

Pure Math 351, Fall 2017

COURSE OUTLINE

Lecture Information

MEET TIME: MWF 1:30-2:20pm ROOM: MC 2035

Lecturer Information

NAME: Nico Spronk E-MAIL: nspronk@uwaterloo.ca
OFFICE: MC 5322 TELEPHONE: 519-888-4567 x35559
URL: <http://www.math.uwaterloo.ca/~nspronk/math351/math351.html>
(or Google “Nico Spronk”, hit PMath 351 on my website)

Grade Distribution

Homework assignments = 30 % Midterm exam = 30 %
Final exam = 40 %

Homework assignments will be given on a 10 day-fortnightly basis.

Office hours will be announced on an ad hoc basis, according to when assignments are due.

Syllabus

Naïve Set Theory

- Set operations and relations; review of construction of real numbers \mathbb{R} .
- Axiom of Choice, Zorn’s Lemma and Well-ordering Principle.
- Cardinal arithmetic.

Metric Spaces

- Basic concepts and examples; normed vector spaces.
- Topology; boundaries, interiors and closures of sets.
- Sequences and continuous functions.
- Completeness; Cauchy sequences; basic spaces: \mathbb{R} , \mathbb{R}^n , ℓ^p and $C(X)$.
- Completions of metric spaces.
- Compactness; continuity; finite dimensional normed vector spaces.
- Banach Contraction Mapping Theorem; application to integral equations
- Baire Category Theorem; Uniform Boundedness Principle.

Spaces of continuous functions

- Weierstrauss approximation; Stone-Weierstrauss Theorem.
- Compactness: Arzela-Ascoli Theorem; application to differential equations.

Text

No specific published text will be followed. The course is self-contained, and based on lectures.

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/ 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,

<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 to avoid committing academic offenses and to take responsibility for his/her actions. A student who is unsure whether an action constitutes an offense, or who needs help in learning how to avoid offenses (e.g., plagiarism, cheating) or about "rules" for group work/collaboration should seek guidance from the course professor, academic advisor, or the undergraduate associate dean. For information on categories of offenses and types of penalties, students should refer to Policy 71, Student Discipline,

<http://www.adm.uwaterloo.ca/infosec/Policies/policy71.htm>.

For typical penalties check Guidelines for the Assessment of Penalties,

<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, <http://www.adm.uwaterloo.ca/infosec/Policies/policy72.htm>.

AccessAbility Services: Information about AccessAbility Services can be found by way of their website: <https://uwaterloo.ca/accessability-services/>.