

1044: SYSTEMS ENGINEERING - MASTER OF ENGINEERING (ONLINE)

In Workflow

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Approval Path

1. Fri, 05 Jul 2024 22:45:51 GMT
Gabrielle Martinez (gdmart): Approved for Student Records Office - Programs
2. Sat, 06 Jul 2024 12:58:31 GMT
Gabe Garcia (gabegarc): Approved for EG Academic Dean
3. Sat, 06 Jul 2024 16:39:47 GMT
Ranjit Koodali (rkoodali): Approved for Graduate Dean
4. Thu, 29 Aug 2024 18:47:30 GMT
Joe Lakey (jlakey): Approved for UPAC - Chair
5. Thu, 29 Aug 2024 18:49:42 GMT
James Mcateer (mcateer): Approved for Provost
6. Mon, 09 Sep 2024 18:05:45 GMT
Lydia Duran (lbduran): Approved for President
7. Thu, 19 Sep 2024 20:44:44 GMT
Adam Cavotta (cavotta): Approved for Board of Regents

New Program Proposal

Date Submitted: Tue, 02 Jul 2024 05:31:43 GMT

Viewing: 1044 : Systems Engineering - Master of Engineering (Online)

Last edit: Wed, 04 Sep 2024 21:29:05 GMT

Changes proposed by: Hansuk Sohn (hsohn)

Submission Information

The Degree Type will factor into the level and the submissions that must occur for HED and HLC.

- Community College Types: Applied Associate Degree, Associate Degree, Certificate, Concentration
- Main/Global Campus Undergrad Types: Bachelor's Degree, Concentration, Minor
- Main/Global Campus Graduate Types: Master's Degree, Doctoral Degree, Certificate, Concentration, Minor

Degree Type

Master's Degree

The Degree Title dropdown has all existing degree titles in Banner, if you do not see the one you are looking for you will select "Other" then in the New Degree Title box you will type out the official title of the degree (as you would want it to appear on a students record, transcript, and/or diploma).

Degree Title

Other

New Degree Title

Master of Engineering in Systems Engineering

Academic Level

Graduate

The Catalog Title will be what is displayed in the catalog page. The standard format is Major (Concentration) - Degree Title. (I.e., Mathematics (Secondary Education) - Bachelor of Science. Note: If there is no concentration you would just list the Major - Degree.

Catalog Title

Systems Engineering - Master of Engineering (Online)

College

Graduate

Campus

Global Campus

Division

No Division for this Campus

Department

Industrial Engineering

Effective Catalog

2025-2026

If opting for a Global program, specify "Global Campus" under campus type. You must have a Program Proposal on file with Global Campus prior to submission of a new Global program. Contact Global Campus for more information.

Program Teaching Modality

Online

Thesis and Non-Thesis Format

Non-Thesis

CIP Code

142701 - Systems Engineering.

Normal or typical length of time for students to complete the program (in years)

1.5 - 2 years

Curriculum Information**Program Learning Outcomes**

Learning Outcomes	
Outcome 1	Systems Engineering Knowledge and Skills. Identify, analyze, design, and solve complex engineering problems by applying systems engineering principles.
Outcome 2	Communication Skills. Communicate effectively both verbally and in writing, with a range of audiences
Outcome 3	: Collaboration and Teamwork. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

List of academic departments/units and or institutions involved in the delivery of courses**Department/Unit**

Electrical and Computer Engineering (ECE)

The Course Requirements, need to be in the standard format for the catalog because this piece of the form will be imported directly onto the catalog page. See the Student Records Website for a guide. The total number of credits at the bottom of the course list will be the "official" total for the degree. Please make sure it adds up correctly.

Course Requirements

Prefix	Title	Credits
<i>Systems Engineering Program-Specific Courses</i> ¹		
I E 456	Large Scale Systems Engineering	3
I E 459	Systems Thinking and Decision Making	3

I E 451	Engineering Economy	3
I E 466	Reliability	3
I E 561	Advanced Safety Engineering	3
I E 563	Topics in Engineering Administration	3
<i>Electives (12 credits from the following)</i>		12
Track 1 – Modeling, Simulation & Decision		
I E 533	Linear Programming	3
I E 535	Discrete Optimization	3
I E 567	Design and Implementation of Discrete-Event Simulation	3
Track 2 – Systems Analysis		
I E 515	Stochastic Processes Modeling	3
I E 522	Queuing Systems	3
I E 524	Advanced Production and Inventory Control	3
Track 3 – Data Analysis and Design		
I E 460	Evaluation of Engineering Data	3
I E 525	Systems Synthesis and Design	3
I E 545	Characterizing Time-Dependent Engineering Data	3
Track 4 – Electrical Engineering Applications		
E E 460	Space System Mission Design and Analysis	3
E E 590	Selected Topics	1-9
<i>Optional Electives (3 credits) ²</i>		
A 500-level course in the designated field, subject to the consent of your advisor and the course instructor. IE, EE, ME, AE, ET, CE, CHME, ACCT, BCIS, BFIN, MGMT, ECON, CS, AST, and STAT		
Total Credits		30

¹ Masters of Systems Engineering required course.

