

## Math 283 Honors Multivariate Calculus (Fall 2009)

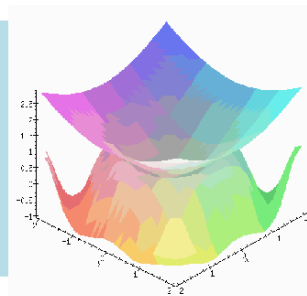
**Instructor** [Mark Pernarowski](#)  
**Textbook** Multivariate Calculus (6th ed.)  
 James Stewart  
**Office Hours** [Schedule](#) (Wil 2-236)  
**Phone** 994-5356  
**Classroom** Wil 1-144

$$\iint_S \vec{F} \cdot \hat{N} dS$$

$$\frac{\partial^2 f}{\partial x^2} \quad \vec{\nabla} \times \vec{F}$$

$$\vec{r}(t) = \vec{r}_0 + t\hat{T}$$

$$\int_0^{2\pi} \int_1^{\sin(\theta)} F(r \cos(\theta)) r dr d\theta$$



[Schedule](#)

[Homework](#)

[Handouts](#)

[Other](#)

**Grading:** The course % is determined by:

|           |    |     |
|-----------|----|-----|
| Midterm 1 | M1 | 100 |
| Midterm 2 | M2 | 100 |
| Final     | F  | 100 |
| Quizzes   | Q  | 100 |
|           |    | 400 |

$$\% = (M1+M2+F+HW)/4$$

The final is not comprehensive.  
 Six quizzes each worth 20 points  
 will be given. Your best 5 quiz  
 scores determine Q above.

Exam and quizz dates are indicated  
 on the [schedule](#) below. Their content  
 will be announced in class.

All exams and quizzes are closed  
 book and no electronic devices  
 are permitted. With the exception  
 of the Final, all exams will be  
 given in class. Final - TBA.

**Syllabus:** Material covered in text is from:

Chapter 12 Vector Geometry  
 Chapter 13 Vector Functions  
 Chapter 14 Partial Derivatives  
 Chapter 15 Multiple Integrals  
 Chapter 16 Vector Calculus

See below for the 'anticipated' schedule

**Homework:** Suggested [homework](#) is listed below.

Although the homework is not graded  
 it is representative of the kinds of  
 questions which will be on quizzes  
 and exams.

Some additional problem sets and/or  
 handouts will be handed out in class  
 and/or posted on this site.

**Topics and Suggested Homework:**

|             |  |  |
|-------------|--|--|
| <b>12.1</b> | 7,11,13,15,20                            | Cartesian coordinates, distance, spheres                 |
| <b>12.2</b> | 13,17,19,21,41                           | Vectors, vector addition and length                      |
| <b>12.3</b> | 5,7,9,17,21,23,25,27,35,37               | Dot product and geometric properties                     |
| <b>12.4</b> | 1,3,15,19,27,31,43                       | Cross product and geometric properties                   |
| <b>12.5</b> | 7,10,11,15,19,23,27,33,35,43,53,55,62,69 | Equations of lines and planes                            |
| <b>12.6</b> | none                                     | Quadratic surfaces                                       |
| <b>13.1</b> | 1,7,9,25,27,37h                          | Vector functions, curves                                 |
| <b>13.2</b> | 3,5,9,11,13,19,21,23,31,33,34            | Vector function calculus, tangent vectors                |
| <b>13.3</b> | 1-3,11,13,17,19,21,25,43                 | Arclength, curvature, normal and binormals               |
| <b>13.4</b> | 3,5,9,15,22,33,35                        | Velocity, acceleration                                   |
| <b>14.1</b> | 11,13,39,41,47                           | Functions of several variables, domain, range            |
| <b>14.2</b> | 7,9,11,15,25,29,33,39                    | Limits and continuity                                    |
| <b>14.3</b> | 5,15,17,19,21,25,39,45,47,51,61          | Partial derivatives, tangents to surfaces                |
| <b>14.4</b> | 1,3,11,13,21                             | Tangent planes and linear approximations                 |
| <b>14.5</b> | 1,5,7,9,13,15,21,27,31,49                | Chain rules, implicit differentiation                    |
| <b>14.6</b> | 4,5,7,9,11,21,25,39,41,47,61             | Gradients, directional derivatives, level sets, geometry |
| <b>14.7</b> | 1,5,7,9,11,15,29,31,39,43                | Maxima, minima, second derivative test                   |
| <b>14.8</b> | 3,5,7,9,25,27,31,33,39                   | Lagrange multipliers, constrained maximization           |
| <b>15.1</b> | none                                     | Double integral definition                               |
| <b>15.2</b> | 1,3,5,7,9,15,25,29                       | Double iterated integrals                                |
| <b>15.3</b> | 1,3,7,13,15,19,21,23,25,39,41,43,45,51   | Double integrals on regions, reversing integration order |
| <b>15.4</b> | 5,7,9,11,13,19,20,25,29,31               | Double integrals in polar coordinates                    |
| <b>15.5</b> | none                                     | Applications of double integrals                         |
| <b>15.6</b> | 3,9,11,13,17,19,21,31                    | Triple cartesian integrals, volumes, mass                |
| <b>15.7</b> | 1,3,7,9,11,15,17,19,21,23a,27            | Triple integrals in cylindrical coordinates              |
| <b>15.8</b> | 1,3,7,9,11,13,21,23,25,27,39             | Triple integrals in spherical coordinates                |
| <b>15.9</b> | 1,3,11,13                                | Double integrals in arbitrary coordinates                |
| <b>16.1</b> | 11-14                                    | Vector fields, gradient fields                           |
| <b>16.2</b> | 1,5,7,9,13,15,19,22,41                   | Scalar and vector line integrals                         |
| <b>16.3</b> | 3,5,9,12,13,14,15,19,21                  | Potentials, path independence and the Fundamental Thm.   |
| <b>16.4</b> | 1,5,11,13,17                             | Greens Theorem in the plane,                             |
| <b>16.5</b> | 1,3,5,13,17,31,35                        | Curl and Divergence of a Vector Field                    |
| <b>16.6</b> | 1,5,19,23h,37,38,39,41,43,47,59          | Areas for graphs and parametric surfaces                 |
| <b>16.7</b> | 5,7,11,15,19,22,23,29                    | Surface integrals and Flux                               |
| <b>16.8</b> | 2,3,7,9,11a                              | Stokes' Theorem  |
| <b>16.9</b> | 1,3,5,11,13                              | Divergence Theorem                                       |

