

# Course Guide Calculus III: Spring 2017:

|         | Topic   | My notes  | Comments                               | Assignment due |
|---------|---|-----------|--|----------------|
| M: 1-16 | vectors, points, components                         | 9 - 18    |  |                |
| T       | dot products, angles, projections                   | 18 - 28   |  |                |
| W       | cross product                                       | 28 - 37   |  |                |
| TH      | Lines and planes                                    | 38 - 50   |  | Mission 1      |
| F       | Curves and Surfaces                                 | 51 - 75   |  |                |
| M: 1-23 | curvilinear coordinates                             | 75 - 83   |  |                |
| T:      | calculus of curves                                  | 89 - 101  |  |                |
| W:      | Arclength   | 101 - 105 |  | Mission 2      |
| TH:     | geometry of curves                                  | 105 - 115 |  |                |
| F:      | 3D motion   | 115 - 125 |  |                |
| M: 1-30 | Kepler's Laws                                       | 125 - 130 |  |                |
| T:      | Integration along a curve                           | 130 - 134 |  | Mission 3      |
| W:      | Integration along a curve                           | 130 - 134 |  |                |
| TH:     | MATH BATTLE I: an in-class group challenge          |           |  |                |
| F:      | MATH BATTLE II: an in-class group challenge         |           |  |                |
| M: 2-6  | Questions ?   |           |  | Mission 4      |
| T:      | TEST I  |           | Covers Chapters 1 and 2 of my notes.   |                |
| W:      | open sets and limits for several variables          | 137 - 142 |  |                |
| TH:     | open sets and limits for several variables          | 143 - 148 |  |                |
| F:      | directional derivatives & partial differentiation   | 149 - 157 |  |                |
| M: 2-13 | directional derivatives via partial differentiation | 158 - 162 |  |                |
| T:      | gradient vector field, level curves, contour plots  | 162 - 169 |  | Mission 5      |
| W:      | partial diff. with three-variables & applications   | 170 - 179 |  |                |
| TH:     | general concept of differentiation                  | 180 - 192 |  |                |
| F:      | chain rules   | 192 - 205 |  |                |
| M: 2-20 | tangent spaces & their equations                    | 206 - 212 |  | Mission 6      |
| T:      | differentials and constrained partial diff.         | 212- 219  |  |                |
| W:      | gradients in curvilinear coordinates                | 220 - 222 |  |                |
| TH:     | Lagrange multipliers                                | 231 - 245 |  |                |
| F:      | Lagrange multipliers                                | 231 - 245 |  | Mission 7      |
| M: 2-27 | multivariate Taylor                                 | 246 - 251 |  |                |
| T:      | second derivative test                              | 252 - 257 |  |                |
| W:      | closed set test                                     | 258 - 262 |  |                |
| TH:     | MATH BATTLE III: an in-class group challenge        |           |  | Mission 8      |
| F:      | MATH BATTLE IV: an in-class group challenge         |           |  |                |
| M: 3-6  | Questions ?   |           |  |                |
| T:      | TEST II   |           | Covers Chapters 3, 4 and 5 of my notes |                |
| W:      | definition and basic multivariate integrals         | 265 - 270 |  |                |
| TH:     | double integrals and TYPE I and II regions          | 270 - 285 |  |                |
| F:      | double integrals and TYPE I and II regions          | 270 - 285 |  |                |
|         | Spring Break 3-13 to 3-17                           |           |  |                |
| M: 3-20 | cartesian triple integrals                          | 286 - 295 |  |                |
| T:      | cartesian triple integrals                          | 286 295   |  | Mission 9      |

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|         |   |           |  |            |
|---------|---|-----------|--|------------|
| W:      | change of variables for double integrals                  | 295 - 307 |  |            |
| TH:     | change of variables for triple integrals                  | 308 - 319 |  |            |
| F:      | algebra and geometry of volume elements                   | 320 - 322 |  | Mission 10 |
| M: 3:27 | MATH BATTLE V: an in-class group challenge                |           |  |            |
| T:      | Questions ? / MATH BATTLE VI: an in-class group challenge |           |  | Mission 11 |
| W:      | Assessment Day  |           |  |            |
| TH:     | TEST III  |           | Covers Chapter 6 of my notes                         |            |
| F:      | vector fields and the gradient operator                   | 325 – 328 |  |            |
| M: 4-3  | On the calculation and properties of grad, curl and div   | 329 – 332 |  |            |
| T:      | line integrals  | 332 – 335 |  | Mission 12 |
| W:      | conservative vector fields                                | 335 – 338 |  |            |
| TH:     | conservative vector fields                                | 335 – 338 |  |            |
| F:      | Green's theorem   | 339 - 345 |  |            |
| M: 4-10 | Green's theorem   | 339 - 345 |  | Mission 13 |
| T:      | Deformation thm, conservative vector fields               | 345 – 353 |  |            |
| W:      | Surface integrals   | 354 – 364 |  |            |
| TH:     | Surface integrals   | 354 – 364 |  |            |
| F:      | Stokes' theorem   | 365 – 374 |  | Mission 14 |
| M: 4-17 | Easter Monday   |           |  |            |
| T:      | Stokes' theorem   | 365 – 374 |  |            |
| W:      | Gauss' Theorem  | 374 – 383 |  |            |
| TH:     | Gauss' Theorem  | 374 – 383 |  |            |
| F:      | Green's identities and Helmholtz theorem                  | 384 – 388 |  | Mission 15 |
| M: 4-24 | Green's identities and Helmholtz theorem                  | 384 – 388 |  |            |
| T:      | Application to Electromagnetism: Fields & Potentials      | 389 - 393 |  |            |
| W:      | MATH BATTLE VII: an in-class group challenge              |           |  |            |
| TH:     | An Introduction to Differential Forms                     |           |  | Mission 16 |
| F:      | MATH BATTLE VIII: an in-class group challenge             |           |  |            |
| M:5-1   | Questions ?   |           |  |            |
| T:      | TEST IV   |           | Covers Chapter 7 of my notes                         |            |
| W: 5-3  | Reading Day,  |           |  |            |
| M:      | Final Exam  |           | Comprehensive: Monday, May 8 <sup>th</sup> , 8-10am. |            |

- ❖ **Grades:** Tests 1,2,3,4 = 4(100pts)=400pts, Final = 300pts, Missions = 200pts, Math Battles & Participation 100pts, .
- ❖ **There are 16 Missions, each problem in these Missions is worth 1pt, there should be at least 200 problems assigned.**