Recommended Prerequisites

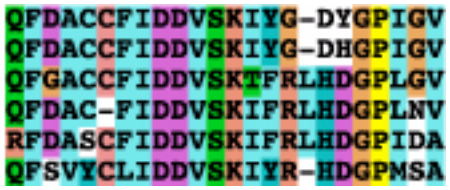
For students deficient in computer science:
CSci 4041.
Algorithms and Data Structures - 4 cr
(CSci 1902 and 2011 or instr consent)

For students deficient in biology, one of the following:
BioC 6021.
Biochemistry - 3cr
(prereq general biology, organic chemistry, instr consent)

BMEn 5501.
Biology for Biomedical Engineering - 3-4cr
(engineering upper div or grad student)

For doctoral students deficient in statistics, one of the following:
PubH 6450.
Biostatistics I - 4cr
([[Math 1111 or Math 1201], hlth sci grad student] or instr consent)

Stat 5021.
Statistical Analysis – 4cr
(College algebra or instr consent)



(courtesy of Steve Cannon, Plant Biology)

For More Information:

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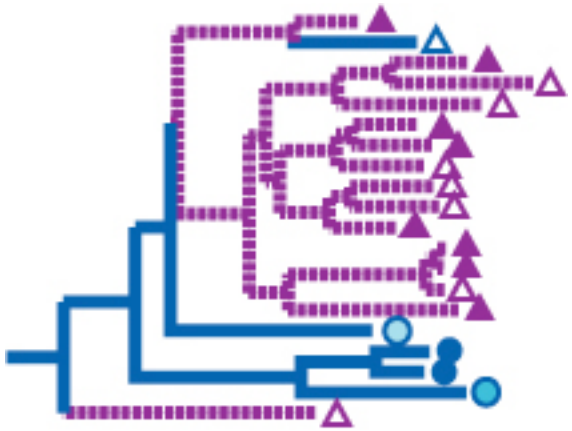

(courtesy of Steve Cannon, Plant Biology)

UNIVERSITY OF MINNESOTA

Graduate Minor Programs in Bioinformatics

Bioinformatics applies computer and information science to solve biological problems. The bioinformatics graduate minors include core coursework in computer and biological sciences. Enrollment in the minor is contingent upon enrollment in a major offered by the UM Graduate School.

The three core courses in bioinformatics are *Computational Techniques for Genomics*, one from several courses in applied genomics or sequence analysis, and *Genetics* or *Molecular and Genomic Evolution* (for computer science majors) or *Practice of Database Systems* or *Principles of Database Systems* (for non-computer-science majors).

The masters minor program is the three core courses (9 cr). The doctoral minor program is the core plus one of two courses in statistical genomics and one course not in the student's major field from a list of relevant electives (15-17 cr).

Depending on a student's background, one or more prerequisite courses may be recommended prior to the start of the minor program.

Core Courses

Spring - **CSci 5481**.
Computational Techniques for Genomics
3 cr - G. Karypis (CSci 4041 or instr consent)

AND one 3 cr. course from the following:

Fall - **PBio/PlPa 5301**.
Plant Genomics - N. Young
([Intro course in genetics, intro course in biochemistry] or instr consent)

Spring - **Phcl 5111**.
Pharmacogenomics - C. Campbell
(Grad student or instr consent)

Spring - **BioC 5361**.
Microbial Genomics and Bioinformatics - L. Wackett and A. Khodursky
(College-level courses in [organic chemistry, biochemistry, microbiology])

AND one 3 cr course from the following:
(non-computer-science majors, one course from the following)

CSci 4707. Practice of Database Systems
(CSci 4041 or instr consent) staff

CSci 5707. Principles of Database Systems
(CSci 4041 or instr consent) staff

(computer-science majors, one course from the following)

Biol 4003. Genetics - staff
(Biol/BioC 3021/6021 or BioC 4331)

EEB 5221. Molecular and Genomic Evolution - G. May and A. Dean
(Biol 4003, GCD 3022, or instr consent)

Total: 9 credits

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For **Doctoral** students, the core courses plus one course from the following:

Spring - **AnSc/MVB 5200**. Statistical Genetics and Genomics - 4 cr - Y. Da
([Stat 3021 or equiv], [GCD 3022 or Biol 4004 or equiv])

Spring - **PubH 7445.** Statistics for Human Genetics and Molecular Biology - 3 cr – C. Reilly ([PubH 6450 or equiv] or instr consent; knowledge of molecular biology)

*AND one 3-4 cr **elective** not in a student's major field from the following or others with DGS approval (prerequisites must be met):*

BioC 4950. Comp. Sim. & Data Analysis in Biochem. V. Bloomfield
ChEn 8754. Sys. Analysis of Biol. Processes. W-S. Hu
Chem 5021/8021. Comp. Chemistry. J. Gao
CSci 5521. Pattern Recognition. Staff
CSci 5980. Func. Genomics, Systems Biol. & Bioinformatics. R. Kuang & C. Myers
CSci 8725. Databases for Bioinformatics. J. Carlis
EEB 5033. Population & Quantitative Genetics. R. Shaw, J. Curtsinger
EEB/Ent 5371. Systematics. R. Zink, S. Weller
EEB 5963. Modeling Nature & the Nature of Modeling. C. Neuhauser
Math 8540. Math. Biology. H. Othmer
NSc 5201. Membranes & Channels. J. Fohlmeister
NSc 5202. Sys. & Inform. Process. D. Redish
Phys 5081. Biopolymer Physics. A. Grosberg
PubH 7475. Stat. Learn. & Data Mining. W. Pan
PubH 6381. Genet. in Public Health (2 cr). &
PubH 6385. Comp. Methods in Genetic Epi. (2 cr). M. Miller
Total: 15 - 17 credits.

11/15/07