

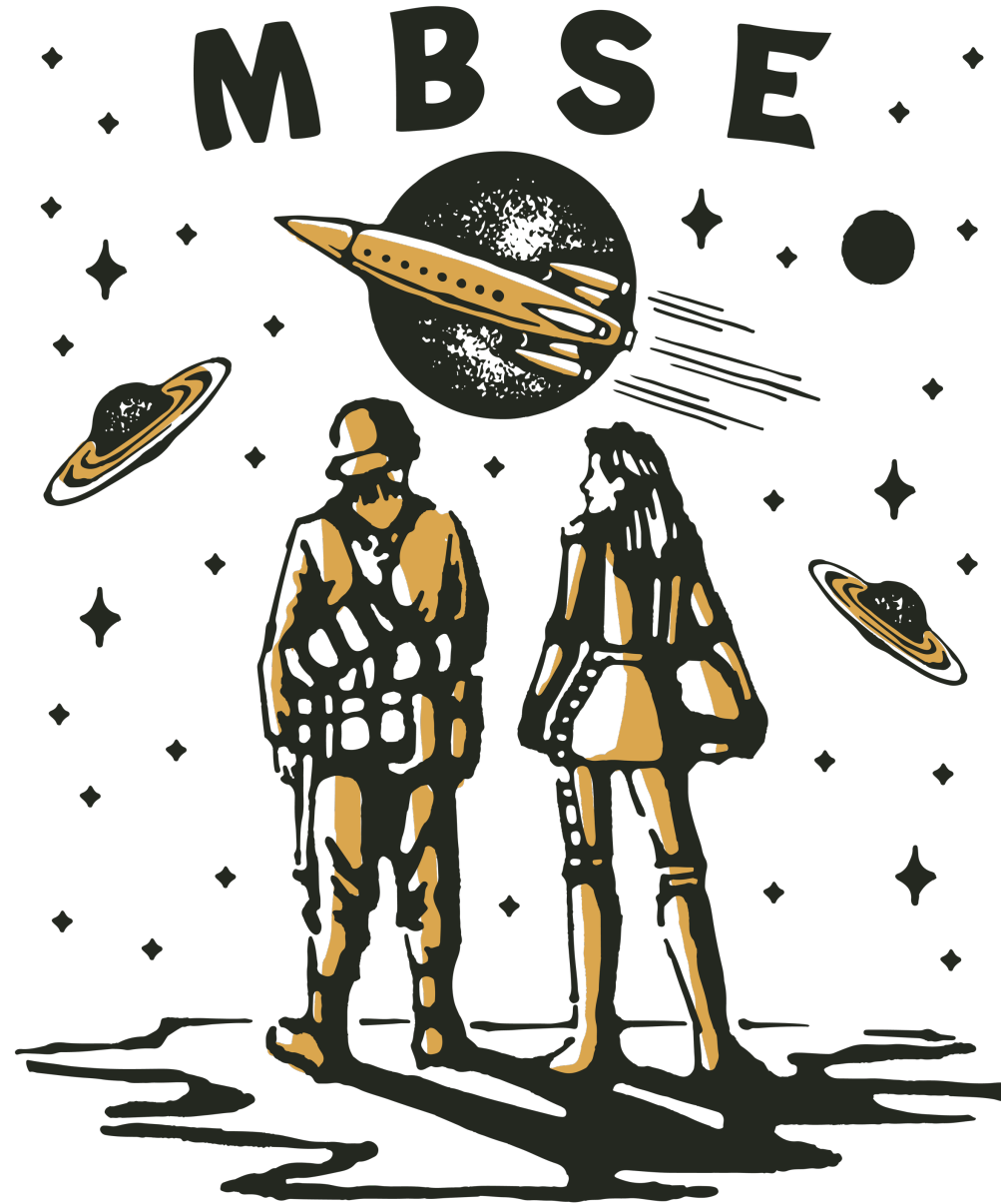
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Systems Engineering Technology:

