

## ACKNOWLEDGEMENT

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UBC's Point Grey Campus is located on the traditional, ancestral, and unceded territory of the  $x^w m \theta k^w \acute{y} \acute{a} m$  (Musqueam) people. The land it is situated on has always been a place of learning for the Musqueam people, who for millennia have passed on in their culture, history, and traditions from one generation to the next.

## COURSE INFORMATION

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Course Title	Course Code Number	Credit Value
Real Analysis II / Functional Analysis	MATH 421/510	3

Time and Room: MWF 11am-12pm in MATH 204

## PREREQUISITES

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MATH 420, Measure Theory

## CONTACTS

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Course Instructor(s)	Contact Details	Office Location	Office Hours
Sven Bachmann	By email: sbach@math.ubc.ca	MATH 228	Wed 1:00-2:30

## OTHER INSTRUCTIONAL STAFF

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TA: TBA

## SCHEDULE OF TOPICS

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1. Topological spaces
  - Basic definitions, continuity, compactness
  - The Stone-Weierstrass Theorem
  - Urysohn's Lemma

2. Banach spaces
  - Metric and normed spaces
  - $L^p$  spaces and their dual
  - The Hahn-Banach Theorem and consequences
  - The Baire Category Theorem and consequences
  - Linear operators, bounded and compact operators
  - The spectrum
3. Hilbert spaces
  - Inner products
  - Orthonormal bases
  - The Riesz Lemma
  - Symmetric and self-adjoint operators
4. Radon measures and the Riesz-Markov Theorem

## LEARNING MATERIALS

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There will be lecture notes posted on the course's website.

The weekly homework assignments and their solutions will be posted on Canvas. All important announcements will be communicated through Canvas.

We will not follow any textbook explicitly. There are many excellent books, among which

1. G.B. Folland  
Real Analysis, Modern Techniques and Their Applications
2. M. Reed and B. Simon  
Methods of Modern Mathematical Physics I: Functional Analysis
3. P. Lax  
Functional Analysis

the first of which being the main reference for the course.

## ASSESSMENTS OF LEARNING

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There will be

1. weekly homework assignments made available on Fridays and due a week later,
2. one final exam to be scheduled in the April exam period.

The course grade is computed as: Homework: 40%, Final: 60%.

In calculating your score for the homework, I will drop your lowest score. These include missed assignment. You must finish a significant amount of term work in order to pass.

A missed final will be handled in a formal way.

## SYLLABUS POLICIES

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General UBC and Mathematics Department policies, for example on missed exams, can be found [here](#).

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