

Department of Mathematics and Statistics
MAT 725 — Integration Theory — Fall 2024

Course Description: Riemann integrals, continuous functions, functions of bounded variation, Riemann-Stieltjes integrals, and an introduction to Lebesgue measure (3 credit hours).

Prerequisites: Prerequisites: MAT 526 or 626 or consent of instructor.

Course Objectives: The student will delve into the various definitions of integrals of functions and explore measures of sets on the real line. Primary skills to be acquired are solving problems involving the concepts, and understanding and constructing mathematical proofs about them.

Instructional Activities: Lectures, problem solving, assignments.

Field, Clinical, Laboratory Experiences, Resources: None.

Instructor: Dubravko Ivanšić [DOO-brahv-ko EE-vahn-shich] Ivanšić is the last name.

Phone & e-mail: 809-3552, divansic@murraystate.edu

Office: Faculty hall 6A-1 (in the Department of Mathematics and Statistics annex)

Course webpage: Has **office hours**; a link to it has also been placed on Canvas.

<http://campus.murraystate.edu/academic/faculty/divansic/24fall/725home.html>

Textbooks & Content Outline: Our primary textbook is H.L. Royden and P.M. Fitzpatrick, Real Analysis, fourth edition (updated printing, if possible; selections from chapters 2–12), but we also plan to use previous semester's R. Bartle & D. Sherbert, Introduction to Real Analysis, fourth edition (chapter 8) and R.L. Wheeden & A. Zygmund, Measure and Integral (chapter 2).

Homework: Homework is a substantial portion of your grade (list is on the webpage). It will consist of a selection of problems of varying degrees of difficulty: type A (5-point), type B (8-point) and type C (12-point) problems. You are strongly encouraged to do all of the problems. For the ones you turn in, you can choose any of the assigned problems subject to the conditions: turn in at least 30 points worth, where at least 40% of total are type B or harder. You may turn in problems with greater point-worth than the minimum, but only the first 60 points' worth will be graded.

Some Success Tips: As you read the textbook or your notes, make sure you have a pencil and paper with you. Work things out on paper as you read them. Whenever a definition is introduced, as you try to understand what the definition is supposed to capture, try to think of several objects that fit the definition and several that do not. Before you read a proof, see if you can figure it out yourself, based on the previous material. (If you have no idea, that's OK, too, then just try to understand the presented proof.) If you have trouble with the material, make sure you stop by for office hours. Many things can be made much clearer in conversation with me.

Attendance: Students are expected to adhere to the MSU Attendance Policy outlined in the current MSU Bulletins. Attendance is strongly encouraged every day, and roll will be taken. If you missed four or fewer classes during the semester, you get 3% bonus points. Note that you are not penalized for missing a class (the points are in excess of your total grade), so an absence is counted as such regardless of the reason ("excused" or not).

Seating: If there are seats available in the front rows of the classroom, no one will be allowed to sit in the back rows.

Exams: There will be three exams whose dates will be announced well in advance. Calculators will **not** be allowed on any of the exams.

Final exam: is comprehensive and will be held on Tuesday, December 10th at 1:30PM in our usual classroom.

Grade: Your homework score is computed as (points earned)/(points attempted), assuming you have satisfied the minimum point requirements. Your final grade is computed roughly as follows: homework will count for 40% of the grade and each exam counts for 20%. Your final exam grade replaces your poorest exam grade only if it is better, so if you are happy with your exam scores during the semester, you don't have to take it.

Whether you have satisfied the minimal requirement for homework point-worth and how much you have done extra also affects your grade, but I don't have a formula for this. Guidance for the final grade scale is

$$90\%–100\%=A, 80\%–89\%=B, 70\%–79\%=C, 60\%–69\%=D, 0\%–59\%=E.$$

Make-ups: Make-ups for exams will be given only in cases of illness, field trips or other unavoidable circumstances. You will need to provide written verification of the reason for your absence in advance and as soon as possible. If you are unexpectedly absent from an exam, contact me by phone or e-mail **that same day** and arrange to take a make-up. The make-up should occur *soon*, which typically means “before I return the exam”. Make-ups for other graded work will be given at my discretion. Asking for a make-up more than once makes it less likely that I will grant it.

Important Dates:

- i) Last day to Audit or Drop without a Grade: Aug 26
- ii) Last day to Drop Course with a “W” Grade: November 21

For more information on audits, drops, and/or “W” grades, please see the MSU Academic Bulletin/Catalog or visit www.murraystate.edu/academics/RegistrarsOffice/Registration/index.aspx

Academic honesty policy: All students must adhere to the Policy on Academic Honesty described in the current MSU Academic Bulletin/Catalog. Students may appeal decisions related to academic dishonesty by following the Academic Honesty Appeal Procedure described in the current MSU Academic Bulletin/Catalog.

