10A Syllabus - Calculus

Lecture Schedule based on *Hughes-Hallet, et al* – Calculus, 4th Edition

Section	Lectures	Topic
1.1	0	Functions and Change
1.2	1	Exponential Functions
1.3	1	New Functions from Old
1.4	1	Logarithmic Functions
1.5	1	Trigonometric Functions
1.6	1	Powers, Polynomials and Rational Functions
1.7	0.5	Introduction to Continuity
1.8	1	Limits
2.1	0.5	How do we measure speed?
2.2	1	The derivative of a point
2.3	1	The Derivative Function
2.4	0.5	Interpretations of the derivative
2.5	1	The Second Derivative
2.6	0.5	Differentiability
3.1	1	Powers and Polynomials
3.2	1	The Exponential Function
3.3	1	The Product and Quotient Rules
3.4	1	The Chain Rule
3.5	1	The Trigonometric Functions
3.6	1	The Chain Rule and Inverse Functions
3.9	1	Linear Approximation and the Derivative
4.1	1	Using First and Second Derivatives
4.3	1	Optimization
4.5	1	Optimization and Modeling

Optional Topics – time permitting.

Section	Lectures	Topic
12.5	0.5	Functions of Three Variables
12.6	1	Limits and Continuity
14.5	1	Gradients and Directional Derivatives in Space
14.8	1	Differentiability

Recommended Calculator : TI-85 or TI-86. At the instructors discretion symbolic manipulation calculators such as TI-89 or TI-92 may be prohibited during exams. For some exams, calculators may not be permitted at all.

10B Syllabus - Calculus

Lecture Schedule based on *Hughes-Hallet, et al* – Calculus, 4th Edition

Section	Lectures	Topic
5.1	1	How do we measure distance traveled?
5.2	1	The Definite Integral
5.3	1	Interpretations of the Definite Integral
5.4	1.5	Theorems about Definite Integrals
6.1	0.5	Antiderivatives Graphically and Numerically
6.2	1	Constructing Antiderivatives Analytically
6.3	0.5	Differential Equations
6.4	1	Second Fundamental Theorem of Calculus
6.5	0.5	The Equations of Motion
7.1	1	Integration by Substitution
7.2	1	Integration by Parts
7.3	0.5	Tables of Integrals
7.4	1.5	Algebraic Identities and Trigonometric Substitutions
7.5	1.9	Approximating Definite Integrals
7.7	1	Improper Integrals
7.8	1	Comparison of Improper Integrals
8.1	1	Areas and Volumes
8.2	1	Applications in Geometry
8.6	1	Applications in Economics
11.1	1	What is a Differential Equation?
11.4	1	Separation of Variables
11.5	1	Growth and Decay
11.6	1	Applications and Modeling
11.7	1	Models of Population Growth

Optional Topics – time permitting.

Section	Lectures	Topic
7.6	1	Approximation Errors and Simpson's Rule
8.4	1	Density and Center of Mass
8.5	1	Applications to Physics
11.2	1	Slope Fields
11.3	1	Euler's Method

Recommended Calculator : TI-85 or TI-86. At the instructors discretion symbolic manipulation calculators such as TI-89 or TI-92 may be prohibited during exams. For some exams, calculators may not be permitted at all.

10C Syllabus - Calculus

Lecture Schedule based on *Hughes-Hallet, et al* – Calculus, 4th Edition

Section	Lectures	Topic
8.6	1.5	Distribution Functions
8.7	1.5	Probability, Mean and Median
9.1	1	Geometric Series
10.1	1	Taylor Polynomials
12.1	1	Functions of Two Variables
12.2	1	Graphs of Functions of Two Variables
12.3	1	Contour Diagrams
12.4	1	Linear Functions
13.1	1	Displacement Vectors
13.2	1	Vectors in General
13.3	1	The Dot Product
13.4	1	The Cross Product
14.1	1	The Partial Derivative
14.2	1	Computing Partial Derivatives Algebraically
14.3	1	Local Linearity and the Differential
14.4	1.5	Gradients and Directional Derivatives in the Plane
14.6	1	The Chain Rule
14.7	1	Second-Order Partial Derivatives
15.1	1.5	Local Extrema
15.2	1.5	Optimization
15.3	1.5	Constrained Optimization: Lagrange Multipliers

Optional Topics – time permitting.

