ELEC 7001 ADVANCED CONTROL SYSTEMS

Credit Points 10

Legacy Code 300603

Coordinator Upul Gunawardana (https://directory.westernsydney.edu.au/search/name/Upul Gunawardana/)

Description This subject covers continuous and discrete control systems. It reviews and builds on the fundamental concepts of the theory of feedback in continuous and discrete time to examine the analysis and design of advanced continuous and discrete time linear control systems. Transfer function and state variable methods are employed. Instruction makes use of extensive experimental tasks. There is also considerable use of Matlab simulations.

School Eng, Design & Built Env

Discipline Electrical And Electronic Engineering And Technology

Student Contribution Band HECS Band 2 10cp

Check your fees via the Fees (https://www.westernsydney.edu.au/currentstudents/current_students/fees/) page.

Level Postgraduate Coursework Level 7 subject

Incompatible Subjects LGYA 5850 - Digital Control LGYA 5813 - Advanced Control Systems

Restrictions

Students must have competence in the use of test equipment, components and data sheets. Students must be enrolled in a postgraduate program.

Assumed Knowledge

Knowledge is assumed in Continuous time control systems, the use of Laplace and Z-transforms, Analog to digital, digital to analog conversion, Vector matrix difference equations, State variable models and familiarity with Matlab or similar software Knowledge is assumed in: Continuous time control systems; The use of Laplace and Z-transforms; Analog to digital, digital to analog conversion; Vector matrix difference equations; State variable models; Introductory Classical Control Systems Theory; Familiarity with MATLAB.

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Develop and use mathematical models of systems in time domain and frequency domain
2. Formulate and analyse models of real systems using physical characteristics
3. Apply root locus and frequency domain techniques for design of feedback controllers
4. Use appropriate computer based tools and laboratory instrumentation to analyse and design feedback control systems.

Subject Content

Continuous and discrete time modelling
Transfer functions, block diagrams, signal flow graphs, state variable methods
Stability methods in s-domain, z-domain, time domain
Root Locus, frequency response methods
State feedback, pole placement and observers
Use of the digital computer as main control element
Converting theoretical designs into hardware

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Type	Length	Percent	Threshold	Individual/ Group Task	Mandatory
Quiz	3 quizzes via vUWS, 2 hours per quiz. Quiz 1, 2 and 3 (10% for each test) * Broad coverage of concepts	30	N	Individual	N
Practical	2 hours per week in a computer lab The practical sessions are set up so that students can enhance and apply what is taught in the class. During practical sessions, MATLAB will be utilised for control system modelling and problem-solving. Students will be given 6 problem sets which are equally weighted and to be attempted and solved within a 2-week interval.	20	N	Individual	Y
Final Exam	2 hours	50	N	Individual	Y

Teaching Periods

Spring (2025)

Parramatta City - Macquarie St

Hybrid

Subject Contact Upul Gunawardana (https://directory.westernsydney.edu.au/search/name/Upul Gunawardana/)

View timetable (https://classregistration.westernsydney.edu.au/odd/timetable/?subject_code=ELEC7001_25-SPR_PC_3#subjects)