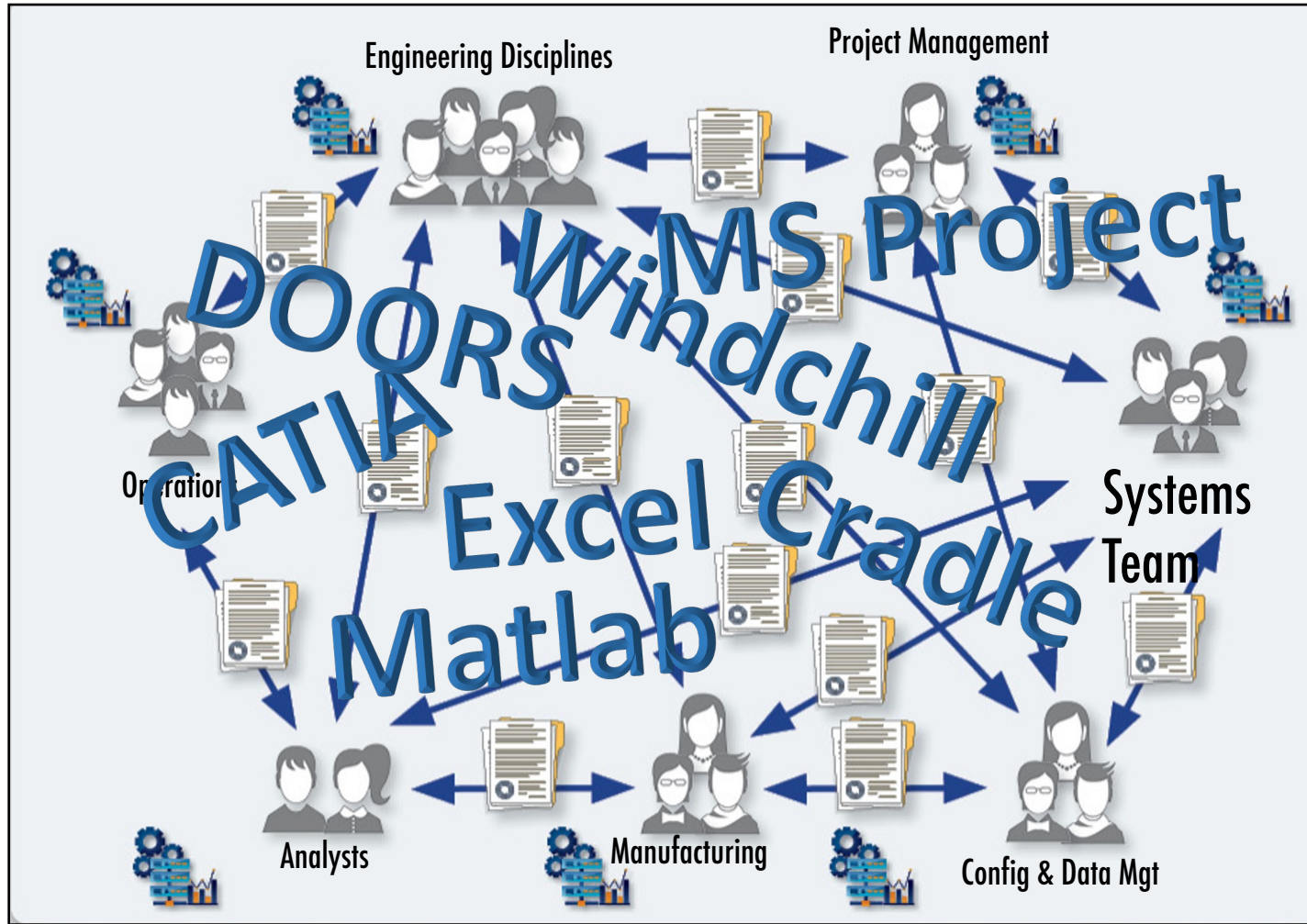
# A Systems Modeler's Career in Digital Engineering Without Calculus or Physics

