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):

| 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 Cell Biology,         |
| MCB 65      | Physical Biochemistry, MCB 68 Cell Bio & Microscopy             |
| OEB 50      | Population Genetics, OEB 53 Evolutionary Biology                |
| SCRB 50     | Building a Body                                                  |

☐ 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, or Psych 1401
☐ 10. Additional Quantitative Elective:

| APMTH 226 | Neural Computation, BME 130 Neural Control of Movement |
| BME 131  | Neuroengineering                                      |
| 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

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 185: Introduction to Dimension Reduction
Stat 195: Statistical Machine Learning
Stat 220: Bayesian Data Analysis