Recording Notification: This course may utilize recordings that capture students’ faces and/or voices. These recordings may be used for course review by enrolled students and/or instructors, and will not be shared with anyone not enrolled, teaching, or aiding in the instruction of the course. Any video capturing student faces and/or voices will be destroyed after all students have been issued a grade for the course.

This course may require the recording of students’ faces and/or voices by the university and/or its applicable technology vendor for the purpose of compliance with the university’s testing integrity protocol, requiring the use of Respondus Monitor and/or Lockdown Browser for exams and/or quizzes. These testing integrity protocols may make reasonable requests to demonstrate that your testing environment remains free of impermissible aids. If a 360° video capture or scan of a student’s residential environment at the time of the test or exam is not permitted, students must make every attempt to complete exams at another space that is appropriate and relatively free from distractions, such as a public library or other public space.

Starfish: Your success is important! Murray State University uses Starfish to communicate with students about academic progress and success. Check your Murray State email regularly for notifications and alerts sent through the Starfish network. If you need help, you can “Raise Your Hand” in Starfish to send an alert. Log into your Starfish account through myGate to use this and other features.

Mental Health Resources: If you or someone you know is experiencing mental health concerns or could benefit from speaking with a counselor, there are free and confidential resources available from three separate sources:

Counseling Center (www.murraystate.edu/counselingcenter) offers free and confidential mental health counseling, offering both in-person and remote sessions for all enrolled students. C104 Oakley Applied Science, open 8:00-4:30 M-F, walk-in hours 9:00 to 2:00 M-F (when the University is open), 270-809-6851, msu.counselingcenter@murraystate.edu

Psychological Center (www.murraystate.edu/psychologicalcenter) offers free and confidential counseling services, as well as psychological evaluations. 401 Wells Hall, 270-809-2504.

TimelyCare (Available in Canvas, at timelycare.com/murraystate, or on the TimelyCare app) offers several free virtual services, including TalkNow, scheduled counseling appointments, health coaching, and on-demand yoga and meditation. Their services are available 24/7. In an emergency, you can also contact **Murray State Police** at 270-809-2222 or call the **24-hour crisis hotline** at 988.

Students with Disabilities: Students requiring special assistance due to a disability should visit the Office of Student Disability Services immediately for assistance with accommodations. For more information, students with disabilities should contact the Office of Student Disability Services, 423 Wells Hall, Murray, KY 42071. Telephone: 270-809-2018 (Voice) 270-809- 5889 (TDD). Email: msu.studentdisabilities@murraystate.edu. The Office of Student Disability Services will work directly with professors regarding any specific accommodation needs that may be applicable to the particular classroom setting.

Non-Discrimination Policy Statement: Murray State University endorses the intent of all federal and state laws created to prohibit discrimination. Murray State University does not discriminate on the basis of race, color, national origin, sex, gender identity, sexual orientation, religion, age, veteran status, or disability in employment or application for employment, admissions, or the provision of services and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford individuals with disabilities equal access to participate in all programs and activities.

In particular and without limiting the preceding and pursuant to and consistent with the requirements of Title VI of the Civil Rights Act of 1964 and its regulations 34 CFR 100 et seq.; Section 504 of the Rehabilitation Act of 1973 and its regulations 34 CFR 104; Title IX of the Education Amendments of 1972, 20 USC 1681 et seq., and its regulations 34 CFR 106 et seq; and the Age Discrimination Act of 1975 and its regulations 34 CFR 110, Murray State University does not discriminate on the basis of race, color, national origin, sex, handicap, or age in its educational programs and activities. This non-discrimination in education programs and activities extends to employment and admissions and to recruitment, financial aid, academic programs, student services, athletics, and housing. Murray State is required by Title IX and 34 CFR part 106 not to discriminate on the basis of sex and the prohibition against sex discrimination specifically includes a prohibition of sexual harassment and sexual violence.

For more information concerning the application of these provisions contact: the Executive Director of Institutional Diversity, Equity, and Access/ Murray State University Title IX Coordinator, Murray State University, 103 Wells Hall, Murray, KY 42071. Telephone: (270) 809-3155; Fax: (270) 809-6887; TDD: (270) 809-3361; Email: msu.titleix@murraystate.edu.