

MATH-SHU 131 SYLLABUS

Calculus, NYU Shanghai

Instructor Information

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Course Information

- Summer Term 2 2022, July 4 - August 12
- Course Credits: 4
- This course presents the foundations of calculus for functions of a single variable. Topics addressed include limits, continuity, rules of differentiation, antiderivatives, indefinite and definite integrals, the fundamental theorem of calculus, integration techniques, and improper integrals.
- Prerequisites: Students should ideally have passed the course 'Precalculus' offered at NYU Shanghai, or some equivalent course elsewhere.
- Weekly Contact Hours:
 - Lectures: 2 x 3hrs per week.
 - Recitations: 2 x 1hr20mins per week.

Course Learning Outcomes

Upon completion of this course, students will be able to:

- formally define the concept of and confidently compute limits and consequently apply them to the definitions of continuity and differentiability;
- competently use various differentiation techniques in the appropriate situations;
- infer key mathematical properties of functions from their graphs as well as, conversely, gain competence in sketching graphs of functions;
- identify the appropriate method of integrating certain functions and be able to integrate by parts and by substitution;
- apply various integration techniques to compute lengths, areas and volumes.

Textbook

The course will follow the textbook 'Calculus - Early Transcendentals (9th Edition)' by James Stewart. This reference provides a rigorous treatment of the main topics, complemented by numerous examples and exercises.

Grades (Assessment, Measurement and Evaluation)

The grade for this course will be determined according to the following formula:

Assignments/Activities	% of Final Grade
Two quizzes	40%
Midterm Examination 1	30%
Midterm Examination 2	30%

Quizzes

There will be two quizzes, each constituting 20% of the overall grade. Quiz 1 will cover material from lectures 1, 2, and 3. Quiz 2 from lectures 7, 8 and 9. As such, due to time constraints, material from lectures 4, 5 and 10, 11 will not be assessed in the quizzes but will still be admissible for the midterm exam 1 and respectively for the midterm exam 2. Quizzes **will not be open-book**, so notes or textbooks materials are not allowed.

Quizzes will be submitted and marked via Gradescope (NYU Classes > Lessons > Gradescope). Students will need to upload clear and readable scans or photographs of their work to the platform before the deadline.

Midterm Examination 1

The midterm exam 1 will cover all the material from the first half of the course. The midterm will be taken remotely, will be **open-book** and will be proctored over Zoom according to the NYU Shanghai policy. The midterm will be 1 hour and 20 min in length. Students' papers will again be uploaded to and marked via Gradescope.

Midterm Examination 2

The midterm exam 2 will cover material from the second half of the course. Again this will be 1 hour and 20 minutes long, will be **open-book** , conducted via Zoom, according to the NYU Shanghai policy and marked via Gradescope.

Letter Grades

Letter grades for the entire course will be assigned as follows:

Letter Grade	Credits	Percent
A	4.00	92.5% and above
A-	3.67	90.00% – 92.49%
B+	3.33	85.00% - 89.99%
B	3.00	80.00% - 84.99%
B-	2.67	77.5% - 79.99%
C+	2.33	72.5% - 77.49%
C	2.00	70.00% - 72.49%
C-	1.67	62.5% - 69.99%
D+	1.33	55% - 62.49%
D	1.00	50.00% - 54.99%
F	0.00	49.99% and below

Grading Evaluation Scale

NYU Shanghai follows the same grading practices as NYU New York. The following grades may be awarded: A, A-, B+, B, B-, C+, C, C-, D+, D, F. In general, A indicates excellent work, B indicates good work, C indicates satisfactory work, and D indicates passable work and is the lowest passing grade. F indicates failure. There are some additional grades—P for pass, W for Withdrawal—which are awarded administratively.

Grade Dissemination

All grades will be published on NYU Classes as punctually as possible. Feedback will be available to see on the marked sheets in Gradescope and can also be discussed with the instructor.

Course Schedule

All times listed here are in China Standard Time (CST).

Lectures

Lectures will take place every Tuesday and Thursday from 13.00 to 16.00 Shanghai time via Zoom. They will not be recorded so presence is mandatory and it is the student responsibility to attend.

Recitations

Recitations will be via Zoom on Tuesdays and Thursdays after the lectures from 16:05 to 17:25 Shanghai time.

Quizzes

Quizzes will be given during the Thursday recitations of the weeks 2 and 5 and solutions will need to be uploaded to Gradescope at the end of the corresponding time slot. Scientific calculators are not allowed to be used.

Examinations

The **midterm examination 1** will take place on the Thursday recitation of week 3. Scientific calculators are not allowed to be used.

The **midterm examination 2** follows the template of the midterm exam 1 above, though taking place in the recitation of the week 6. Scientific calculators are not allowed to be used.

All examinations will be conducted via Zoom and will be proctored according to the NYU policy.

Roadmap

The following is a *provisional* outline for the coverage of topics in the course.

