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| UniofGlasgow_black | **Course Specification¹** |
| Please note: there may be some adjustments to the teaching arrangements published in this course specification. Given current circumstances related to the Covid-19 pandemic it is anticipated that some usual arrangements for teaching on campus will be modified to ensure the safety and wellbeing of students and staff on campus; further adjustments may also be necessary, or beneficial, during the course of the academic year as national requirements relating to management of the pandemic are revised.  **1. Course Code:** | |
| ENG2029 | |
| **2. Course Title:** | |
| Embedded Processors 2 | |
| **3. Academic Session:** | |
| 2021-22 | |
| **4. Academic Level (see [Scottish Credit and Qualifications Framework Levels](https://scqf.org.uk/about-the-framework)):** | |
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| **5. Credits:** | |
| 10 | |
| **6. Short Description of the Course:** | |

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| This course provides an introduction into the functioning and programming of embedded microcontrollers and their peripherals. |

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| **7. Requirements of Entry:** |

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| Mandatory Entry Requirements  None  Recommended Entry Requirements  None |

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| **8. Co-requisites (courses that must be taken in the same session as this course as a condition of enrolment):** |

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| None. |

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| **9. Excluded Courses:** |

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| None. |

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| **10. Associated Programmes:** |

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| Electronic and Software Engineering BEng GHP6-2200  Electronic and Software Engineering MEng HG66-2204  Electronics and Electrical Engineering BEng HH56-2200  Electronics and Electrical Engineering MEng HH56-2204  Electronics with Music BEng H6W3-2200  Electronics with Music MEng H6WJ-2204 |

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| **11. Available to visiting students:** |
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| **12. Available to Erasmus students:** |
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| **13. Typically offered:** |
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| **14. Timetable (if known) and length and frequency of teaching sessions:** |

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| 2 lectures weekly |

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| **15. Course Aims:** |

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| The aims of this course are to:   * provide an introduction to embedded systems and applications; * gain knowledge of the operating principles of microcontrollers and to understand the functional interactions between software and hardware peripherals in embedded systems; * expose the student to fundamental problems and operating principles of typical embedded systems; * gain knowledge and experience on adequate programming skills relevant to embedded systems. |

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| **16. Intended Learning Outcomes of Course*:*** |

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| By the end of this course students will be able to:   * program an HCS08 microcontroller in C, assembly and machine language; * use and interface with the hardware peripherals of the microcontroller correctly; * construct paced loops, by hardware and software methods; * appreciate the difference between polling and interrupt driven programming; * use different data representations, such as ASCII and BCD; * use fixed point arithmetic to perform simple operations; * write and debug interrupt handlers, both in assembly and in C; * use serial, SPI or I2C protocols to interface with off-chip peripherals. |

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| **17. Learning and Teaching Methods:** | | |
| **Method** | **Formal Contact Hours** | **Notional Learning Hours** (including formal contact hours) |
| Lecture | 20.00 | 40.00 |
| Seminar | 0.00 | 0.00 |
| Tutorial | 5.00 | 0.00 |
| Project Supervision | 0.00 | 0.00 |
| Demonstration | 0.00 | 0.00 |
| Practical Classes and Workshops | 12.00 | 48.00 |
| Supervised time in studio / Workshop | 0.00 | 0.00 |
| Fieldwork | 0.00 | 0.00 |
| External Visits | 0.00 | 0.00 |
| Work Based Learning | 0.00 | 0.00 |
| Guided Independent Study | Not Applicable | 12.00 |
| Placement | 0.00 | 0.00 |
| Year Abroad | 0.00 | 0.00 |
| **TOTAL** | **37.00** | **100.00** |
| **18. Minimum Requirement for Award of Credits:** | | |

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| Students must attend the degree examination and submit at least 75% by weight of the other components of the course’s summative assessment.  Students must attend the timetabled laboratory classes.  Students should attend at least 75% of the timetabled classes of the course.  Note that these are minimum requirements: good students will achieve far higher participation/submission rates. Any student who misses an assessment or a significant number of classes because of illness or other good cause should report this by completing a MyCampus absence report. |

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| **19. Summative Assessment Methods:** | | |
| **Method** | **%** |
| Written Exam | 80.00% |
| Written Assignment, including Essay | 20.00% |
| Report | 0.00% |
| Dissertation | 0.00% |
| Portfolio | 0.00% |
| Project Output (Other than dissertation) | 0.00% |
| Oral Assessment & Presentation | 0.00% |
| Practical Skills Assessment | 0.00% |
| Set Exercise | 0.00% |
| **TOTAL** | **100.00** |
| **20. Description of Summative Assessment:** | | |

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| 80% Examination  20% Course Work |

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| **21. Are reassessment opportunities normally available for all summative assessments in this course?:** |
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| Reassessments are normally available for all courses, except those which contribute to the Honours classification. For non Honours courses, students are offered reassessment in all or any of the components of assessment if the satisfactory (threshold) grade for the overall course is not achieved at the first attempt. This is normally grade D3 for undergraduate students and grade C3 for postgraduate students. Exceptionally it may not be possible to offer reassessment of some coursework items, in which case the mark achieved at the first attempt will be counted towards the final course grade. Any such exceptions for this course are described below. |

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| **22. Formative Assessment & Feedback:** |

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| None. |

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| **23. Grading Basis (see University Calendar):** |
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| **24. Examination Diet:** |
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| **25. Total Exam Duration (Excluding in-class tests):** |
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| **26. Short Title:** |
| Embedded Processors 2 |
| **27. Independent Work (i.e. the result for this course can be used to meet the generic Honours requirement to achieve a grade D3 or better in a piece of independent work worth at least 20 credits or the generic PGT requirement to achieve a D3 or better in a piece of independent work worth at least 60 credits – normally a Dissertation or Project):** |
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| **28. Subject:** |
| Engineering |
| **29. Location(s):** |
| Main Campus |
| **30. College:** |
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| **31. Lead School/Institute:** |
| Engineering [REG30300000] |
| **32. Cost Centre:** |
| ENG - Micro and Nanotechnology [30305000] |
| **33. Is this course collaborative with another institution?:** |
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| **34. Teaching Institutions:** |

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| . University of Glasgow |

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| **35. Taught wholly by distance learning:** |
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| **36. Open Studies Credit Bearing:** |
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| **37. Represents a work placement or period of study abroad:** |
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| **41. Additional Relevant Information (if applicable):** |

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| It is not practicable to offer reassessment in any aspect of this course that requires practical or group work.  Recommended books   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | **Authors** | **Title, edition** | **Publisher** | **Year** | ISBN | **Cost** | **Code** | | Motorola Inc. | Understanding Small Microcontrollers | Motorola Inc. | 1998 | — | Free | A |   Codes : A = compulsory; B = strongly recommended; C = recommended; D = wider reading |

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| **42. Date of approval:** | 23/07/2019 |