The course builds on DS110 and during the first part of the semester introduces a number of classification and regression algorithms on top of the popular python packages numpy, pandas, matplotlib and scipy. It then moves to introducing a high performance language (Rust) and how to use it to implement a number of fundamental CS data structures and algorithms (lists, queues, trees, graphs etc), Students are expected to propose and complete an independent project on a large graph dataset using Rust.

| **Date** | Topics Covered |
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| Week 1 | Course overview, supervised and unsupervised learning, decision trees. |
| Week 2 | Classification, Regression, Pandas, Interpolation Homework: Markdown and decision trees |
| Week 3 | Clustering, k-means, linear programming, linear regression  Homework: Numpy and K-clustering |
| Week 4 | Loss functions, overfitting, underfitting, hyperparameter tuning  Homework: Pandas and Linear Programming |
| Week 5 | Programming languages, documentation, source control, basics of Rust.  Homework: Rust, overfitting and underfitting |
| Week 6 | Rust: project manager, functions, flow control, arrays, tuples, enums, memory management  Homework: Data set research |
| Week 7 | Rust: ownership, borrowing, methods, copying, references, generics and traits.  Homework: Basic Math in Rust |
| Week 8 | Rust: Collections, Vectors, Hash Maps, Hash Sets, Graphs  Homework: Enums, Structs and Traits in Rust |
| Week 9 | Rust: Graph algorithms, modules and external files.  Homework: Generics and methods in Rust |
| Week 10 | Rust: Parsing, stacks and queues, DFS, BFS, Priority queue, Binary heaps.  Homework: Simple decision tree in Rust |
| Week 11 | Rust: Sorting, shortest paths, strings, &str, closures and iterators  Homework: Graph pagerank in Rust |
| Week 12 | Rust: Binary search trees, dynamic programming, greedy algorithms. |
| Week 13 | Rust: Multithreading and parallel programming. |

**Homework dates are when the homeworks are due (they will be handed out the week before).**