² The optional courses outside the department and/or the college should be previously approved by the academic advisor. See your advisor for more detailed information about selecting elective courses.

The Road Map, need to be in the standard format for the catalog because this piece of the form will be imported directly onto the catalog page. See the Student Records Website for a guide. All courses and the total number of credits at the bottom of the roadmap should match the Course Requirements list.

Road Map

Below is a recommended roadmap tailored for full-time students, considering enrollment in three courses per semester. It's important to highlight that the suggested degree program is flexible and can be pursued by part-time students taking one or two courses per semester, including summer sessions, based on individual preferences. For alternative plans of study and additional details, feel free to reach out to the program director or faculty advisor.

First Year

		Credits
Fall		
I E 456	Large Scale Systems Engineering	3
I E 459	Systems Thinking and Decision Making	3
I E 561	Advanced Safety Engineering	3
Credits		9
Spring		
I E 451	Engineering Economy	3
I E 466	Reliability	3
I E 563	Topics in Engineering Administration	3
Credits		9
Second Year		
Fall		
I E 533	Linear Programming	3
I E 535	Discrete Optimization	3
I E 567	Design and Implementation of Discrete-Event Simulation	3
Credits		9
Spring		
Elective from the Approved Elective List ¹		3
Credits		3
Total Credits		30

¹ The optional courses outside the department and/or the college should be previously approved by the academic advisor. See your advisor for more detailed information about selecting elective courses.

Will this Master's degree program have a Master's Accelerate Program (MAP) option and roadmap?

Yes

MAP Requirements

- The Master's Accelerated Program (MAP) option offers academically qualified undergraduate students the opportunity to start pursuing a master's degree during their junior and senior years.
- Prior approval from the department head is required before beginning the MAP, and eligibility is limited to students who have not yet completed a bachelor's degree.
- Undergraduates can apply for acceptance into the MAP after completing 60 semester hours of coursework, including at least 25 credit hours at NMSU, with a GPA of 2.75 or higher.
- Applicants must also satisfy additional program-specific requirements.
- MAP participants can apply up to 12 credits of NMSU coursework at the 450 level or higher toward their master's program, provided they earn a grade of B or higher in each course applied toward the graduate degree.

MAP Roadmap

MAP participants can apply up to 12 credits of NMSU coursework toward their master's program, allowing them to complete the required coursework within two regular semesters. Below is a recommended roadmap tailored for full-time students, considering enrollment in three courses per semester. It's important to highlight that the suggested degree program is flexible and can be pursued by part-time students taking one or two courses per semester, including summer sessions, based on individual preferences. For alternative plans of study and additional details, feel free to reach out to the program director or faculty advisor.

First Year

Fall		Credits
IE 456	Large Scale Systems Engineering	3
IE 459	Systems Thinking and Decision Making	3
IE 561	Advanced Safety Engineering	3
Credits		9
Spring		Credits
IE 451	Engineering Economy	3
IE 466	Reliability	3
IE 563	Topics in Engineering Administration	3
Credits		9
Total Credits		18

The admission requirements are needed if the program has a specialized admission process that exceeds the campus requirements for either the Undergraduate or Graduate admission standards.

• For graduate programs, the Graduate School asks for the following information (Provide a summary of the documents and specific information each student will need to provide to be considered for the program): Description, Statement of Purpose/Letter of Interest; Specialty Letter of Interest; Resume; Writing Sample; GRE; GMAT; Special Questions (if yes, what questions need to be answered); Letters of Recommendation (how many are required); NMSU Faculty Representative (if yes, how many); Foreign Language; WES Evaluation; Special License or Verifications (what license/verification)

Admission Requirements

Admission Requirements

Students seeking regular admission to graduate study in Systems Engineering Master of Engineering must meet departmental admission requirements in addition to those of the Graduate School (<https://catalogs.nmsu.edu/nmsu/graduate-school/>). The departmental requirements are listed below:

- Applicants should hold a bachelor's degree in engineering or related fields from an accredited university. All applicants are expected to have college-level proficiency in English (reading and writing) and mathematics.
- A letter of intent should be written providing the department with information about why the student wants to pursue a graduate degree, and professional and academic plans/goals.

Note that up to 15 credits may be transferred if the student was enrolled in an approved graduate program. An applicant should meet or correspond directly with the IE graduate faculty as a first step in determining his or her specific admission status.

