Math 318/201   **Probability with Physical Applications**   **Jan-Apr 2014**

Monday, Wednesday, Friday 14:00-15:00 Buchanan A102
Instructor: Dr. Daniel Valesin, Math Annex 1103, 604-822-4605, `valesin@math.ubc.ca`.

Textbook: S.M. Ross, "Introduction to Probability Models," 10th edition, Academic Press, (2010).

Course material:

WEEK 1

- − Introduction to Probability Theory and its history
- − Counting problems
- − Probability spaces

WEEK 2

- − Independence and conditional probability
- − Discrete random variables: Bernoulli, Binomial, Geometric, Poisson

WEEK 3

- − Continuous random variables: Uniform, Exponential, Normal
- − Expectation, moments, variance of a random variable

WEEK 4

- − Joint distribution of random variables
- − Covariance and independence

WEEK 5

- − Generating functions and characteristic functions
- − Sums of independent random variables

WEEK 6

- − Convergence of random variables
- − Law of large numbers and central limit theorem

WEEK 7 and 8

- − Confidence intervals
- − Random walks

WEEK 9

- − Conditional expectation
- − Introduction to Markov Chains

WEEKS 10-13

- − Markov Chains: irreducibility, recurrence and transience, reversibility, asymptotic behavior, applications, Markov Chain Monte Carlo

Final exam: There will be a final examination during the April examination period.

Evaluation: The final mark will be calculated as follows:
9 homework assignments: 10%
2 midterm exams: 40%
Final exam: 50%