

# College of Engineering

*PLANNING FOR THE FUTURE: ADVANCING  
PROFESSIONAL GRADUATE DEGREES*

David V. Jauregui, Associate Dean of Academics

College of Engineering

Office of Engineering Academics



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**New Mexico State University**

# Background and Career Summary

- **Native New Mexican raised in Hurley, NM (Cobre HS graduate)**
- **Education BSCE** and **MSCE** (NMSU), **PhD** (University of Texas-Austin) | research engineer at LANL (Engineering & Science Applications) between graduate degrees
- **Tenure @ NMSU**

**Asst-Full Professor** of Civil Engineering (1999-) | endowed professor

**Director** of Bridge Inspection & Evaluation Program (2008-) | practice-oriented research & training activities

**Department Head** of Civil Engineering (2015-2022) | teaching & advising, research funding, scholarship & creative activity, service & outreach

**Associate Dean** of Academics (2023-present)



# Mission of OEA

*Serve the apprentice and professional communities through development and promotion of strategic programs that satisfy personal interests and meet the needs of current and emerging areas of engineering and engineering technology.*

*Facilitate the preparation, processing, and completion of student transactions pertinent to the undergraduate and graduate degree programs in the College of Engineering.*

# NMSU LEADS 2025 & COE Strategic Roadmap

## ***GOAL 1. ENHANCE STUDENT SUCCESS AND SOCIAL MOBILITY***

“Interdisciplinary faculty clusters and industry leaders will be organized to assess and develop curricular and programmatic opportunities in relevant areas to include additive manufacturing, cybersecurity, autonomous systems, data and information science, bioprocessing, space and launch systems, and the nexus of food, energy, and water systems” **[COE Key Performance Indicator 1]**