Does this program lead to licensure, yes or no?

No

Faculty Members Employed to Teach in the Program

Existing Personnel

Hansuk Sohn

FTE

1

Course load and courses they will teach in the proposed program

Course load: 1+2,
Courses in Systems Engineering: IE515, IE533, IE535

Courses taught in other programs currently offered

IE413, IE423, IE451, IE490, IE515, IE533, IE535, IE590

Description of academic qualifications

Dr. Hansuk Sohn holds a PhD in Industrial Engineering from the University of Iowa, earned in 2004. He has led the development and implementation of three new undergraduate minors: Systems Engineering, Supply Chain and Operations Research Analytics, and Lean Manufacturing and Analytics. Dr. Sohn has dedicated significant efforts to enhancing the visibility and prestige of the online IE master's program as a valuable career advancement pathway. Dr. Sohn's commitment to excellence with his department faculty is evidenced by four No.1 rankings in 2023 from US College Assessment organizations.

Prior instructional responsibility and other experiences relevant to assigned courses

Bringing 24 years of teaching experience, Dr. Sohn specializes in Operations Research and its application in large-scale computational science and engineering, particularly within the realms of engineering management and systems engineering.

For graduate programs, document scholarship and research capability

Dr. Sohn is the author of over 45 peer-reviewed publications and has secured more than \$2.3 million in research grants as both Principal Investigator (PI) and Co-Principal Investigator (Co-PI). Dr. Sohn has graduated 11 PhD students and 16 master's students.

Existing Personnel

John Mullen

FTE

1

Course load and courses they will teach in the proposed program

Course load: 3+3
Courses in Systems Engineering: IE 460, IE 522, IE 525, IE 545, IE 561

Courses taught in other programs currently offered

IE311, IE411, IE 460, IE 522, IE524, IE 525, IE 534, IE561, IE 563, IE 571

Description of academic qualifications

Dr. John Mullen earned a B.S. degree in Mathematics from the University of Pennsylvania in 1968, and M.S. and Ph.D. degrees in Industrial Engineering from Iowa State University in 1984 and 1994, respectively

Prior instructional responsibility and other experiences relevant to assigned courses

Dr. Mullen brings over 45 years of teaching experience with expertise in stochastic optimization problems relevant to engineering management and systems engineering.

For graduate programs, document scholarship and research capability

Dr. Mullen is a former consultant for the U.S. Army TRADOC Analysis Center at WSMR and a former supervisor for the Salvage and Rework Department at Presto Products, Inc.

Existing Personnel

Manuel Ivan Rodriguez

FTE

1

Course load and courses they will teach in the proposed program

Course load: 3+3

Courses in Systems Engineering: IE 466, IE 451, IE 563, IE459

Courses taught in other programs currently offered

IE316, IE351, IE365, IE413, IE423, IE424, IE451, IE 466, IE467, IE478

Description of academic qualifications

Dr. Manuel Ivan Rodriguez earned a Master of Science degree in Statistics from UTEP in 2007, and a PhD in Industrial Engineering from NMSU in 2011.

Prior instructional responsibility and other experiences relevant to assigned courses

With 10 years of industry experience complementing 19 years of teaching experience, Dr. Rodriguez will offer invaluable real-world best practices, particularly in engineering management and systems engineering.

For graduate programs, document scholarship and research capability

Dr. Rodriguez has authored over 30 peer-reviewed publications and has been actively collaborating with professors from ACES and Business Colleges.

Existing Personnel

Edward Kennedy

FTE

1

Course load and courses they will teach in the proposed program

Course load: 2+2

Courses in Systems Engineering: IE 524, IE456, IE459

Courses taught in other programs currently offered

IE151, IE351, IE 524, IE590

Description of academic qualifications

Dr. Edward Kennedy earned a Master of Science degree in Electrical Engineering in 1991, and a PhD in Industrial Engineering in 2023. Both degrees are from NMSU.

Prior instructional responsibility and other experiences relevant to assigned courses

Before joining NMSU, Dr. Kennedy served the U.S. Department of Defense for 33 years in the field of systems engineering and engineering management. He will offer students direct access to invaluable industry knowledge and real-world best practices.

For graduate programs, document scholarship and research capability

Dr. Edward Kennedy has authored two peer-reviewed journal publications. He is a former president of the WSMR Historical Foundation and a recipient of both the Global War on Terrorism Medal (with a \$5,000 award from Headquarters) and the Department of Defense Achievement Medal for Civilian Service.

Existing Personnel

Chaitanya Mahajan

FTE

1

Course load and courses they will teach in the proposed program

Course load: 1+1

Courses in Systems Engineering: IE 451

Courses taught in other programs currently offered

IE217, IE316

Description of academic qualifications

Dr. Chaitanya Mahajan earned a Master of Science degree in Industrial & Systems Engineering in 2014, and PhD in Engineering in 2019. Both degrees are from the Rochester Institute of Technology.

