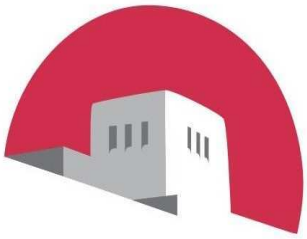


THE UNIVERSITY of NEW MEXICO

Civil Engineering

Academic Program Review

Spring - 2017

School of Engineering

Table of Contents

Table of Contents 1
Criterion 0 . Introductory Section and Background Information 4
0A . Executive Summary 4
0B . History 4
0C . Organizational Structure and Governance 6
0D . Specialized and/or External Accreditations 7
0E . Overview of Previous Academic Program Review 8
Criterion 1 . Student Learning Goals and Outcomes 10
1A . Vision and Mission 10
1B . Relationship between the Unit and University's Vision and Mission 11
1C . Unit Goals and Student Learning Outcomes 13
1D . Constituents and Stakeholders 17
1E . Primary Constituents and Stakeholders 18
1F . Student Learning Goals and Outcomes Strategic Planning 19
Criterion 2 . Teaching and Learning: Curriculum 19
2A . Curricula 20
2B . Contributions to other Units 30
2C . Course Delivery Modes 31
2D . Teaching and Learning: Curriculum Strategic Planning 31
Criterion 3 . Teaching and Learning: Continuous Improvement 35
3A . Overview of Assessment Process 35
3B . Impact Assessment Process on Unit 39
Criterion 4 . Students (Undergraduate and Graduate) 41
4A . Student Recruitment and Admissions 41
4B . Enrollment Trends, Persistence, and Graduation Trends 43
4C . Advisement Process 43
4D . Student Support Services 45
4E . Student Success and Retention Initiatives 45
4F . Student Strategic Planning 46
Criterion 5 . Faculty 48
5A . Faculty Composition and Credentials 48
5B . Faculty Course-Load 48
5C . Faculty Professional Development 49
5D . Faculty Research and Creative Works 54
5E . Faculty Involvement in Student Retention and Academic Success 57
5F . Faculty Experience 57
5G . Faculty Strategic Planning 58
Criterion 6 . Resources and Planning 60
6A . Resource Allocation and Planning 60
6B . Budget and Funding 60
6C . Staff Composition and Responsibilities 61
6D . Library Resources 63
6E . Resources and Planning Strategic Planning 63
Criterion 7 . Facilities 64
7A . Unit's Allocated Facilities 65
7B . Ability to Meet Academic Requirements with Facilities 66
7C . Space Management Planning Efforts 66
7D . Unit Facility Goals and Strategic Planning 67
Criterion 8 . Peer Comparisons 68
8A . Unit's Distinguishing Characteristics 68

8B . Strategic Planning in Relation to Peer Institutions 69
Appendices 70

Criterion 0 . Introductory Section and Background Information

The section should provide a brief introduction to the self-study

0A . Executive Summary

An Executive Summary that provides a one to two-page summary/abstract of the information contained within the Self-Study Report.

The Department of Civil Engineering is one of 6 departments within the School of Engineering, currently with 17 Full-time faculty, 10 staff members. The department is unique in that it offers 3 accredited undergraduate degrees (Civil Engineering, Construction Engineering and Construction Management). The department offers MS, MENG, MCM, and PhD in various concentration areas. The MCM degree is offered 100% online. Current enrollment of the undergraduate program is about 270 students and current graduate program is above +120 students.

The department's annual research expenditures exceed $5.5 million for the last three years and allow the faculty to engage in a broad spectrum of research activities and provide much-needed support for graduate students and laboratories. The department's programs received a US News and World Report Ranking of 82. The department is the home of Center of Water and the Environment (CWE) funded as a CREST center by the National Science Foundation (NSF) and is also a partner in a regional university transportation center UTC (TranSET) with Louisiana State University.

The Department's faculty are active in many national committees and professional societies, including some in leadership roles, for example, there is one faculty who is a Fellow in the American Concrete Institute. The faculty have been featured in the local and national media numerous times in the past two years due to their expertise in cutting edge technical areas that are relevant to the community such as water quality, transportation safety and structural engineering. The department is in the process of hiring two new faculty members in 2018 in the fields of Transportation and Construction Management. The department has launched a major fundraising campaign in 2017 and expects to annnouce its second endowed Chair position in 2018.

The urban location allows the students to find job opportunities before completion of their undergraduate degrees and along with the racial diversity of the population base poses unique opportunities and challenges to the academic environment. The department moved into the $42 million Centennial Engineering Center in August 2008 and currently has state-of-the-art labs and facilities.

Over the past many years, the department has successfully built very strong connections with the local community in Albuquerque and New Mexico in large. This connections were established and strengthened through the department continuous supply of civil, construction engineers and construction managers who work in engineering consulting firms and construction companies in New Mexico. The department also has very strong connections through long-history of collaborations with the national labs specifically Air Froce Lab, Sandia National Labs and Los Alamos National Lab. The department also has built very strong ties with Albuquerque Metropolitan Flood Control Authority (AMFCA), New Mexico Department of Transportation (NMDOT) and the Indian tribes. The department leadership has focused on those connections and will continue to put efforts to strengthen those connections for their strategic value for UNM Civil Engineering and as they represent an integral part of the department identity.

0B . History

A brief description of the history of each degree/certificate program offered by the unit.

