Department of Systems Engineering (DSE) Prospective Faculty Brief

“The United States Military is an Equal Opportunity, Affirmative Action Employer. Minorities and female officers, as well as graduates of institutions other than USMA, are needed and sought to ensure a balanced faculty composition.”

Agenda

PURPOSE: Provide prospective faculty with an overview of the Department of Systems Engineering, the application process, and career timeline implications.

- United States Military Academy Mission
- Department of Systems Engineering (DSE) Overview, Structure, and Course Offerings
- Academic Programs Overview
- Research Overview
- DSE Instructor Opportunities
- Application Requirements and Process
- Planning Timelines – Junior Military Faculty
- Questions & Points of Contact

Current As Of: 18 September 2021

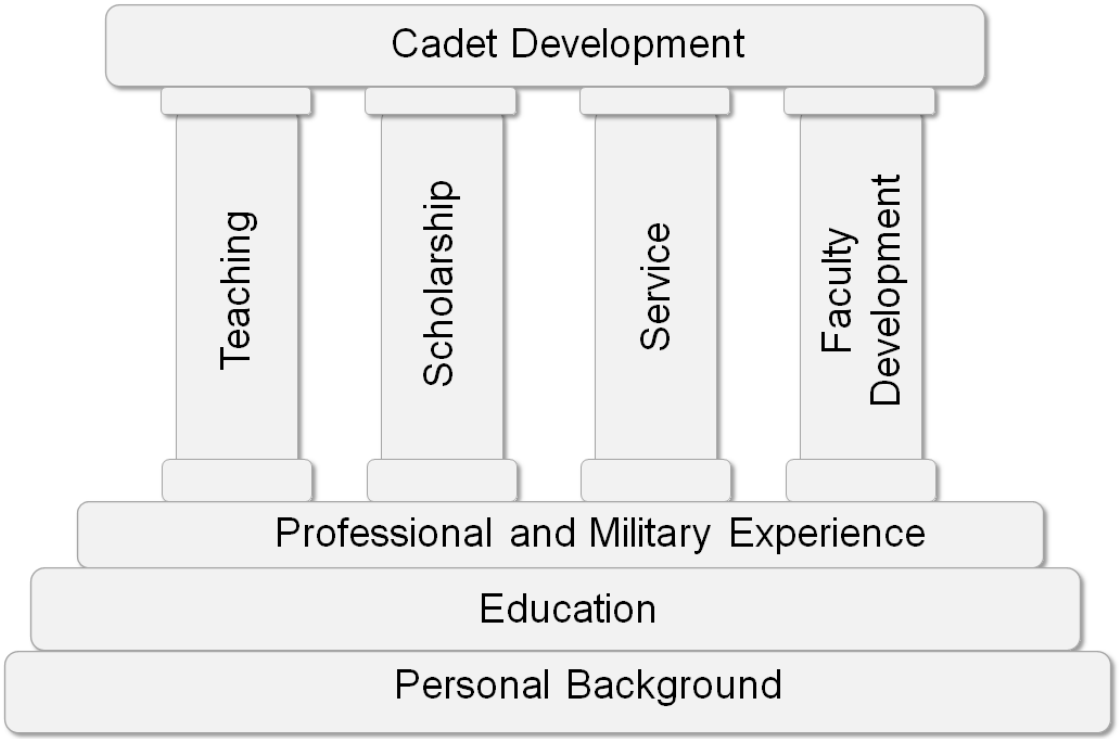
DSE's Faculty Philosophy

USMA Mission

To **educate, train, and inspire the Corps of Cadets** so that each graduate is a commissioned leader of character committed to the values of Duty, Honor, Country and prepared for a career of professional excellence and service to the Nation as an officer in the United States Army.

DSE Mission

The Department of Systems Engineering educates, develops, and inspires **leaders of character** who identify, formulate, and solve complex, engineering, and socio-technical problems for our Army and Nation. We use an interdisciplinary, integrative approach that applies systems thinking, engineering design, data analysis, mathematical modeling, simulation, decision science, and project management.



- Cadet Development is the fundamental objective of every DSE faculty member, regardless of position or academic rank.
- Depending on the faculty member's (1) Position, (2) Skillset, and (3) Goals, emphasis on each domain can and should adjust.

