Control System Analysis and Design

Control 4 (ENG4042)
Control M (ENG5022)
Control Systems 4 (ENG4195)
Control Systems M (ENG5314)

➢ Dr. Henrik Gollee

- Mondays, 11am-1pm
- henrik.gollee@glasgow.ac.uk

➢ Moodle resources

- **Control System Analysis and Design**

Digital Control
Control 4 (ENG4042)
Control M (ENG5022)

➢ Dr. Matteo Ceriotto,
Matteo.Ceriotti@glasgow.ac.uk
- ▪ Fridays 9-11am

➢ Moodle resources
- ▪ **Digital Control**

Course delivery

All lectures will be online

➢ Online live sessions (via Zoom) during the timetabled slots – details on Moodle

- Lectures, examples
- Questions & Answers

➢ Pre-recorded material

- Mainly theoretical material to be watched in preparation of online live sessions

Labs / practical exercise

Control of a servo motor system.

➢ For MSc students: **timetabled** online + **in-person** lab sessions.

  ▪ Attendance is compulsory to gain course credits.

➢ For UG students: Online exercise

➢ **Basic knowledge of Matlab / Simulink is a pre-requisite**

  ▪ **All MSc students** need to complete the online on-ramp Preparatory course in advance (details to follow on Moodle)

Assessment

- ➢ Undergraduate students
  - ▪ 100% exam

- ➢ Postgraduate (MSc) students
  - ▪ 90% exam
  - ▪ 10% lab assignment

- ➢ Exams will be conducted online in December

How to stay in contact with your lecturers?

1) Attend the **timetabled "online live" sessions**
   - Opportunity to ask questions and get them answered

2) Use the **Moodle "Discussion forums"**
   - Control System Analysis and Design
   - Digital Control

3) **Only use email to the lecturers** for specific question which are not appropriate for (1) or (2)

Recommended textbooks

See Moodle page

➢ G.F. Franklin, J.D. Powell, A. Emami-Naeini: Feedback Control of Dynamic Systems.

➢ Any introductory textbook to control engineering, e.g. http://bookboon.com/en/control-engineering-matlab-ebook

➢ Further reading: **Reading list** (follow the link on Moodle)

Recommended Mobile devices app
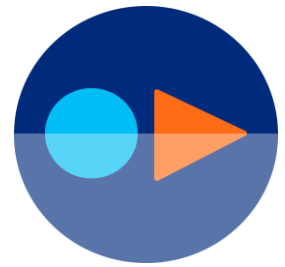
Experience Controls by Quanser

Experience Controls is a free mobile textbook designed to give you real design intuition and relevant skills in a hands-on way in the control systems engineering space.

The textbook app includes:
- 50+ lesson modules covering introductory to advanced concepts
- Interactive simulations of industrial-level controls problems
- Mini-lecture podcasts that summarize key takeaways for each chapter, available in-app or in your preferred podcast player
- End-of-chapter review questions to check your understanding

Download on the App Store

GET IT ON Google Play

Why study control engineering

https://spectrum.ieee.org/at-work/tech-careers/where-the-jobs-are-2017

Article | At Work | Tech Careers

Where the Jobs Are: 2017

Hot fields in the United States include embedded engineering, control engineering, and robotics

Posted 20 Jul 2017 | 19:00 GMT
By **JULIANNE PEPITONE**

Particularly hot areas for American engineers include embedded systems engineering, control engineering, robotics, and design validation, Keller says. At the core of these seemingly disparate trends lies a strong cross-industry focus on product development, often aided by some degree of automation to speed the process.

Course module overview

➢ **Revision:** Time domain, state space and transfer function representations

  ▪ Open / closed loop control

➢ **Part I - Classic Control:** Frequency domain analysis of feedback system

  ▪ **Concepts**:

    ✓ **Sensitivity** of control systems
    ✓ **Stability** and **robustness**
    ✓ **Design goals**

  ▪ **Controller design**:

    ✓ PID, root locus, pole placement,

➢ **Part II - Modern Control:** State space design

  ▪ State feedback control

  ▪ Observer design