

Dynamic Programming

Offered in 114-2

♡ Save

Add Preselect

Serial Number
23607

Course Number
IE5038

Course Identifier
546 U6080

No Class

3 Credits

Elective
GRADUATE INSTITUTE OF INDUSTRIAL ENGINEERING / Interdisciplinary Bachelor's ...

CHENG-HUNG, WU

Mon 6, 7, 8

國青101

Type 2

30 Student Quota
NTU 30

Specialization Program

Data and Decision Sciences

🇬🇧 English

🔗 NTU COOL

🔗 Core Capabilities and Curriculum Planning

⬇ Download Course Syllabus File

📖 Notes

The course is conducted in English ◦

↗ NTU Enrollment Status

Enrolled	Remaining	Registered
20 / 30	10	0

📖 Course Description

☰ **NTU Course** 👤

dynamic optimization methods in theory and practice. General knowledge of probability theory and stochastic processes is assumed. Applications considered include revenue management, queueing systems and supply chain systems. The topics discussed also have wide applications to financial, economic, and engineering systems.

🕒 Course Objective

- Solve problems in which sequential decision making is an issue
- Understand the Principle of Optimality

- Know how to include randomness in sequential decision-making processes
- Construct and Solve infinite horizon Markov decision problems
- Show the existence of optimal policy structure for a wide variety of dynamic optimization problems
- Introduction to Stochastic Programming (another stochastic optimization tool based on mathematical programming)

☰ Course Requirement

Background in college level mathematical analysis, probability theory, and stochastic processes is required.

In addition, homework and term project will include developing computer codes for algorithms presented in class. These computer codes could be applied to solve stochastic dynamic decision problems in practice.

🕒 Expected weekly study hours before and/or after class

📅 Office Hour

📖 Designated Reading

📖 References

There are many good textbooks on dynamic programming, however, most of them are much more extensive than what we could cover in this semester. These textbooks differ slightly in their emphasis and presentation; I am providing references to some of them for you to use as reference materials in this course:

- E. V. Denardo, Dynamic Programming: Models and Applications, 1982 (out of print)
- M. L. Puterman, Markov Decision Processes, Wiley, 1994
- L. I. Sennott, Stochastic Dynamic Programming and the Control of Queueing Systems, Wiley, 1999
- J. R. Birge and F. Louveaux, Introduction to Stochastic Programming, Springer, 1997
- S. G. Nash and A. Sofer, Linear and Nonlinear Programming, McGraw-Hill, 1996
- D. P. Bertsekas, Dynamic Programming and Optimal Control, 2nd edition, Athena Scientific, 2001
- V. G. Kulkarni, Modeling and Analysis of Stochastic Systems, Chapman & Hall, 1995
- S. M. Ross, Introduction to Probability Models, 8th edition, Academic Press, 2002
- S. M. Ross, Stochastic Processes, 2nd edition, Wiley, 1995
- S. Resnick, Adventure in Stochastic Processes, 1st edition, Birkhauser, 1992
- S. Karlin and H. E. Taylor, A First Course in Stochastic Processes, 2nd edition, Academic Presses, 1975

Grading

1. NTU has not set an upper limit on the percentage of A+ grades.
 2. NTU uses a letter grade system for assessment. The grade percentage ranges and the single-subject grade conversion table in the NATIONAL TAIWAN UNIVERSITY Regulations Governing Academic Grading are for reference only. Instructors may adjust the percentage ranges according to the grade definitions. For more information, see [the Assessment for Learning Section](#) °
-

 [Adjustment methods for students](#)

 [Make-up Class Information](#)

 [Course Schedule](#)

Sponsor |  華南銀行
HUA NAN BANK

NTU Course

NTU | NTU ACA

Copyright © 2025 Office of Academic Affairs,
National Taiwan University. All Rights Reserved. v3.2.8

[User Agreement](#) | [Privacy Policy](#)