Department Structure

Department Head	COL Rich Morales
Deputy Department Head	COL Julia Coxen

Academic Programs

Systems Engineering Program

Director:
COL Matt Dabkowski
Advisor:
Vacant

Engineering Management Program

Director:
LTC(P) Jim Schreiner
Advisor:
Dr. Ken McDonald

Systems & Decision Sciences Program

Director:
Dr. Vikram Mittal
Advisor:
Vacant

Research Centers

Operations Research Center

Director:
LTC(P) James Enos
Associate Director:
Mr. Jeffrey Demarest

Systems Design & Analysis Center

Director:
LTC(P) Brandon Thompson
Associate Director:
Dr. Isabella Sanders

Staff

- Executive Officer
- S1 - Personnel
- S3 - Operations
- S4 - Supply
- Department Academic Counselors
- Administrative Office
- Information Technology

DSE Course Offerings

Academic Programs

Systems Engineering Program

- **SE302:** Fundamentals of Systems Engineering
- **SE370**: Computer Aided Systems Engineering
- **SE375**: Statistics for Engineers
- **SE387**: Deterministic Models
- **SE388**: Stochastic Models
- **SE400**: Professional Engineering Seminar
- **SE485**: Combat Modeling
- **SE490**: Advanced Topics in SE/EM

Engineering Management Program

- **EM381**: Engineering Economy
- **EM384**: Analytical Methods for Engineering Management
- **EM411**: Project Management
- **EM420**: Production Operations Management
- **EM481**: Systems Simulation
- **EM482**: Supply Chain Engineering and Information Management

Systems & Decision Sciences Program

- **SE301**: Fundamentals of Engineering Design & Systems Management
- **SE385**: Decision Analysis
- **SE450**: Applied Systems Design and Decision Making
- **SM484**: System Dynamics Simulation

Research Centers

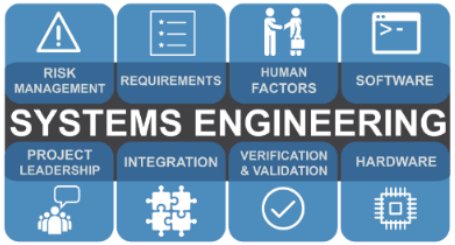
Operations Research Center

- N/A

Systems Design & Design Analysis

- **SE402/403**: Systems Design & Management I/II
- **EM402/403**: Engineering Management Design I & II
- **SE489**: Advanced Individual Study in Systems Engineering/Engineering Management
- **SE491**: Research Project in Systems Engineering/Engineering Management

Program Overview – Systems Engineering



"**Systems Engineering** is an **interdisciplinary approach** and means to enable the realization of successful systems. It focuses on **defining the customer's [technical and business] needs** and . . . it **integrates [other engineering] disciplines** into a **team effort** forming a **structured development process** that proceeds from **concept to production to operation.**" (www.incose.org)

The Systems Engineering Program:

Applies engineering principles to understand **real-world problems.**

Prepares cadets for the everyday challenges faced by **Army officers.**

Provides the foundation for a wide spectrum of **graduate degrees.**

The Systems Engineering Program is accredited by the Engineering Accreditation Commission of ABET. http://www.abet.org

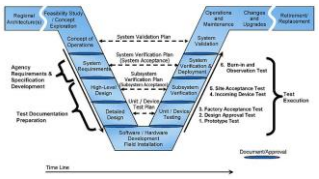
Systems Engineering Major Summary

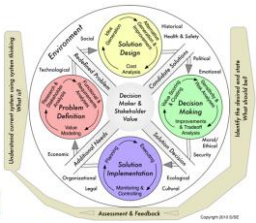
Students learn a wide variety of methods and tools used to model and analyze systems. These include:

- **Simulation Modeling**: represents a system in a computer environment to gain insight.
- **Optimization Modeling**: searches for the best possible solution given a set of specified constraints.
- **Stochastic Modeling**: handles the uncertainty of information in order to inform the system outcome risks.
- **Project Management**: applies a structured process to plan, organize, lead, control resources, and execute tasks to achieve specified goals.
- **Decision Modeling**: builds a composite perspective of several stakeholders with multiple, competing objectives for complex, high-stakes decisions with uncertain information.
- **System Design**: develops solutions to complex problems from concept development and detailed design to system validation and implementation.

