Coursework

Software Engineering
Version control, CI/CD and pipelining, Agile software development philosophy, DevOps and project management techniques / philosophies.

Computer Networks
Explored Socket API in C; Data Link, Network, Transport, and Application layers of the OSI model; TCP / IP

Databases
Covered SQL, relational database design with ER and UML diagramming, Oracle, Big Data principles and using Hadoop / Pig.

Compiler Design
Explored Flex and Bison by creating a compiler for a simple programming language

Systems Architecture
Learned the architecture of a processor, and computers, from the ground up. I learned more in this class than any other I've taken; helped me understand how software runs on physical hardware.

Web Programming
Covered basic HTML and CSS, React, Node servers with Express, and integrating a MySQL server with Node.

Artificial Intelligence
Introductory AI course. Broad overview of Machine Learning, best-first search algorithms, and more

Algorithms and Data Structures
First learned basic C++ programming, then data structures: implemented templated Vector, Linked List, and Doubly Linked List classes. Explored sorting algorithms including Insertion Sort, Merge Sort, Quicksort, and Heap Sort and their runtimes. Consquently, learned asymptotic notation and the performance of the aforementioned algorithms. Finally, learned search algorithms, including Dijkstra's and Prim's algorithms, and Breadth First and Depth First searches.

Operating Systems
Wrote and installed a Linux kernel module, implemented a custom shell in C. Learned the mechanisms of fork and wait in C, and implemented a simulated CPU Scheduler. Implemented simulated Memory Pager in C. Learned about threads and thread management to implement a DNS Resolver in C.

Parallel Programming
Explored the massive performance improvements to be had through using compiler flags depending on computer hardware. Optimized image processing software with OpenMP pragmas and techniques such as loop unrolling. Learned how to use MPI and Apache Spark. Explored performance impact of running MPI and Spark in a Docker container for final project.

Computer Security
Using Kali Linux, spent the semester exploring various penetration testing tools through ethical hacking labs. Participated in the NCL individual and team games.