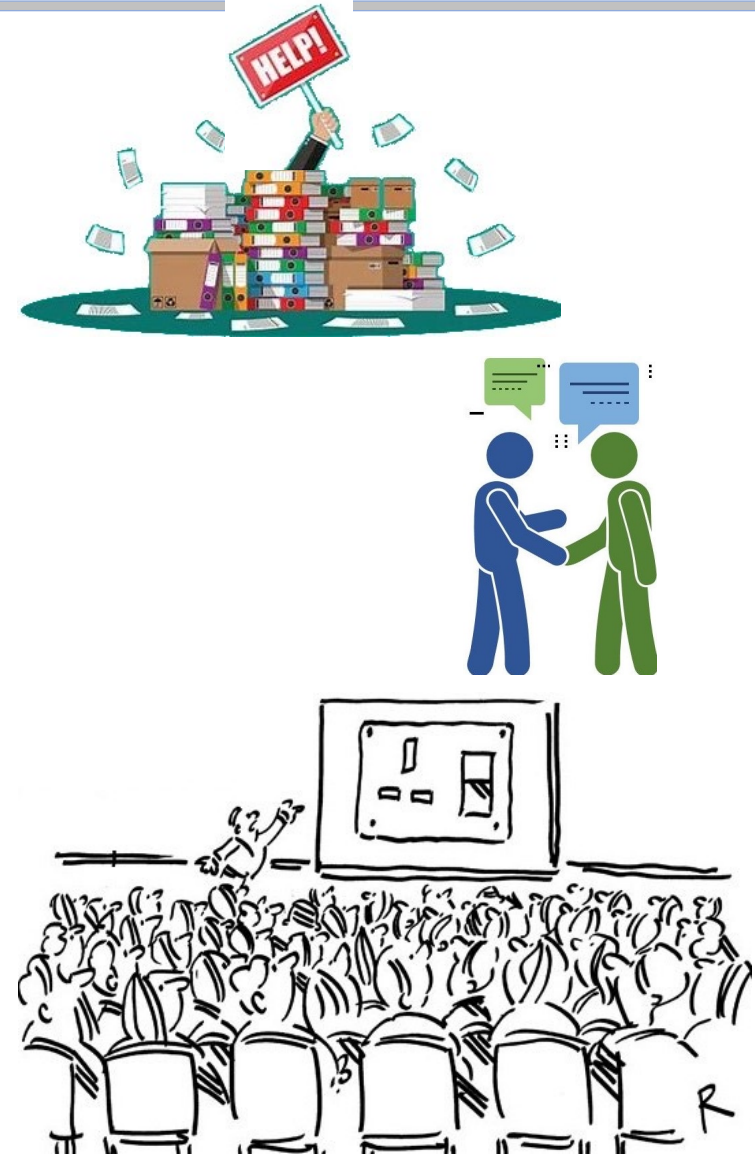
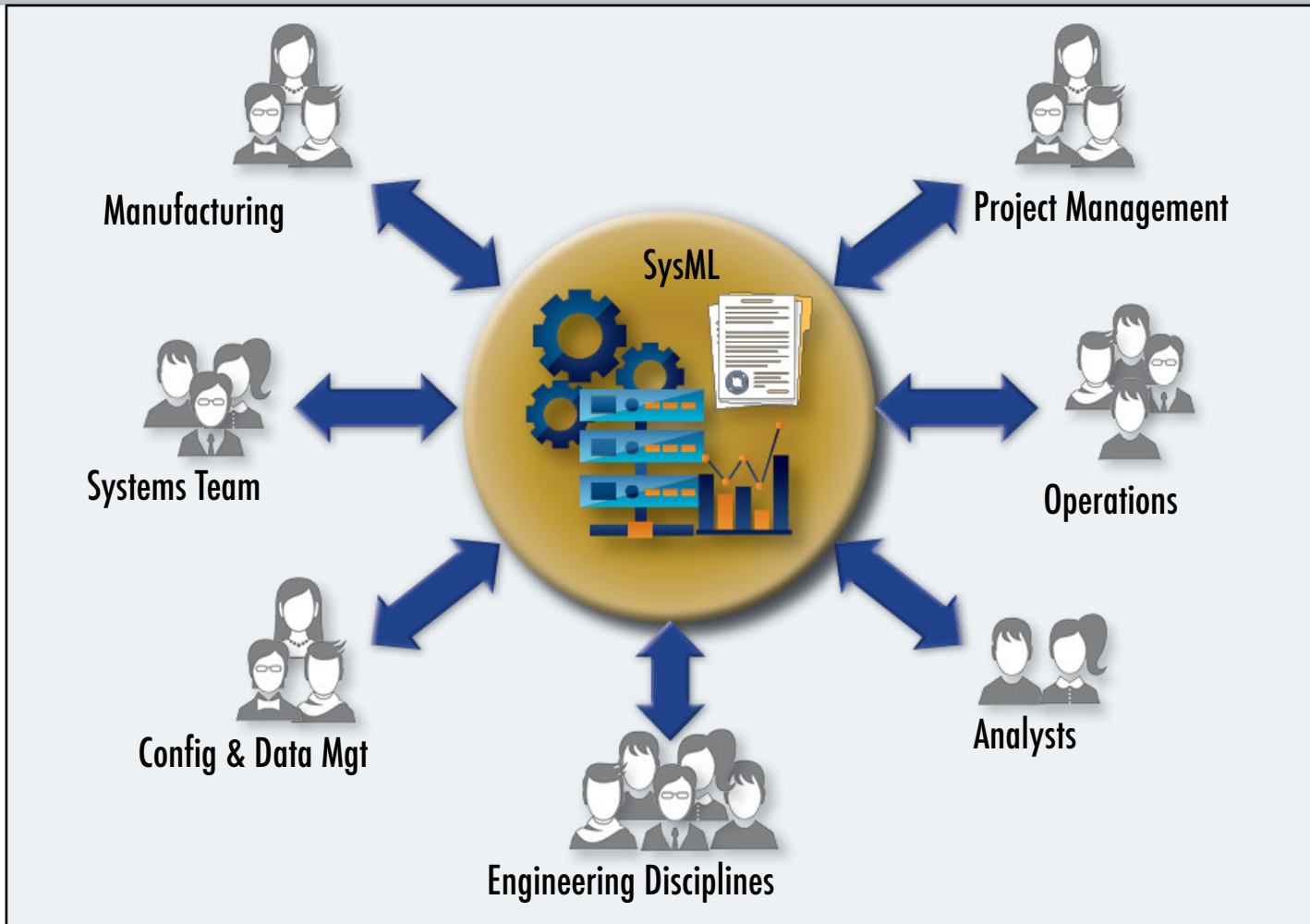
National Institute for Staff and Organizational Development (NISOD)  
International Conference on  
Teaching and Leadership Excellence  
Austin, TX  
May 27-30, 2023

