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| Course Title/Number  | Calculus with Analytic Geometry III **MTH 231** – 101 (CRN 3081) |
| Semester/Year | Fall 2015 |
| Days/Time | MTWR 12:00 – 12:50 |
| Location | Smith Hall 511 |
| Instructor | Dr. Clayton Brooks |
| Office | Smith Hall 723 |
| Phone | (Note: the University does not grant me comprehensive telephone dialing access, so I am not able to return many calls. With this in mind, the number is x6-6702) |
| E-Mail | brooksc@marshall.edu |
| Office/Hours | MTWR 10:00 – 11:30 or by appointment |
| University Policies | By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy be going to [www.marshall.edu/academic-affairs](http://www.marshall.edu/academic-affairs) and clicking on “Marshall University Policies.” Or, you can access the policies directly by going to <http://www.marshall.edu/academic-affairs/?page_id=802> Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment  |

**Course Description: From Catalog**

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| Vectors, curves, and surfaces in space. Derivatives and integrals of functions of more than one variable. A study of the calculus of vector valued functions. (PR: *C* or better in MTH 230) |

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| **Course Student Learning Outcomes**  | **How student achievement of each outcome will be assessed in this Course** |
| Students will have an understanding of the fundamental concepts of calculus and an appreciation of its many applications. | Homework and tests |
| Develop critical thinking skills by asking students to convert real-world problems into forms suitable for calculus, and interpret the results of calculus in real-world problems. | Homework and tests |
| A deeper understanding of the mathematics that is used in their science and engineering courses. | Homework and tests |
| Students will develop facility in using graphing calculators to solve mathematics problems. | Homework and tests |
| *Reasoning:* Calculus is a collection of reasoning techniques that allows one to understand how changing quantities behave. This understanding is fundamental to progress in science and engineering. Students will use mathematical reasoning in their study of calculus concepts to verify properties of the concepts they study, and they will use scientific reasoning to determine whether possible solutions are reasonable for a given situation. | Homework and tests |
| *Representations:* Students will work with information specified in verbal, graphical, tabular, and symbolic forms. Many problems will require students to take information in one of these forms, analyze it, and create a solution in a different form. Students will be required to produce verbal explanations of the meanings of mathematical concepts, both in general and in the context of specific problems. | Homework and tests |
| *Information literacy:* To solve the applied problems in this course, students must determine which information in the problem is relevant to the solution, access this information and use it to obtain a mathematical solution, and then translate the mathematical solution back into the language of the original problem. | Homework and tests |

**Required Texts, Additional Reading, and Other Materials**

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| 1. Calculus (early transcendentals) 2/e by Jon Rogawski
2. TI-83/4 or equivalent graphing calculator
3. Standard student access to the University Computing Facilities
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**Grading Policy**

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| 100 points (or less) for the total of homework, projects, and quizzes100 points for each exam200 points for the final exam  |

**Attendance Policy**

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| A penalty of 1% reduction for each hour late will be assessed for any assignment. Make-up tests will not be given for any unexcused absence. |

**Course Schedule:**

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| **Week** | **Sections** | **Topics** |
| Aug 24 – 27 | 12.1 – 12.3 | Review of vectors, dot product, angle, and projection |
| Aug 31 – Sep 3 | 12.4 – 12.6 | Cross product, planes, quadric surfaces |
| Sep 8 – 10 | 12.7, Test | Cylindrical and spherical coordinates, **Test on Sep 10** |
| Sep 14 – 17 | 13.1 – 13.3 | Vector functions, calculus on vector functions, arc length |
| Sep 21 – 24 | 13.4 – 13.5  | Curvature, motion |
| Sep 28 – Oct 1 | Test, 14.1 – 14.2 | **Test on Sep 29,** Multivariable functions, limits and continuity |
| Oct 5 – 8 | 14.3 – 14.4 | Partial derivatives, differentiability and tangent planes  |
| Oct 12 – 15 | 14.5 – 14.7 | Gradient, directional derivatives, multivariable chain rule, optimization |
| Oct 19 – 22 | 14.8, Test | LaGrange multipliers, **Test on Oct 22** |
| Oct 26 – 29 | 15.1 – 15.3 | Multivariable integration |
| Nov 2 – 5 | 15.4, 15.6 | Integration in other coordinates, change in variables |
| Nov 9 – 12 | Test, 16.1 – 16.2 | **Test on Nov 10,** Vector fields, line integrals |
| Nov 16 – 19 | 16.3 – 16.4 | Conservative vector fields, parameterized surfaces, surface integrals |
| Nov 30 – Dec 4 | 17.1 | Green’s Theorem |
| Dec **9** | Final | **Final Exam on Dec 8, 12:45 – 2:45** |