The major culminates with an integrative **Capstone** experience working for a real-world client developing a system solution to a complex problem.

Systems Engineering majors acquire the skills to make tough decisions…





…and learn the process to build complex systems.

West Point's Department of Systems Engineering educates cadets and develops faculty to lead teams that design and implement high value solutions to challenging problems in a dynamic, uncertain, and technologically complex world.

Department of Systems Engineering
Mahan Hall, 4th Floor
Building 752, Thayer Road
West Point, New York 10996

https://westpoint.edu/academics/academic-departments/systems-engineering

Program Overview – Engineering Management

The Top-Rated EM Program in the United States 14 times over the last two decades, most recently in 2021.

The Engineering Management Program is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org

ENGINEERING MANAGEMENT

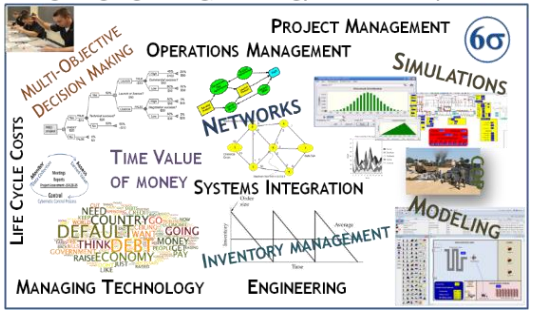
Merging engineering, technology, management, and leadership into solutions for a complex world.

Focal areas for the EM program:

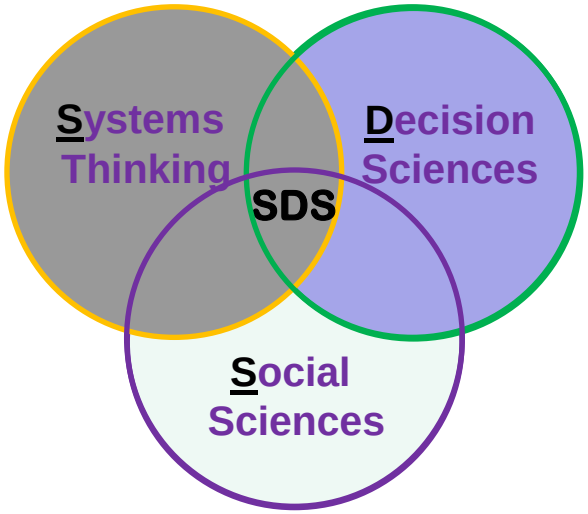
- Systems design and engineering
- Methods for analyzing and making engineering decisions with emphasis on data analytics
- Applied mathematical and simulation modeling
- Design and analysis of production operations
- Supply chain design, planning, operation, business processes, and information management systems
- Fundamentals of sound financial decisions and business operations
- How to plan, monitor, and control a project
- A 3-course engineering sequence of your choosing

AIAD and Capstone Partners

Integrating engineering, technology and business operations



Program Overview – Systems & Decision Sciences



SDS graduates build interdisciplinary skills rooted in **engineering, management,** and **social sciences.**

This major will prepare SDS graduates for the following types of graduate programs:

- MBA
- Engineering & Management
- Industrial and Systems Engineering
- Business / Data Analytics

Decision Making for Leaders in a Complex and Dynamic World

SYSTEMS AND DECISION SCIENCES (SDS)

The Systems and Decision Sciences (SDS) major centers on the design, management, and decision analysis of tangible and abstract systems in accordance with performance requirements, budget, and schedules. The program combines elements of traditional engineering, systems engineering, finance, decision analysis, and organizational management into a single major. Cadets will learn the methods, processes, and tools needed to understand and conduct meaningful decision analysis in support of complex systems. This major will produce graduates with technical management skills and engineering depth to prepare them for future academic and professional opportunities in a world increasingly dominated by technological change.