**Schedule:**

| Monday           | Tuesday       | Wednesday           | Thursday            | Friday              |
|------------------|---------------|---------------------|---------------------|---------------------|
| <b>Aug 31</b>    | <b>Sept 1</b> | <b>2</b>            | <b>3</b>            | <b>3</b>            |
| 12.1             | 12.2          |                     | 12.3                | 12.3/12.4           |
|                  |               |                     |                     |                     |
| <b>7</b>         | <b>8</b>      | <b>9</b>            | <b>10</b>           | <b>11</b>           |
| <b>Labor Day</b> | 12.4          |                     | 12.5                | 12.5                |
|                  |               |                     |                     | Quiz 1              |
| <b>14</b>        | <b>15</b>     | <b>16</b>           | <b>17</b>           | <b>18</b>           |
| 12.5             | 13.1/13.2     |                     | 13.2/13.3           | 13.3                |
|                  |               |                     |                     |                     |
| <b>21</b>        | <b>22</b>     | <b>23</b>           | <b>24</b>           | <b>25</b>           |
| 13.3/13.4        | 13.4          |                     | 14.1/14.2           | 14.2                |
|                  |               |                     |                     | Quiz 2              |
| <b>28</b>        | <b>29</b>     | <b>30</b>           | <b>Oct 1</b>        | <b>2</b>            |
| 14.3             | 14.3          |                     | Review              |                     |
|                  |               |                     |                     | Midterm 1           |
| <b>5</b>         | <b>6</b>      | <b>7</b>            | <b>8</b>            | <b>9</b>            |
| 14.4             | 14.5          |                     | 14.5/14.6           | 14.6                |
|                  |               |                     |                     |                     |
| <b>12</b>        | <b>13</b>     | <b>14</b>           | <b>15</b>           | <b>16</b>           |
| 14.7             | 14.7          |                     | 14.7/14.8           | 14.8                |
|                  |               |                     |                     | Quiz 3              |
| <b>19</b>        | <b>20</b>     | <b>21</b>           | <b>22</b>           | <b>23</b>           |
| 14.8             | 15.1/15.2     |                     | 15.2/15.3           | 15.3                |
|                  |               |                     |                     |                     |
| <b>26</b>        | <b>27</b>     | <b>28</b>           | <b>29</b>           | <b>30</b>           |
| 15.3             | 15.4          |                     | 15.4                | 15.6                |
|                  |               |                     |                     | Quiz 4              |
| <b>Nov 2</b>     | <b>3</b>      | <b>4</b>            | <b>5</b>            | <b>6</b>            |
| 15.6             | 15.6          | 15.7                | Review              |                     |
|                  |               |                     |                     | Midterm 2           |
| <b>9</b>         | <b>10</b>     | <b>11</b>           | <b>12</b>           | <b>13</b>           |
| 15.7             | 15.8          | <b>Vetran's Day</b> | 15.8                | 15.9                |
|                  |               |                     |                     |                     |
| <b>16</b>        | <b>17</b>     | <b>18</b>           | <b>19</b>           | <b>20</b>           |
| 16.1/16.2        | 16.2          |                     | 16.3                | 16.3                |
|                  |               |                     |                     | Quiz 5              |
| <b>23</b>        | <b>24</b>     | <b>25</b>           | <b>26</b>           | <b>27</b>           |
| 16.4             | 16.5          |                     | <b>Thanksgiving</b> | <b>Thanksgiving</b> |
|                  |               |                     |                     |                     |
| <b>30</b>        | <b>Dec 1</b>  | <b>2</b>            | <b>3</b>            | <b>4</b>            |
| 16.6             | 16.6/16.7     |                     | 16.7                | 16.7                |
|                  |               |                     |                     | Quiz 6              |
| <b>7</b>         | <b>8</b>      | <b>9</b>            | <b>10</b>           | <b>11</b>           |
| 16.8             | 16.8/16.9     |                     | 16.9                | Review              |
|                  |               |                     |                     |                     |
| <b>14</b>        | <b>15</b>     | <b>16</b>           | <b>17</b>           | <b>18</b>           |
| <b>Finals</b>    | <b>Finals</b> | <b>Finals</b>       | <b>Finals</b>       | <b>Finals</b>       |