DBMI Program starting Fall 2015

**5 Core Courses** (3 credits each) PhD, Postdoc, and MA

**Fall 1:** Introduction to Biomedical Informatics

**Fall 1:** Acculturation to Programming and Statistics (may place out with permission of Acculturation faculty)

**Spring 1:** Research Methods (this is a core course which can count as a qualitative objective for CL or PH PhD students; is optional for MA where it can count as qualitative objective)

**Spring 1:** Computational Methods

**Fall 2:** Symbolic Methods

Seminar (required for PhDs, Postdocs, full-time MAs; recommended for part-time MAs) – 1 credit Ethics (PhD and Postdoc MA) – 1 credit

TA – 2 times for PhD, 2 times for postdocs staying 3 years, 1 time for postdocs staying 2 years) –2 credits each time

Overall, 5 additional courses to the core courses (2-3 objective classes and 2-3 domain classes) to be taken to fit into the program for PhDs and postdocs; 4 additional courses to the core courses for MAs who are not Postdocs (note that these MAs may count Research Methods or Computational Methods as one of their objectives). The distributions of the courses over the objectives and domains is determined for each type of student (full-time MA, part-time MA, postdoc, PhD), and for each type of specialization).

**Objectives**

*Qualitative* – 3 credits each

Introduction to Qualitative Methods (Nursing school)

User Interface Design (CS)

Research Methods (core for clinical and translational, but can count as Qualitative objective for data science track and non-postdoc MAs**)**

Computational Systems Biology (core for bio students – Qualitative objective is not required)

*Quantitative* – 3 credits each

Visualization (TC)

Design of Medical Experiments (Biostats)

Intro to Biostatistics (Biostats)

Machine Learning (CS)

Advanced Machine Learning (CS)

Data Mining (Stats)

Applied Data Mining (Stats)

Foundations of Graphical Models (Stats,CS)

Natural Language Programming (CS)

*Information Technology* – 3 credits each

Databases (CS)

Advanced Databases (CS)

Programming and Problem Solving (CS)

Analysis of Algorithms (CS)

Advanced Software Engineering (CS)

Algorithms for data science (Data Science)

Visualization (TC)

*Domain Specific Courses* – 3 credits each

|  |  |  |  |
| --- | --- | --- | --- |
| Clinical | Biological | Translational | Public Health |
| - Process Redesign  - Clinical information  systems  - Acculturation to Medicine and Biomedical Informatics  - Mechanisms in Human Disease (Pharmacology) | **- Computational Systems Biology**  **- Quantitative & Computational Aspects of Infectious Disease**  **-** Introduction to Genomic Information Science and Technology  - Computational Methods for High-throughput Sequencing  - Deep Sequencing  Biological sequence analysis  -Advanced Statistical and Computational Methods in Genetics and Genomics  - Other courses listed in <http://systemsbiology.columbia.edu/courses> | **-Translational Bioinformatics**  - Mechanisms in Human Disease (Pharmacology)  - Principles of Systems Pharmacology (Pharmacology)  - **Computational Aspects of Infectious Disease**  Development  - Computational Methods for High-throughput Sequencing | - Principles of Epidemiology  - Social Epidemiology  - New Media and Health  - Public Health Informatics |

Examples of Objective trajectories for PhDs and Postdocs:

* Data science track: 2 quant, 1 IT, 2 domain
* Clinical track (includes public health, intervention): 3 from any combination of Qual, Quant, IT and 2 from domain or 2 from any combination of qual, quant, IT and 3 from domain
* Translational track: 2 quant, 1 IT, 2 domain
* Bioinformatics track: 2 quant, 1 IT, 2 domain

Examples of Objective trajectories for Mas (similar but contains one less course):

- Data science track: 2 from quant, 2 from domain

- Clinical track (includes public health, intervention): 2 from any combination of Qual, Quant, IT, and 2

from domain

- Bioinformatics track: same as for PhDs or postdocs but 1 less quant or 1 less domain

- Translational track: same as for PhDs and Postdocs but 1 less quant or 1 less domain

**Credits**

* 18 credits max per term
* 1 credit seminar every year, except optional 1 year
* 1 credit ethics Spring I
* research credits for PhDs and Postdocs
  + Year 1: 6 credits per term
  + Year 2: 9 credits per term
  + Year 3: 12 credits per term

**Sample trajectory**

**Fall I (16 credits)**

* Introduction to Biomedical Informatics (3 credits)
* Acculturation to Programming and Statistics (3 credits)
* Objective or domain (3 credits)
* Seminar (1 credit)
* Research (6 credits)

**Spring I (17 credits)**

* Computational Methods (3 credits)
* Research Methods (3 credits)
* Objective or domain (3 credits)
* Ethics (1 credit)
* Seminar (1 credit)
* Research (6 credits)

**Fall II (18 credits)**

* Symbolic Methods (3 credits)
* Objective or domain (3 credits)
* Seminar (1 credit)
* Research (9 credits)
* TA (2 credits)

**Spring II (16 or 17 credits)**

* 2 objective or domain courses (6 credits)
* TA (2 credits) OR Seminar (1 credit) and TA in Fall III
* Research (9 credits)