Section	Lectures	Topic
12.5	0.5	Functions of Three Variables
12.6	1	Limits and Continuity
14.5	1	Gradients and Directional Derivatives in Space
14.8	1	Differentiability

Recommended Calculator : TI-85 or TI-86. At the instructors discretion symbolic manipulation calculators such as TI-89 or TI-92 may be prohibited during exams. For some exams, calculators may not be permitted at all.

11 Syllabus – Elementary Probability and Statistics

Lecture Schedule based on Triola – *Elementary Statistics*, 9th Edition

Section	Topic
2.2	Frequency Distributions
2.3	Visualizing Data
2.4	Measures of Center
2.5	Measures of Variation
3.3	Addition Rule
3.4	Multiplication Rule: Basics
3.5	Multiplication Rule: Complements and Conditional Probability
3.6	Probabilities Through Simulations
3.7	Counting
4.2	Random Variables
4.3	Binomial Probability Distributions
4.4	Mean, Variance and Standard Deviation for the Binomial Distribution
4.5	The Poisson Distribution
5.2	The Standard Normal Distribution
5.3	Applications of Normal Distributions
5.4	Sampling Distributions and Estimators
5.5	The Central Limit Theorem
5.6	Normal as Approximation to Binomial
5.7	Determining Normality
6.2	Estimating a Population Proportion
6.3	Estimating a Population Mean: σ Known
6.4	Estimating a Population Mean: σ Not Known
6.5	Estimating a Population Variance
7.2	Basics of Hypothesis Testing
7.3	Testing a Claim About a Proportion
7.4	Testing a Claim About a Mean: σ Known
7.5	Testing a Claim about a Mean: σ Not Known
7.6	Testing a Claim About a Standard Deviation or Variance
9.2	Correlation
9.3	Regression
9.4	Variation and Prediction Intervals
9.5	Multiple Regression
9.6	Modeling

Note: These are the topics that may be covered in this course. Some topics may not be included due to time constraints.

15A Syllabus – Discrete Mathematics

Lecture Schedule based on Epp – *Discrete Mathematics with Applications*, 3rd Edition

Section	Lectures	Topic
1.1	1	Logical Form and Logical Equivalence
1.2	1	Conditional Statements
1.3	1	Valid and Invalid Arguments
1.4	1	Application: Digital Logic Circuits
1.5	1	Application: Number Systems and Circuits for Addition
2.1	1.5	Predicates and Quantified Statements I
2.2	1	Predicates and Quantified Statements II
2.3, 2.4	1	Arguments with Quantified Statements
3.1	1	Direct Proof and Counterexample I
3.2, 3.3	1	Direct Proof and Counterexample II & III: Rational Numbers & Divisibility
3.4	1	Direct Proof and Counterexample IV: Division into Cases and the Quotient-Remainder Theorem
3.5	0.5	Direct Proof and Counterexample V: Floor and Ceiling
3.6	1	Indirect Argument: Contradiction and Contraposition
4.1	0.5	Sequences
4.2, 4.3	1	Mathematical Induction I & II
4.4, 5.1	1	Strong Mathematical Induction and the Well-Ordering Principle; Basic Definitions of Set Theory
5.1	0.5	Basic Definitions of Set Theory con'td
5.2	1	Properties of Sets
7.1	1	Functions Defined on General Sets
7.2	1	Application: Finite-State Automata
7.3, 7.4	1	One-to-One and Onto, Inverse Functions; Application: The Pigeonhole Principle
7.5	1	Composition of Functions
10.1	1.5	Relations on Sets
10.2	1	Reflexivity, Symmetry and Transitivity
10.3	1	Equivalence Relations
10.5	1	Partial Order Relations