## MATH 255A: Calculus for the Life Sciences I

## Schedule for Spring 2020 (Tentative!)

| Week | Days | Coverage | Online Problems | Practice Problems |
|---|---|---|---|---|
| 1 | 01/21 – 01/24 | 1.1, 1.2, 1.3 | **1.1**: 7, 10, 17, 20, 31, 37, 41, 46; **1.2**: 1, 9, 12, 14, 20, 22, 32, 45; **1.3**: 3, 6, 11, 16, 18, 21, 25, 28, 36; | **1.1**: 18, 32, 38, 41, 44, 45; **1.2**: 13, 15, 18, 31-34, 45, 48; **1.3**: 7, 8, 12, 13, 25, 29, 37. |
| 2 | 01/27 – 01/31 | 1.4, 1.5 | **1.4**: 2, 4, 13, 20, 23, 25, 28, 29, 33, 35, 42; **1.5**: 30, C15**, 26, 47, 34, 35, 44; | **1.4**: 7, 9, 14, 26, 27, 32, 34, 37, 39, 44; **1.5**: 8, 10, 15, 35, 42, 43. |
| 3 | 02/03 – 02/07 | 1.6, 1.7 | **1.6**: 21, 23, 31, 34, 37, 42, 43, 46, 10; **1.7**: 1, 12, 14, 21, 23, 25, 31, 32. | **1.6**: 12, 13, 14, 15-30; 38; **1.7**: 21, 23, 24, 31, 33, 35. |
| 4 | 02/10 – 02/14 | 2.1, midterm 1 | **2.1**: C1, C4, 17, 26, 30, 37, 39, 43; | **2.1:** 3, 6, 9, 12, 13, 23, 30, 37, 41, 52. |
| 5 | 02/17 – 02/21 | 2.2, 2.3, 2.4 | **2.2:** C5, C6, C8, C10, C4, 40, 41, 42; **2.3:** 11, C20, C21, 20, C1, C10, C11, C12, 23, 27; **2.4:** C2, C3, C4, C5, C6, C1, C7, C9, C10, 39, 40, 46; | **2.2:** 1, 3, 5, 7, 15, 17, 21, 22, 23, 27-30, 40, 41 **2.3:** 1, 5, 7, 8, 11, 13, 20, 21, 23, 27, 39, 41; **2.4:** 1-9, 19, 21, 22, 25, 26, 31, 32, 39, 47. |
| 6 | 02/24 – 02/28 | 2.5, 2.6, 2.7 | **2.5:** 1, 9, 15, 16, 17, 25, 29, 33; **2.6:** 1, 6, 16, 24, 26, C1, 33, 35; **2.7:** 6, 7, 14, 22, 29, 31, 45; | **2.5:** 3, 8, 10, 13, 18, 21, 27, 30, 34; **2.6:** 3, 4, 5, 7, 9, 17, 19, 25, 27, 34, 36, 37; **2.7:** 5, 8, 13, 15, 21, 30, 31, 46. |
| 7 | 03/02 – 03/06 | 3.1, 3.2 | **3.1:** C3, C4, C5, C7, C9, C12, 1, 9, 19, 31, 39; **3.2:** C2, C3, C5, C7, C8, 21, 26, 35. | **3.1:** 1, 2, 5, 7, 9, 11, 13, 15, 17, 20, 21, 23, 25, 31, 33, 34; **3.2:** 1, 5, 9, 13, 15, 19, 21, 22, 24, 27, 31, 34, 37. |
| 8 | 03/09 – 03/13 | 3.3, midterm 2 | **3.3:** C2, C3, C4, C9, C11, C14, C15, C19, C21, C20, 34 | **3.3:** 3, 5, 7, 9, 12, 13, 16, 19, 29, 33, 35, 37. |
| 9 | 03/23 – 03/27 | 3.4, 3.5, 3.6 | **3.4:** C2, C7, C10, 13, 16, 28, 31, 34; **3.5:** C1, C6, 13, 16, 18, 19, 24, 32, 34, 40; **3.6:** C1, C2, 4, 9, 19, 27, 45, 49; | **3.4:** 5, 7, 9, 11, 12, 15, 19, 20-25, 27, 31, 33, 35; **3.5:** 1, 2, 5, 7, 9, 13, 15, 19, 21, 27, 28, 33, 34, 35; **3.6:** 1, 2, 5, 8, 9, 11, 19, 23, 25, 27-29, 35, 37, 39, 45, 46, 50. |
| 10 | 03/30 – 04/03 | 4.1, 4.2 | **4.1:** 4, 6, 15, 27, 29, 31, 33, 35; **4.2:** 8, 12, 13, 15, 18, 22, 24, 38; | **4.1:** 3, 5, 9, 11, 14, 17, 19, 21, 28, 32, 34; **4.2:** 1, 3, 5, 7, 11, 16, 19, 20, 23, 24, 34, 39. |
| 11 | 04/06 – 04/10 | 4.3, 5.1 | **4.3:** 1, 3, 15, 23, 27, 37; **5.1:** 1, 4, 10, 20, 27, 28, 29, 41, 45, 49; | **4.3:** 2, 14, $8^{\dagger}$, $9^{\dagger}$, $25^{\dagger}$, $26^{\dagger}$, 32, 36, 38; **5.1:** 3, 7, 11, 15, 19, 23, 25, 30, 42, 46, 47, 50, 52; |

