Assessment Specification

EMATM0054 Robotic Systems

Teaching Block 1 2021/2022

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University of BRISTOL

Assessment Structure & Rules

Assessment 1, Formative, Individual basis
27th Sep – 5th Nov 2021: UoB Weeks 1-6

You must program your robot to autonomously follow a line marked out on the floor, adhering to the Assessment 1 Specification detailed overleaf (the "Line Following Challenge").

- Deadline for final submission of formative work: UoB Week 6, **Friday 5th November 2021, 1pm**.
- Submission via an online self-assessment form, and your final version of code used to Blackboard via "Other Formative & Draft Submissions > Formative Assessment Code Submission".
- You are not permitted to use any external software libraries within your solution with the exception of standard C libraries (e.g. math.h).
- In the event of a significant disagreement in the attribution of marks for Summative Assessment 2, your Formative Assessment 1 submission will be used to determine whether you have achieved the fundamental Intended Learning Outcomes of the unit. This will be taken into consideration when exercising academic judgement in the case of any disputes.

Assessment 2, Summative (100%), team basis:
8th Oct – 17th Dec 2021: UoB Weeks 7-12

Working in pairs, your team must produce a 6-page report which details a scientific experiment conducted with your robotic system (3Pi+ or Webots), adhering to the Assessment 2 Specification, detailed overleaf.

- Your team must submit a single proposal of your project by Friday 29th October 2021 11.30pm (British Summer Time) via Blackboard.
- Final Report Deadline: **UoB Week 12 (date/time TBC).**
- You must provide a submission of a 6-page report & the working source code used for your experiment to Blackboard.
- You are not permitted to use any external software libraries within your solution with the exception of standard C libraries (e.g. math.h).
- The mark awarded for your 6-page report will be applied equally between members, unless there is a significant disagreement of contribution.
- All team members must contribute equally to the body of work.
- Your team must attend weekly supervision meetings, in which you will discuss and determine a distribution of a fictional £800 per week remuneration between team members to reflecting their working contribution. Attendance to supervision meetings is mandatory and recorded.
- Supervision meetings will have minutes taken. On a weekly basis, the recorded minutes will be sent back to you, which will include your stated current progress, goals set, and the fictional equity model distribution agreed
- In a circumstance of significant disagreement of team member contribution, a voce viva process will be held between the involved students and academics to determine final contribution. The record of supervision meetings will be included in the consideration of outcome. Your prior submission for Formative Assessment 1 will be taken into consideration to determine whether you have achieved the fundamental Intended Learning Outcomes of the unit. These factors will be taken into consideration when exercising academic judgement to resolve any disputes.

Study Support

The above two assessment components run across two consecutive 6-week study periods for Assessment 1 and Assessment 2 respectively. Your study will be supported by contact time with staff in the form of:

- Weeks 1-5: 2-hour lab-sessions each week, either on-line or in-person.
- Weeks 2-12: optional 1hr drop-in support sessions, either on-line or in-person.
- Week 7: Feedback on a Proposal made for your Assessment 2 Submission.
- Weeks 1-12: Video lectures released online.
- Live Q&A session provided Weekly, online and in-person, to support recorded videos and the coursework.
- Weeks 7-11: A weekly supervision meeting to guide and inform progress on your Assessment 2 Submission, online or in-person.
- Teaching materials, available through Blackboard. This includes a guideline 6-page report template for Assessment 2.
- Via Blackboard, video demonstrations of a solution to the Line Following Challenge, and the construction of the Line Following Challenge Map.

You should treat the 2-hour lab-session as valuable time to raise questions with staff and gain feedback on your progress. Do not attempt complete the coursework by only working within each 2 hour lab-session - use time away from staff to work independently. For a 20 Credit unit, you should look to cumulatively invest approximately 16 hours per week (2 full days of work). It is encouraged that you discuss your progress with your peers and generally support each other. However, Assessment 1 must be your own work.

Assessment 2 Specification, Summative (100%), Team Basis

Using the skills you have developed in Assessment 1 through weeks 1-6, you must identify a scientific experiment to conduct with your robotic system. You should draw on your critical insight of robotic systems to form a hypothesis, to demonstrate via the analysis of collected results, of either:

- An improvement to the robotic system operation from a baseline level of autonomous operation.
- A proof of an underlying characteristic, phenomenon, or principle of a robotic system and its consequence on autonomous operation.

Your experiment should be designed such that the body of work is reproducible and repeatable, via a robust implementation and experiment methodology, and the credibility of the results presented. The value and significance of your work should be reflected in the introduction where context is provided, and in the analysis, evaluation and conclusion of your study. These elements will be assessed by the evidence provided in your team submission of a 6-page report in a conference style. A template of a report is provided which also contains guidance.

Working in pairs, your team must produce a 6-page report which documents a scientific experiment conducted with your robotic system (either Pololu 3Pi+ or Webots). Your report must be based on and include data retrieved through empirical study of your robotic system. Your report should effectively communicate:

- the problem/challenge/hypothesis under investigation, and why it is significant.
- the experiment methodology designed and used as suited to the investigation.
- a discussion of metric(s) selected to evaluate your data and robotic system.
- clear presentation of results captured from your robotic system, and their analysis and evaluation.
- a conclusion and/or discussion, drawing from the methodology and results presented, including a brief evaluation of the study.