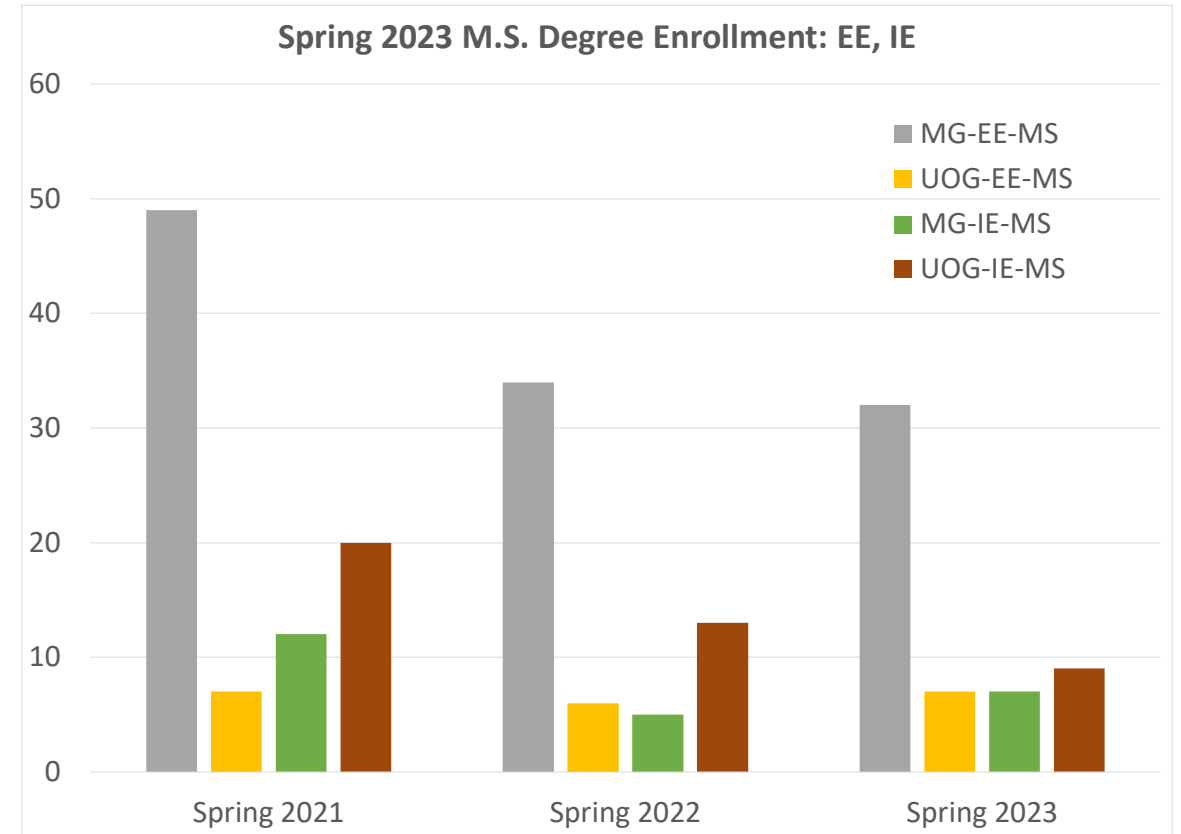
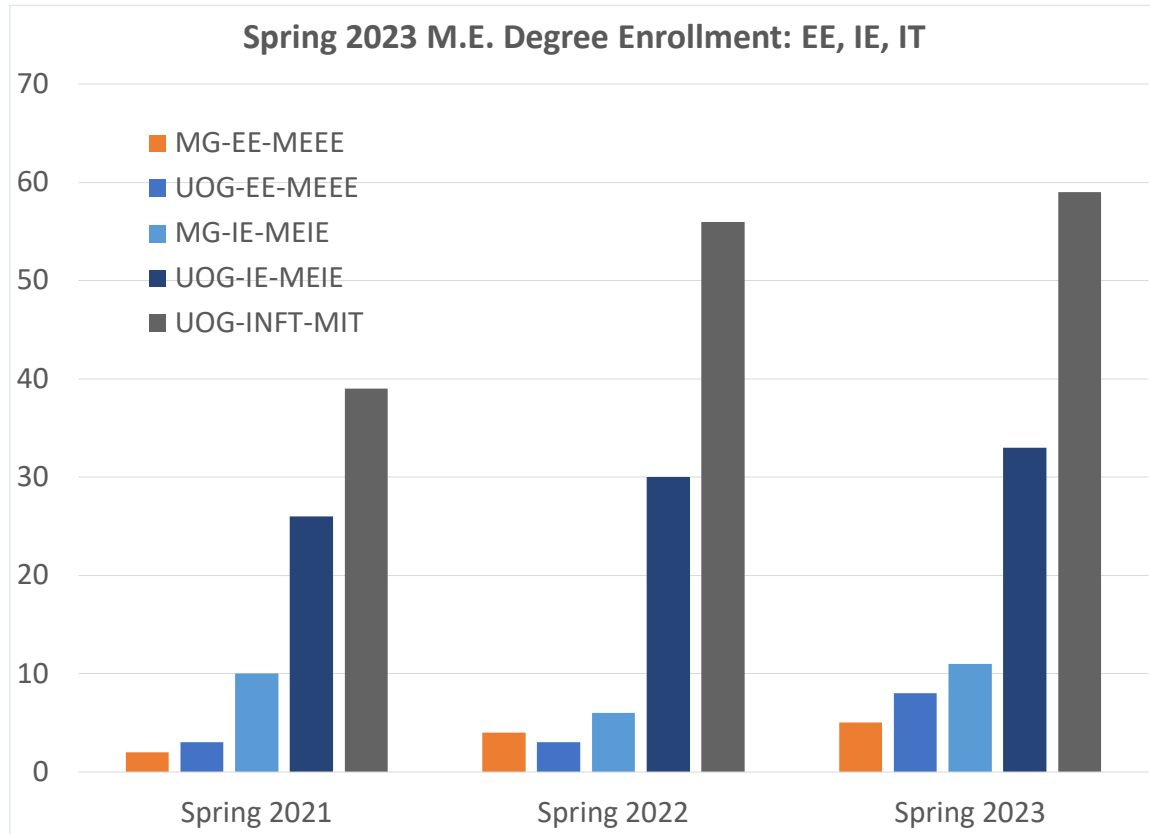


