

CS 3430: Scientific Computing with Python

Weekly Schedule, Spring 2020

Professor:	Vladimir Kulyukin
Email:	vladimir.kulyukin@usu.edu
Office:	Old Main 402D
Office hours:	Thursday 4:30 - 6:00pm, by appointment
Class meeting time:	TR, 3:00 - 4:15pm
Class location:	Old Main 121.

Summary: We'll have 27 lectures, 3 exams, and regular weekly/bi-weekly assignments.

Week 01: Linear Systems

Lecture 01 (01/07): Linear Systems, Gaussian-Jordan Reduction

Lecture 02 (01/09): Matrix Transposes, Inverses, Determinants, Cramer's Rule

Week 02: Linear Systems

Lecture 03 (01/14): LU-Decomposition

Lecture 04 (01/16): LU-Decomposition

Week 03: Linear Programming

Lecture 05 (01/21): Constraints, Feasible Sets, Objective Functions

Lecture 06 (01/23): Bounded and Unbounded Sets, Corner Points, Simplex Algorithm

Week 04: Linear Programming, Differentiation

Lecture 07 (01/28): Simplex Algorithm

Lecture 08 (01/30): Differentiation, Differentiation Formulas, Differentiation Engines

Week 05: Differentiation, Exam 1

Lecture 09 (02/04): Differentiation, Newton-Raphson Algorithm

Exam 1 (02/06): In class, closed everything (notes, books, devices), lectures 01 – 09, Old Main 121, 3:00 – 4:15pm

Week 06: Integration

Lecture 10 (02/11): Central Divided Difference, Integration Approximation, Richardson Extrapolation

Lecture 11 (02/13): Romberg Integration

Week 07: Integration, Image Processing

Lecture 12 (02/18): Romberg Integration

Lecture 13 (02/20): Edge Detection with Gradients

Week 08: Image Processing

Lecture 14 (02/25): Line Detection with Hough Transform, Image Histograms

Lecture 15 (02/27): Digital Particle Image Velocimetry

Week 09: Spring Break

No lecture (03/03): Spring Break

No lecture (03/05): Spring Break

Week 10: Image Processing, Decision Trees

Lecture 16 (03/10): Digital Particle Image Velocimetry

Lecture 17 (03/12): Decision Trees

Week 11: Decision Trees, Huffman Encoding

Lecture 18 (03/17): Decision Trees

Lecture 19 (03/19): Huffman Encoding

Week 12: Huffman Encoding, Exam 2

Lecture 20 (03/24): Huffman Encoding

Exam 2 (03/26): In class, closed everything (books, notes, devices), lectures 10 – 20, Old Main 121, 3:00 – 4:15pm

Week 13: Time Series Comparison

Lecture 21 (03/31): Levenstein Distance

Lecture 22 (04/02): Dynamic Time Warping

Week 14: Number-Theoretic Algorithms

Lecture 23 (04/07): Unique Factorization, GCD Recursion Theorem, Euclid's and Extended Euclid's Algorithms

Lecture 24 (04/09): Modular Arithmetic, Modular Equations, Modular Exponentiation

Week 15: Cryptography

Lecture 25 (04/14): RSA Cryptosystem

Lecture 26 (04/16): RSA Cryptosystem

• **Week 16:** Review, Exam 3

Lecture 27 (04/21): Review

Exam 3 (04/23): In class, closed everything (books, notes, devices), comprehensive; Old Main 121, 3:00-4:50pm