Department of mathematics & Natural sciences
School of Data & Sciences

MAT 120 Integral Calculus & Differential Equations (Mathematics II)
Fall 2023

"We will always have stem with us. Some things will drop out of the public eye and will go away, but there will always be science, engineering, and technology. And there will always, always be mathematics"—Katherine Johnson

Consultation Schedule
Will be provided by the course instructor

Instructor Information
Will be provided by the course instructor

Prerequisites:
MAT 110

Course Aims and Outcomes

Content in this course will be adaptive, allowing students to achieve a certain concept before moving on to the next level.

Learning Outcomes

This course is designed to provide science/ engineering students an intense foundational introduction to the fundamental concepts in mathematics. After completing this course a student will be benefitted in the following ways:

- Find the anti-derivative of elementary polynomials, exponentials, logarithmic and trigonometric functions.
- Interpret the definite integral geometrically as the area under a curve and construct the limit of a Riemann Sum.
- Use substitution as to find the anti-derivative of a composite function.
- Interpret the indefinite integral as a definite integral with variable limits
- Integration of several variables (two, three) functions and their applications
- Solve differential equations (including higher order) along modeling.

Course Contents:

- Integration using Riemann Sums, Integration and Antiderivatives, Indefinite & Definite integrals, Integrals with variable limits, Infinite Integral, Integration by Substitution.
- Improper Integrals, Integration by parts, Reduction formula, Integration by Trigonometric Substitution, Integration of Rational Function.
- Beta and Gamma Function.
- Length of a curve, Surface area of revolution.

****The topics above could be the tentative syllabus of midterm exam ****

- Basic concept of Double integral, Double integral in Cartesian and Polar Coordinate system
- Concept of Triple Integral, Triple integral in Cartesian, Cylindrical and Spherical Coordinate system.
- Introduction to Differential Equation, Separable Variables, Linear Equations, Integrating Factor
- Exact Equation, A non-Exact DE made Exact.

- Higher order DE, homogeneous and inhomogeneous cases.
- Modeling with 1st and 2nd order DE

**** The topics above could be the tentative syllabus of final exam ****

Marks Distribution

Attendance = 5%
Assignment = 10%
Quiz = 15%
Midterm = 20%
Final = 30%
Lab = 20%
Total = 100%

Attendance	Marks
90% and above	5
85% - 89%	4
80% - 84%	3
75% - 79%	2
70% - 74%	1
Less than 70% (Unable to sit for Final Exam)	

Administrative information and Course Requirements

- There will be **no makeup quizzes**.
- For **makeup midterm**, a student must *submit application* through the corresponding chair/dean of the department within an appropriate time range.
- No students will be allowed to sit for final exam if he/she misses 30% of the total classes.
- You are strongly encouraged to drop by my office to ask questions and discuss problems. If you are unable to meet with me during consultation hour, then I am available at other times by appointment.
- Pass mark – 50%

Reference Books :

- Calculus with analytic geometry (10th Edition) by **Howard Anton**
- A First course in Differential Equations With Modeling Applications (7th edition) by **Dennis G. Zill**
- Calculus, Early Transcendentals (9th Edition) by **Stewart, Clegg, Watson**

Academic Integrity

Each student in this course is expected to abide by the BRAC University Code of Academic Integrity. Any work submitted by a student in this course for academic credit will be the student's own work. Also refer to plagiarism policy that will be on the web.

You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an e-mail, an e-mail attachment file, a diskette, or a hard copy.

If copying occurs, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the quizzes and assigned work at home. Penalty for violation of this Code can also be extended to include failure of the course and University disciplinary action.

During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor May you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

Attendance Requirement

Attendance in a class is mandatory.

A student with class attendance below 70% must consult the instructor in order to discuss the completion of the course.

Student absent in 3 consecutive classes will require a chairperson's permission to attend the following classes.

Student unable to attend classes for known reason, must apply to the Chairperson, with copies to the course teacher and the Registrar's Office, mentioning the dates and reasons for absence. If it is not possible to inform it in advance, the Chairperson must be informed by sending an application through messenger, post, fax, or email.

Source: < https://www.bracu.ac.bd/academics/policies-and-procedures>