

**Marshall University**  
**Syllabus**

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| <b>Course Title</b>              | <i>Calculus with Analytic Geometry III</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Course Number</b>             | <i>MTH 231- Section 102-CRN 3044</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Semester/Year</b>             | Fall 2018                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Days/Time</b>                 | MTWR 2-2:50pm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Location</b>                  | Harris Hall 236                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Instructor</b>                | Dr. Michael Otunuga                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Website for Past Question</b> | <a href="http://science.marshall.edu/otunuga/">http://science.marshall.edu/otunuga/</a><br><a href="#">Password: otunuga990</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Office</b>                    | WAEC 3229 (Engineering building)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Office Hours</b>              | MTWRF 10-12pm; others by appointment.<br>To make an appointment, email in advance when possible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Phone</b>                     | (304) 696-3049                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>E-Mail</b>                    | otunuga@marshall.edu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Textbook</b>                  | <b>Calculus</b> , Early Transcendental by Stewart, 8th edition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Sections Covered</b>          | 12.1-12.6, 13.1-13.4, 14.1-14.8, 15.1-15.4; 15.6-15.9, 16.1-16.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Course</b>                    | Vectors, curves, and surfaces in space                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Course Description</b>        | 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Calculator</b>                | TI-83 or higher. Graphing calculators may not be allowed during exam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Prerequisites</b>             | MTH 230 with "C" or higher                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Outcome &amp; Objectives</b>  | Student will learn to calculate and apply limits, to calculate with vectors, to calculate partial and total derivatives and to interpret them as rates of change, to calculate multiple integrals, line integrals and surface integrals; and to interpret them as accumulations and limits of sample sums, to apply integrals to word problems, to apply derivatives and integrals to parametric curves, to work with rectangular, polar, cylindrical and spherical coordinates.                                                                                                                                                                                                                                                                                                                                         |
| <b>University Policies</b>       | By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to <a href="http://www.marshall.edu/academic-affairs/?page_id=802">http://www.marshall.edu/academic-affairs/?page_id=802</a> for policies regarding Academic Dishonesty, Excused Absence Policy, University Computing Services Acceptable Use, Inclement Weather, Dead Week, Academic Dismissal, Academic Forgiveness, Academic Probation and Suspension, Academic Rights and Responsibilities for Students, Affirmative Action, Sexual Harassment. See the <a href="http://www.marshall.edu/calendar/academic/">University Academic Calendar</a> ( <a href="http://www.marshall.edu/calendar/academic/">http://www.marshall.edu/calendar/academic/</a> ) for course withdrawal dates. |
| <b>Disabled Students</b>         | The Disabled Student Services web site is now available. You may visit it at <a href="http://www.marshall.edu/disabled">http://www.marshall.edu/disabled</a> . Students seeking special accommodations need to follow the university policy detailed in this web site.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

### **Course Contents**

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|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Vector Geometry:</b>                | Vectors, the dot product, the cross product, equations of lines and planes, cylinders, spherical and quadric surfaces, etc.                                                                                        |
| <b>Vector-Valued Functions:</b>        | Vector functions and space curves, derivatives and integrals of vector functions, arc length, speed, and curvature, motion in space, etc.                                                                          |
| <b>Differentiation in Several Var:</b> | Functions of several variables, limits and continuity, partial derivatives, tangent planes and linear approximation, the chain rule, gradient and directional derivatives, optimization in several variables, etc. |
| <b>Multiple Integration:</b>           | Double and triple integrals, iterated integrals, cylindrical and spherical coordinates, change of variables, etc.                                                                                                  |
| <b>Line &amp; Surface Integrals:</b>   | Vector fields, line integrals, the fundamental theorem of line integrals, Green's theorem, curl and divergence, parametric surfaces and their areas, surface integrals, Stokes' theorem, etc.                      |

### **How each student learning outcome will be practiced and assessed in the course**

| <b>Student Learning Outcomes</b>                                                                                                                                            | <b>How students will practice each outcome</b>                                        | <b>How student achievement will be assessed</b>                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Student will learn to calculate and solve problems relating to Vectors, the dot product, the cross product, equations of lines and planes,                                  | Students will complete homework, classwork, and quizzes to get practice and feedback. | Students' understanding will be evaluated through questions on HW, quizzes and 3 in-class tests and the comprehensive final exam. |
| Students will be able to calculate partial and total derivatives and to interpret them as rates of change                                                                   | Students will complete homework, classwork, and quizzes to get practice and feedback. | Students' understanding will be evaluated through questions on HW, quizzes and 3 in-class tests and the comprehensive final exam. |
| Students will be able to calculate multiple integrals, line integrals and surface integrals                                                                                 | Students will complete homework, classwork, and quizzes to get practice and feedback. | Students' understanding will be evaluated through questions on HW, quizzes and 3 in-class tests and the comprehensive final exam. |
| Students will be able to interpret multiple integrals, line integrals and surface integrals as accumulations and limits of sample sums, to apply integrals to word problems | Students will complete homework, classwork, and quizzes to get practice and feedback. | Students' understanding will be evaluated through questions on HW, quizzes and 3 in-class tests and the comprehensive final exam. |

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|----------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| Students will be able to apply derivatives and integrals to parametric curves,               | Students will complete homework, classwork, and quizzes to get practice and feedback. | Students' understanding will be evaluated through questions on HW, quizzes and 3 in-class tests and the comprehensive final exam. |
| Student will be able to work with rectangular, polar, cylindrical and spherical coordinates. | Students will complete homework, classwork, and quizzes to get practice and feedback. | Students' understanding will be evaluated through questions on HW, quizzes and 3 in-class tests and the comprehensive final exam. |

### Course Requirements / Due Dates

**Attendance:** Attendance is required and you must come with your text. Attendance will be taken every class day by sign-in-sheet. 2 points will be reduced towards attendance grade for every missed class. Having more than 25% absences (university qualified unexcused) may result in a course grade of F! Absences which can be excused include illness, emergencies, or participation in another university activity. Documentation from an outside source must be provided.

**Homework:** Homework problems are assigned below. Each Section is due the next Monday (or next day) the section is completed.

**Quizzes:** There will be quizzes given every Wednesday.

**Exams:** There will be **3 in-class** tests during the semester. The date will be announced in class. Make-up exams will only be given in the event of a university-excused absence. Inform me on time.

**Final Exam:** The final exam will be on **Monday, December 10, 2018 from 12:45-2:45pm**. Please make travel arrangements accordingly. Make-up/early tests will not be available to accommodate individual travel plans.

### Grading Policy

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|---------------------------------------------------------------------------------------------------------------|--------|
| Attendance                                                                                                    | 25pts  |
| Quizzes                                                                                                       | 50pts  |
| Homework                                                                                                      | 100pts |
| Three major exams                                                                                             | 300pts |
| Final ( comprehensive ) exam                                                                                  | 150pts |
| The grading scale <b>A:</b> 90 – 100%, <b>B:</b> 80 – 89, <b>C:</b> 70– 79, <b>D:</b> 60 – 69, <b>F:</b> 0-59 |        |