

**MODULAR PROGRAMME**

**COURSEWORK ASSESSMENT SPECIFICATION**

**Module Details**

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| **Module Code** UFME7F-15-M | **Run** 20JAN/1 | **Module Title**  Advanced Control and Dynamics |
| **Module Leader**  Quan Zhu | **Module Coordinator** | **Module Tutors** |
| **Component and Element Number**  B: CW1 | | **Weighting: (25 % of the Module's assessment)** |
| **Element Description** ASSESSMENT (ASSESSMENT OF PRACTICAL WORK) | | **Total Assignment time** |

**Dates**

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| **Date Issued to Students** | **Date to be Returned to Students** |
| **Submission Place**  **Blackboard** | **Submission Date**  28/04/2022 |
| **Submission Time** **2.00 pm** |

**Deliverables**

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| Attached sheet details deliverables |

**Module Leader Signature**

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**Assignment Details**

**Submission deadline: 2pm (at the latest), Thursday, to be announced/08/2021**



**Pages:** 13-18

**Aim:** To present a consultant report for designing and simulating a control system.

**Objectives:**

Students, assumed to act as the control engineering consultants, will be expected to work alone and each will submit a formal report including

1) Define a practical engineering plant which would feature similar dynamical behaviour to the theoretical dynamics given in the **plant description** below. Briefly describe the operation of the plant. (5%)

2) Draw two equivalent control system block diagrams, which features the output feedback and the state feedback respectively. Compare the similarity and difference. (5%)

3) Analyse the plant performance such stability, observability, controllability, and time response to a unit step reference input. (15%)

4) Design a state feedback controller (you specify the reasonable design criteria). (20%)

5) Design a corresponding observer and explain when it will be used. (20%)

6) Provide relevant performance data and analysis from your simulated studies. (15%)

7) Discuss the implementation of computer based digital control system including digital controller algorithm and major hardware components. Indicate how you would choose the sampling time required for the computer control system. (10%)

8) Formality of report, including references. (10%)

**Assessment:**

All reports must be typed. The assessment will be based on

1) Achieving the objectives.

2) Quality and content of report, including references and formality.

3) Oral explanation on report if required.

**Plant description:**

A system plant is uniquely described as follows