Operations Research Center (ORCEN)

LTC James Enos
ORCEN Director
IN/Academy Professor
MS, System Design & Management, MIT
PhD, Systems Engineering, Stevens Institute of Tech

Mr. Jeffrey Demarest
ORCEN Associate Director
Title X/Assistant Professor
MS, Systems Engineering, University of Virginia

MAJ Arthur Middlebrooks
Analyst & Instructor
AR/49
MS, Engineering & Management, MIT

MAJ Courtney Razon
Analyst & Instructor
EOD/49
MBA, Operations Concentration, UNM

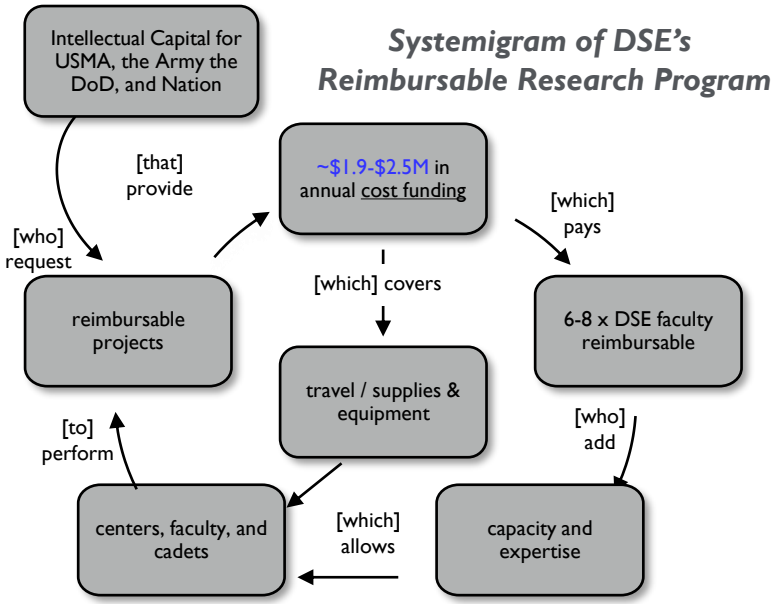
MAJ Erin Williams
EN/49
MS, Data Science, Harvard
MS, Engineering Management, University of Missouri S&T

Self-Sustaining and Relevant Programs
AY21 'By the Numbers'

- 32nd Anniversary of ORCEN (Est 1988)
- Over 70 Cadet internships to 35 DoD, Army, and private organizations (In a normal year)
- $1.9 M in partner cost funding
- 44 Cadet Capstones across 40 partner organizations
- 14 Direct DSE Research / ORCEN projects

Payne Award for Excellence in Analysis	2009 Analysis of Individual and Unit Dwell
2005 Base Realignment & Closure	2011 US Army Officer Flow Model
2007 Predicting Small Arms Effective Life	2016 Residential Energy Analysis

Systemigram of DSE's Reimbursable Research Program



LTC James R. Enos, Director, ORCEN
james.enos@westpoint.edu

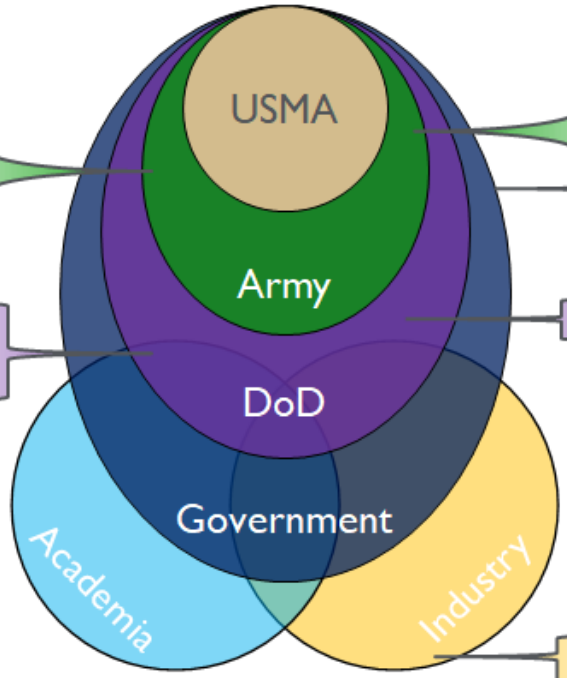
DSE Research Program

People
JSOC Data Analysis

Modernization
FVL CFT MFOP
NGCV Analysis
ERDC Smart Base
GVSC Engine Assessment
TSOA System Assessment

