MATH 435/535
Numerical Analysis I (3 units)

Course Outline

Topics	# of Weeks
Norms, Arithmetic, Well-Posed Computations	
1. Vector and matrix norms	
2. Floating-point arithmetic and roundoff errors	0.5
3. Well-posed computations	
Iterative Solution of Non-Linear Equations	
1. Bisection method	
2. Simple iteration or chord method	
3. Newton's method	3.0
4. Secant method and method of false position	
5. Special methods for polynomials	
Basic Theory of Polynomial Approximation	
1. Weierstrass Approximation Theorem and Bernstein polynomials	
2. Lagrange interpolating polynomial	
3. Hermite interpolating polynomial	3.0
4. Least squares approximation	
5. Polynomials of "best' approximation	
Numerical Differentiation	
1. Newton's interpolation polynomial	
2. Iterative linear interpolation	1.5
3. Numerical differentiation	
Numerical Integration	
1. Interpolatory quadrature	1.5
2. Gaussian formula: maximum degree of precision	
Numerical Solution of Linear Systems and Matrix Inversion	
1. Gaussian elimination	
2. Direct factorization methods	3.5
3. Iterative methods	
4. Matrix inversion by higher order iterations	
Exams and Projects	1.0

Textbook: Analysis of Numerical Methods by Isaacson and Keller

Adopted: Fall 2016