Prior instructional responsibility and other experiences relevant to assigned courses

Before joining NMSU's Industrial Engineering department, Dr. Mahajan was a lecturer in Industrial and Manufacturing Engineering at Kettering University and a postdoctoral associate in the Department of Industrial & Systems Engineering at Rochester Institute of Technology.

For graduate programs, document scholarship and research capability

Dr. Mahajan has authored six peer-reviewed journal publications. He recently received a \$200,000 research grant from NSF CMMI.

Existing Personnel

Salvador Rodriguez

FTE

1

Course load and courses they will teach in the proposed program

Course load: 2+2

Courses in Systems Engineering: IE 451, IE 456, IE 459

Courses taught in other programs currently offered

IE 451, IE 456, IE 459

Description of academic qualifications

Prof. Salvador Rodriguez earned a Master of Science degree in Industrial Engineering from NMSU in 2005. He is currently pursuing his PhD degree in Industrial Engineering at NMSU.

Prior instructional responsibility and other experiences relevant to assigned courses

Prof. Rodriguez brings his extensive experience from 28 years at the U.S. Department of Defense in systems engineering and engineering management to NMSU. This translates into invaluable industry knowledge and real-world best practices that he'll share with students.

For graduate programs, document scholarship and research capability

Prof. Rodriguez recently submitted a research grant proposal to NSF for the EPSCoR Research Infrastructure Improvement program.

Existing Personnel

Steve Stochaj

FTE

1

Course load and courses they will teach in the proposed program

Course load: 1+1,

Courses in Systems Engineering: EE 401, EE 460

Courses taught in other programs currently offered

EE 401, EE 460

Description of academic qualifications

Dr. Stochaj holds a PhD from the University of Maryland in Physics. His research area is astrophysics and space systems.

Prior instructional responsibility and other experiences relevant to assigned courses

Dr. Stochaj has worked on NASA and AFRL space projects for over 35 years.

For graduate programs, document scholarship and research capability

Dr. Stochaj has graduated 12 PhD students and 45 master's students. He has 85 journal publications and has led 35 funded research projects.

Gray Associates Data

Systems Engineering Scorecard.pdf

NM Higher Education Department

Is there a certificate embedded in the degree program? If so, list certificates and courses required?

No

Does the master's level degree articulate to a doctoral program, yes or no?

Yes

If yes, to which Doctoral Program?

Doctor of Philosophy in Engineering (Specialization in Industrial Engineering)

Describe your institution's plan for periodic evaluation of program effectiveness. Include criteria that will be used to determine effectiveness.

Evaluation of Program Effectiveness

Per NMSU policy, the program will be subject to the Annual Academic Departmental Assessment (AADA). See <https://assessment.nmsu.edu/annual-departmental-assessment/index.html> for more details. Specifically, this process involves

1. Direct measurement of student proficiency in one or more program-level learning objectives.
2. Analysis of assessment findings, including evaluation of its relevance for curricular decision-making.
3. Planning and implementing change in response to findings and analysis.
4. Substantial engagement of program faculty and others as appropriate in steps 1 and 2.
5. Reassessment of learning following changes made in prior years' assessments.

Measurement of student proficiency will be carried out through course examinations, in-class student projects, and assignments from the practicum course, depending on the learning objective being assessed.

The proposed program will participate in the Academic Program Review (APR) on the six-year rotation cycle established by the university. The proposed program will not be subject to external accreditation. See <https://inside.nmsu.edu/adpr/> for more details.

The proposed program must meet one or more specified needs within the state or region. Clear and convincing evidence must be provided of the reality and extent of such need.

The Department of Industrial Engineering at New Mexico State University proposes to offer a fully online new master's degree in the field of Systems Engineering. The degree, if approved, will meet the needs of the state's major employers in an occupation that is rapidly growing in demand. Students from New Mexico, who often have the desire to stay within the state after graduation, will be attracted to the program for the high salary that a career in systems engineering offers and the local job opportunities in this field. The program will fulfill the mission of New Mexico State University's Colleges of Engineering to serve the diverse needs of the state through comprehensive programs of education as well as the mission of the University to promote social mobility for the state's diverse student populations.

The proposed master's degree program in Systems Engineering aims to equip graduates with the necessary knowledge for an interdisciplinary field of engineering and engineering management, concentrating on the design, integration, and management of complex systems throughout their life cycles. The core focus of the Systems Engineering graduate involves applying systems thinking principles to effectively organize this knowledge. This proficiency enables them to independently address intricate problems within a collaborative technical environment, instruct these methods at the undergraduate level, and actively contribute to the development of grant proposals and the creation of applied technical and research publications. This program augments those currently offered in the state of New Mexico, intending to broaden accessibility for students and working professionals residing in Southern New Mexico. It particularly emphasizes the application of systems engineering for individuals without extensive training in this methodology, preparing them for roles in industry, government, and the public sector.

