

DEPARTMENT OF SYSTEMS ENGINEERING AND OPERATIONS RESEARCH

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The Systems Engineering and Operations Research (SEOR) Department offers a bachelor's degree in systems and industrial engineering, a master's degree in systems engineering, a master's degree in operations research, and a doctoral degree in systems engineering and operations research. The department also offers a minor in systems engineering, a minor in aviation flight training and management, and a minor in sustainable systems engineering. The department offers a concentration in predictive analytics and a concentration in financial engineering within the college-wide master's degree in data analytics engineering. The department offers six systems engineering certificates at the master's level: C4I and cyber (command, control, communications, computing, intelligence, and cyber), communications and networking, digital engineering and systems architecture, engineering resilient enterprise systems, financial systems, and tactical computer operations, and; the department offers three operations research certificates: computational modeling, military operations research, and predictive data analytics. The department also offers a dual master's degree in operations research and master's degree in statistical science jointly with the Statistics Department.

There is much overlap between systems engineering, industrial engineering, and operations research. The department encourages students to elect courses in a variety of these areas. For more information, go to the department's website (<http://seor.gmu.edu/>).

Systems and Industrial Engineering

Systems and Industrial engineers determine the most effective ways to use all of a system's components: people, machines, materials, information, and energy. The engineers plan, design, implement, and manage integrated systems, working to ensure performance, safety, reliability, and maintainability. They also work to ensure that systems are delivered on time at a reasonable cost. Examples of systems include the national air transportation system, computer networks, autonomous vehicles, intelligent robots, the electric power grid, healthcare systems, and financial trading systems. Whereas other engineering disciplines concentrate on individual aspects of a system, systems and industrial engineers focus on the system as a whole and the interaction of the underlying parts. Systems and industrial engineering is a people-oriented profession, involved with the human and organizational aspects of developing the desired system.

Operations Research

Operations Research (OR) is a professional field that leverages advanced mathematical techniques, data analytics, and artificial intelligence (AI) to optimize decision-making processes across various industries. By harnessing the power of AI and data analytics, OR professionals can analyze large datasets, identify patterns, develop predictive models, and solve data-driven optimization models to enhance operational efficiency

and strategic planning. OR techniques such as optimization, simulation, and machine learning play a vital role in solving complex problems in logistics, supply chain management, finance, healthcare, energy systems, military operations, transportation, and more. Integrating OR with AI and data analytics enables organizations to make informed decisions, allocate resources effectively, and adapt to dynamic environments.

Faculty

Department Faculty

Professors

Brouse, Chang, Chen, Costa, Pyster, Shortle (chair), Sherry, Sofer, Terpenney, Xu, Zaidi

Associate Professors

El-Amine, Ganesan, Jones, Luo, Sokolov

Assistant Professors

Amissah, Feng, Ji, Mohebbi, Raz

Research and Affiliate Professors

Miller-Hooks, Shelley

Adjunct Professors

Ahmed, Bailey, Barry, Burke, Charbonneau, Clemons, Comer, Edson, Demirtas, Durrani, Ferguson, Ferreira, Ghorbanzadeh, Guharay, Icore, Jbara, Keltz, Killam, Mulhearn, Nicholas, Ray, Rothwell, Stimpson, Warren, Wieland, Woodaman, Xie

Emeritus Faculty

Donohue, Hoffman, Laskey, Nash, Palmer

Programs

- Aviation Flight Training and Management Minor
- Operations Research and Engineering Graduate Certificate
- Operations Research, MS
- Sustainable Systems Engineering Minor
- Systems Engineering Graduate Certificate (SEOR)
- Systems Engineering Minor
- Systems Engineering and Operations Research, PhD
- Systems Engineering, MS
- Systems and Industrial Engineering, BS