# MTH112 Spring  2011

```
Professor: Miaohua Jiang
Office: 335 Manchester Hall
Office Phone: *5951
Email: jiangm@wfu.edu
Office Hours:  3:00-4:30 MT,  2:00 - 4:00 R, and by appointment
Class: 2:00- 2:50 MTWF, 016 Manchester Hall
```

*Course Description:* Calculus with Analytic Geometry (II): Techniques of integration, indeterminant forms, improper integrals, transcendental functions, sequences, Taylor's formula, and infinite series, including power series.

*Text:* Single Variable Calculus, James Stewart, Brooks/Cole Publishing Company, sixth Edition (6e).

*Topics: recommended by the department:*

 Integration (1 week):
    Sigma symbol
    Approximating area and notion of Riemann sum
    Definition of integral/properties/interpretation in terms of areas

Fundamental Theorem of Calculus (1 week):
    FTC and use through substitution
    $2^{nd}$ FTC anticipating the integral definition of *ln*

Integration applications:
    Included in choices noted at the end of this outline

Inverse functions (2 weeks):
    Inverse functions
    Exponential functions and logarithm functions (algebraic properties/differentiation/antidifferentiation/integration)
    Inverse trig functions (definitions/properties/differentiation/antidifferentiation/intergration)

L'Hospital's rule (1/2 week):
    0/0 and infinity over infinity only

Methods of integration (1 ½ weeks):
    Integration by parts
    Sin and cos forms
    Demonstrate trig substitution
    Demonstrate numerical integration: trapezoid and Simpson in addition to left end point/right end point/midpoint

Improper integrals (1/2 week):
    First kind (1 day)
    Second kind (1 day)

Sequences and series (4- weeks):
    Sequence/definition of sequence and computation of limit

Definition of series and sum series/example of definition/geometric series
Tests for convergence/divergence test/integral test/limit comparison test/ ratio test
Alternating series Conditional and absolute convergence with ratio test for absolute convergence
Taylor's theorem with remainder/examples/remainder estimation Maclaurin and Taylor series/examples
Proof of convergence (using Taylor's theorem) of Maclaurin or Taylor series to the function
(sin/cos/exp/choice) Power series/radius of convergence/interval of convergence with end points
Differentiation and antidifferentiation of power series (short summary)

Note: The estimated time for the preceding material is 12 ½ weeks out of the 14 week semester.  The remaining 1 ½ weeks may be used at the appropriate time during the semester to do applications of integration and/or differential equations.  The final exam will be approximately 80% on common material and 20 % on choice of each instructor; 20 common questions and 5 individual questions.

*Examinations* : Two 50-minutes midterm exams will be given during the semester and the dates will be announced at least one week before the exams. One 3-hour comprehensive final examination will be given at the end of the semester.

*Quizzes and Homework Assignments* : Several 5-10 minute quizzes will be given through out the semester. I will also hand out homework assignments. You are required to solve the problems in the assignments and write up the solutions with necessary details. Homework assignments need to be turned in on time. Selected problems will be read and a score will be given for each assignment.

*Grades* : Letter grades will be assigned based on the total points a student earns during the semester: The cut-off for each grade is approximately as follows: A: Excellent >= 90 %, B: Good >= 80%, C: Above Average >=70 %, D: Average >= 60 %.

```
Attendance: 25 pts.
Midterm One: 90 pts.
Midterm Two: 90 pts.
Homework, course projects 75 pts.
Quizzes: 45 pts.
Final Comprehensive Examination: 175 pts
```

*Use of calculators and Thinkpads:*
It is discouraged to use calculators to do algebraic manipulations and find derivatives, etc. while you are doing your homework assignments. It is OK to use calculators to do some numerical computations such as finding values of functions. We will have special classes to discuss the use of Maple on Thinkpad and assign problems that require the use of it. It is OK to use a graphic calculator to verify the results you have got in your assignments. However, you need to learn many techniques without using a calculator.
**Use of calculators or Thinkpad is not allowed in quizzes or exams.**

*Attendance*
Attendance is required. It is always recommended that you let me know preferably beforehand if you have to miss a class. Makeup exams and quizzes will be provided if you cannot come to the class because of illnesses, emergencies, and University duties etc. For reasons other than these, there will be a 20% penalty on the scores of makeup exams and quizzes.

*Classroom behaviors*
To create an effective learning environment, cell phones should be turned off during classes. Activities such as eating food, drinking soda, typing your papers, checking your Emails, etc. are strongly discouraged.

*Expectations*
Preview the textbook before classes; read and make an effort to understand the textbook after classes.
Go through examples in the textbook thoroughly.
Turn in quizzes and assignments in time.
Try simple problems first, then more complicated ones.
Do more problems than the assigned (no need to turn in).
Come to TA's help sessions and my office hours when you have difficulties.