The Systems Engineering program scores very highly on the Gray Associates Scorecard, with a total market score of 40 and a percentile of 96, indicating this program is among the top 4% of similar programs nationally.

- High student demand: This program scores well in student demand (score 24, percentile 95). It means this program is in higher demand than 95% of similar programs nationwide, suggesting strong interest from prospective students.
- Competitive intensity: The program has a competitive score of 7 (percentile 91) for competitive intensity, meaning it attracts students from various backgrounds and experiences.
- Excellent employment outcomes: The score of 14 (percentile 98) in employment highlights that graduates of this program are successful in finding jobs in their field compared to 98% of similar programs.

According to the 2022 report from the U.S. Bureau of Labor and Statistics, the demand for Systems Engineers is projected to grow by 12% over the next decade, translating to 22,800 jobs from 2022 to 2032. Engineers with bachelor's degrees earn an average salary of \$96,350 (ranging from \$62,730 to \$134,990). For Systems Engineers holding master's degrees in Systems Engineering, the average

salary increases to \$124,014 (ranging from \$95,000 to \$163,000). In New Mexico, key employers for Systems Engineers include: 1) The Department of Defense (White Sands

If the program fills a regional workforce need, describe collaboration between your institution and regional employers in the program development.

Top Employers:

- Government Agencies: In New Mexico, key employers for Systems Engineers include: 1) The Department of Defense (White Sands Missile Range (TRAC-WSMR), NM / Kirtland Air Force Base, NM / Holloman Air Force Base, NM); 2) The Department of Energy (Sandia National Laboratory (Sandia lab), NM / Los Alamos National Laboratory (LANL), NM); and 3) National Aeronautical and Space Agency (NASA at White Sands Missile Range and NASA at White Sands Test Facility).
- All actively seek Master's-level Systems Engineers locally. These employers consistently face challenges in attracting and retaining Systems Engineers with master's degrees from outside of the state, expressing ongoing interest in hiring locally from the community and regional NM State Colleges and Universities.

Connecting with Employers:

- Career Fairs: TRAC-WSMR, LANL, Sandia lab, and NASA organize multiple career fairs annually, where they recruit for a variety of positions, including numerous opportunities within NMSU engineering. NMUS Career Services also hosts career fairs and employer information sessions throughout the year, featuring participation from TRAC-WSMR, LANL, Sandia Lab, and NASA. Moreover, they offer a variety of internship opportunities for both our undergraduate and graduate students in engineering fields.
- Master's Programs and Systems Engineering Certificate: The Master's degree in Industrial Engineering and Systems Engineering Graduate Certificate have gained significant popularity among high-tech workforces within the US Defense sector. A substantial portion of our master's program clientele comprises employees from key defense employers, including TRAC-WSMR, Sandia Lab, and LANL. Note that, within the NMSU Department of Industrial Engineering, the Graduate Certificate in Systems Engineering was created in 2006 to address a known and growing market need for advanced education in complex adaptive socio-technical systems. It is based online for easy access for regional professionals including 12 credits of graduate coursework. Additionally, it is marketed as a path of entry to a graduate engineering degree program or a career change for working professionals. It was developed through a collaboration between Industrial Engineering and Klipsch School of Electrical and Computer Engineering with the aid of staff from General Dynamics and Sandia National Labs.

Identify where similar degree programs are offered by other public higher education institutions in New Mexico.

We have identified another degree program in New Mexico that could be considered similar to the one we are proposing: the master's program in Space Systems Engineering, leading to a Master of Science in Electrical Engineering at the University of New Mexico.

If similar programs are offered at other public higher education institutions in New Mexico, provide a rationale for offering an additional program.

The NMSU Systems Engineering Master's Program will provide a broader perspective, not solely focusing on space systems but encompassing a more comprehensive range of engineering disciplines and their applications. This approach aims to significantly enhance access and availability in the State of New Mexico for the key audience groups and employers outlined in this proposal, with a regional emphasis on Southern New Mexico, West Texas, and Ciudad Juarez, Chihuahua, Mexico.

List any nearby non-New Mexico institutions of higher learning where the program is being planned or offered, particularly WICHE member institutions.

