitor and delays. |
| 0955 | DC Motors | AL | Brief explanation of what a DC motor does and how they are powered. Walk through powering using the 5v and GND pins, control direction by swapping pins around, reduce speed by using the 3.3v pins. Explain why a Motor Driver is needed. |
| 1015 | Break | | |
| 1030 | Mechanical Build Brief | GM | How to assemble bots, cover how to read Assy drawings, BOMs, part and fixing names, balloons, exploded views, correct chassis orientation, assembly notes. Discuss why nylocs are used with washers, overtightening. Tool H&S brief. |
| 1045 | Mechanical Build | ALL | DS to support, catch errors but allow teams to make their own, balance time impact and learning opportunity. Watch out for H&S issues. |
| 1230 | Lunch | | |
| 1315 | Electrical Brief | AL | How to read wiring diagram, jumper wires, Male and Female ends, screw terminals (safety tug), splicing wires. Do not plug 9V Batteries in until checked by DS. |
| 1330 | Electrical Build | ALL | DS to support, when teams are ready, all wiring must be checked. Incorrect wiring will lead to short circuiting. |
| 1350 | Motor Control Program | HM | Arduino script to send digital signals from Arduino to Motor Driver. Control each wheel individually with car on mount. Direction and speed control. Handout after teaching with code. Commenting Code. Variables. Do a straight-line race. |
| 1440 | Ultrasonic Sensor | AM +HM | Fit Ultrasonic sensor (However teams want to). Guide cadets to website to learn how the ultrasonic sensor works. Write new script to print distance to the serial monitor. |
| 1520 | Break | | |
| 1535 | Autonomy Algorithm | HM | Walk through algorithm step to step for autonomous control. Code walk-through for using if else statements but leave actual code to teams. Support teams and provide help where needed. |
| 1550 | Programming and Testing | ALL | Cadets to program their bots for autonomous control. DS to support and talk-through code to help teams get a good result. If teams do well, propose ways of making the code better. |
| 1625 | Debrief | HM | Round up on success of Autonomous control |
| 1635 | Course Photograph | CM | Charlie Mole to take course photo, Staff seated, cadets holding bots. |
| 1645 | Tidy and Debrief | HM | Set expectations and goals for Day 2 |
| 1700 | Depart |  |  |

**Day 2:**

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| --- | --- | --- | --- |
| **Time** | **Activity** | **Who** | **Notes** |
| 0830 | Introduction | HM | Plan for the Day |
| 0835 | What is CREST? | LC | Describe what CREST Awards are and why they’re important, that they’re cadet led, requires a workbook to be filled in. |
| 0845 | CREST Objectives | GM | Describe the options for teams to select from, talk them through and offer possible paths to success for each, allow teams to select based on ability level.   * Controlled rotation – When hit wall, rotate slowly until the distance is long then drive forwards * Obstacle Course – Cadets to build an obstacle course and then program in set moves and turns to drive around it. * Servo Motor – Connect up a Servo Motor and attach ultrasonic sensor, when hit wall, turn servo to find the optimum direction to turn towards * RC Car – Remove Ultrasonic Sensor and replace with a Radio Transceiver (HARD) * Random Motion – When hit wall, turn in a random direction (clockwise or anticlockwise) and turn for a random amount of time * Teams choice of project |
| 0945 | CREST Workbooks | HM | Teams to populate section 1 of their CREST workbooks with details about their project. DS to support teams. |
| 1030 | Break | | |
| 1045 | Project Work | ALL | Support cadets in completing their objectives, provide some technical and engineering support but aim is for projects to be cadet led. Encourage filling in CREST Workbook throughout |
| 1230 | Lunch | | |
| 1315 | Continued Project Work | ALL | As above |
| 1415 | Self-Evaluation and Presentation Planning | GM +ALL | Cadets to complete the end of their workbook and plan their 15 min presentation. Teams should present their project to DS and the course by discussing aims, their process, problems they faced and how they overcame them, lessons learned, demonstration. |
| 1500 | Presentations | ALL | Teams split into 2 or 3 groups to deliver their presentations. Ask questions to get teams to justify their designs, processes, and choices. |
| 1600 | Disassemble | HM +ALL | Teams to disassemble their bots – following instruction from HM, step-by-step to avoid damage to parts |
| 1645 | Tidy and Debrief | HM |  |
| 1700 | Depart |  |  |

Admin Tasks

* Register, TG 23 Generate register and health condition list – Payment Collected (GM)
* CREST Admin (LC)
* Event Success Tracking (ALL)
* Attendance Logging (HM)