### INTRODUCTORY REQUIREMENTS

**Calculus:** MATH 19A (FWS) ___ + 19B (FWS) ___

**Linear Algebra:** MATH 21 (FWS) ___

**Vector Calculus:** MATH 23A (FWS) ___ + MATH 23B (FWS) ___

**Ordinary Differential Equations:** Math 24 (S) ___

### ADVANCED REQUIREMENTS

**Math:**
- MATH 100 Introduction to Proof and Problem Solving (FWS) ___
- MATH 110 Introduction to Number Theory (F) ___
- MATH 111A Algebra (FW) ___ OR Math 117 Advanced Linear Algebra (W) ___

**Differential Equations:**
- ONE from the following...
  - Math 106 Systems of Ordinary Differential Equations (F) ___
  - Math 107 Partial Differential Equations ___ (*)

**Analysis:**
- ONE from the following...
  - MATH 103A Complex Analysis (WS) ___
  - MATH 105A Real Analysis (FW) ___

**Computational:**
- ONE from the following...
  - Math 106 Systems of Ordinary Differential Equations (F) ___
  - MATH 145/L Introduction to Chaos Theory (W) ___
    - (cannot receive credit for both MATH 145 and AMS 114)
  - AMS 114 Introduction to Dynamical Systems (formerly AMS 146) (W) ___
    - (cannot receive credit for both AMS 114 and MATH 145)

**Electives:** TWO from the following...
- Any AMS course numbered 100 and above ___
- BME 110 Computational Biology Tools (FS) ___
- CMPE 107 Mathematical Methods of Systems Analysis Stochastic (FW) ___
- CMPE 108 Data Compression (*) ___
- CMPE 117 Embedded Software (*) ___
- CMPE 153 Digital Signal Processing (FS) ___
- CMPE 177 Applied Graph Theory and Algorithms (*) ___
- CMPS 101 Algorithms and Abstract Data Types (FWS) ___
- CMPS 102 Introduction to Analysis of Algorithms (S) ___
- CMPS 104A Fundamental of Compiler Design I (F) ___
- CMPS 109 Advanced Programming (WS) ___
- CMPS 112 Comparative Programming Languages (W) ___
- CMPS 122 Computer Security (W) ___
- CMPS 130 Computational Models (FW) ___
- CMPS 132 Computability & Computational Complexity (S) ___
- CMPS 142 Machine Learning and Data Mining (W) ___
- EART 172 Geophysical Fluid Dynamics (S) ___
- EE 103 Signals and Systems (FS) ___
- EE 130 Introduction to Optoelectronics and Photonics (W) ___
- EE 135/L Electromagnetic Fields and Waves Laboratory (W) ___
- EE 151 Communications Systems (W) ___
- EE 154 Feedback Control Systems (F) ___
- PHYS 115 Computational Physics (S) ___

### COMPREHENSIVE REQUIREMENT

**Disciplinary Communication:** Students satisfy this requirement by successfully completing courses MATH 100 and either

MATH 194 or MATH 195. The DC course requirement must be taken at UCSC.