| Week | Days | Coverage | Online Problems | Practice Problems |
|---|---|---|---|---|
| 12 | 04/13 – 04/17 | review, midterm 3 | | |
| 13 | 04/20 – 04/24 | 5.2, 5.3 | **5.2:** C3, C7, C8, C10, 25, 37; **5.3:** C3, C7, 13, 22, 30, 33, 43, 45; | **5.2:** 3, 9, 15, 17, 26, 38; **5.3:** 14-16, 19, 29, 31, 35, 39, 40, 44, 46. |
| 14 | 04/27 – 05/01 | 5.4, 5.5 | **5.4:** C4, C6, C7, C8, C10, C11, C12, C13, C16, 17, 30; **5.5:** C1, C2, C3, C4, C7, C10, C19, C23, C25, 33. | **5.4:** 3, 5, 7, 9-13, 17, 19, 21, 25, 31; **5.5:** 9, 11, 12, 15, 17, 19, 21, 23, 29, 34. |
| 15 | 05/04 – 05/08 | review | | |

* No classes the week of March 16 – 22 (spring recess) and on Tuesday March 31 (César Chávez Day)

** Problems marked with C are "Core Calculus" questions, from the WileyPlus problem database. (Similar textbook questions included in Practice Problems.)

† optional, depending on lecture coverage

**Textbook:**

*Calculus for the Life Sciences, by S. J. Schreiber, K. Smith, W. Getz, 1st ed., Wiley 2014.*

**Course Topics:**

1. Modeling with Functions (brief Precalculus Review)
    1.1. Real Numbers and Functions
    1.2. Data Fitting with Linear and Periodic Functions
    1.3. Power Functions and Scaling Laws
    1.4. Exponential Growth
    1.5. Function Building
    1.6. Inverse Functions and Logarithms
    1.7. Sequences and Difference Equations*
2. Limits and Derivatives
    2.1. Rates of Change and Tangent Lines
    2.2. Limits
    2.3. Limit Laws and Continuity
    2.4. Asymptotes and Infinity
    2.5. Sequential Limits*
    2.6. Derivative at a Point
    2.7. Derivatives as Functions
3. Derivative Rules and Tools
    3.1. Derivatives of Polynomials and Exponentials
    3.2. Product and Quotient Rules
    3.3. Chain Rule and Implicit Differentiation
    3.4. Derivatives of Trigonometric Functions
    3.5. Linear Approximation
    3.6. Higher Derivatives and Approximations
    3.7. l'Hopital's Rule*
4. Applications of Differentiation
    4.1. Graphing Using Calculus
    4.2. Getting Extreme
    4.3. Optimization in Biology
    4.4. Decisions and Optimization*
    4.5. Linearization and Difference Equations*
5. Integration
    5.1. Antiderivatives
    5.2. Accumulated Change and Area under a Curve
    5.3. The Definite Integral
    5.4. The Fundamental Theorem of Calculus
    5.5. Integration by Substitution

* Optional sections, not part of the final exam. Can be covered as time permits and included in midterms.