Readiness
ASA(ALT) Cost Analysis
AC/RC Balance

Full Mobilization Modeling



People
AFRICOM Enlisted Development
AR/VR Aviation Branch Selection
SF Q-Course Modeling
USMA Housing Inventory

Veteran's Affairs Analysis

Readiness
APG Lean Six Sigma
ASD Readiness Assessment
Cyber and EM Simulation
TYAD Lean Six Sigma

Modernization
AFC Due Diligence Process
Aircraft Survivability Equipment
AR for Radio Frequency Visualization
Autonomous Cyber Decision Support
AvMC System Readiness
MITRE – Fires Support Next
LMCO – JADC2

AY 22 Research:
-6 Fully Funded ORCEN Projects
-3 Funded Faculty Research Projects
-28 Cadet Capstone Projects
-11 Independent Research Projects

The DSE research program supports Army priorities through **engaged scholarship**;
links theory and practices through **dedicated analytic capability** to solve complex problems;
enriches cadet education, encourages innovation, **develops faculty**, and integrates emerging technology into curriculum.

DSE Military Instructor Opportunities

Junior Military Faculty (MS)

- Post-KD CPTs & MAJs
- All Commissioning Sources and Branches
- STEM Undergraduate (Typically)
- 2-years in MS program
- 36-month USMA utilization
- All ILE options available
- Positions: Instructor, Course Director, Capstone Advisor, ORCEN Analyst, Primary Staff, Club OIC, Team Officer Representative (OR)
- Possible academic promotion to Assistant Professor

Senior Military Faculty (PhD)

- MAJs and LTCs
- All Commissioning Sources and Branches
- No prior USMA teaching experience required
- 3-years in PhD program
- 36-month USMA utilization (Senior Rotating Faculty)
- Possible 60-month USMA utilization (FA47)
- SSC opportunities
- Positions: Assistant Professor, Program Director, Capstone Advisor
- Possible academic promotion to Associate Professor

Direct Hire (MS or PhD)

- CPT-LTC
- All Commissioning Sources and Branches
- Already possesses MS and/or PhD
- Positions are need-based; apply anytime
- 24-36-month USMA utilization (timeline-dependent)

Common MS, MBA, and PhD Programs

University of Michigan; Virginia Tech; Georgia Tech; Stanford University; Massachusetts Institute of Technology; Yale University; Harvard; Stevens Institute of Technology

FY22 Selection Board Application Requirements & Process

TEACH Application Requirements

1. West Point ("Common") TEACH Application Materials
   a. Basic Biographical Data
   b. Contact Information
   c. Assignment History
   d. Desired Position
   e. Timeline Considerations
   f. CFD Intentions (if applicable)
   g. Career Satisfaction Program Information (if applicable)
   h. Degrees Completed and Transcripts
   i. GRE/GMAT Score Scores and Report
   j. Publications (if applicable)
   k. Officer Evaluation Reports (OERs)
   l. Letters of Recommendation (LORs)
   m. Officer Record Brief (ORB)
   n. Special Considerations (MACP, EFMP, etc.)
2. DSE-specific TEACH Application Materials
   a. Department Essay Questions (3x)
   b. CV or Resume (optional)
   c. APFT/ACFT Scores (optional)
   d. Desired Board Year

