MATH 220 – Calculus II

Disclaimer: This syllabus is intended to give the student guidance in what may be covered in the course and will be followed as closely as possible. However, the professor reserves the right to modify, supplement and make changes as needs arise.

Course Information

Semester	: June 29, 2020 – July 31, 2020
Credit	: 4
Teaching Hours	: 50 Hours
Time	: 2 hours/day, Mon-Fri
Professor	: Sheiba I. Mas-Oud
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Catalog Description

A study of the applications of integration, first-order linear and separable differential equations, techniques of integration, improper integrals, sequences, series, and Taylor and Maclaurin Series. Prerequisite: Completion of MATH 219 Calculus I with a minimum grade of C (2.00) or better.

Content

This course focuses on expanded methods of integration and their application. Derivatives of the exponential, logarithmic and inverse trigonometric functions as well as their antiderivatives will be examined. Students learn to compute the customary antiderivatives of functions and apply antidifferentiation to such areas as volumes, moments, centroids, arc lengths and surfaces of revolution. Students will be introduced to differential equations. The use of L'Hopital's Rule and the evaluation of improper integrals are examined. The convergence tests of infinite series as well as the Power, Taylor and Maclaurin series are analyzed.

Required Textbook

Textbook: Calculus for Scientists & Engineers by Briggs, Cochran, Gillet, Schulz; Pearson Publishing, 3rd edition,© 2019
ISBN:13-9780134765631
Materials: Graphing calculator
Website: Access to www.mymathlab.com

Course Hours

The course has 25 sessions in total. Each class session is 120 minutes in length. The course meets from Monday to Friday. Federal regulations dictate that students be required to engage in two hours of work outside of class for each credit hour. So a summer school student is expected to spend 4 hours per day outside the regular classroom reviewing notes, working homework problems and preparing for exams.

Calculators and Cell phones

No calculators may be used on tests. Cell phones must be turned off and put away during tests.

Homework

There will be regular homework assignments. Students are encouraged to work together on the homework problems, but the homework will not be graded. However, it is very important to do all the homework.

Attendance and in-class work

Students are expected to be in class every day for the full class period. Material will be covered very quickly; it will be difficult to catch up, should one fall behind. We will spend some time in class working on problems. Some of this work may be presented or turned in.

Student Learning Outcomes & Instructional Objectives

This course is designed to achieve the following student outcomes and objectives:

- Evaluate velocity position and displacement.
- Calculate net change and future value.
- Evaluate the area of regions between curves.
- Understand the general slicing method and evaluate a volume by slicing.
- Apply correctly the Disk and Washer methods.
- Calculate volume by shells.
- Evaluate the length of curves.
- Understand and evaluate the area of a surface of revolution.
- Define and calculate the work done by a variable force.
- Solve lifting problems.
- Calculate the derivatives of inverse functions
- Define the natural logarithmic and exponential functions.
- Evaluate the derivative and integral of the exponential function.
- Correctly apply logarithmic differentiation.
- Define and correctly use the General Power Rule.
- Find growth rates using exponential models.
- Evaluate inverse trigonometric functions.
- Compute derivatives and integrals involving inverse trigonometric functions.
- Calculate limits involving exponential functions using L'Hopital's rule.
- Define the hyperbolic functions.
- Evaluate derivatives and integrals of hyperbolic functions.
- Use correctly integration by parts for indefinite integrals.
- Apply correctly trigonometric substitutions to evaluate integrals.
- Compute integrals using partial fractions.
- Approximate integrals using Numerical Integration.

- Evaluate Improper Integrals.
- Define and solve separable differential equations.
- Solve special first-order linear differential equations.
- Model with differential equations.
- Define and work with sequences.
- Evaluate the limit of a sequence.
- Evaluate geometric series.
- Determine the divergence of series using the divergence test.
- Determine the convergence or divergence of series using the Integral, Ratio, Root, and Comparison tests.
- Define and work with alternating series.
- Find Taylor polynomials of order n.
- Approximate functions with polynomials.
- Find the interval and radius of convergence of power series.
- Find Taylor and Maclaurin series for a function.
- Work with Taylor Series.

Teaching Procedures

Most classes will be a combination of lecture, group activities, and in-class assignments. You will be given homework assignments on MML to be completed outside of class, with due dates/times. There will a 15min quiz at the beginning of each class and a class test at the end of each week.

