**MATH 301: Calculus III**

**Fall 2016** **Section 001** **4 credit hours**

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| **Instructor:** | **Kristen Abernathy** | **Instructor's Teaching Schedule:** | MWF: 9:30 am – 10:45 am<br>MW: 11:00am-12:15pm<br>TR: 9:30 am – 10:45 am |
| **Office**: | Bancroft 148 | | |
| **Office Phone**: | 803-323-4681 | **Office Hours:** | M: 2:00-4:00 and<br>W: 12:30-2:30. |
| **Math Department**: | 803-323-2175 | | |
| **Campus Email**: | abernathyk@winthrop.edu | | |

The instructor reserves the right to make modifications to this syllabus. Students will be notified in class & by email.

**A complete syllabus and schedule is available at: www.winthrop.edu/cas/math/syllabus.**

**Grades**

Throughout the semester we will have regular homework assignments, course projects, four tests, and a cumulative final exam. The final exam score may replace either the lowest test grade or a missed test score. The two lowest homework assignments will be omitted from the final grade. Grades will be assigned as follows:

92-100 A 90-91.99 A- 87-89.99 B+ 82-86.99 B 80-81.99 B- 77-79.99 C+
72-76.99 C 70-71.99 C- 67-69.99 D+ 62-66.99 D 60-61.99 D-

**Determination of Grade**

**Homework (15%)** Homework will be regularly assigned from each section and a subset will be collected and graded for correctness. For one or two of these graded problems, you are expected to turn in a written solution that explains the mathematical steps taken to solve the problem. Homework will be graded on the ability to correctly solve the mathematical problem, as well as provide a clear explanation of the mathematical problem-solving steps taken for the designated problems that require written solutions. Late homework will be accepted for one week after the due date at a five point penalty for each day it is late.

**Projects (10%)** To supplement course material, there will be two writing projects assigned during the course. You may work in groups of two or three and you will be given ample time to complete each project. Each group will receive a handout describing the expectations for the project later in the course.

**Tests (60%)** There will be four in-class tests as listed on the attached schedule. You are expected to take the tests and the final exam at the scheduled time. Make-up tests are not given. An unexcused absence will result in the grade of zero for any missed test. Excused absences from tests will be dealt with at the end of the term and may depend on individual circumstances. Anticipated absences should be reported and verified in advance; emergency absences must be verified within one week after returning to class. Any questions concerning grading of tests must also be resolved within one week after the tests are returned.

**Final Exam (15%)** The cumulative final exam is scheduled for Monday, December 12th, 2016, 11:30 AM.

**Text, Materials and Learning Aids**

- Required Text: *Calculus* by Howard Anton, Irl Bivens, and Stephen Davis. Tenth Edition. Hoboken: John Wiley and Sons, 2012.
- The ability to use *Mathematica* is a prerequisite skill for this course.

**Course Policies (section specific policies may be added on the full syllabus)**

1. Winthrop University is dedicated to providing access to education. If you have a disability and require specific accommodations to complete this course, contact the Office of Disability Services (ODS) at 323-3290. Once you have your official notice of accommodations from the Office of Disability Services, please inform me as early as possible in the semester.
2. Review the student code of conduct for university polices on academic misconduct. Academic misconduct will not be tolerated and will result in a failing grade on the assignment and/or in the course. The full handbook is available online at: (http://www2.winthrop.edu/studentaffairs/handbook/StudentHandbook.pdf)

3. All electronic devices (including cell phones) other than a calculator should be set to silent and kept in your book bag or purse throughout class time unless otherwise instructed.
4. Students may not use cell phones, MP3 players, or other electronic devices in place of a calculator. Students may not share calculators during quizzes, tests, or the final exam. Any student caught using an unapproved electronic device during a quiz, test, or the final exam will receive a grade of zero on that assessment and the incidence will be reported to the Dean of Students.
5. A grade of C- or better in MATH202 is required to enroll in MATH301.

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| **Drop/Add:** | Through F 8/26 | **SU and Course Withdraw Date:** | F 10/21 |
| **Fall Break:** | F 10/14 through M 10/17 | **Final Exam:** | M 12/12, 11:30am |

**Links to the General Education Program**
This course meets the Logic, Language, and Semiotics requirement through activities and requirements that require students to: (1) use logic and mathematical information to draw reasonable conclusions and (2) use the symbols and language of mathematics to communicate about problems and present solutions.

