

Syllabus for BIOL 701: Likelihood Methods in Biology

Monday and Wednesday 10-10:50 AM

2025 Haworth

Course website: <http://phylo.bio.ku.edu/courses/likelihood>

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|-------------|--|----------|--------------|
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Office hours by appt.

Grades will be based on class participation and homework assignments. We will have approximately one homework assignment per week.

Approximate Schedule of Topics

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|----------------|-----------------------------------|--|
| <u>Week 1</u> | Jan 23 | Probability, random variables, distributions |
| <u>Week 2</u> | Jan 28, Jan 30 | Random samples, sample distributions, likelihood |
| <u>Week 3</u> | Feb 04, Feb 06 | Explicitly specifying variability: likelihood examples and Bayes' rule |
| <u>Week 4</u> | Feb 11, Feb 13 | Likelihood examples and maximum likelihood estimation |
| <u>Week 5</u> | Feb 18, Feb 20 | Review / Likelihood ratio test statistic |
| <u>Week 6</u> | Feb 25, Feb 27 | Generalized Linear Models |
| <u>Week 7</u> | Mar 04, Mar 06 | Generalized Linear Models (continued) |
| <u>Week 8</u> | Mar 11, Mar 13 Mar 21 - Mar 27 | Model Selection and Parametric bootstrapping SPRING BREAK |
| <u>Week 9</u> | Mar 25, Mar 27 | Computational aspects: numerical optimization |
| <u>Week 10</u> | Apr 01, Apr 03 | Computational aspects: numerical optimization |
| <u>Week 11</u> | Apr 08, Apr 10 | Computational aspects: Markov chain Monte Carlo (MCMC) |
| <u>Week 12</u> | Apr 15, Apr 17 | Multiparameter MCMC |
| <u>Week 13</u> | Apr 22, Apr 24 | Hastings ratio and model jumping |
| <u>Week 14</u> | Apr 29, May 01 | Special topics: based on student suggestions |
| <u>Week 15</u> | May 06, May 08 | Special topics: based on student suggestions |