



HANYANG UNIVERSITY

2019 HISS Syllabus (Calculus I)

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Dept.: Mathematics

Description: In Calculus I, we will study the fundamental concepts such as limits, continuity, derivatives, anti-derivatives, the fundamental theorem of Calculus, the definite and indefinite integrals, improper integrals, arc length, area of a surface, polar coordinates, sequences, and power series.

Objective: The main objective to learn Calculus is to acquire the basic techniques to deal with modeling systems in physics, science, engineering, statistics, and economics, etc. Since Calculus is the study of how things change, learning various techniques in this course will provide a way for us to deduce its consequences in modeling systems which are nothing but relatively simple quantitative depictions of real life situations.

Preparations: Textbook: Calculus: Early Transcendentals 8th Edition By James Stewart.

Schedule:

Week 1	1.5 Inverse Functions and Logarithms (Inverse trigonometric functions) (Exercises: 63,67,68,69,71) 3.5 Implicit differentiation (Exercises:7,12,17,24,25,31,37,46,51,55,60,65) 3.10 Linear Approximations and Differentials (Exercises:3,9,13,16,19,27,31,36,38) 3.11 Hyperbolic Functions (Exercises:5,9,11,15,21,31,34,36,43,45,51,55) 4.4 Indeterminate Forms and L'Hospital Rule (Exercises:17,28,31,39,49,52,57,65,74,84) 4.8 Newton's Method (Exercises:6,11,16,17)
Week 2	5.2 The Definite Integral (Exercises:11,24,29,41,47,53,74) 5.3 The Fundamental Theorem of Calculus (Exercises:12,16,38,42,63,65,76,83,84) 5.4 Indefinite Integrals and the Net Change Theorem (Exercises:16,40,51)

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	<p>5.5 The Substitution Rule (Exercises:21,30,37,38,43,68,88,91)</p> <p>6.3 Volumes by Cylindrical Shells (Exercises:2,5,8,14,19,31,39,41)</p> <p>7.1 Integration by Parts (Exercises:9,11,14,30,38,42,50,53,62,71)</p> <p>7.2 Trigonometric Integrals (Exercises:2,11,22,28,36,49,67)</p> <p>7.3 Trigonometric Substitution (Exercises:5,7,16,25,30,39)</p> <p>7.4 Integration of Rational Functions by Partial Fractions (Exercises:12,16,30,37,46,52)</p> <p>7.8 Improper Integrals(Exercises:7,12,19,30,50,52,55,58,79)</p>
Week 3	<p>Midterm</p> <p>8.1 Arc Length (Exercises:10,16,37,45)</p> <p>8.2 Areas of a Surface of Revolution (Exercises:11,14,17,33,35)</p> <p>10.2 Calculus with Parametric Curves (Exercises:6,15,28,33,43,44,57,63)</p> <p>10.3 Polar Coordinates (Exercises:10,18,25,29,35,42,45,56,61)</p> <p>10.4 Areas and Arc Length in Polar Coordinates (Exercises:3,5,10,21,28,32,41,48)</p> <p>11.1 Sequences (Exercises:81)</p> <p>11.2 Series</p> <p>11.3 The Integral Test and Estimates of Sums (Exer:6,13,18,22,24,29,36,46)</p>
Week 4	<p>11.4 The Comparison Tests (Exercises:3,9,13,25,31,38,45)</p> <p>11.5 Alternating Series (Exercises:4,12,17,20,25,27,34)</p> <p>11.6 Absolute Convergence and the Ratio and Root Tests (Exercises:6,9,14,22,30,31,36,44,45)</p> <p>11.8 Power Series (Exercises:4,7,14,15,17,24,26,30,31,37)</p> <p>11.9 Representations of Functions as Power Series (Exercises:4,8,10,14,16,20,28,30)</p> <p>11.10 Taylor and Maclaurin Series (Exercises:4,11,14,22,34,37,42,51,62,74,79)</p> <p>Final exam.</p>

Evaluation:	Midterm (%)	Final (%)	Attendance (%)	Assignments (%)	Participation (%)	Etc. (%)
	40	40	10	10	00	00