Lecture #	Topics	Textbook Sections
1	Introduction to functions, key examples, transformation of functions, function symmetry, composite functions, inverse functions.	1.1 - 1.5
2	Limits: infinite limits, limit laws, direct substitution property, squeeze theorem, limits at infinity, asymptotes.	2.2, 2.3, 2.6.
3	Continuity, intermediate value theorem, tangent and normal lines, derivatives.	2.5, 2.7.
4	Differentiation laws, product rule, quotient rule, chain rule.	3.1, 3.2, 3.4.
5	Implicit differentiation, l'Hôpital's rule, indeterminate forms, mean value theorem.	3.5, 4.4, 4.2.
6	Revision	-
7	Maximum and minimum values, monotonicity, concavity, curve sketching.	4.1, 4.3, 4.5.
8	Optimisation problems, antiderivatives, Riemann sums, definite integrals.	4.7, 4.9, 5.1, 5.2.

9	The fundamental theorem of calculus, area between curves, indefinite integrals.	5.3, 6.1, 5.4.
10	Integration by substitution, integration by parts, improper integrals.	5.5, 7.1, 7.8.
11	Arc length, area of surfaces of revolution, volume of solids of revolution.	8.1, 8.2, 6.2.
12	Revision	-

Course Policies and Student Expectations

Class Attendance and Participation

Attendance to all lectures and recitations is deemed mandatory. All recitations will be done live. Failure to attend will not be penalised, however, if cases of poor performance are coupled with low attendance this will be used in evidence against the student, should they wish to query marks received or the ultimate passing or failure of the course. Should students fail to attend or submit any assessments or examinations then a grade of 0% will be awarded with no course for retribution, unless extenuating circumstances are in play and alternative arrangements are agreed upon *in advance* of the assessments.

Students, either as individuals or as members of student organizations are permitted to be absent from classes to participate in competitions, conferences, and presentations, either at home or out of town, as approved by the Assistant Dean for Academic Affairs provided the following conditions are met:

- All work missed must be made up to the satisfaction of the instructor(s) concerned;
- No trip shall involve an absence of more than two days, excluding days when classes are not scheduled;
- The total number of days of absence shall not exceed six per sport or per organization annually;

- Each student will obtain an absence authorization signed by the Assistant Dean for Academic Affairs. The student will present this authorization to the instructor before the date in question. This is not an excuse for work missed.
- Making up exams: A common practice for approved absences is to have the student's teacher or supervisor proctor exams or quizzes during travel to a contest.

University Policy on Make-up of Absence from Class due to illness:

When students are ill, they are expected to notify professors *in advance* of class, if at all possible. Students should negotiate with professors the time and place for make-up of assignments, tests and/or examinations missed. In cases where students are seriously ill and will miss more than a week of classes, the Office of Health and Wellness should be contacted so that the student's other professors may be contacted. The Office of Health and Wellness will not verify medical absences of under a week.

Late submission

Missed assignments will earn a mark of 0%. Exceptions can be made only with the *prior approval* of the instructor.

Instructional Technology

Email: All key communication will occur via email. This includes any important announcements regarding the course as well as any personal communication between the instructor and any given student.

Zoom: All lectures will be given using Zoom. Likewise all examinations will be conducted via Zoom.

Academic Honesty/Plagiarism

Note that the homework assignments have a lifetime of one week between being distributed and handed in, therefore it is possible and in fact encouraged that students work on these collaboratively in groups of their peers. However, this does not give licence for some students to simply copy off others, all students should actively engage with the material and contribute to any group work.

All other assessments are necessarily individual pursuits. In any case of academic misconduct (e.g. plagiarism, access to contraband) there may be a hearing and the university has the discretion to award a mark of 0% for any given assessment. All examinations are taken remotely, via Zoom, and as such will be open-book. Students can thus use the textbook or their personal notes throughout the examinations but collaboration between students on the exams is strictly forbidden.

Disability Disclosure Statement

Academic accommodations are available for students with disabilities. Please contact the Moses Center for Students with Disabilities (212-998-4980 or mosescsd@nyu.edu) for further information. Students who are requesting academic accommodations are advised to reach out to the Moses Center as early as possible in the semester for assistance.

Title IX Compliance

From the [NYU Title IX website](#): "Title IX of the Education Amendments of 1972 (Title IX) prohibits discrimination on the basis of sex in educational programs. It protects victims of sexual or gender-based bullying and harassment and survivors of gender-based violence. Protection from the discrimination on the basis of sex includes protection from being retaliated against for filing a complaint of discrimination or harassment. NYU is committed to complying with Title IX and enforcing University policies prohibiting discrimination on the basis of sex. Mary Signor,

Executive Director of the Office of Equal Opportunity, serves as New York University's Title IX Coordinator. The University's Title IX Coordinator is a resource for any questions or concerns about sex discrimination, sexual harassment, sexual violence, or sexual misconduct and is available to discuss your rights and judicial options. University policies define prohibited conduct, provide informal and formal procedures for filing a complaint and a prompt and equitable resolution of complaints.

