

School of Basic Sciences and Humanities
First Semester 2016/2017
Calculus 1 (MATH 101)

TEXTBOOK: Thomas' Calculus: Early Transcendentals (13th Edition), by Thomas Jr., George B.; Weir, Maurice D.; Hass, Joel R., ISBN-13: 978-0321884077

OTHER REFERENCES: *Calculus*, 4th ed., by Robert T. Smith and Roland B. Minton

In addition, you will need:

- **A NOTEBOOK** to keep your notes and homework. It should be brought to class each day.

Course Objective

This course introduces the student to the calculus of single-valued functions. Topics include: limits, continuity, rates of change, rules for differentiating, differentials and local linear approximations, maxima and minima problems, L'Hôpital's rule, related rates, logarithmic and implicit differentiation, inverse trigonometric and hyperbolic functions, Rolle's Theorem, the mean-value theorem, and applications of derivatives and integrals. Prerequisite: PreCalculus or its equivalent

COURSE OUTLINE

- Review of inverse trigonometric functions
- Limits and continuity, including trigonometric functions
- Derivatives: rates of change and techniques of differentiation, including trig functions
- Function composition, chain rule, and implicit differentiation
- Exponential and logarithmic functions - graphs, derivatives, and applications
- Inverse trigonometric and hyperbolic functions - graphs, derivatives, and applications
- L'Hôpital's rule, improper integrals
- Techniques of integration - integration by parts, integration by partial fractions.

HOMEWORK ASSIGNMENTS

Homework problems are assigned on a weekly basis. The homework assignments are for your own practice. They will help you understand the material covered in class. Help and tutoring sessions will be provided if possible.

Course Grading Policy

First Exam	25/7/2016	30%
Second Exam	15/8/2016	30%
Final Exam	TBD	<u>40%</u>
Course Total Grade		100%

ACADEMIC CONDUCT

Academic honesty and mutual respect (student with student and instructor with student) are expected in this course. Mutual respect means being on time for class and not leaving early, being prepared to give full attention to class work, not reading during class time. Academic misconduct of any form, including copying or the use of prohibited materials during a testing situation, will result in a grade of zero on the class as well as

appropriate academic disciplinary measures. Cheating is not tolerated and will be dealt with harshly. Any form of cheating will result into immediate failing of the class in accordance with University Regulations.

More on Classroom Conducts and Attendance will be discussed thoroughly during the first day of classes.

IMPORTANT NOTE: Absences may be **excused** by medical certificate but they are **never erased**. The only circumstance where an absence is erased is if a student is officially representing the university and has produced a letter from Student Affairs to prove this or if a student must attend an exam on the **same day and time** provided an acceptable letter is produced from the relevant Doctor of that subject. All other absences are considered as official and are counted. A verbal warning will be given by the teacher after 3 absences. A written formal warning will be given after 4 absences and a student with 5 absences will be required to drop the course and re-register the following semester. **If a student is regularly late this will result in an absence.** The following are the instructions given in the university regulations: **A student is not permitted to absent himself / herself from more than 15% of the total number of credit hours assigned for each course (i.e. four lectures of the total number of lectures prescribed for a course that is being taught two times per week with a duration of one hour and a half per lecture).**

(In addition to this syllabus, please refer to the GJU Standard Course Policies sheet.)

