ELEC4632: COMPUTER CONTROL SYSTEMS

Session 2, 2014

Lecturer
Prof. Andrey Savkin, Office: Room 203, EE&T Building G17, Kensington, E-Mail: a.savkin@unsw.edu.au (use subject: ELEC 4632), Phone: 93856359

Course Information
Units of Credit: 6
Lectures: Tuesday 9.00–11.00, Week 1 – Week 12.
Location: Lectures are scheduled for CivEng 101, but may be re-scheduled.
Labs: Week 2 – Week 13.

Course PreRequisite:
This course builds on a standard introductory undergraduate course on control engineering such as ELEC3114.

Aims: Provide an introduction to computer control systems from both an input/output and a state space point of view. Provide an introduction to pole placement and optimal design methods, nonlinear digital systems, and digital control of biomedical systems.

Course Contents:
Covers the design of practical control systems intended for implementation using digital controllers and embedded systems.

Particular topics include: digital control systems, discrete systems, stability analysis, digital controller synthesis, digital PID controllers, design of digital controllers, state-space models, observability and controllability, pole placement design, optimal design methods, nonlinear discrete-time systems, digital control of biomedical systems, digital control of wind power systems, case studies.

Aspects of implementation are constantly emphasized.

Expected Learning Outcomes:
By the end of the course, students will be expected to be able to model, design and analyse digital control systems based on the above topics.

The course delivery methods and course content address a number of core UNSW graduate attributes; these include:
1. The capacity for analytical and critical thinking and for creative problem- solving, which is addressed by the lectures and tutorials.
2. The ability to engage in independent and reflective learning, which is addressed by the labs.
3. Information literacy, which is addressed by the homework.
4. The skills of effective communication, which are addressed by the lab reports.

Please refer to http://www.ltu.unsw.edu.au/content/userDocs/GradAttrEng.pdf for more information about graduate attributes.

Teaching Strategies:
Lectures – to give the basic material in written form, and to highlight the importance of different sections, and help with the formation of schema.

Tutorials and Labs – to give practice in problem solving.
Mid-semester test – to assess your progress.
Examination – the final test of competency.
Course Evaluation:
Labs - 20% (week 2 – week 13).
One mid-semester test (week 7) – 20%
Exam – 60%

Recommended Reading:
Lecture notes and papers will be handed out during the lectures and placed on the web page. The following texts will supplement the material:

Academic Honesty and Plagiarism
What is Plagiarism? Plagiarism is the presentation of the thoughts or work of another as one’s own.* Examples include:
direct duplication of the thoughts or work of another, including by copying material, ideas or concepts from a book, article, report or other written document (whether published or unpublished), composition, artwork, design, drawing, circuitry, computer program or software, web site, Internet, other electronic resource, or another person’s assignment without appropriate acknowledgment; paraphrasing another person’s work with very minor changes keeping the meaning, form and/or progression of ideas of the original; piecing together sections of the work of others into a new whole; presenting an assessment item as independent work when it has been produced in whole or part in collusion with other people, for example, another student or a tutor; and claiming credit for a proportion a work contributed to a group assessment item that is greater than that actually contributed.

For the purposes of this policy, submitting an assessment item that has already been submitted for academic credit elsewhere may be considered plagiarism. Knowingly permitting your work to be copied by another student may also be considered to be plagiarism. Note that an assessment item produced in oral, not written, form, or involving live presentation, may similarly contain plagiarized material. The inclusion of the thoughts or work of another with attribution appropriate to the academic discipline does not amount to plagiarism. The Learning Centre website is main repository for resources for staff and students on plagiarism and academic honesty. These resources can be located via:
www.lc.unsw.edu.au/plagiarism

The Learning Centre also provides substantial educational written materials, workshops, and tutorials to aid students, for example, in:
correct referencing practices; paraphrasing, summarizing, essay writing, and time management; appropriate use of, and attribution for, a range of materials including text, images, formulas and concepts.

Individual assistance is available on request from The Learning Centre. Students are also reminded that careful time management is an important part of study and one of the identified causes of plagiarism is poor time management. Students should allow sufficient time for research, drafting, and the proper referencing of sources in preparing all assessment items.

* Based on that proposed to the University of Newcastle by the St James Ethics Center. Used with kind permission from the University of Newcastle. Adapted with kind permission from the University of Melbourne.
Administrative Matters: On issues and procedures regarding such matters as special needs, equity and diversity, occupational health and safety, enrollment, rights, and general expectations of students, please refer to the School policies, see http://scoff.ee.unsw.edu.au/.