SUMMER COURSE FOR ECONOMICS STUDENTS AND POLICY PROFESSIONALS

QuantEcon-RSE Intensive Course in Computational Modeling

Australian National University

Co-Organizers: John Stachurski and Sebastian Wende

Dates	16th–20th December, 2019
Location	Canberra
Institution	Australian National University
Primary Sponsor	Research School of Economics

This one week summer course for advanced undergraduate students and policy professionals will provide training in cutting edge computational modeling

for economic analysis. Intake is highly selective and all university students accepted to the program will be fully funded. The course will also provide a forum for students to interact with policy professionals from the Treasury, the Productivity Commission and the Reserve Bank of Australia.

The motivation for this short course is that computationally intensive models are increasingly used for applied policy analysis and, as a result, economic modeling now requires strong computational skills. For example, many computational models in economics are built on top of an optimal choice framework called dynamic programming (see, e.g., Ljungqvist and Sargent (2018) and Stokey et al. (1989)), which is used in contexts such as fiscal and monetary policy, as well as analyses of industry-specific policy including water in the Murray-Darling Basin (Grafton et al., 2011) and energy demand and supply (Ringkjøb et al., 2018). State-of-the-art dynamic programming is computationally intensive and intellectually demanding.

This one-week intensive course will establish a baseline competency in those computational methods required to apply dynamic programming and other related techniques for the purpose of public policy analysis. The skills gained will be directly useful for public policy practitioners. For students, the course will provide a basis for further study and research, a chance to meet and discuss in-demand skills with policy professionals, and a demonstrable applied skill for prospective job applications. It will build the pool of talent available to public policy institutions requiring computational economic modeling.

Goals

The goal of this course is to

1. develop capacity in computational modelling for the analysis of Australian economic data,
2. grow interest in computational economics in order to encourage students to undertake further research and learning in the area, and

3. build bridges between academic economists, students and Australia's leading policy institutions.

Instructors

The primary instructor is John Stachurski. Guest lecturers will include Dr. Fedor Iskhakov (ANU) and policy professionals (TBA).

Structure

The structure of the course for its one week duration will be as follows:

- 9am-12pm: Lectures
- 1pm-5pm: Group exercises

There will also be a social event sponsored by the Research School of Economics, as well as presentations from representatives of leading policy institutions on economic modeling in practice.

Course Content

The coding language of instruction will be Python, which is rapidly rising in popularity for scientific computing, artificial intelligence and machine learning. The course will cover the following topics:

- Python and its scientific libraries
- Dynamic models and distributions
- Dynamic programming and optimization

- Basic principles of software engineering
- Introduction to high performance computing

Applications will be drawn from macroeconomics, finance and applied microeconomics.

Financial Support

Accommodation and travel costs will be covered for all honours students based outside Canberra who are selected for the course. Tuition is free for all selected honours students.

Prerequisite Knowledge

Attendees will require familiarity with calculus and linear algebra. All attendees should have a strong interest in computing.

Applications

To apply, existing honours students and those planning to take honours next year should write a discussion of up to one page on their interests in economics and computational methods, their future plans, and why they believe they would benefit from a course on computational techniques. Students should also attach an academic transcript to their application email. Applications should be sent to both john.stachurski@anu.edu.au and sebastian.wende@anu.edu.au, with the subject line "Honours Summer Course Application".

Applications close midnight Sunday 29 September.

Administration

The administrative contact for this course is Nicole Millar via nicole.millar@anu.edu.au.

References

Grafton, R., Chu, L., Stewardson, M., and Kompas, T. (2011). Optimal dynamic water allocation: Irrigation extractions and environmental tradeoffs in the murray river, australia. *Water Resources Research - WATER RESOUR RES*, 47.

Ljungqvist, L. and Sargent, T. J. (2018). *Recursive Macroeconomic Theory*. MIT Press, fourth edition.

Ringkjøb, H.-K., Haugan, P. M., and Solbrekke, I. M. (2018). A review of modelling tools for energy and electricity systems with large shares of variable renewables. *Renewable and Sustainable Energy Reviews*, 96(C):440–459.

Stokey, N. L., Lucas, R. E., and Prescott, E. C. (1989). *Recursive Methods in Economic Dynamics*. Harvard University Press.