**Attendance Policy**
The University Attendance policy as stated in the current catalog (http://www.winthrop.edu/recandreg/default.aspx?id=7380): if a student's absences in a course total 25 percent or more of the class meetings for the course, the student will receive a grade of N if the student withdraws from the course before the withdrawal deadline; after that date, unless warranted by documented extenuating circumstances as described in the previous section, a grade of F or U shall be assigned.

**Student Learning Objectives – Mathematics Department**
1. Students apply fundamental mathematical concepts and techniques to solve problems and evaluate results.
2. Students demonstrate the ability to apply appropriate technologies to the study of mathematics and effectively use such technologies to investigate and develop an understanding of mathematical ideas.

**Student Learning Objectives – Calculus III**
1. Students will use the language of vectors, vector operations and parametric equations to express the ideas of calculus in two-dimensional and three-dimensional space.
2. Students will master the differentiation of functions of more than one variable by computing partial derivatives, interpreting the gradient, and applying these concepts to optimization problems.
3. Students will use iterated integrals to compute double and triple integrals, and will use integration to find volumes and surface areas of three-dimensional regions.
4. Students will gain a working knowledge of vector fields and their physical interpretation, including the divergence and curl operators.
5. Students will use technology to visualize curves and surfaces and to apply calculus concepts to them.

For purposes of departmental assessment of student learning in this course, sections of the final exam may be tabulated for all students.

Tentative Course Schedule

| Date | | Section | Topic |
|---|---|---|---|
| W | 8/24 | 11.1, 11.2 | Rectangular Coordinates in 3-Space; Spheres; Cylindrical Surfaces; Vectors |
| F | 8/26 | 11.2, 11.3 | Vectors; Dot Product; Projections |
| M | 8/29 | 11.4 | Cross Product |
| W | 8/31 | 11.5 | Parametric Equations of Lines |
| F | 9/2 | 11.6 | Planes in 3-Space |
| M | 9/5 | | Labor Day – No Class |
| W | 9/7 | 11.7, 12.1 | Quadric Surfaces; Vector-Valued Functions |
| F | 9/9 | 12.2, 12.3 | Calculus of Vector-Valued Functions; Arc Length |
| M | 9/12 | 12.4 | Unit Tangent, Normal, and Binormal Vectors |
| W | 9/14 | 12.5 | Curvature |
| F | 9/16 | Exam 1 | |
| M | 9/19 | 13.1 | Functions of Two or More Variables |
| W | 9/21 | 13.2 | Limits and Continuity |
| F | 9/23 | 13.3 | Partial Derivatives |
| M | 9/26 | 13.4 | Differentiability, Differentials, and Local Linearity |
| W | 9/28 | 13.5, 13.6 | The Chain Rule; Directional Derivatives and Gradients |
| F | 9/30 | 13.6 | Directional Derivatives and Gradients |
| M | 10/3 | 13.7 | Tangent Planes and Normal Vectors |
| W | 10/5 | 13.8 | Maxima and Minima of Functions of Two Variables |
| F | 10/7 | 13.8, 13.9 | Maxima and Minima of Functions of Two Variables; Lagrange Multipliers |
| M | 10/10 | 13.9 | Lagrange Multipliers |
| W | 10/12 | Exam 2 | |
| F | 10/14 | | Fall Break – No Class |
| M | 10/17 | | |
| W | 10/19 | 14.1 | Double Integrals |
| F | 10/21 | 14.2 | Double Integrals over Nonrectangular Regions |
| M | 10/24 | 14.2 | Double Integrals over Nonrectangular Regions |
| W | 10/26 | 14.3 | Double Integrals in Polar Coordinates |
| F | 10/28 | 14.5 | Triple Integrals |
| M | 10/31 | 11.8 | Cylindrical and Spherical Coordinates |
| W | 11/2 | 14.6 | Triple Integrals in Cylindrical and Spherical Coordinates |
| F | 11/4 | Exam 3 | |
| M | 11/7 | 15.1 | Vector Fields |
| W | 11/9 | 15.2 | Line Integrals |
| F | 11/11 | 15.3 | Independence of Path; Conservative Vector Fields |
| M | 11/14 | | |
| W | 11/16 | 15.4 | Green's Theorem |
| F | 11/18 | 14.4 | Surface Area; Parametric Surfaces |
| M | 11/21 | 15.5 | Surface Integrals |
| W | 11/23 | | Thanksgiving Break – No Class |
| F | 11/25 | | |
| M | 11/28 | 15.6 | Applications of Surface Integrals; Flux |
| W | 11/30 | 15.7 | The Divergence Theorem |
| F | 12/2 | 15.8 | Stokes' Theorem |
| M | 12/5 | Exam 4 | |
| M | 12/12 | Final Exam | |