Duplication at non-New Mexico Institutions (WICHE)

The table below lists master's programs in Systems Engineering and related fields currently offered by 3 of NMSU's peer institutions. Most are specifically designed for engineers, scientists, and technologists holding bachelor's degrees in respective fields, and housed in Departments of Engineering. The uniqueness or "niche" that our program will help address is to increase access and availability to retain and sustain this skill mix within the Southern New Mexico population who seek to stay in the area while being a direct feed to the major employers in the area mentioned in this proposal. Also, given the breadth of the collaborative research experience of our faculty, our program can be tailored to any number of areas of application.

Master in Engineering Management Programs Offered by Peer Institutions
 University of Arizona Master of Science in Systems Engineering
 Arizona State University Master of Engineering in Systems Engineering
 University of Texas – El Paso Master of Science in Systems Engineering

Enrollment and Graduation Projections

Student Type	Year 1	Year 2	Year 3	Year 4	Year 5
New Students	10	20	30	40	50
Continuing Students	0	10	20	30	40
Graduates	0	0	10	20	30

Annual Retention Rate Target (%)

80

Target 100% Graduation Rate (%)

80

Target Job Placement Rate (%)

100

Describe the faculty resources that are needed to initiate the program. Will any additional faculty be needed?

Faculty Resources (Initiation)

In addition to utilizing existing faculty resources to support the proposed master's degree, which involves reallocating some current teaching assignments to graduate courses and directing faculty advising from other disciplines toward Systems Engineering master's students, the proposed program will be enhanced by the inclusion of a tenure-track faculty member joining in year two. This addition will ensure ongoing excellence in research and scholarship, thereby raising the program's national profile and facilitating further program development and sustainability. Furthermore, the program will benefit from the inclusion of two Professors of Practice, starting in years one and five, who will provide students with direct access to invaluable industry knowledge and real-world best practices. With this expert faculty team in place, the program will be able to offer a broader range of specialized courses tailored to meet diverse student needs and address evolving industry trends. This, in turn, will attract more students and enhance the program's reputation. These dedicated faculty members will also offer enhanced advising, mentorship, and career guidance to students, thereby fostering greater student success and satisfaction with the program. It's worth noting that funding support for these new faculty positions has already been secured from NMSU Global.

Existing Personnel

Hansuk Sohn, Ph.D., IE Department Head and Associate Professor
 John Mulled, Ph.D., IE Associate Professor
 Chaitanya Mahajan, Ph.D., IE Assistant Professor
 Manuel Ivan Rodriguez Borbon, Ph.D., Professor of Practices
 Salvador Rodriguez, MS, Professor of Practices
 Edward Kennedy, Ph.D., Professor of Practices

Describe the library and other academic support resources that are needed to initiate the program. What, if any, additional resources will be needed?

We expect that the existing resources in the main campus library will be sufficient for launching the proposed new online Systems Engineering Master's program. This is due to the fact that the library resource requirements for this new online degree align completely with the needs of the current Industrial Engineering and other engineering departments that provide specialization courses. Therefore, there is no need for additional library resources.

Describe the physical facilities of the institution that will be used for the first five years of the program. Will additional space or modifications of existing space be required within the first five years of program operation.

The existing office space allocated for faculty is expected to be adequate during the first five years of the proposed Systems Engineering master's degree program operation. While we are confident that the initial teaching requirements can be accommodated with the current faculty and space, it's important to note that future adjustments might be necessary as the program expands. The growth of the program may require additional space to accommodate new faculty members in the coming years.

Describe the institution's equipment and technological resources needed for the first five years of the program? What, if any, additional equipment will be needed?

We expect that existing technological resources will be adequate for the first five years of the master's program. Faculty offices are equipped with desktop computers and printers. Faculty also have access to NMSU's High-Performance Computer (HPC) Cluster. The computer lab in NMSU's Industrial Engineering houses 16 Windows-based computers. A variety of software is available including MS Office, RStudio, MATLAB, Minitab, Arena, SIMIO, FICO Xpress, and LINDO. The NMSU Instructional Media Services have in place technology to support the asynchronous delivery of courses. Resources include Adobe Connect and Zoom for presenting and recording lectures and a "smart interactive monitor" that can capture the instructor's writing and show it simultaneously to in-person and remote participants.

Describe any other operating resources needed to initiate the program.

No initial additional resources are foreseen to be needed to initiate the Systems Engineering Master's program.

Are there existing external facilities that will be used? Have agreements been established to ensure use of the those facilities?

We do not anticipate the use of external facilities except as required for the administration of examinations to students attending classes remotely. These resources are available through NMSU Online or through private services such as ProctorU.

Provide a clear analysis of the projected cost of the proposed program and the sources of funding that will support it for the first five years that the program will be offered. Include a discussion how any of the needed resources discussed in your attachment. This should be completed in collaboration with your institution's financial office.

Projected Cost and Institutional Readiness - Sys Eng.pdf

Letters of Support

Support letters for ENGR MGMT 9-4-24.pdf

Accreditation

Is the program seeking specialized accreditation?

