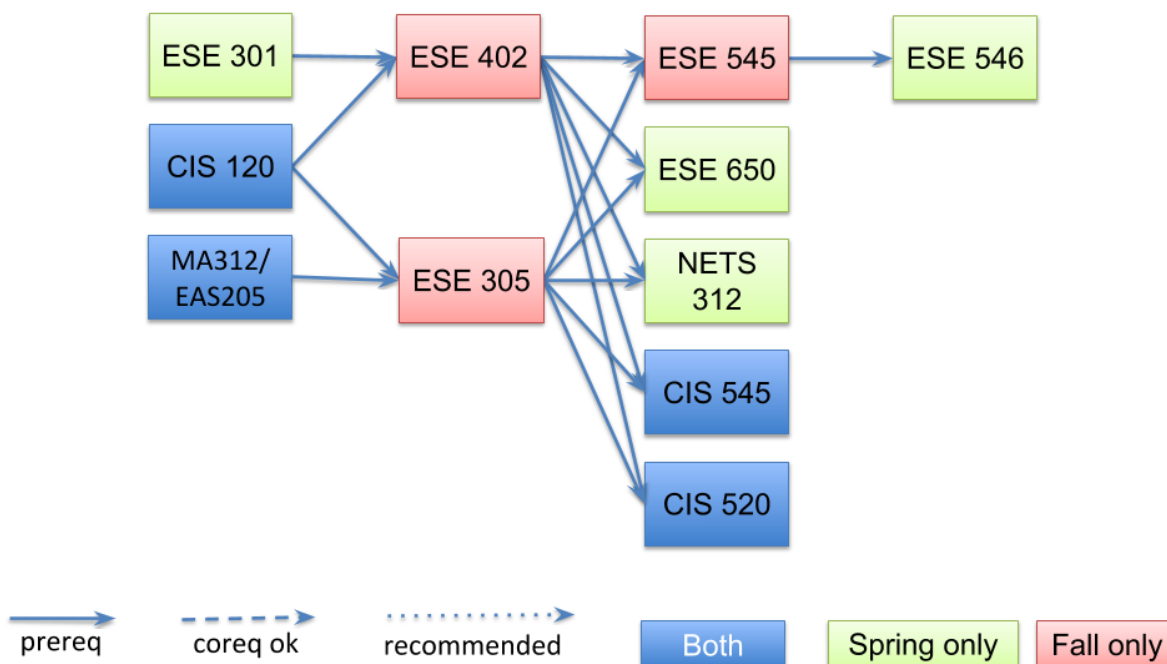# ESE Concentration: Data Science

Requirements: Complete ESE305 and ESE 402/502
Choose 2 Electives: ESE 545, ESE 546, ESE 650, NETS 312, CIS 545, CIS 520

Requirement Flow:

Impact: The exponential growth of available data and computational resources is revolutionizing all branches of science and technology alike. Applications of DS can be found in, for example, developing smarter cities using data from traffic and environmental sensors, improving medical diagnosis from electronic health records, enhancing business decisions based on market trends, or enabling more efficient management of manufacturing processes, to mention a few. Work across nearly all engineering domains is becoming more data driven, affecting both the jobs that are available and the skills that are required. As more data and ways of analyzing them become available, more aspects of the economy, society, and daily life will become dependent on data.

Description: Data Science (DS) is an interdisciplinary field aiming to extract knowledge and insights from complex datasets using tools from probabilistic modeling, statistical inference, machine learning, and engineering. The DS concentration will equip students with the foundational knowledge and technical expertise to understand the tools needed to transform unstructured sources of information into actionable decisions in engineering domains. The students will dive into the fundamentals of probability and statistics, as well as learn, implement, and experiment with data analysis techniques and machine learning algorithms. Students in this concentration will develop the ability to responsibly collect and manage data, think critically, and use data to make data-driven decisions.

Sample industries and companies:
- Financial services, internet companies, robotics, sports analytics, manufacturing, and automotive industries.

Sample Job Titles:
- Data Scientist, Data Analyst, Business Intelligence Analyst, Systems Analyst, and Data Engineer.

Graduate research in: Robotics, Control, Signal Processing, Network Science, Biology, Medicine, Business.