Course Syllabus

[Jump to Today]

Tentative Schedule:

- Week 1 - Introduction. Gaussian process.
- Week 2 - Covariance function. Applied Stochastic Modeling Lab 1.
- Week 3 - Linear prediction. Likelihood-based inference.
- Week 4 - Bayesian inference. Applied Stochastic Modeling Lab 2.
- Week 5 - Covariance function on nonstandard data. Midterm Exam.
- Week 6 - Gaussian Markov Random Fields. Applied Stochastic Modeling Lab 3.
- Week 7 - Advanced Modeling. Monte-Carlo Sampling.
- Week 8 - Point process. Epidemic modeling. Applied Stochastic Modeling Lab 4.
- Week 9 - Stochastic differential equation models. Final projects.
- Week 10 - Project reports. Project presentations.

Recommended reading:

• P. Diggle, P. J. Ribeiro. “Model-based Geostatistics”, Springer Series in Statistics, Springer, 2007.
• H. Rue, L. Held. “Gaussian Markov Random Fields: Theory and Applications”, CRC, 2005.
• C. E. Rasmussen, C. K. I. Williams. “Gaussian Processes for Machine Learning”, MIT Press, 2005.

Additional Reading:

• H.M. Taylor and S. Karlin. “An Introduction to Stochastic Modeling”, 3rd edition, AP, 1998.
• S. Karlin and H.M. Taylor. “A First Course in Stochastic Processes”, 2nd edition, AP, 1975.
• S. Karlin and H.M. Taylor. “A Second Course in Stochastic Processes”, AP, 1981
• K. Lange. “Applied Probability”, Springer, 2004.

Prerequisites

STAT 516 or an equivalent first course in stochastic processes covering inference for discrete time Markov chains, hidden Markov models and Markov random fields. As with STAT 516, students are expected to be familiar with multivariate analysis, linear algebra, some differential equations, and probability theory. Students should be able to complete short programming assignments using any low or high level programming language (e.g. R/S-Plus, Python, Matlab, SAS, C, C++, Java, Perl).

Grading

Grades will be assigned based on homeworks (60%) and exams (40%).

Homework

Homework due date will be explicitly stated on each homework assignment. Homework turned in late will receive 0 points. Each student is allowed 1 deadline extension at most over the quarter. The extension is 48hrs. The request for extension must be received before the submission deadline. There will be no extension for the midterm exam.

Exam

There will be a midterm exam around week 5 of the Winter quarter.

Course Summary:

Date	Details	Due
Thu Jan 4, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3480498&include_contexts=course_1698307)	2:30pm to 4pm
Tue Jan 9, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3480499&include_contexts=course_1698307)	2:30pm to 4pm
Thu Jan 11, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3480500&include_contexts=course_1698307)	2:30pm to 4pm
Tue Jan 16, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3480501&include_contexts=course_1698307)	2:30pm to 4pm
Wed Jan 17, 2024	HW1 (https://canvas.uw.edu/courses/1698307/assignments/8969139)	due by 11:59pm
Thu Jan 18, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3480502&include_contexts=course_1698307)	2:30pm to 4pm

Date	Details	Due
Tue Jan 23, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3480503&include_contexts=course_1698307)	2:30pm to 4pm
Thu Jan 25, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3480504&include_contexts=course_1698307)	2:30pm to 4pm
Fri Jan 26, 2024	HW2 (https://canvas.uw.edu/courses/1698307/assignments/8969140)	due by 11:59pm
Tue Jan 30, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3480505&include_contexts=course_1698307)	2:30pm to 4pm
Thu Feb 1, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3480506&include_contexts=course_1698307)	2:30pm to 4pm
Tue Feb 6, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3480507&include_contexts=course_1698307)	2:30pm to 4pm
Wed Feb 7, 2024	Midterm Exam (https://canvas.uw.edu/courses/1698307/assignments/8969141)	due by 11:59pm
Thu Feb 8, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3571839&include_contexts=course_1698307)	2:30pm to 5:30pm
	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3571838&include_contexts=course_1698307)	3pm to 4pm
Fri Feb 9, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (Lab 3: Part 2)	12pm to 1pm

Date	Details	Due
	(https://canvas.uw.edu/calendar?event_id=3573226&include_contexts=course_1698307)	
Wed Feb 14, 2024	HW3 (https://canvas.uw.edu/courses/1698307/assignments/8987606)	due by 11:59pm
Thu Feb 15, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3571840&include_contexts=course_1698307)	2:30pm to 5:30pm
Wed Feb 21, 2024	Final Project - Paper Choice (https://canvas.uw.edu/courses/1698307/assignments/9104554)	due by 11:59pm
	HW4 (https://canvas.uw.edu/courses/1698307/assignments/8987609)	due by 11:59pm
Thu Feb 22, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3571841&include_contexts=course_1698307)	2:30pm to 5:30pm
Thu Feb 29, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3571842&include_contexts=course_1698307)	2:30pm to 5:30pm
Tue Mar 5, 2024	Final Project - Written Report (https://canvas.uw.edu/courses/1698307/assignments/9123311)	due by 11:59pm
Wed Mar 6, 2024	Final Project - Presentation Slides (https://canvas.uw.edu/courses/1698307/assignments/9136934)	due by 11:59pm
Thu Mar 7, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3571843&include_contexts=course_1698307)	2:30pm to 5:30pm
Thu Mar 14, 2024	STAT 517 A Wi 24: Stochastic Modeling Of Scientific Data (https://canvas.uw.edu/calendar?event_id=3571844&include_contexts=course_1698307)	2:30pm to 5:30pm