

# ECONOMICS 422 (WINTER 2022)

TAO CHEN

## COURSE DESCRIPTION

Economics 422 is a topic course that provides a basis for advanced undergraduate students on the subject of limited-dependent variable models and introduces kernel based nonparametric estimation techniques that are widely used in modern empirical research. The prerequisite is Econ 201, Econ 221 (or equivalent courses from another department) and one of Econ 322, Stat 331, Stat 361 and Stat 371. It is strongly recommended that the students have had Econ 421 or its equivalence. The overall grade will be based on some homework sets, two midterm exams and a group project.

## TEXT

The recommended textbooks for this course are *Introductory econometrics: a modern approach* by Jeffrey Wooldridge (2009, South Western Cengage Learning), *Nonparametric regression and generalized linear models: a roughness penalty approach* by Peter Green and Bernard Silverman (1994, Chapman & Hall), *Limited-Dependent and Qualitative Variables in Econometrics* by Gangadharrao Soundalyarao Maddala (1983, Cambridge University Press) and *Regression Analysis of Count Data* by Colin Cameron Pravin Trivedi (2013, Cambridge University Press). We plan to cover the following topics:

- I. Mathematical preliminaries
  - (a) The idea of conditioning and conditional expectation
  - (b) Basic asymptotic theory
- II. Maximum likelihood approach
  - (a) Censoring and truncation
  - (b) Discrete choice models
  - (c) Count data
- III. Semi-parametric/Semi-nonparametric alternatives
  - (a) An introduction to nonparametric regressions
  - (b) Single-index model and its variations
  - (c) Identification under symmetry
- IV. Connection to the machine learning literature
- V. Applications

## GRADING

The overall grade will be based on some homework sets, two midterm exams and a group project. The homework is 10% in total, the midterm is 30% each and the group project is 30%. There will be no late homework. You have to take at least one exam, and there will be no makeup for the midterm exams. If you miss one exam, your project will count for 60% of the grade.

## CLASS TIME

Monday, Wednesday and Friday 13:30 – 14:20 in AL 208.

## EXAM

First midterm: Feb. 27; Second midterm: TBA.

## CONTACT INFORMATION

- Room: 207 HH
- Phone: 519-888-4567 ext. 32558
- Email: [t66chen@uwaterloo.ca](mailto:t66chen@uwaterloo.ca)
- Office hours: Wednesday 14:45– 15:45 or by appointment

## ECONOMICS DEPARTMENT DEFERRED FINAL EXAM POLICY

Deferred Final Exam Policy found at <https://uwaterloo.ca/economics/current-undergraduates/policies-and-resources/deferred-final-exam-policy>.

## CROSS-LISTED COURSE

Please note that a cross-listed course will count in all respective averages no matter under which rubric it has been taken. For example, a PHIL/PSCI cross-list will count in a Philosophy major average, even if the course was taken under the Political Science rubric.

## ACADEMIC INTEGRITY, GRIEVANCE, DISCIPLINE, APPEALS AND NOTE FOR STUDENTS WITH DISABILITIES

See [www.uwaterloo.ca/accountability/documents/courseoutlinestmts.pdf](http://www.uwaterloo.ca/accountability/documents/courseoutlinestmts.pdf). The text for this web site is listed below:

- Academic Integrity: In order to maintain a culture of academic integrity, members of the University of Waterloo community are expected to promote honesty, trust, fairness, respect and responsibility. [Check [www.uwaterloo.ca/academicintegrity/](http://www.uwaterloo.ca/academicintegrity/) for more information.]
- Grievance: A student who believes that a decision affecting some aspect of his/her university life has been unfair or unreasonable may have grounds for initiating a grievance. Read Policy 70, Student Petitions and Grievances, Section 4, [www.adm.uwaterloo.ca/infosec/Policies/policy70.htm](http://www.adm.uwaterloo.ca/infosec/Policies/policy70.htm). When in doubt please be certain to contact the department's administrative assistant who will provide further assistance.
- Discipline: A student is expected to know what constitutes academic integrity [check [www.uwaterloo.ca/academicintegrity/](http://www.uwaterloo.ca/academicintegrity/)] to avoid committing an academic offence, and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offence, or who needs help in learning how to avoid offences (e.g., plagiarism, cheating) or about "rules" or group work/collaboration should seek guidance from the course instructor, academic advisor, or the undergraduate Associate Dean. For information on categories of offences and types of penalties, students should refer to Policy 71, Student Discipline, [www.adm.uwaterloo.ca/infosec/Policies/policy71.htm](http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm). For typical penalties check Guidelines for the Assessment of Penalties, [www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm](http://www.adm.uwaterloo.ca/infosec/guidelines/penaltyguidelines.htm).
- Appeals: A decision made or penalty imposed under Policy 70 (Student Petitions and Grievances) (other than a petition) or Policy 71 (Student Discipline) may be appealed if there is a ground. A student who believes he/she has a ground for an appeal should refer to Policy 72 (Student Appeals) [www.adm.uwaterloo.ca/infosec/Policies/policy72.htm](http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm).
- Note for Students with Disabilities: The AccessAbility Services office (<https://uwaterloo.ca/disability-services>), located on the first floor of the Needles Hall extension (NH 1401), collaborates with all academic departments to arrange appropriate accommodations for students with disabilities without compromising the academic integrity of the curriculum. If you require academic accommodations to lessen the impact of your disability, please register with the AS office at the beginning of each academic term.
- Turnitin.com: Text matching software (Turnitin®) will be used to screen assignments in this course. This is being done to verify that use of all material and sources in assignments is documented. In the first week of the term, details will be provided about the arrangements for the use of Turnitin® in this course.