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

Math and Statistics (3 courses)

☐ 1. Multivariable Calculus: Math 19a*
   Math 21a, 22b, 23b, 25b, 55b, Applied Math 21a, or 22b
☐ 2. Linear Algebra: Math 18/19b*, 21b, 22a, 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 32, 50, or Applied Math 10
☐ 5. CS 51 or 61

Foundational Biology (2 courses)

☐ 6. Any one of the following (courses with labs are underlined):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>LS 1a or LPSA</td>
<td>Chemistry, Molecular/Cell Bio, LS 1b Genetics, Genomics, Evolution</td>
</tr>
<tr>
<td>LS 2</td>
<td>Evolutionary Human Physiology and Anatomy, HEB 1420 Human Anatomy</td>
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<tr>
<td>MCB 60</td>
<td>Cell Biology, MCB 63 Biochemistry, [MCB 64], MCB 66 Cell Biology,</td>
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<tr>
<td>MCB 65</td>
<td>Physical Biochemistry, MCB 68 Cell Bio &amp; Microscopy</td>
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<tr>
<td>OEB 50</td>
<td>Population Genetics, OEB 53 Evolutionary Biology, SCR 50 Building a Body</td>
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☐ 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, Neuro 120 (Neuro 120 strongly recommended)
☐ 10. Additional Quantitative Elective:

<table>
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<th>Course Code</th>
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<tbody>
<tr>
<td>APMTH 226</td>
<td>Neural Computation, BME 130 Neural Control of Movement</td>
</tr>
<tr>
<td>BME 131</td>
<td>Neuroengineering, BME 129: Intro to Bioelectronics</td>
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<tr>
<td>Neuro 105</td>
<td>Systems Neuroscience, Neuro 115 Cellular Basis of Neuronal Function,</td>
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<td>Neuro 120</td>
<td>Introductory Computational Neuroscience, Neuro 130 Visual Recognition</td>
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<tr>
<td>MCB 131</td>
<td>Computational Neuroscience, Neuro 140 Artificial and Biological Intelligence,</td>
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<tr>
<td>Neuro 141</td>
<td>Physics of Sensory Systems, Psych 1401 Cognitive Computational Neuro</td>
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<tr>
<td>Psych 1406</td>
<td>Biological and Artificial Visual Systems, Psych 1451 Debugging the brain</td>
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</table>


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. ______________________ |

Research and thesis courses – optional

☐ 15. Neuro 91 Laboratory Research, LS100 Experimental Research, or Neuro 99 Thesis Research
**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

BME 110: Physiological Systems Analysis

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 143: Computer Networks  
CS 181: Machine Learning  
CS 182: Artificial Intelligence  
CS 187: Computational Linguistics

ENG-SCI/APM 115: Mathematical Modeling  
ENG-SCI/APM 121: Intro to Optimization  
ENG-SCI 155: Systems and Control  
ENG-SCI 157: Biological Signal Processing

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 120: Introduction to Bayesian Inference and Applications  
Stat 121: Data Science  
Stat 131: Time Series  
Stat 139: Linear Models  
Stat 149: Generalized Linear Models  
Stat 171: Stochastic Processes  
Stat/CS 184: Introduction to Reinforcement Learning  
Stat 185: Introduction to Dimension Reduction  
Stat 195: Statistical Machine Learning  
Stat 220: Bayesian Data Analysis