Course Outline

Applications of Integration
6.2 Regions between Curves
6.3 Volume by Slicing
6.4 Volume by Shells Methods
6.5 Lengths of Curves
6.6 Surface Area
6.7 Physical Applications
16.6 Integrals for Mass Calculations
Logarithmic and Exponential Functions
7.1 Inverse Functions
7.2 The Natural Logarithmic and Exponential Functions
7.3 Logarithmic and Exponential Functions with other bases
7.4 Exponential Models
7.5 Inverse Trigonometric Functions
7.6 L'Hopital's Rule and Growth Rates
7.7 Hyberbolic Functions
Integration Techniques
8.1 Basic Approaches

8.2 Integration by Parts
8.3 Trigonometric Integrals
8.4 Trigonometric Substitutions
8.5 Partial Fractions
8.9 Improper Integrals
Differential Equations
9.1 Basic Ideas
9.3 Separable Differential Equations
9.4 Special First-Order Linear Differential Equations
Sequences and Infinite Series
10.1 An overview
10.2 Sequences
10.3 Infinite Series
10.4 The Divergence and Integral Tests
10.5 Comparison Tests
10.6 Alternating Series
10.7 The Ratio and Root Tests
Power Series
11.1 Approximating Functions with Polynomials
11.2 Properties of Power Series
11.3 Taylor Series and Maclaurin Series

Assessment

Students will be assessed in various ways, including a project, in-class quizzes and exams, homework, and a cumulative final exam. Remember, your written work is a reflection of your effort in this course and therefore, all work is to be written legibly, with scratch work done on separate paper.

Grading Breakdown

05% Attendance
25% Homework
20% Quizzes
30% Exams
20% Cumulative Final Exam

A	95 – 100	B –	80 – 82	D +	67 – 69
A –	90 – 94	C +	77 – 79	D	63 – 66
B +	87 – 89	C	73 – 76	D –	60 – 62
B	83 – 86	C –	70 – 72	F	0 – 59

Attendance & Student Responsibilities

- Students should NOT use calculators to integrate or differentiate.

- Most students find it difficult to learn Mathematics on their own and, since this is a rigorous course, it is expected that you will attend *all* classes for the full period in order to be successful in this course.
- Late attendance is a source of distraction to both the students and the instructor. Out of mutual courtesy and respect, please be in your seat and prepared to work at the start of our class time.
- Should you happen to miss a class, you will be responsible for making up that day's work and getting notes from another student
- Homework will be assigned progressively. It is important that students keep on top of the course material, so homework must be done when assigned. Please note that completion of all homework assignments in a timely manner is necessary to reinforce the skills learned in class that day.
- Missing an exam is a *serious* matter. In the event a student must miss an exam because of circumstances beyond his/her control, it is imperative that the student contacts the instructor before the scheduled exam, or before the next class following the exam. Once a graded exam has been returned to the class, it is not possible for a student to make it up.

Class participation and attentiveness will be considered an integral part of this course.

Academic Honesty

I expect that all of your work will be your own.
Integrity is essential to academic life. Consequently, students who enroll at Framingham State University agree to maintain high standards of academic honesty and scholarly practice. They shall be responsible for familiarizing themselves with the published policies and procedures regarding academic honesty.
Academic honesty requires but is not limited to the following practices: appropriately citing all published and unpublished sources, whether quoted, paraphrased, or otherwise expressed, in all of the student's oral and written, technical, and artistic work; observing the policies regarding the use of technical facilities.
Infractions of the Policy on Academic Honesty include, but are not limited to:
1. Plagiarism: claiming as one's own work the published or unpublished literal or paraphrased work of another. It should be recognized that plagiarism is not only academically dishonest but also illegal.
2. Cheating on exams, tests, quizzes, assignments, and papers, including the giving or acceptance of these materials and other sources of information without the permission of the instructor(s).
3. Unauthorized collaboration with other individuals in the preparation of course assignments.
4. Submitting without authorization the same assignment for credit in more than one course.
5. Use of dishonest procedures in computer, laboratory, studio, or field work.
Further clarification on academic honesty will be provided, when appropriate, in individual courses.
6. Misuse of the University's technical facilities (computer machinery, laboratories, media equipment, etc.), either maliciously or for personal gain. Examples include but are not necessarily limited to: (a) accessing the private files of another person or agency without express permission, and (b) the unauthorized use of technical facilities for purposes not connected with

academic pursuits. When evidence indicates that a student has improperly used a technical facility, an appropriate supervisor (faculty or staff member) may take appropriate action reflecting the seriousness of the infraction, ranging from a verbal warning to, but not beyond, denial of use of the facility. If coursework may have been plagiarized, the supervisor will also inform all concerned faculty members, who may take action as described in the procedures for handling cases of alleged infractions of academic honesty.
7. Falsification of forms used to document the academic record and to conduct the academic business of the University

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