A. **Academic Division:** Liberal Arts

B. **Discipline:** Mathematics

C. **Course Number and Title:** MATH2010 Calculus III

D. **Course Coordinator:** Sara Rollo  
   **Assistant Dean:** Deb Hysell

**Instructor Information:**
- **Name:** Click here to enter text.
- **Office Location:** Click here to enter text.
- **Office Hours:** Click here to enter text.
- **Phone Number:** Click here to enter text.
- **E-Mail Address:** Click here to enter text.

E. **Credit Hours:** 4

F. **Prerequisites:** MATH1151 (Minimum grade of C- required)

G. **Syllabus Effective Date:** Fall, 2017

H. **Textbook(s) Title:**
   - **On Campus Classes:** Calculus (packaged w/Web Assign)  
     - **Author:** Ron Larson/Bruce Edwards  
     - **Copyright Year:** 2018  
     - **Edition:** 11TH  
     - **ISBN #** 9781337604741
   - **Off Campus Classes (at High Schools):** Calculus (packaged w/Web Assign)  
     - **Author:** Ron Larson/Bruce Edwards  
     - **Copyright Year:** 2014  
     - **Edition:** 10TH  
     - **ISBN #** 9781305718661

I. **Workbook(s) and/or Lab Manual:** Supplies: TI-83 or TI-84 required

J. **Course Description:** This is the third of three courses in the basic calculus sequence. Topics include vector functions, functions of two or more variables, gradients, tangent planes and normal lines, Lagrange multipliers, partial derivatives (including applications), arc length and curvature, multiple integration, implicit and parametric calculus, spherical and cylindrical coordinates, Jacobians to change variables, and vector calculus including Green's Theorem and Stoke's Theorem. This course meets the requirements for OTM Calculus III TMM018 and also TAG# OMT018.
K. College Wide Learning Outcomes:

<table>
<thead>
<tr>
<th>College-Wide Learning Outcomes</th>
<th>Assessments - - How it is met &amp; When it is met</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication – Written</td>
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<td>Communication – Speech</td>
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<tr>
<td>Intercultural Knowledge and Competence</td>
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<td>Critical Thinking</td>
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<td>Information Literacy</td>
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<td>Quantitative Literacy</td>
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</table>

L. Course Outcomes and Assessment Methods:

Upon successful completion of this course, the student shall:

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Assessments – How it is met &amp; When it is met</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Differentiate and integrate vector-valued functions. For a position vector function of time, interpret these as velocity and acceleration.</td>
<td>HW, Test, Final exam Weeks 1,2,4 and 16</td>
</tr>
<tr>
<td>2. Evaluate limits, determine the continuity, determine the differentiability and describe the graphs of functions of several variables.</td>
<td>HW, Test, Final exam Weeks 2,3, 4 and 16</td>
</tr>
<tr>
<td>3. Find arc length and curvature of space curves.</td>
<td>HW, Test, Final exam Weeks 2,4 and 16</td>
</tr>
<tr>
<td>4. Find partial derivatives, directional derivatives, gradients, and differentials of functions of several variables and use them to solve applied problems.</td>
<td>HW, Test, Final exam Weeks 5,6,7,8 and 16</td>
</tr>
<tr>
<td>5. Find equations of tangent planes and normal lines to surfaces that are given implicitly or parametrically.</td>
<td>HW, Test, Final exam Weeks 4,5,8 and 16</td>
</tr>
<tr>
<td>6. Apply differentials of functions of several variables to optimization problems.</td>
<td>HW, Test, Final exam Weeks 6,7,8, 12 and 16</td>
</tr>
<tr>
<td>7. Use Lagrange multipliers to solve constrained optimization problems.</td>
<td>HW, Test, Final exam Weeks 8,12 and 16</td>
</tr>
<tr>
<td>8. Evaluate multiple integrals in appropriate coordinate systems such as rectangular, polar, cylindrical and spherical coordinates.</td>
<td>HW, Test, Final exam Weeks 10,12 and 16</td>
</tr>
<tr>
<td>9. Use Jacobians to change variables in multiple integrals.</td>
<td>HW, Test, Final exam Weeks 11, 12 and 16</td>
</tr>
<tr>
<td>10. Use the Fundamental Theorem of Line Integrals to solve applied problems.</td>
<td>HW, Test, Final exam Weeks 9,10, 12 and 16</td>
</tr>
<tr>
<td>11. Identify conservative and inverse square fields.</td>
<td>HW, Test, Final exam Weeks 12 and 16</td>
</tr>
<tr>
<td>12. Find the curl and divergence of a vector field, the work done on an object moving in a vector field, and the flux of a field through a surface.</td>
<td>HW, Test, Final exam Weeks 13,14 and 16</td>
</tr>
</tbody>
</table>
**Outcomes**

