University of Glasgow | School of Computing Science

Assessed Coursework

Course Name	**Safety-Critical Systems (H)**			
Coursework Number	**Open Assessed Exercise 1**			
Deadline	**Time:**	**16.30**	**Date:**	**27th February 2020**
% Contribution to final course mark	**20%**			
Solo or Group ✓	**Solo**	**X**	**Group**	**X**
Anticipated Hours				
Submission Instructions	**Secure boxes beside the Student Support and Enquires office at the entrance of Sir Alwyn Williams Building.**			
Please Note: This Coursework cannot be Re-Assessed				

Code of Assessment Rules for Coursework Submission

Deadlines for the submission of coursework which is to be formally assessed will be published in course documentation, and work which is submitted later than the deadline will be subject to penalty as set out below.

The primary grade and secondary band awarded for coursework which is submitted after the published deadline will be calculated as follows:

(i) in respect of work submitted not more than five working days after the deadline

a. the work will be assessed in the usual way;

b. the primary grade and secondary band so determined will then be reduced by two secondary bands for each working day (or part of a working day) the work was submitted late.

(ii) work submitted more than five working days after the deadline will be awarded Grade H.

Penalties for late submission of coursework will not be imposed if good cause is established for the late submission. You should submit documents supporting good cause via MyCampus.

Penalty for non-adherence to Submission Instructions is 2 bands

You must complete an "Own Work" form via https://studentltc.dcs.gla.ac.uk/ for all coursework

Safety-Critical Systems: Open Assessment 2019-20

Risk Assessment Techniques to reduce the Safety Concerns from Environmental Change (Level H)

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1. Introduction

The 26th session of the Conference of the Parties (COP26) of the UN Framework Convention on Climate Change (UNFCCC) is expected to take place from 9-19 November 2020, in Glasgow (see https://unfccc.int). There is a growing body of evidence that we are experiencing a period of climate change. The nature and extent of those changes are unclear; there is equal disagreement about proportionate means to limit the impact of those changes.

2 Tool Development

Your task in the open assessment is to develop a technique that will help identify and address the safety concerns that arise from future climate change. The aim is to enable senior or middle management from stakeholder organizations to assess and mitigate the risks associated with their company from climate change. Stakeholders in this context include, but are not limited to, system manufacturers, regulators, operators and the general public who might be affected by climate change. You should begin by focusing on a particular industry and company. Identify existing work in the area – both commercial examples and applicable research. For example, if you focus on aviation you could develop a systematic means of assessing the probability and consequences associated with a number of meteorological changes (stronger winds, cloud bursts etc) predicted by different scientists together with their impact on particular phases of flight. If you focus on electricity distribution, you could look at means to assess the risk from flooding or from fires that might destroy substations – there are reports dealing with these events in previous incidents that you can then map to future climate predictions.

The choice of risk assessment technique is entirely open. You may choose to extend one of the approaches that are introduced during this course, such as Fault Trees or Failure Modes, Effects and Criticality Analysis. Alternatively, you may choose to develop an entirely new method. However, if you use an existing approach you must show how it can be used with detailed AND specific case studies for risk assessment of climate change on a safety-related application. The key aim is to help organizations assess the likelihood and consequence of hazards. The specific focus must be on helping managers mitigate those risks by appropriate planning before those changes are realized hence there will be a degree of uncertainty or a confidence interval associated with any risk assessment reflecting the uncertainty of predictions about the impact of climate change.

You could implement your approach by pencil and paper. Equally, you may choose to develop electronic tools that support the application of your risk assessment technique using any programming methodology. The implementation of the tool could rely on simple web pages generated using HTML, PHP or any other associated technology. Your design may be realized using conventional programming languages or you could simply rely on paper-based support. However, the marking scheme will take into account both the strengths of the design for the risk assessment technique and the effectiveness of an implementation in terms of the support that they offer to the potential end users.

3 Evaluation
It is important that you evaluate your technique/tool for assessing the risks associated with climate change in safety-related systems. One means of doing this would be to ask a number of different users to try out your risk assessment technique on a case study, exploiting an appropriate evaluation methodology. For example, you could ask one group to use your technique and another to use an alternate approach developed by someone else in the course. If you work in a team you MUST consider the relevant plagiarism guidance on the School Learning and Teaching Committee web site and state the name of the person you worked with on your submission. You must develop your reports independent of each other. You also need to consider the level of existing expertise that the people you test will have in risk assessment. Please consult with me before conducting your evaluation so that I can provide advice in answering some of these questions. You should also consult the course handbook and associated web pages that cover the ethical guidelines for user testing.

4 Transferable Skills
This exercise will provide a first-hand introduction to the challenges that face many large organizations as they try to innovate and at the same time ensure the safety of their products. There is little common agreement on the best approaches to adopt to the potential impact of climate change and hence you will be working in an area of active research, which is also a focus for public, government and commercial interest. The exercise will underline the uncertainty that often characterizes risk assessment in safety-critical engineering – for example, credible attempts to use quantitative techniques will attract high marks especially if you can validate assessments of the probability and consequence of particular hazards arising from climate change. You should consider the role of regulators in the development process; this is covered in the early part of the course.

5 Assessment Criteria and Submission Details
This exercise is degree assessed. It contributes 20% to the total marks associated with this course. The body of the report should not exceed fifteen A4 pages. The report must be printed out and must be submitted in a binder (something that keeps the pages together and does not have sharp edges). It must include: A title page containing your contact details (student number, email etc); a table of contents and appropriate page numbers; a section on the tool that you developed; a section on the evaluation method that you used; a results sections and some conclusions. In addition to the fifteen pages in the body of the report, you may also include appendices. These should contain the listing of any code used during the study together (this can be included on a CD or other media) with suitable acknowledgements for the source of code that has been borrowed from other programmers.

The report should be handed in by 16:30, **27th February 2020 using the secure boxes beside the Student Support and Enquires office at the entrance of Sir Alwyn Williams Building.** Please make sure that you keep back-up copies of all of your work and submit a plagiarism statement using the standard on-line form. The following marking scheme will be applied: 30 for the method; 20 for the results; 30 for the conclusion; 20 for the technical documentation. All solutions must be the work of the individual submitting the exercise and the usual lateness penalties will apply unless I am given good reason in advance of the deadline. You must state your name and the title of the exercise on the front of your submission – this topic is only for level H students. Failure to answer the correct question will jeopardize your marks.

All solutions must be the work of the individual submitting the exercise and the usual lateness penalties will apply unless I am given good reason in advance of the deadline. You must state the title of this question on the front of your submission so I know you are answering the level H open exercise. You will need to do considerable reading first so please do not delay starting this assessment.