Chapter	Chapter	Suggested Practice Exercises
Review	The Inverse Trigonometric Functions $y = \sin^{-1}x$, $y = \cos^{-1}x$, $y = \tan^{-1}x$	
2	Limits and Continuity	
2.1	Limits and Continuity	
2.2	Limit of a Function and Limit Laws	1, 5, 10, 11, 15, 23, 25, 29, 31, 33, 37, 41, 43, 47, 53, 60, 61, 63, 65, 79, 81, 89
2.4	One-Sided Limits (trigonometric limits)	2, 4, 9, 11, 15, 17, 19, 23, 25, 27, 28, 29, 31, 33, 37, 40
2.5	Continuity	3, 5, 13, 15, 18, 23, 24, 25, 30, 31, 35, 38, 43, 45, 47, 54
2.6	Limits Involving Infinity; Asymptotes of Graphs	2, 3, 5, 7, 9, 13, 17, 21, 23, 27, 33, 35, 37, 39, 41, 49, 51, 53, 57, 81, 83
3	Differentiation	
3.1	Tangents and the Derivative at a Point	5, 13, 18, 21, 25, 35, 51
3.2	The Derivative as a Function	1, 3, 5, 9, 11, 17, 19, 25, 37, 41, 58
3.3	Differentiation Rules	1, 5, 9, 13, 17, 23, 25, 29, 33, 37, 45, 53, 69, 70
3.5	Derivatives of Trigonometric Functions	1, 3, 7, 9, 11, 15, 19, 25, 27, 34, 47, 53, 57
3.6	The Chain Rule	1, 3, 7, 9, 15, 21, 23, 27, 31, 35, 37, 43, 47, 55, 57, 63, 67, 71, 77, 79, 81, 85, 87, 88, 89, 91, 93
3.7	Implicit Differentiation	1, 3, 5, 11, 13, 17, 19, 21, 23, 25, 29, 31, 33, 36, 39.
3.8	Derivatives of Inverse Functions and Logarithms	1, 3, 7, 11, 13, 15, 17, 19, 21, 27, 29, 32, 33, 39, 41, 51, 53, 55, 61, 63, 65, 67, 69, 73, 75, 79, 83, 87, 89, 93, 95
3.9	Derivatives of Inverse Trigonometric Functions	1, 3, 5, 13, 15, 16, 21, 23, 33, 34, 42

Chapter	Chapter	Suggested Practice Exercises
4	Applications of Derivatives	
4.1	Extreme Values of Functions	1, 3, 21, 23, 25, 27, 29, 31, 35, 37, 38, 39, 40, 45, 49, 51, 59, 63, 65, 73, 77, 78.
4.3	Monotonic Functions and the First Derivative Test	1, 5, 7, 11, 13, 15, 25, 31, 35, 37, 41, 43, 45, 53, 55, 57, 59, 61, 63, 73, 77
4.4	Concavity (second derivative test)	1, 3, 5, 7
4.5	Indeterminate Forms and L'Hôpital's Rule	1, 3, 5, 11, 13, 15, 19, 21, 27, 29, 31, 37, 39, 45, 47, 51, 55, 57, 61, 65, 69, 71, 73, 75, 77, 79, 81, 84, 85, 87
4.8	Antiderivatives	3, 5, 11, 15, 17, 19, 23, 25, 29, 41, 45, 49, 51, 56, 61, 63, 65, 67, 69, 83, 85, 91, 95, 99, 103, 107.
5	Integration	
5.1	Area and Estimating with Finite Sums (Idea only)	
5.2	Sigma Notation and Limits of Finite Sums (Idea only)	
5.3	The Definite Integral	10, 27, 61, 71
5.4	The Fundamental Theorem of Calculus	7, 17, 22, 41, 51, 56, 64
5.5	Indefinite Integrals and the Substitution Method	4, 15, 19, 41, 52, 60, 65
7	Integrals and Transcendental Functions	
7.1	The Logarithm Defined as an Integral	13, 19, 21, 31, 42
7.3	Hyperbolic Functions "sinh(x), cosh(x), tanh(x)"	3, 11, 15, 23, 31, 34, 47, 52, 57
8	Techniques of Integration	
8.1	Using Basic Integration Formulas	1, 15, 29
8.2	Integration by Parts	5, 13, 17, 33, 45, 47
8.3	Trigonometric Integrals	7, 11, 19, 35, 41, 45, 65
8.5	Integration of Rational Functions by Partial Fractions	5, 15, 29, 37, 49, 57
8.8	Improper Integrals	13, 19, 21, 29, 33, 41