A. **Academic Division:** Liberal Arts

B. **Discipline:** Mathematics

C. **Course Number and Title:** MATH1051 Technical Mathematics II

D. **Course Coordinator:** Pam Robison  
   **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:**
   - MATH1050 (Minimum grade of C- required)
   - OR-
   - COMPASS College Algebra score of 46 or higher
   - OR-
   - ACT Math score of 26 or higher
   - OR-
   - ACCUPLACER College Level Math score of 55 or higher

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

H. **Textbook(s) Title:**
   - *Basic Technical Math w/Calculus*
   - **Author:** Allyn J. Washington
   - **Copyright Year:** 2014
   - **Edition:** 10th
   - **ISBN #** 9780133116533

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

J. **Course Description:**

This course includes:

1) Trigonometric equations of any angle and applications
2) Radians and applications
3) Solutions of triangles including the Laws of Sines and Cosines
4) Vectors, operations and applications
5) Fractional exponents, radicals and operations
6) Complex numbers, operations, equations, and applications (including DeMoivre’s Theorem and alternating current applications)
7) Exponential and logarithmic functions, equations, and applications
8) Binomial Theorem
9) Derivatives, differentials, and applications
10) Integration and applications

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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<tr>
<td>Communication – Speech</td>
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<tr>
<td>Intercultural Knowledge and Competence</td>
<td></td>
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<tr>
<td>Critical Thinking</td>
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<tr>
<td>Information Literacy</td>
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<tr>
<td>Quantitative Literacy</td>
<td></td>
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</tbody>
</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. Evaluate Trigonometric functions in both radians and degrees and convert between radians and degrees.</td>
<td>Homework, Tests, Final Exams Weeks 1, 2, 8 and 16</td>
</tr>
<tr>
<td>2. Add, subtract and draw vectors and use Trigonometric functions to resolve a vector into its components.</td>
<td>Homework, Tests, Final Exams Weeks 2, 3, 8 and 16</td>
</tr>
<tr>
<td>3. Solve oblique triangles using the law of sines and or law of cosines.</td>
<td>Homework, Tests, Final Exams Weeks 3, 8 and 16</td>
</tr>
<tr>
<td>4. Use formulas for arc length, area of a sector, and velocity of a point on a wheel.</td>
<td>Homework, Tests, Final Exams Weeks 2, 3, 8 and 16</td>
</tr>
<tr>
<td>5. Sketch graphs of Trigonometric functions using the parameters of amplitude, period, and displacement.</td>
<td>Homework, Tests, Final Exams Weeks 4, 5, 8 and 16</td>
</tr>
<tr>
<td>6. Simplify expressions with integral or fractional exponents, and radicals and perform operations with radicals.</td>
<td>Homework, Tests, Final Exams Weeks 5, 6, 8 and 16</td>
</tr>
<tr>
<td>7. Perform operations using complex numbers, graph complex numbers and convert complex numbers to polar and exponential form.</td>
<td>Homework, Tests, Final Exams Weeks 6, 7, 8 and 16</td>
</tr>
<tr>
<td>8. Solve logarithmic and exponential equations and sketch their graphs.</td>
<td>Homework, Tests, Final Exams Weeks 8, 9 and 16</td>
</tr>
<tr>
<td>9. Determine the formula for arithmetic and geometric sequences.</td>
<td>Homework, Tests, Final Exams Weeks 9 and 16</td>
</tr>
<tr>
<td>10. Find the derivative and slope of functions and apply to curvilinear motion.</td>
<td>Homework, Tests, Final Exams Weeks 10, 11, 12 and 16</td>
</tr>
<tr>
<td>11. Find the antiderivative and area of functions.</td>
<td>Homework, Tests, Final Exams Weeks 12, 13, 14, 15 and 16</td>
</tr>
</tbody>
</table>
### Topical Timeline (Subject to Change):

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Topics</th>
</tr>
</thead>
</table>
| 1-2   | Sign of the trigonometric functions  
Trig Functions of any Angle  
Radians  
Applications of Radian Measure |
| 2-3   | Introduction to Vectors  
Components of Vectors  
Vector Addition by Components  
Application of Vectors  
Oblique Triangles, The Law of Sines  
Oblique Triangles, The Law of Cosines |
| 4-5   | Graphs of $y = a \sin x$ and $y = a \cos x$  
Graphs of $y = a \sin bx$ and $y = a \cos bx$  
Graphs of $y = a \sin (bx + c)$ and $y = a \cos (bx + c)$  
Graphs of $y = \tan x$, $y = \cot x$, $y = \sec x$, $y = \csc x$ |
| 5-6   | Simplifying Expressions with Integral Exponents  
Fractional Exponents  
Simplest Radical Form  
Addition and Subtraction of Radicals  
Multiplication and Division of Radicals |
| 6-7   | Basic Definitions  
Basic Operations with Complex Numbers  
Graphical Representation of Complex Numbers  
Polar Form & Exponential Forms of a Complex Number  
Products, Quotients, Powers, and Roots of Complex Numbers (including De Moivre’s Theorem)  
An Application to Alternating-Current Circuits |
| 8-9   | The Exponential Functions  
Logarithmic Functions  
Properties of Logarithms  
Logarithms to the Base 10  
Natural Logarithms  
Exponential and Logarithmic Equations  
Graphs on Logarithmic and Semi-logarithmic Paper |
| 9     | Binomial Theorem |
| 10-12 | Limits  
The Slope of a Tangent to a Curve  
The Derivative  
The Derivative as an Instantaneous Rate of Change  
Derivatives of Polynomials  
Derivatives of Products and Quotients of Functions  
The Derivative of a Power of a Function  
Differentiation of Implicit Functions  
Higher derivatives |
| 12-13 | Curvilinear Motion  
Related Rates  
Using Derivatives in Curve Sketching  
Applied Maximum and Minimum Differentials |
| 13-14 | Antiderivatives  
The Indefinite Integral  
The Area Under a Curve  
The Definite Integral  
Numerical integration: trapezoidal rule |
| 14-16 | Applications of the Indefinite Integral  
Areas by Integration  
Volumes by Integration |
N. **Course Assignments:**

1. Chapter 8 [M. 1-4]
2. Chapter 9 [M. 5-10]
3. Chapter 10 [M. 11-14]
   a. Omit sections 10.5 and 10.6
4. Test 1
5. Chapter 11 [M. 15-19]
6. Chapter 12 [M. 20-25]
7. Chapter 13 [M. 26-32]
8. Midterm Exam
9. Chapter 19 section 4 (only) [M. 33]
10. Chapter 23 [M. 34-42]
11. Chapter 24 [M. 43-47]
   a. Omit sections 24.1, 24.2 and 24.6
12. Test 3
13. Chapter 25 [M. 48-52]
   a. Omit section 25.6
14. Chapter 26 [M. 53-55]
   a. Omit sections 26.4, 26.5 and 26.6
15. Comprehensive Final Exam

O. **Recommended Grading Scale:**

<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:**

Homework/Quizzes 20%, Tests 60%, Final 20%

Q. **Examination Policy:**

Click here to enter text.

R. **Class Attendance and Homework Make-Up Policy:**

Click here to enter text.

S. **Classroom Expectations:**
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 through 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](http://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.