13. Use Green’s Theorem, the Divergence (Gauss’s) Theorem and Stoke’s Theorem.

**Assessments – How it is met & When it is met**

- HW, Test, Final exam
- Weeks 15 and 16

**M. Topical Timeline (Subject to Change):**

| Weeks 1-2 | Graph and find the equation of a line and plane in space  
Graph and find the equations of surfaces in space such as cylinders and quadric surfaces  
Convert between rectangular, cylindrical and spherical coordinates |
| Weeks 2-4 | Differentiate and integrate vector-valued functions  
Find the unit tangent vector and principal unit normal vector of a smooth curve and use to find the arc length and curvature  
Find the tangential and normal components of acceleration for a smooth curve |
| Weeks 5-8 | Describe graphs, level curves and level surfaces of functions of several variables and evaluate limits of functions of several variables  
Discuss the continuity and differentiability of a function of several variables  
Find partial derivatives, directional derivatives, gradients and differentials of functions of several variables and use them to solve applied problems  
Find equations of tangent planes and normal lines to surfaces (including parametric surfaces)  
Use the chain rule for functions of several variables (including implicit differentiation)  
Find extrema of functions of several variables using the second partials test and Lagrange multipliers and solve applied problems |
| Weeks 9-12 | Evaluate iterated integrals and use them to find the area of plane regions  
Evaluate multiple integrals in rectangular, polar, cylindrical and spherical coordinates and use them to solve applications involving volume, surface area, density, moment and centroids  
Use a Jacobian to change variables in multiple integrals |
| Weeks 12-16 | Identify conservative and inverse square fields  
Find the curl and divergence of a vector field and the flux of a field through a surface and solve applied problems  
Evaluate line and surface integrals (including parametric surfaces) and solve applied problems  
Identify when a line integral is independent of path and use the Fundamental Theorem of Line Integrals  
Use Green’s Theorem, the Divergence (Gauss’s) Theorem and Stokes’s Theorem |

**N. Course Assignments:**

1. Chapter 11 [M. 1-3]
2. Test 1
3. Chapter 12 [M. 4-6]
4. Test 2
5. Chapter 13 [M. 7-12]
6. Test 3
7. Chapter 14 [M. 13-15]
8. Test 4
9. Chapter 15 [M. 16-20]
10. Comprehensive Final Exam

**O. Recommended Grading Scale:**
### NUMERIC GRADE POINTS DEFINITION

<table>
<thead>
<tr>
<th>NUMERIC</th>
<th>GRADE</th>
<th>POINTS</th>
<th>DEFINITION</th>
</tr>
</thead>
<tbody>
<tr>
<td>93–100</td>
<td>A</td>
<td>4.00</td>
<td>Superior</td>
</tr>
<tr>
<td>90–92</td>
<td>A-</td>
<td>3.67</td>
<td>Superior</td>
</tr>
<tr>
<td>87–89</td>
<td>B+</td>
<td>3.33</td>
<td>Above Average</td>
</tr>
<tr>
<td>83–86</td>
<td>B</td>
<td>3.00</td>
<td>Above Average</td>
</tr>
<tr>
<td>80–82</td>
<td>B-</td>
<td>2.67</td>
<td>Above Average</td>
</tr>
<tr>
<td>77–79</td>
<td>C+</td>
<td>2.33</td>
<td>Average</td>
</tr>
<tr>
<td>73–76</td>
<td>C</td>
<td>2.00</td>
<td>Average</td>
</tr>
<tr>
<td>70–72</td>
<td>C-</td>
<td>1.67</td>
<td>Below Average</td>
</tr>
<tr>
<td>67–69</td>
<td>D+</td>
<td>1.33</td>
<td>Below Average</td>
</tr>
<tr>
<td>63–66</td>
<td>D</td>
<td>1.00</td>
<td>Below Average</td>
</tr>
<tr>
<td>60–62</td>
<td>D-</td>
<td>0.67</td>
<td>Poor</td>
</tr>
<tr>
<td>00–59</td>
<td>F</td>
<td>0.00</td>
<td>Failure</td>
</tr>
</tbody>
</table>

P. Grading and Testing Guidelines:
Click here to enter text.

Q. Examination Policy:
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R. Class Attendance and Homework Make-Up Policy:
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S. Classroom Expectations:
Click here to enter text.

T. College Procedures/Policies:

**Attendance Requirements:** All students are required to attend all scheduled classes and examinations. Each faculty member has the right to establish regulations regarding attendance that he/she considers necessary for successful study.