TEACH Platform: https://teach.westpoint.edu/teach/login

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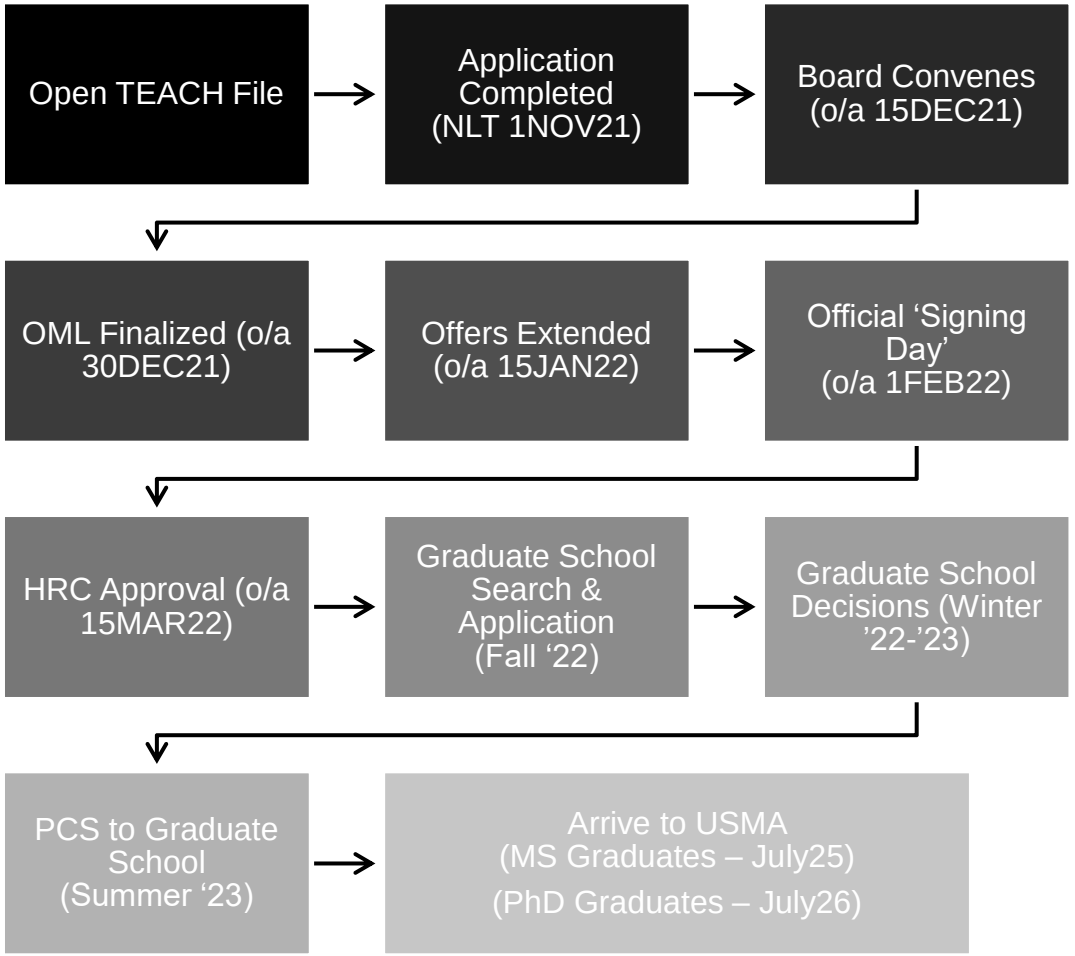
Application and Approval Process



Planning Timelines – Junior Military Faculty

FY2022 Selection Board Target Year Groups:

YG2015, 2016, and 2017

	YG2014	YG2015	YG2016	YG2017	YG2018
PZ MAJ BOARD	April ‘23	April ‘24	April ‘25	April ‘26	April ’27
6 YEAR PLAN* – USMA BNRs IN	April ’20	April ‘21	April ‘22	April ‘23	April ‘24
NLT USMA TOUR COMPLETE (RES ILE)	June ‘26	June ‘27	June ‘28	June ‘29	June ’30
NLT USMA TOUR COMPLETE (NON-RES ILE, PCS TO KD)	June ‘27	June ‘28	June ‘29	June ‘30	June ’31
This timeline provides each departing officer 30 months for their MAJ KD assignment before their LTC PZ Board					
LTC PZ Board	Jan ‘30	Jan ‘31	Jan ‘32	Jan ‘33	Jan ‘34

***NOTE:** Deviations are considered on a case-by-case basis

Department POCs and Important Websites

Point of Contact – DSE Personnel Office

LTC Tom Lainis, Thomas.Lainis@westpoint.edu, 845-938-4893

MAJ Nate Hedgecock, Nathan.hedgeock@westpoint.edu, 845-938-5206

Department Home Page: https://www.westpoint.edu/academics/academic-departments/systems-engineering

Prospective Faculty: https://www.westpoint.edu/academics/academic-departments/systems-engineering/faculty/prospective-faculty

Current Faculty: https://www.westpoint.edu/academics/academic-departments/systems-engineering/staff-and-faculty

TEACH Platform: https://teach.westpoint.edu/teach/login

***Copy & Paste (do not click) this link to access instructor application portal.*