Chris M. Crumbly, Executive Director  
*Institute for Digital Enterprise Advancement*  
[www.IDEA-set.org](http://www.IDEA-set.org)



*I DON'T KNOW WHAT IT IS... BUT I KNOW WE NEED TO DO IT.*



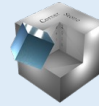


1. **Ensure the product satisfies the customer and stakeholders**
2. **Optimize the system and facilitate compromise**
3. *Connect the product and organizational parts, find the gaps*
4. *Reduce the confusion and risk caused by complexity*

## Problem Statement

MBSE shortens the DDT&E life-cycle but the *supply* of practitioners does not meet the workforce *demand*

### USG Industrial Base Investment



**CORNERSTONE**  
Cornerstone of the American Military  
competitive edge



Industry Partner

### Academic Partners



Auburn  
University



CALHOUN  
COMMUNITY COLLEGE



INSTITUTE FOR  
DIGITAL  
ENTERPRISE  
ADVANCEMENT

Nonprofit Partner



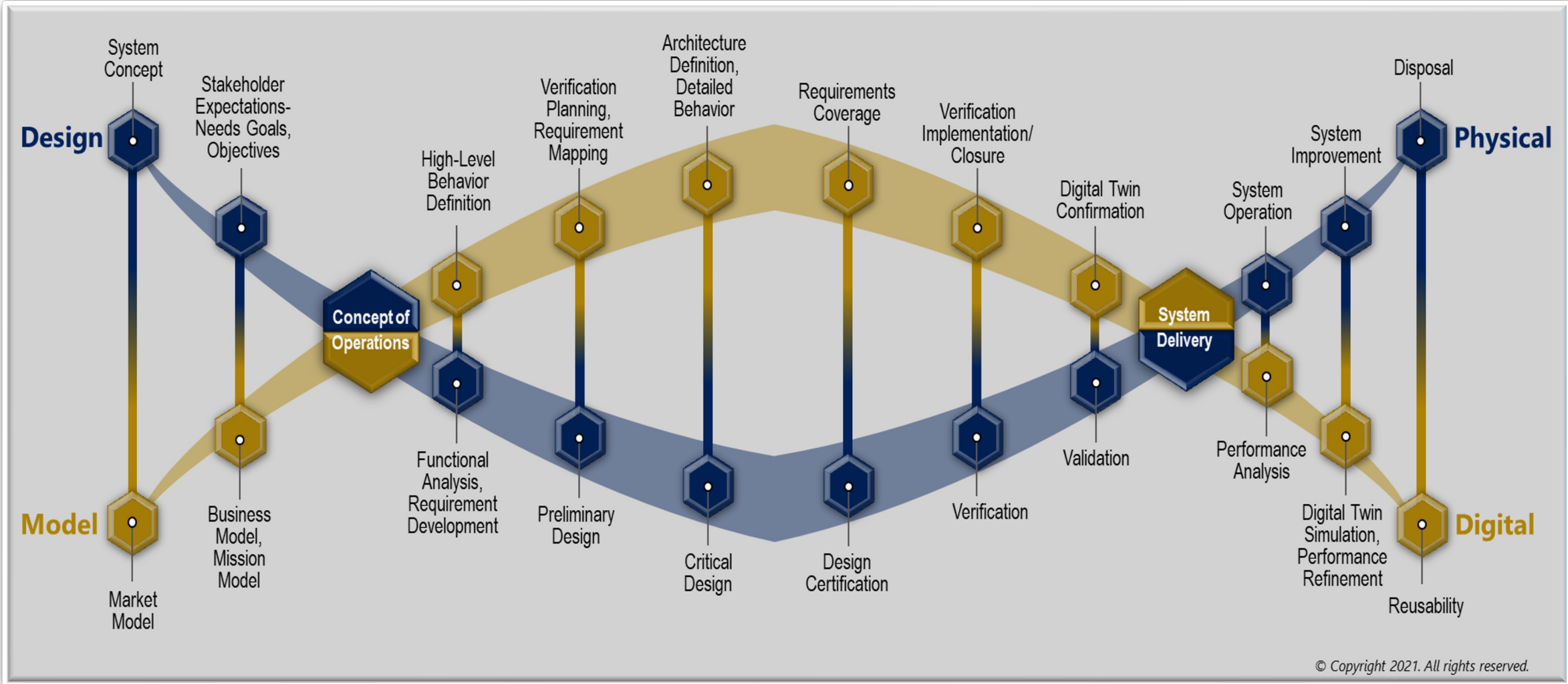
## The SET Approach

Develop a *Systems Engineering Technology* degree modeled after the CAD Technician 2-year degree

## Plan of Action

- Implement the pathfinder SET curriculum at Calhoun (8/21)
- Deploy SET in DDT&E communities across the nation
- Move upstream to high schools and downstream to universities
- Provide professional instruction to practicing engineers

Demonstrating the digital transformation of the systems engineering life cycle.



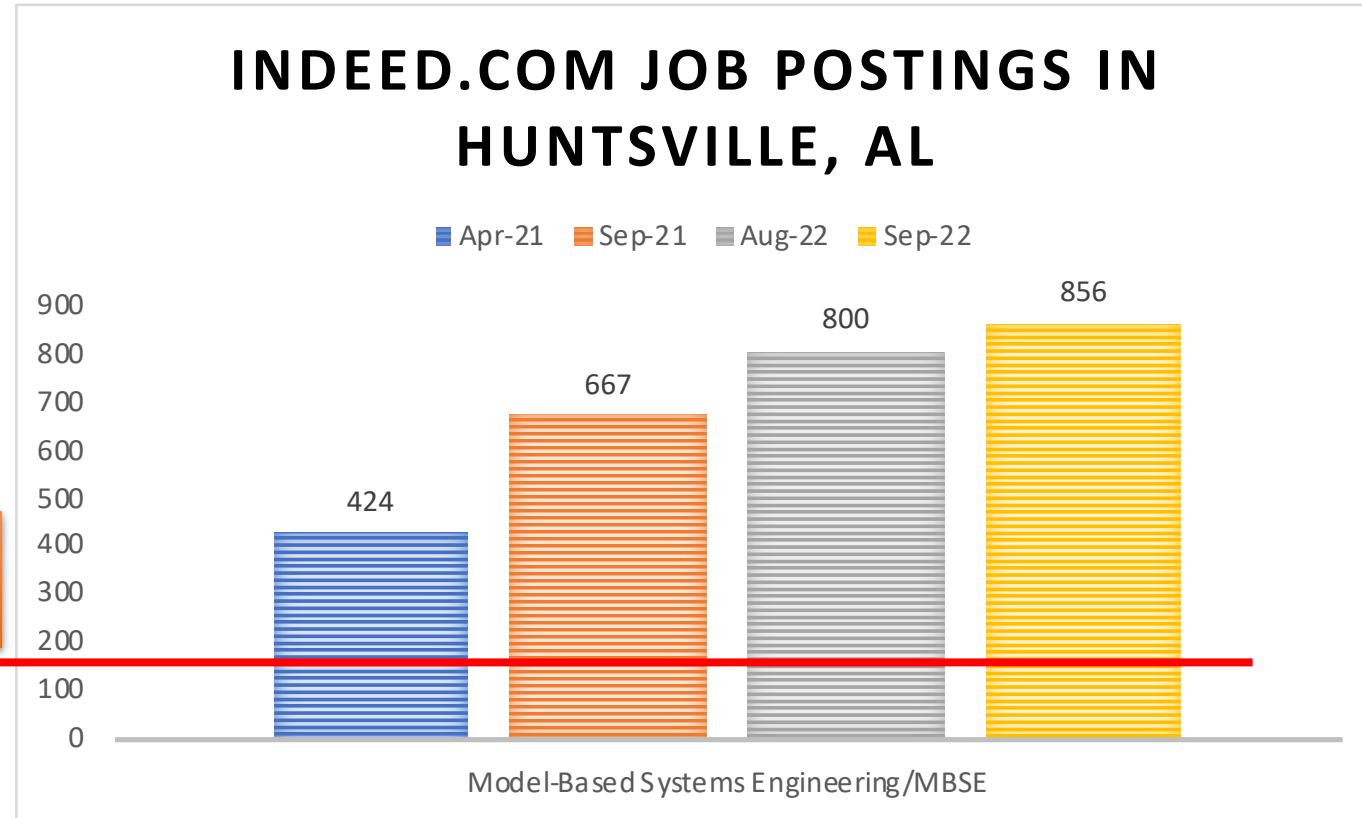
*Universities are not meeting  
the regional demand for  
MBSE practitioners*

