Advanced Infrastructure Systems (AIS)

The AIS education and research area focuses on the application and exploration of emerging Information and Communication Technologies (ICT) to improve the design, construction and operations of infrastructure systems including:

- Buildings and other facilities
- Transportation infrastructure
- Telecommunications networks
- Environmental systems and
- The electric power grid

MS Concentrations in Advanced Infrastructure Systems

Advanced Infrastructure Systems Technology Development and Applications

This AIS concentration provides the tools to develop new technologies that can improve the sustainability, efficiency, maintainability, durability and overall performance of infrastructure systems. Graduates will be able to perform data-driven decision-making, and will develop the ability to design and evaluate systems for intelligent behavior in an infrastructure-oriented domain.

IT-Based Sustainable Global Infrastructure and Construction Management

With consideration of the global nature of modern projects and the growing need for sustainable practices, this MS concentration prepares students for a career in construction management assisted by advanced information and communication technologies. Graduates are able to leverage emerging Information and Communications Technologies (ICT) to manage more efficiently and effectively infrastructure systems and their associated processes; to perform data-driven decision-making; to design and evaluate systems for intelligent behavior in an infrastructure-oriented domain.
Recommended Courses
The following courses are recommended for the AIS concentrations, but the MS program is flexible and students should work with their academic advisors to tailor coursework towards their own individual interests and career goals.

12-711  Building Information Models and IT-based Analysis for Construction Project Management
12-740  Data Acquisition
12-741  Data Management
12-746  Special Topics: Python Prototyping for Infrastructure Systems
12-743  Computer-based Approaches for Search and Decision Support in Civil Infrastructure
12-745  AIS Project

Additional Courses
The following crosscutting courses relate to these concentrations and may be of interest for additional course work, depending on individual student goals.

AIS Technology Development and Applications

10-605  Machine Learning with Large Datasets
10-708  Probabilistic Graphical Models
15-381  Artificial Intelligence: Representation and Problem Solving
15-781  Machine Learning
16-385  Computer Vision
16-722  Sensing and Sensors
18-290  Signals and Systems
18-510  Sensor Systems Design
18-618  Smart Grids and the Future of Electric Systems
18-748  Wireless Sensor Networks
95-791  Data Mining

IT-Based Sustainable Global Infrastructure and Construction Management

12-411  Project Management for Construction
12-610  Special Topics: ICCM: International Collaborative Construction Management
12-704  Probability and Estimation Methods for Engineering Systems
12-706  Civil Systems Investment Planning and Pricing
12-712  Introduction to Sustainable Engineering
12-747  Sustainable Buildings
12-748  Mechanical and Electrical System Design for Buildings
12-750  Infrastructure Management

For a full listing of available courses and their descriptions, visit the Course Catalog in the HUB (www.cmu.edu/hub/consumer)