# ADVANCEMENT OF M.E. & MIT DEGREES

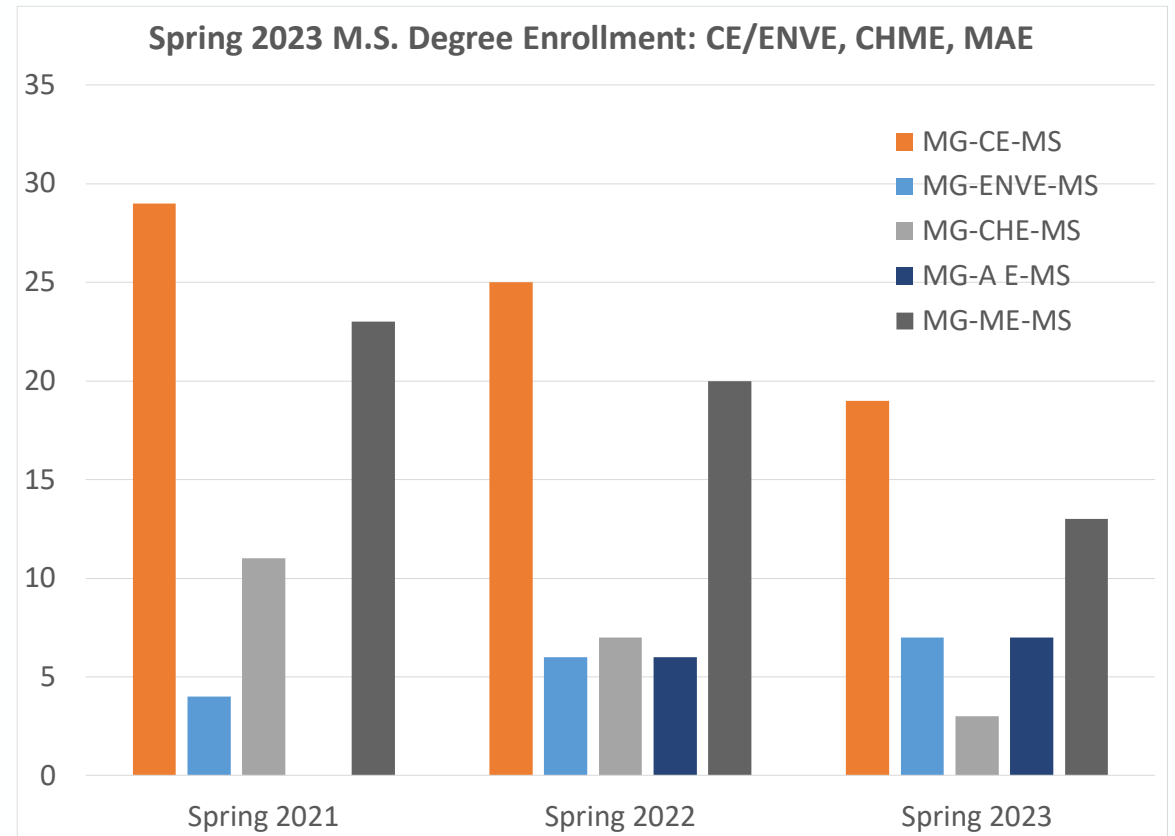
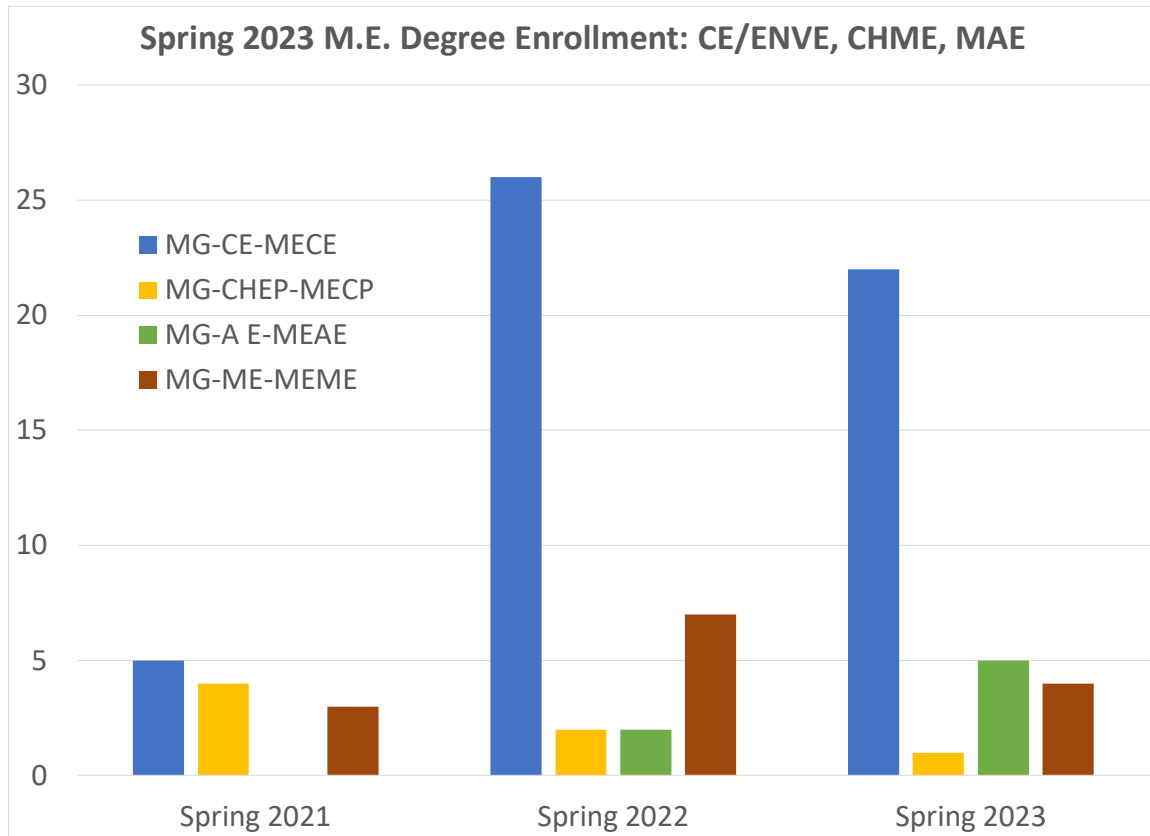