Key Aerospace and Defense  
Organizations in Huntsville, Alabama

- NASA
- US Army Missiles and Space
- US Army Aviation
- US Army Material Command
- Missile Defense Agency
- Boeing
- Lockheed Martin
- Aerojet Rocketdyne
- L3 Harris
- Ratheon
- More than 300 A&D companies

*>\$160B in Federal Funds Annually*

163 SE Degrees  
conferred in 2021 across  
all Alabama schools



*SET enrollment reached 44  
students in 4 semesters—at one  
school alone*

## *MBSE Job Postings April 2023 (indeed.com)*

Eglin AFB, FL

100

1500

Los Angeles, CA

Dayton, OH

200

1100

Seattle, WA



## Associate Degree for Systems Modelers (or short certificate)

- Associate of Applied Science degree in Systems Engineering Technology-
- Student Internships/apprenticeships with MBSE implementing organizations to provide real experience

Associate  
Degree

## Professional Education Courses

- Short course in MBSE implementation, benefits, implications, and costs (8 hours)
- Short course in MBSE familiarization and relationships with other project functions (40 hours)

Professional  
Education

## Systems Engineering Certificate Demonstrating MBSE Competency

- Certificate programs currently under development
- Semester-length course leading to a certificate demonstrating modeling competency

Certificate

## University-level Electives and/or Short-term Certificates

- Industrial and systems engineering Elective
- Add-on certificates for modeling

University  
Level

## High School and Middle School Modules

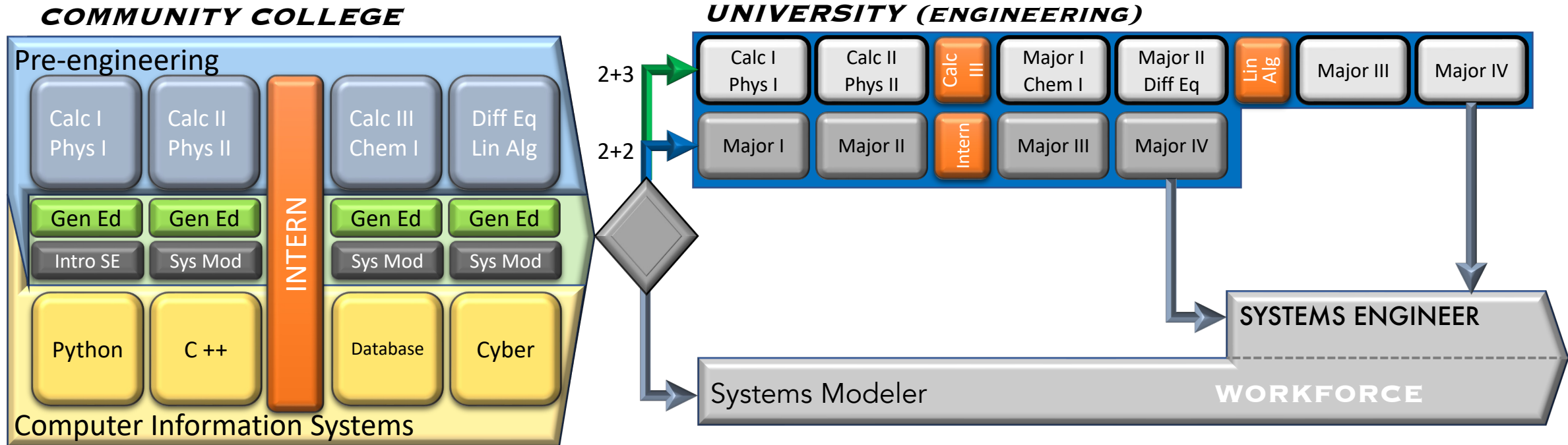
- Introduce systems engineering concepts early
- Provide alternate pathway for STEM career