No

Is specialized accreditation required for licensure or practice in the program?

No

Has the program already obtained the appropriate specialized accreditation? If so, attach a copy of the letter from the agency granting accreditation?

No

If the program has not yet obtained accreditation but has begun the process of seeking or plans to seek specialized accreditation, specify the name of the agency and provide the time-line for completing the process.

N/A

If the program does not plan to seek specialized accreditation, provide a rationale for not-seeking accreditation here. (if there is not a specialized accrediting organization for this program, indicate so as your rationale).

NMSU is regionally accredited by the Higher Learning Commission (HLC), and the Academic Program Review (APR) is an annual requirement and supports our HLC accreditation. The proposed Systems Engineering Master's program will participate in the APR on the six-year rotation cycle established by the university.

If the program includes any of the following, explain how it will ensure that student work and levels of knowledge competencies achieved will be comparable to those achieved through traditional formats: (Award credit for prior learning; use of compressed time frames; use of on-line deliver; inclusion of accelerated formats; or other approaches to learning.)

Award Credit for Prior Learning: The program will utilize rigorous assessment mechanisms, encompassing industry certifications and project demonstrations, to evaluate and award credit for demonstrably equivalent prior learning. This ensures that students receive appropriate recognition for their existing knowledge and skills, aligning with the standards established in traditional formats.

Use of Online Delivery: Leveraging online delivery, the program will employ advanced instructional technologies, interactive modules, and continuous assessment methods. This ensures that students' work and knowledge competencies are not compromised and remain equivalent to those achieved in traditional formats.

Inclusion of Accelerated Formats: Through the Masters Accelerated Program (MAP), students have an opportunity to take up to 12 graduate credits during their undergraduate program that can apply toward the proposed Systems Engineering master's degree. Other accelerated formats within the proposed program can be carefully designed to prioritize intensive learning without sacrificing educational rigor. However, robust assessments and quality assurance measures need to be in place to guarantee that student achievements align with or surpass those in traditional formats.

Will the program be part of a contractual or consortial arrangement (yes/no, explain)?

NO

If the program is planning any involvement by external organizations (other than from accredited higher education institutions) in the key operations as identified below, provide the information as requested.

Type of Involvement	Name of External Organization	Percent of Involvement
Course placement and advising of students	N/A	N/A
Design and oversight of curriculum	N/A	N/A
Direct instruction and oversight	N/A	N/A
Other support for delivery of instruction	N/A	N/A
Recruitment and admissions of students	N/A	N/A

Briefly describe the planning process for determining the need for this new program, including the role of faculty in the planning and approval process.

The Industrial Engineering department engaged department faculty members to conduct an extensive needs assessment. Input from alumni, industry professionals, and potential employers was collected to identify specific skills and knowledge gaps. The College Dean's office provided market research data to identify the potential target audience for the proposed online master's program. Additionally, a thorough analysis of competition was carried out, including the identification of similar programs from other institutions and an assessment of their strengths and weaknesses. A curriculum development committee, consisting of department faculty members specializing in Systems Engineering, was established to collaboratively design a curriculum in line with industry standards and tailored to the needs identified during the assessment. Faculty members were assigned the task of creating a comprehensive proposal for the new program, and they also assumed a key role in reviewing and refining the proposal.

Describe the process for assessing and improving student learning in the proposed program.

Mentoring of Students:

Upon admission to the master's program, each student will be paired with a faculty mentor. In addition to advising the student regarding his or her academic coursework, the mentor will serve as the focal point for communication between the student and the program faculty. The graduate program director, who will oversee admissions to the master's program and the allocation of graduate assistantships with input from a committee of faculty, will also be available to meet with students to discuss their progress and any challenges that they may be facing.

Assessment of Student Learning:

We will assess student learning at both the individual and the program levels. We will develop assessment instruments that measure student learning against the program's learning objectives. Instruments will be administered during course examinations, depending on the learning objective that is being assessed. Changes will be made to the curriculum as program-level deficiencies are identified (see Periodic Program Evaluation).

Describe the process for assessing and improving student persistence and completion, in the new program.

To ensure a high completion rate, we'll utilize a data-driven approach to continually assess and improve the student experience.

Tracking Progress: We'll gather data on key metrics like enrollment, retention rates, time to completion, and course completion rates. Additionally, student engagement through login frequency and participation will be monitored. Finally, exit surveys from departing students will provide valuable insights into their reasons for leaving.

Identifying Challenges: By analyzing this data, we'll pinpoint areas where students face hurdles. This could involve specific courses with high withdrawal rates, program drop-off points, or student demographics correlated with lower completion rates.