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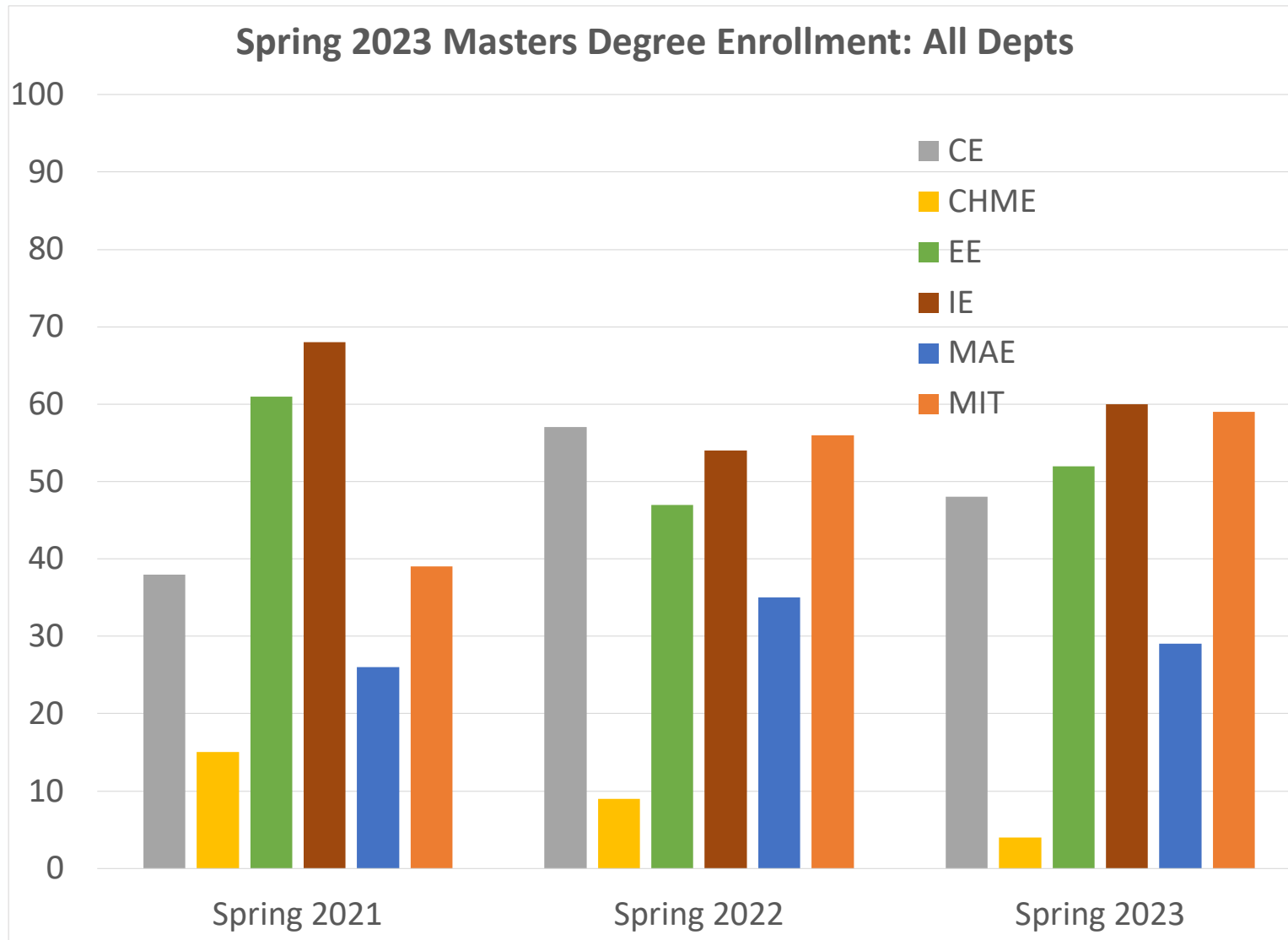
# COE Dept Summary