Students who do not attend classes may be administratively withdrawn from those classes. However, failure to attend classes does not constitute withdrawal, and students are expected to process a formal withdrawal though the Student Records Office in Kee Hall.

**Student engagement requirements:**
Student engagement is based on the “active pursuit” of learning which can be measured by class attendance, class participation (in class or online), taking required quizzes/examinations, and submission of work assignments or papers. Student engagement consists of a student attending at least 60% of the class sessions (there should be attendance throughout the term) and/or completing 75% of the assignments listed on the syllabus at the midpoint in the term. Exceptions can be made when there is on-going communication between the student and faculty member. The communication must be documented and the faculty member and student must be in agreement regarding the exception. Students not meeting the expectation will be administratively withdrawn from class. If a student believes he/she was administratively withdrawn in error, he/she may file an appeal. Being administratively withdrawn may have program and financial aid implications.

**Academic Misconduct** is any activity that tends to compromise the academic integrity of the college, or
subvert the educational process. Examples of academic misconduct include, but are not limited to:

1. **Violation of course or program rules** as contained in the course syllabus or other information provided to the student; violation of program requirements as established by departments and made available to students.

2. **Plagiarism** including, but not limited to, submitting, without appropriate acknowledgment, any written, visual or oral material that has been copied in whole or in part from the work of others (whether such source is published or not) even if the material is completely paraphrased in one’s own words. This includes another individual’s academic composition, compilation, or other product, or a commercially prepared paper. Plagiarism also includes submitting work in which portions were substantially produced by someone acting as a tutor or editor.
   Such practices constitute plagiarism regardless of motive. Those who deny deceitful intent, claim not to have known that the act constituted plagiarism, or maintain that what they did was inadvertent are nevertheless subject to penalties when plagiarism has been confirmed.

3. **Cheating** and dishonest practices in connection with examinations, papers and projects, including but not limited to using unauthorized notes, study aids or information on an examination; obtaining help from another student during an examination; taking an exam or doing work for another student; providing one’s own work for another student to copy and submit as his/her own; or allowing another student to do one’s work and then submitting the work as one’s own. Also included would be altering a graded work after it has been returned, then submitting the work for re-grading; or submitting identical or similar papers for credit in more than one course without prior permission from the course instructors.

4. **Fabrication** including but not limited to falsifying or inventing any information, data or citation; presenting data that were not gathered in accordance with defined appropriate guidelines, and failing to include an accurate account of the method by which data were collected.

5. **Obtaining an Unfair Advantage** including, but not limited to stealing, reproducing, circulating, or otherwise gaining access to examination materials prior to the time authorized by the instructor; unauthorized collaborating on an academic assignment; taking, hiding or altering resource material; or undertaking any activity with the purpose of creating or obtaining an unfair advantage over another student’s academic work.

6. **Aiding and Abetting Academic Dishonesty** including, but not limited to providing material, information or other assistance to another person with the knowledge that such aid could be used in any of the violations stated above, or providing false information in connection with any inquiry regarding academic integrity.

7. **Alteration of Grades or Marks** including but not limited to, action by the student in an effort to change the earned credit or grade.

In addition, cases of academic dishonesty may involve photocopied materials. Materials used may fall under the Copyright Act. Violations of said Act may subject the user and/or the College to sanctions.

**Statement on Disabilities:** Any student who requires reasonable accommodations related to a disability should inform the course instructor and the Coordinator of Specialized Services (Room 138 in Kee Hall; phone 419-755-4727).

Students who encounter difficulty in any of their courses are encouraged to visit the Tutoring Resource Center (Room 119 in Fallerius Technical Education Center) for tutoring assistance, and the Student Success Center (Room 136 in Kee Hall) for academic assistance, advising services, referrals for personal counseling and Learning Disability (LD) Testing.
Statement on Withdrawals: As a student, you are expected to attend class. If you are unable or choose not to attend class, or if for whatever reason you are unable to keep up with the requirements of a course, you need to officially drop the class at the Student Records Office. Refund dates and withdrawal dates will vary slightly from term to term. Contact the Student Records Office for applicable dates. Additionally, these dates are posted on the academic calendar available on the college’s website, www.ncstatecollege.edu, under the Academics heading on the home page and are available at the Student Records Office in Kee Hall. Students should go to the Student Records Office (Room 142 in Kee Hall) to process their withdrawal from any class.

If you choose to walk away from your class without officially withdrawing from it, the faculty member teaching the class must grade your classroom performance on the material available to him or her. This normally results in an "F" grade. An "F" grade can lower your grade point average considerably depending on the total credits accumulated.