Computational Neuroscience Track worksheet
(14 courses required or 15 for Honors)

Math and Statistics (3 courses)
- 1. Multivariable Calculus: Math 19a*, Math 21a, 22a, 23b, 25b, 55b, Applied Math 21a, or 22b
- 2. Linear Algebra: Math 18/19b*, 21b, 22b, 23a, 25a, 55a, Applied Math 21b, or 22a
- 3. Statistics 110

* Not recommended for students planning to take additional Math/Applied Math courses (or Modeling/Analysis electives with higher math pre-reqs).

Computer Science (2 courses)
- 4. CS 50
- 5. CS 51 or 61

Foundational Biology (2 courses)
- 6. Any one of the following (courses with labs are underlined):

<table>
<thead>
<tr>
<th>LS 1a or LPSA Chemistry, Molecular/Cell Bio, LS 1b Genetics, Genomics, Evolution</th>
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<tbody>
<tr>
<td>LS 2 Evolutionary Human Physiology and Anatomy, HEB 1420 Human Anatomy</td>
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<tr>
<td>MCB 60 Cell Biology, MCB 63 Biochemistry, MCB 64 Cell Biology,</td>
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<tr>
<td>MCB 65 Physical Biochemistry, MCB 68 Cell Bio &amp; Microscopy</td>
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<tr>
<td>OEB 50 Population Genetics, OEB 53 Evolutionary Biology</td>
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<tr>
<td>SCRB 50 Building a Body</td>
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</table>

- 7. One approved 100-level HEB, MCB, OEB, or SCRB course (or any second course from the box above)

Neurobiology (5 courses)
- 8. Neuro 80: Neurobiology of Behavior
- 9. Neuro 105, Neuro 115, or Neuro 120
- 10. Additional Quantitative Elective:

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<tr>
<th>APMTH 226: Neural Computation, BME 130 Neural Control of Movement</th>
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<tbody>
<tr>
<td>Neuro 105 Systems Neuroscience, Neuro 115 Cellular Basis of Neuronal Function,</td>
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<tr>
<td>Neuro 120 Introductory Computational Neuroscience, Neuro 130 Visual Recognition</td>
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<tr>
<td>MCB 131 Computational Neuroscience, Neuro 140 Artificial and Biological Intelligence,</td>
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<tr>
<td>Neuro 141 Physics of Sensory Systems, Psych 1401 Cognitive Computational Neuro</td>
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<tr>
<td>Psych 1451 Debugging the brain</td>
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Modeling and Analysis (2 courses) Any two courses from our approved list:
https://www.mcb.harvard.edu/undergraduate/neuroscience/neuro-courses/?course-button=compneurotrack

- 13. ________________________________
- 14. ________________________________

Honors – optional
- 15. Neuro 91 Laboratory Research or LS100 Experimental Research or completion of a senior thesis
Computational Track Electives

The following list of classes count as modeling/analysis electives for students on the Computational Neuroscience Track. Additional courses may be petitioned for approval.

APM 50: Intro to Applied Mathematics
APM 104: Series Expansions and Complex Analysis
APM 105: Ordinary and Partial Differential Equations
APM 107: Graph Theory and Combinatorics
APM 108: Nonlinear Dynamical Systems
APM 111: Intro Scientific Computing
APM 120: Applied Linear Algebra and Big Data
APM 232: Learning, estimation and control of Dynamical Systems

CS 108: Intelligent Systems: Design and Ethical Challenges
CS 109: Intro to Data Science
CS 121: Intro to Theory of Computation
CS 124: Data Structures and Algorithms
CS 125: Algorithms and Complexity
CS 143: Computer Networks
CS 181: Machine Learning
CS 182: Artificial Intelligence

ENG-SCI/APM 115: Mathematical Modeling
ENG-SCI/APM 121: Intro to Optimization
ENG-SCI 155: Biological Signal Processing
ENG-SCI/APM 158: Feedback Control of Dynamical Systems

MCB 111: Mathematics in Biology
MCB 112: Biological Data Analysis
MCB 198: Advanced Math Techniques for Modern Biology
MCB 199: Statistical Thermodynamics and Quantitative Biology

Psych 2030: Bayesian Data Analysis

Stat 108: Computing Software
Stat 111: Theoretical Inference
Stat 115: Intro Computational Biology
Stat 117: Data Analysis in Modern Biostatistics
Stat 121: Data Science
Stat 131: Time Series
Stat 139: Linear Models
Stat 171: Stochastic Processes
Stat 220: Bayesian Data Analysis
Stat 149: Generalized Linear Models