# COE Dept Summary (cont)



### Spring 2023 Masters Degree Enrollment: All Depts



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# COE Dept Summary (cont)

	M.E. Degree Requirements	Program Attributes
AE	ME 570 + 4 ME courses (from 4 topical areas) + 3 grad elect (any COE dept) + 2 grad elect (any college)	Large UG population; 2+2 BS MOU w/ UACH
CE	1 CE general elect course + 7 CE/ENVE/A EN courses + 2 grad elect (any college)	Prof conf; licensure; 3+2 BS   ME MOU w/ UACH
CHME	4 CHME courses + CHME 548 + CHME 594/690 + 2 grad electives (any college) + 2 CHME courses OR project sequence	Focused on Chemical Process Industry professionals
EE	6 EE courses (from 3 topical areas) + 4 grad electives (any college)	100% GR courses offered online (80% async)
IE	5 IE courses (from 4 topical areas) + 5 grad electives (any college)	100% GR courses offered online (100% async)
ME	Similar to MEAE but different topical areas	Large UG population
MIT	7 ET courses + 3 grad electives (ET or outside dept/college)	100% GR courses offered online (100% async)

**NOTE: ME 570 – Engineering Analysis I | CE general elective – Intro to AI, Intro to NDT, Numerical Methods, Tech Communication | CHME 548 – Industrial Safety, CHME 594/690 – Professional Communication + Graduate Seminar**



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# COE Dept Summary (cont)

	UG	GR	ME	MS	PhD	Needs / Opportunities			
						MAP	GR	CNC	MOU
AE	337	17	5, -	7, -	5	X	X	X	
CE	209	82	22, -	26, -	34		X	X	
CHME	115	17	1, -	3, -	13	X		X	X
EE	208	<u>109</u>	5, 8	32, 7	51	X			
IE	36	75	11, 33	7, 9	15				X
ME	458	36	4, -	13, -	19	X	X	X	X
ICT/MIT	73, 146	59	-, 59	-	-	X			

**NOTE:** **MAP** – increase UG student recruitment; **GR** – increase online grad course offerings; **CNC** – develop concentrations w/ other depts; **MOU** – adapt existing agreements across college (e.g., 3+2 w/ UACH) → <http://fing.uach.mx/>



# MAP Engineering Students

	SP19	FA19	SP20	FA20	SP21	FA21	SP22	FA22	SP23	$\Sigma$ **
AE	-	1	4	1	2	2	-	-	-	10 (0)
CE *	-	-	5	2	2	2, 3	9	3	6	32 (7)
CHME	-	-	1	1	-	-	2	-	-	4 (0)
EE	-	5	8	-	2	3	6	13	3	40 (1)
IE	-	-	1	1	2	1	4	2	1	12 (10)
ME	-	7	2	1	5	1	7	2	1	26 (3)
ICT/MIT	-	-	-	-	-	1	1	2	1	5 (4)

**\* NOTE: 3/5 (60%) in ENVE [Fall 2021]**

**\*\* NOTE: # in parentheses = # applied to M.E. degree programs [others either in M.S. programs or application not submitted]**



# Master of Engineering Graduates

	SP19	FA19	SP20	FA20	SP21	FA21	SP22	FA22	$\Sigma$
AE	-	-	-	-	-	1	-	1	2
CE	-	-	3	-	2	5	-	4	14
CHME	-	-	-	-	-	2	2	-	4
EE *	-	-	-	1	-	2	2	2	7
IE *	-	-	6	3	16	8	11	6	50
ME	-	-	1	-	-	1	4	-	6
MIT *	-	-	-	-	2	3	14	10	29