- You must submit a proposal of your project by Friday 29th October 2021 11.30pm (British Summer Time) via Blackboard.
- Final Report Deadline: UoB Week 12 (date/time TBC).
- You must provide a submission of a 6-page report & the working source code used for your experiment to Blackboard.
- You are not permitted to use any external software libraries within your solution with the exception of standard C libraries (e.g. math.h).
- The mark awarded for your 6-page report will be applied equally between members, unless there is a significant disagreement of contribution.
- All team members must contribute equally to the body of work.
- Your team must attend weekly supervision meetings, in which a discussion of contribution will be recorded on an equity model of distributing £800 per week between team members for their work (attendance mandatory).
- Supervision meetings will have minutes taken. The recorded minutes will be sent back to you.
- In a circumstance of disagreement, a voce viva process will be held between the involved students and academics to determine contribution. The record of supervision meetings will be included in the consideration of outcome. Your prior submission for Formative Assessment 1 will be taken into consideration to determine whether you have achieved the fundamental Intended Learning Outcomes of the unit. These factors will be taken into consideration when exercising academic judgement to resolve any disputes.

Assessment 2 Criteria:

Your report will be assessed with consideration to the following unit criteria and general University marking criteria and scales. Feedback will be provided addressing the same criteria where appropriate.

Criteria	Weight
Aims & Objectives (e.g., the "what"): - Identify relevant investigation - Realistic & challenging aims - Situation of topic within robotics - Appropriate technical difficulty	0.1
Context of work (e.g. the "why" / "value"): - Problem/research area is discussed so value is clear - Ability to meaningfully decompose a problem - Relevant literature when appropriate - Critical assessment of problem/research area.	0.2
Scientific Argument (e.g. "how" / "academic"): - Development and coherence of argument and/or proposal made. - Clearly stated hypothesis or research questions. - Evidence of synthesising reasoning and understanding. - Comparative analysis between project outcome and initial proposals. - Evidence of the ability to evaluate information and synthesise conclusions. - Correctness of work presented and evaluated.	0.25
Research/Experiment Method (e.g. "how" / "practical"): - Sufficient level of detail in documentation for reproducibility of the work. - Appropriate selection of methods, quantitative and/or qualitative. - Identification of appropriate techniques to gather and analyse credible data. - Appropriate quantity and quality of data captured. - Discussion of limitations and advantages of methods and/or metrics, impact on study. - Evaluation and interpretation of discoveries / anomalies in results with respect to the hypothesis.	0.25
Evaluation and Accomplishment (e.g., the project as a whole): - Critical appraisal of the project and process throughout - Achievements, reflections on shortcomings of the project in relation to explicit aims. - Realistic outline of further work (e.g., from what was learnt)	0.1
Report Presentation: - Logical structure, clarity of presentation. - Conformity to style (academic presentation of work) - Quality of writing, spelling, grammar, diagrams and figures. - Clarity of the use of English - Appropriate communication to audience. - Citation: Sufficient, Appropriate; accuracy, consistency, completeness.	0.1

Grade	0-20 point scale	0-100 point scale	Criteria to be satisfied
A	20 19 18	100 94 89	➢ Work would be worthy of dissemination under appropriate conditions. ➢ Mastery of advanced methods and techniques at a level beyond that explicitly taught. ➢ Ability to synthesise and employ in an original way ideas from across the subject. ➢ In group work, there is evidence of an outstanding individual contribution. ➢ Excellent presentation. ➢ Outstanding command of critical analysis and judgement.
	17 16 15	83 78 72	➢ Excellent range and depth of attainment of intended learning outcomes. ➢ Mastery of a wide range of methods and techniques. ➢ Evidence of study and originality clearly beyond the bounds of what has been taught. ➢ In group work, there is evidence of an excellent individual contribution. ➢ Excellent presentation. ➢ Able to display a command of critical analysis and judgement.
B	14 13 12	68 65 62	➢ Attained all the intended learning outcomes for a unit. ➢ Able to use well a range of methods and techniques to come to conclusions. ➢ Evidence of study, comprehension, and synthesis beyond the bounds of what has been explicitly taught. ➢ Very good presentation of material. ➢ Able to employ critical analysis and judgement. ➢ Where group work is involved there is evidence of a productive individual contribution.
C	11 10 9	58 55 52	➢ Some limitations in attainment of learning objectives, but has managed to grasp most of them. ➢ Able to use most of the methods and techniques taught. ➢ Evidence of study and comprehension of what has been taught ➢ Adequate presentation of material. ➢ Some grasp of issues and concepts underlying the techniques and material taught. ➢ Where group work is involved there is evidence of a positive individual contribution.
D	8 7	48 45	➢ Limited attainment of intended learning outcomes. ➢ Able to use a proportion of the basic methods and techniques taught. ➢ Evidence of study and comprehension of what has been taught, but grasp insecure.
E	6	42	➢ Poorly presented. ➢ Some grasp of the issues and concepts underlying the techniques and material taught, but weak and incomplete.
	5	35	➢ Attainment of only a minority of the learning outcomes. ➢ Able to demonstrate a clear but limited use of some of the basic methods and techniques taught. ➢ Weak and incomplete grasp of what has been taught. ➢ Deficient understanding of the issues and concepts underlying the techniques and material taught.
	1 - 4	7 - 29	➢ Attainment of nearly all the intended learning outcomes deficient. ➢ Lack of ability to use at all or the right methods and techniques taught. ➢ Inadequately and incoherently presented. ➢ Wholly deficient grasp of what has been taught. ➢ Lack of understanding of the issues and concepts underlying the techniques and material taught.
0	0	0	➢ No significant assessable material, absent, or assessment missing a "must pass" component.