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):

| LS 1a or LPSA | Chemistry, Molecular/Cell Bio, LS 1b Genetics, Genomics, Evolution |
| LS 2         | Evolutionary Human Physiology and Anatomy, HEB 1420 Human Anatomy |
| MCB 60       | Cell Biology, MCB 63 Biochemistry, [MCB 64], MCB 66 Cell Biology, |
| MCB 65       | Physical Biochemistry, MCB 68 Cell Bio & Microscopy |
| OEB 50       | Population Genetics, OEB 53 Evolutionary Biology |
| SCR 50       | Building a Body |

7. One approved 100-level HEB, MCB, OEB, or SCR 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:

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


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

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