**\* NOTE: 4/7 (57%) EE, 35/50 (70%) IE, and 29/29 (100%) MIT [NMSU Global]**



# COE and Industry Collaboration

Challenges	Action Items
Faculty turnover – departures & retirements	<i>Require online section(s) for all GR courses (engage new faculty members → Allocation of Effort)</i>
Vacated online courses – transfer to other faculty	Assist w/ course development resources (e.g., personnel, expense)
Allocation of tech-ready classrooms – less than capacity	Assist in modernizing conventional classrooms
Online course offerings – irregular schedule	
“Special topic” offerings – low enrollment	Help define key courses & concentrations (i.e., skill sets) for workforce (entry, mid-career, senior employees)
Collaboration between depts – advance communication	Diversify membership of Industry Advisory Boards
Student interest – Master of Science > Master of Eng	Promote grad ed via career pathways incl. internships, tuition allowance, work schedule flexibility → promotion



# Advanced Manufacturing - Concentration

The graduate concentration in advanced manufacturing educates students and creates a skilled workforce for the growing needs of new technologies and advanced products in the 21st century. The program provides hands-on experience on designing, adapting, and building parts using advanced materials by including new processes, changing the supply chain, and adapting business models. It also includes the design optimization, materials selection and characterization, process parameter mapping, data analytics, software development, and final part inspection among other concepts. This concentration is maintained by the College of Engineering but is open to any Master's level major/degree.

Prefix	Title	Credits
<b>Required Courses</b>		
IE 575	Advanced Manufacturing Processes	3
IE 571	Advanced Quality Control	3
CE 510	Introduction to Nondestructive Testing	3
CHME 564	Polymer Science & Engineering	3
CHME 491/AGRO 450	Special Topics (AGRO 450 CHME 491 Development of Agricultural Technologies)	3
<b>Electives</b>		
5 Electives (Select 500 Level Courses from EE, CHME, IE, CE, or MAE) <sup>1</sup>		15
<b>Total Credits</b>		<b>30</b>

<sup>1</sup> With Approval of the advisor and instructor

## Selection of Advisor

Newly admitted graduate students will be assigned a temporary advisor for the first semester, but they must select a degree option and permanent advisor before registering for the second semester.

In considering a decision about option and advisor, the student should arrange to meet with several members of the graduate faculty during the first six weeks of study to discuss specific educational objectives. The student can use these meetings to become familiar with faculty interests and research projects currently in progress. The faculty member must agree (in writing) to serve as the student's advisor.

Although there is no oral exam, students will be required to complete an exit-interview with one of Advanced Manufacturing concentration and one graduate faculty member from the master of engineering they select to study.

# Graduate Education

- ***Course Development and Delivery***

Development of **new courses adaptable to other delivery modes** (async → in-person, sync, hybrid) | work with **experienced and newly hired professors** (significant consideration in P&T) | create **synergy between course offerings** via NMSU campuses (Main and Online) and **micro-credentials** via NMSU On Demand

- ***Curriculum Planning and Marketing***

Structure curriculum and degree programs to different student groups and interests: **1 MAP students** (includes MOU transfers); **2 Engineers-In-Training** ( $\leq 5$  years out); and **3 Professional Engineers, Project Managers, etc.** ( $> 5$  years out) → M.E. vs. M.S. vs. PhD | elevate presence of **OEA at state, reg'l, & nat'l venues** to recruit from target groups (PE/PS @ NM TransCon & NMSPE conferences, Hispanic students @ annual SHPE conference)



# Graduate Education (cont)

- ***Sample of Interdisciplinary Courses***

ETSE – Intelligent Transportation Systems, Emerging Technologies in Geospatial Technologies  
IE – Systems Eng / Decision Making, Adv Engineering Economics, Topics in Eng Admin  
CHME – Nanoscience and Nanotechnology, Development of Agriculture Technologies  
ME – Properties / Mechanical Behavior of Materials, Engineering Failure Analysis  
EE – Machine Learning, Digital Image Processing  
CE/ENVE – Aquatic Chemistry, Non-destructive Testing

- ***Asynchronous Instructors-of-Record***

College Wide (39) – PoP (26%), **Asst (10%)**, Assoc (26%), **Full (33%)**, GA (5%) &  
CE (10%), MAE (8%), CHME (15%), **ETSE (31%)**, EE (18%), IE (18%) | % Faculty Per  
Department – MAE & CE (20-30%), CHME & EE (40%), ETSE (60%), IE (88%)





**THANK YOU !!!**



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