Targeted Interventions: Based on the identified challenges, we'll develop targeted interventions to support student success. Offering academic support services like online tutoring and writing assistance would further empower students. Building a sense of community through online forums and virtual events can combat feelings of isolation. Furthermore, faculty training on engaging online teaching practices and flexible learning options can enhance the online learning experience. Finally, early intervention programs to identify and support at-risk students can make a significant impact.

Continuous Improvement: The effectiveness of these interventions will be regularly evaluated by analyzing updated data on student persistence and completion. This ongoing cycle of assessment, intervention, and evaluation ensures that the program adapts to student needs, leading to a thriving online learning environment with consistently high completion rates.

If any of the institution's accreditation relationship (including other regional, specialized, or national accrediting agencies) are currently under or recommended for a negative status or action (e.g., withdrawal, probation, sanction, warning, show-cause, etc.)

N/A

If the institution is undergoing or facing substantial monitoring, special review or financial restrictions from the U.S. Department of Education or other federal or state government agencies.

N/A

If the institution's senior leadership or board membership has experienced substantial resignations or removals in the past year.

N/A

If the institution is experiencing financial difficulty through conditions, such as, a currently declared state of exigency, a deficit of 10% or more, a default or failure to make payroll during the past year, or consecutive deficits in the two most recent years.

N/A

Institution Specific Information Area

Primary target audience for the program (e.g., full#time, part#time, traditional college age, working adults, transfer students, military personnel, or particular ethnic group)

We have identified two groups of target audiences for the Systems Engineering Master's Program: 1) students who hold a bachelor's degree in engineering or a related discipline looking to specialize in systems engineering for career entry or advancement; 2) working professionals who do not currently hold a master's degree-seeking to enhance their skills and advance their careers without interrupting their work commitments. This also includes military professionals interested in acquiring expertise in systems engineering, especially given the relevance of the field in defense and aerospace, leveraging the flexibility of an online program.

We expect that individuals from both 1 and 2 groups will find the Systems Engineering Master's program very relevant and beneficial to their professional career paths due to its broad application in industry, government, and public sectors. As the reputation of our IE master's program grows, we also expect more outside admissions of students, including students who recently earned their undergraduate degrees at other universities in the region. We also expect individuals in both groups 1 and 2 who are seeking an opportunity for a Master in Systems Engineering in the greater Las Cruces Area to be more accessible from a geographic perspective.

The asynchronous delivery of courses will allow individuals in both groups who reside outside of the Las Cruces area and/or are full-time working professionals to complete the required coursework remotely.

How does the proposed program align with the department, college and university mission?

The mission of the College of Engineering is to serve the diverse needs of the state through comprehensive programs of education, research, extension and outreach, and public service. The proposed online Systems Engineering Master's program will meet the needs of the state's major employers in an occupation that must retain and sustain its current demand and be postured to respond to its growing demand.

Part of the vision of NMSU is to excel in promoting social mobility for the state's diverse student populations. For New Mexico students earning a degree from the program, a career in Systems Engineering offers considerable social mobility, as evidenced by the high starting salaries and potential for managerial positions in industry. These economic gains will be achieved regardless of whether students find positions inside or outside of New Mexico.

Discuss how admissions criteria and strategies will recruit a diverse student body?

To ensure the recruitment of a diverse student body for the new online Systems Engineering Master's degree, we will extend our evaluation beyond traditional metrics. We recognize that different people may come from diverse backgrounds and experiences, so we will also consider factors like socioeconomic background, first-generation status, ethnicity, gender, and military service as part of our comprehensive admissions evaluation. This ensures that underrepresented groups have a fair chance to be recognized for their potential and contributions.

In recent years, the majority of our international students have come from developing nations, including Nigeria, Ghana, Bangladesh, Egypt, and Iran. Additionally, the program has recruited several Hispanic students from southern New Mexico and El Paso. The asynchronous delivery of the master's program will allow us to attract working professionals from within the state of New Mexico and beyond.

Recognizing the importance of diversity in STEM, several Industrial Engineering faculty members have recently become involved with maximizing access to the Engineering and Science Careers program at NMSU. We leverage alumni and current students as ambassadors to share their positive experiences. Moreover, we are committed to establishing feedback mechanisms to continually assess and improve our diversity recruitment strategies.

What controls are in place to ensure that the information presented to all constituencies in advertising, brochures, and other communications will be accurate?

We'll establish a review and approval process for all promotional materials, involving relevant stakeholders including faculty, program director, administrators, and marketing director, in the review process to catch inaccuracies. We'll also establish a schedule for regular updates of program information to reflect any changes accurately.

Student Records Office Uploads

HLC wants CIP Code information that is currently being offered at both the institutional and degree level for 4-digit and 2-digit CIP codes for all new programs. This information will be provided by the University Student Records office and added to the form during the HED submissions workflow step.

Key: 1044