

## Suggested courses for students who want to become computational(ly competent) from scratch:

### Foundational

- **GS559** - Intro python for absolute beginners
  - *There is a large gap between where 559 ends and 540 begins. We're working on getting a new class to bridge this. In the meantime, we recommend this course from the biology department. Also see the resources below.*
  - **BIOL519** – Slightly more advanced python, intro to utilities common in comp bio (e.g., version control, command line, etc.). Appropriate for students either after or in lieu of GS559.
- **GS540** - Comp bio I
  - This class will vastly improve your programming ability, and is worth the effort if you truly want to be a computational(ly competent) biologist. But it does entail a heavy workload (plan on 15-20 hours/week).
- **GS541** - Comp bio II
  - More of a survey course. Nice exposure to a lot of methods in computational bio overall. Far less work than 540, but still requires decent programming skills to complete. Note this is the foundational required course required for the highly recommended CMB certificate program (see below).
- **Foundation in statistics** -- no ideal series, pick the option right for you from these or from another department's catalogue.
  - **Statistics 509**: Introduction to Mathematical Statistics
  - **Statistics 512-513**: Statistical Inference
  - *Note that BIOST517/518 is discouraged. The summer stats course common among MCB students is probably insufficient for the kinds of analyses common in computational biology.*

### Electives

- **BIOST578** - Bayesian Statistics (special topic)
- **GS570** - Phylogenetic Inference
- **PABIO 536** (co-listed as BIME 536/PHG 536) - *Bioinformatics and Gene Sequence Analysis. Non-programming intro to common databases, etc.*
- **EPI554** - Intro to Epidemic Modeling - *Great introductory class to programming deterministic mathematical models for infectious diseases.*
- **CSE544** – Data Management
- **CSE 546 or STAT 535** – Machine Learning
- **CSE 512** – Data Visualization
- **CSE527** – *The computer science version of GS540 for students coming from a CS background.*
- **CSE586** – *Intro to synthetic biology (again, for students with a preexisting background in CS or comp bio)*

### Resources

- **Programming**
  - Online intro python – <http://www.codecademy.com>
  - Hutch IO routinely offers short courses on python, R, the command line, and other utilities in computational bio. Courses fill quickly; sign up for their email list. <http://www.fredhutch.io/>
  - Guide from the CS department on which programming courses to take. Note that these are undergraduate level courses (do not count for MCB credit), but may help bridge the gap between GS559 and GS540 for students who are serious about learning to program. Particularly useful looking courses below:  
<https://courses.cs.washington.edu/courses/cse140/13wi/which-programming-class.html>

- CSE 391 - Another undergraduate course that does not count for MCB credit, but covers highly useful utilities for working in comp bio (e.g. command-line interface, file and string manipulation, regular expressions, and using version-control systems.)
- **Certificate programs**
  - Certificate programs pull students from many departments, and can be a great way to tap into a learning community of peers with shared interests. It can also help structure your curriculum and adds a line to your CV.
  - MCB supports students' participation in the following:
    - Computational Molecular Biology (CMB) - <http://cmb.washington.edu/requirements.htm>
    - eScience Advance Data Science Option - <http://escience.washington.edu/education/phd/advanced-phd-data-science-option/>
    - Statistical Genetics - <http://www.stat.washington.edu/statgen/index.php?page=procedures-for-completion>
- Coming soon (Fall 2017): student interest group / peer learning network.
  - Interested? Or want to be part of shaping this? Contact Sidney Bell – [sidneymb@uw.edu](mailto:sidneymb@uw.edu)