# AI and Robotics +Explore

Computer Science Department / JMH

**Aim: To give a taste of Electronic & Mechanical engineering alongside Computer Science. Help those interested in this area gain an experience that will help them make a more informed choice about HE/Apprenticeships.**

**To ensure all the students have an enjoyable, challenging experience, working in small teams developing a range of hard and soft skills.**

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| Week | Activity | Resources/Notes | Aim by the end of the session |
| 1 | Intro to the course: Ice breaker. Robot building…  (Make sure at the end everything is bagged and labled) | PPT. Boston dynamic video  CAMJAM instruction sheet #1,  Robot Chassis, Rpi with SD cards prep’d | Chassis built  All students know the aim of the course.  I’m aware of the motivations/ experience of all students. |
| 2 | Getting moving: Learnt to code, debug soft and hardware components | GPIO control instruction sheet. | All groups have some running code and some hardware control working.. ideally motors are wired and ready |
| 3 | Controlling motors | PWM control instruction sheet.  ***(recruit for Student Robotics Competition)*** | Everyone understands PWM and has motor speed control working |
| 4 | Line Sensing #1 (simple line sensor) | Line sensor Instruction sheet | Everyone has the line sensor wired and returning a Black/White value |
| 5 | Line Sensing #2 (feedback to the motors) | Demo concepts. Calling routines sheet | Everyone has motor control code being called based on the line sensor output (probably not well tuned) |
| 6 | Debug/refine/ repeat 😊 | Line follow challenge track | Most groups have a robot that will follow the oval track with reasonable success |
| 7 | Distance Sensing #1 Ultra sound | Demo and explain potential dividers.  UltraSound Instruction sheet.  (will need to use cascade help to avoid long delays) | Everyone’s robots has at least the ultra sound triggering, hopefully with echo time being displayed |
| 8 | Distance Sensing #2 Room navigation |  | All robots are moving in a non-deterministic manner, responding to the environment. |
| 9 | Robot Olympics.  Each team trys to complete as many challenges as possible | Challenges sheets. Arena, line track | Everyone has enjoyed seeing their robots complete challenges  Everyone gives feedback |