ELEC6229
Advanced Systems and Signal Processing
Overview of the Module

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A little bit about me
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2000~2007
Tsinghua Univ
Beijing, China
BSc, MSc

2007~2010
Sheffield Univ
PhD

2010~2012
Oxford Univ

A little bit about me

Learning control

Networked systems

Energy & sustainability
An example: AlphaGo

- How can you win a professional player?
An example: real time tracking

- How does computer ‘see’ moving object?
An example: finance

- How can you maximise your expected return?
Important Information Now!
Course goal

Having successfully completed the module, you will be able to demonstrate knowledge and understanding of:

- how to evaluate the performance of a stochastic system using Monte Carlo methods
- how to estimate unknown system parameter and state using noisy measurement data
- how to design and implement model based control systems
Course prerequisite

- Linear algebra
- Probability
- Linear systems theory
- Signal processing
- Computing software, e.g. Matlab
Course overview

- Review of necessary mathematical tools
- Stochastic simulation & Monte Carlo method
- Stochastic signal processing: optimal state estimation
- Advanced model based system design
Course Arrangement

- Lectures (2 lectures/week)
- Tutorial/Lab/Office hour (1 session/week)
- Highly mathematical and numerical based
- **Emphasis** is placed on guided reading and assessed coursework/project
- Participate! Participate! Participate!
- Office hour (Wens. 12:00 – 13:00)/Email
This IS a (VERY) Challenging Module

- Learning by Doing
  - Lectures (2 lectures/week) – key idea
  - Guided reading – the details
  - Tutorial/Lab - how to do it (toy problem)

- Assessed coursework/project – real problem (?)

- Please do not choose this module if you do not want to be challenged
Course Assessment

- One Take-home Test: 10%
- Assignment 1: 20%
- Assignment 2: 20%
- Project A: report: 30%
- Project B: 10% presentation + 10% peer review
Course Material

- In class notes and related reading
Course Material

All the course information (including a preliminary timetable, course slides and related readings) can be found on the course webpage

https://secure.ecs.soton.ac.uk/notes/elec6229/
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