Secondary  
Education

## Systems Engineering Technology (SET) AAS Degree Major Course Requirements

				Credits
★	<b><u>INTRO</u></b>	CIS 134	IT Fundamentals ( <i>CompTIA</i> ® <i>ITF+</i> )	3
		SYS 101	Introduction to Systems Engineering	3
	<b><u>SECURITY</u></b>	CIS 199	Network Communications ( <i>CompTIA</i> ® <i>Network+</i> ) <b>OR</b>	3
		CIS 270	Cisco CCNA I	
		CIS 280	Network Security ( <i>CompTIA</i> ® <i>Security+</i> )	3
★ ★ ★	<b><u>PROGRAMMING</u></b>	CIS 202	Python Programming	3
		CIS 207	Introduction to Web Development	3
		CIS 251	C++ Programming	3
		CIS 266	Software Engineering with Secure Coding	3
		CIS 285	Object-Oriented Programming	3
		SYS 231	Systems Modeling I	3
		SYS 232	Systems Modeling II	3
		SYS 233	Systems Modeling III	3
★ ★	<b><u>DATABASE</u></b>	CIS 222	Database Management Systems	3
		SYS 221	MBSE in the Digital Environment	3
★	<b><u>CAPSTONE</u></b>	SYS 241	Systems Engineering Technology Capstone	3

# 3 MBSE Workforce Pathways



## Systems Engineering Technology Courses

SYS 101: Intro to Systems Engineering

SYS 231: Systems Modeling I

SYS 233: Systems Modeling III

SYS 221: MBSE in the Digital Environment

SYS 232: Systems Modeling II

SYS 241: SET Capstone

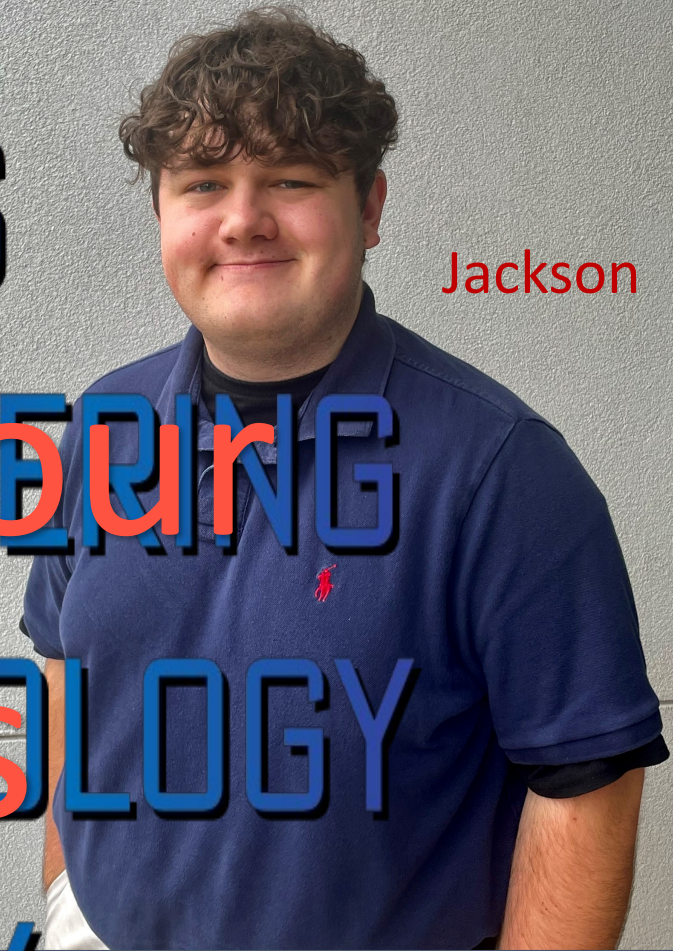
Linda



**Nontraditional student, with a Master of Psychology Degree**

*The opportunity to apply my classroom skills in the workforce is incredibly valuable. In addition to building my resume with new programming skills, exposure to the workplace environment reinforces the classroom curriculum.*

Jackson

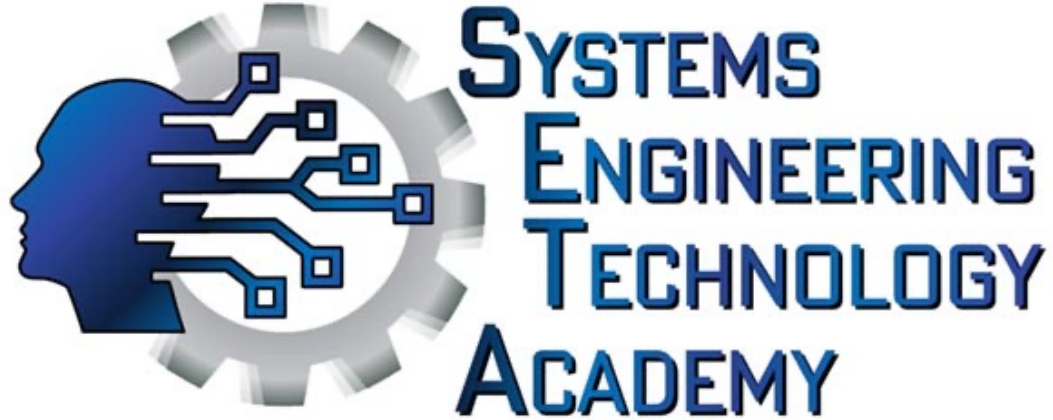


**Nontraditional Student pursuing a 2+3 Engineering Degree after SET**

*I have an opportunity lined up at Auburn University that allows me to get a bachelor's degree in systems and industrial engineering and possibly a master's in the same thing at the same time...My skills-based SET experience will give me a unique perspective and ability to contribute to classes.*

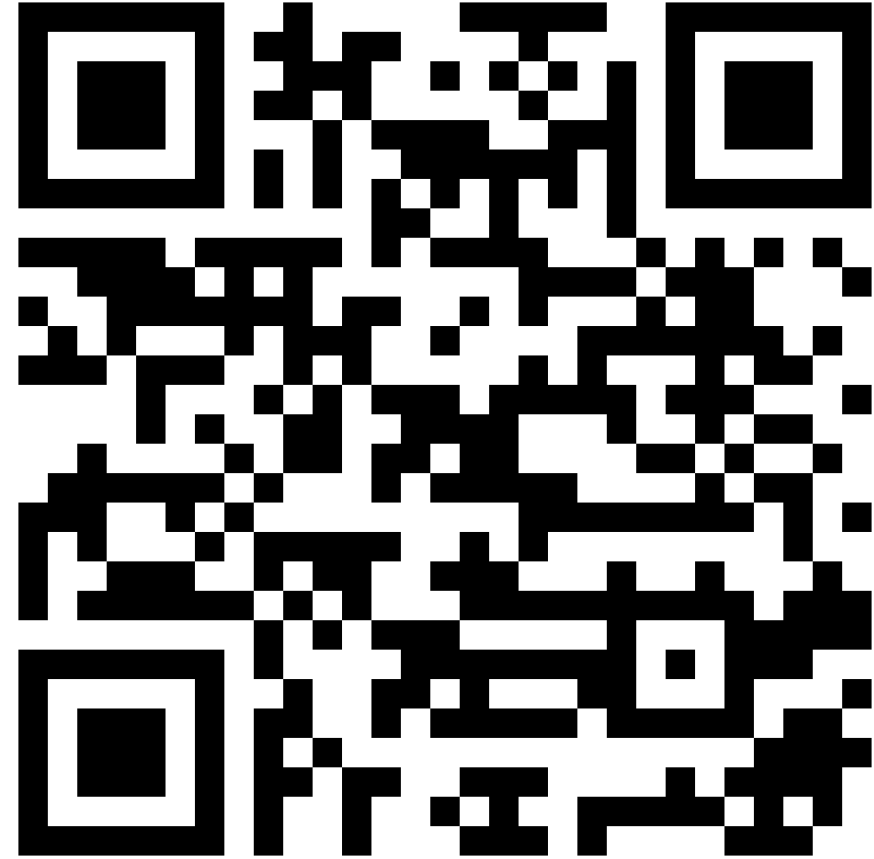
# SYSTEMS ENGINEERING TECHNOLOGY ACADEMY

Meet some of our  
SET Students



- *SET course content (plug and play)*
  - *Blackboard*
  - *Canvas*
- *Train-the-trainer programs*
- *Professional education programs (noncredit)*
- *Adjunct instructor sourcing*
- *Ongoing support from IDEA*
- *Continuous updates as MBSE tools mature*

# Questions



Use this QR code for more information on SET

Or this link: <https://IDEA-set.org/>