The Department of Civil Engineering is the oldest engineering program at the University of New Mexico; it was created in 1908 and graduated its first Bachelor of Science in Civil Engineering in 1912. Between 1951 and 1960, the department offered a BS in Architectural Engineering. In the 1970s, the department began to offer a construction option, which evolved into a Bachelor of Science in Construction Engineering in 1988. In 1989, the department began offering a Bachelor of Science in Construction Management. The Engineering Accreditation Commission of the Accreditation Board initially accredited the undergraduate degrees in civil engineering and construction engineering for Engineering and Technology in 1936 and 1990, respectively. The American Council for Construction Education initially accredited the undergraduate degree in construction engineering in 1994. The department's only previous academic program review, in Spring 1996, was restricted to the graduate program. The department has grown over the years, reaching a peak in 1980 when 55 BS degrees in civil engineering were awarded. In recent years, the annual number of baccalaureate degrees has typically

been 24-40. The department's first MS (MSCE) degree was awarded in 1947, and its first PhD (Engineering) was awarded in 1966.

Prior to the fall of 2013, the UNM-mandated minimum number of credit hours required to earn a Bachelors degree was 128. During the fall of 2013, the Provost proposed reducing this minimum to 120 credit hours. The faculty senate approved this proposal in spring of 2014. Subsequently, the Provost strongly encouraged all Bachelors degree programs at UNM to reduce the required number of hours to as close to 120 hours as possible. The main rationale for this change was to improve overall UNM graduation rates, which are factored into the state higher education funding formula. During the 2014-15 academic year, all of the School of Engineering Bachelors degree programs were responsive to the Provost's request and proposed new curricula that reduced credit hours to close to the 120-hour minimum. School of Engineering programs went from 128-133 hours to 120-124 hours. The UNM faculty senate approved these changes in the spring of 2015, and engineering students have already begun to graduate under the new reduced credit hour curricula. A focus of our outcomes assessment in the next few years will be to determine what effect the reduction in credit hours has had on students' achievement of the program outcomes.

The emphasis on construction in the curriculum began with the appointment of Richard H. Clough as Professor and Chairman of the Department in 1957. Dr. Clough, a 1943 graduate of the Department, had previously served as Executive Vice-President of a regional general contracting firm. His textbooks Construction Contracting (First Edition 1960) and Construction Project Management (First Edition 1972), and their subsequent editions are still used in numerous construction programs. After Professor Clough completed a stint as Dean of the College of Engineering (1960-68), he returned to the CE Department as a full-time teacher, with an emphasis on construction-related courses. The Department established a construction option during the 1970s, and Professor Glenn A. Sears was hired as the second construction faculty member in 1975. Professor Sears retired in 1993. In 1984, the establishment of the AGC Endowed Chair to support construction programs created a lifelong partnership between UNM and the AGC New Mexico membership. The formal degree programs in Construction Engineering and in Construction Management were initiated in 1985, the same year that Professor Clough retired. The Department was fortunate to have Professor Michael Vorster (University of Cape Town) as a Visiting Professor in the Fall 1985 and Professor Axel Gaarslev (University of Denmark) as a Visiting Professor in Fall 1987. Mr. Bartholomew Dennehy served as a visiting faculty member in the construction program from 1986 to 1988. Professor Gregory A. Howell joined the Department as a Distinguished Visiting Scholar in 1987 and as a tenure-track faculty member in 1988. Professor Howell left in 1997 to return to private practice. Dr. Bolivar A. Senior joined the faculty in August 1993 and left the university in 1996. Professor Aviad Shapira, from the Technion, occupied a visiting faculty position for the 1993-94 academic year. Dr. Deborah Fisher joined the Department in 1994 as an associate professor and was granted tenure in 1997. Dr. Fisher left the University in August of 2005. Dr. Stephen Staneff joined the Department in 1998 as an associate professor, leaving in Spring of 2001. Mr. Salvador Reyes served as a visiting lecturer in the construction programs from 1997 to 2001. Dr. James Lutz served as a visiting professor from January of 2001 through December of 2001.

In the Fall of 2001, Dr. Jerald Rounds joined the faculty to fill the AGC Endowed Chair position and take on responsibilities as Construction Programs Leader. Dr. Rounds retired in Spring 2013. In the Spring semester of 2002, Dr. John Seo joined the faculty as Assistant Professor but resigned prior to the end of the academic year due to personal and family reasons. In the Fall of 2004, Dr. Susan Bogus joined the faculty as an Assistant Professor, bringing the construction faculty up to the full complement of 3 regular faculty members for the first time in many years. Dr. Bogus attained tenure with promotion to Associate Professor in Spring of 2010 and was promoted to Professor in Summer 2017. With the departure of Dr. Fisher in 2005, a national faculty search resulted in Dr. Giovanni Migliaccio joining the faculty in Fall of 2007. Dr. Migliaccio left UNM at the end of the Spring semester in 2010. With the departure of Dr. Migliaccio, a national search to fill the vacant position resulted in Dr. Vanessa Valentin joining the faculty in the Fall of 2011. Recognizing a chronic and acute need for faculty to teach construction courses that were outsourced to the community college or taught by adjunct faculty, a national search resulted in Dr. Mark Russell joining the faculty in Fall of 2011. Dr. Russell filled the AGC Endowed Chair position in Spring 2013 when Dr. Rounds retired. Dr. Russell left UNM for family reasons. Dr. Susan Bogus Halter has been named as the AGC Endowed Chair since Fall 2016. A national search for a faculty in the field of construction engineering and management has been launched in Fall 2017 and the department plans to hire a new faculty in July 2018. The regular construction faculty members are supported by a cadre of exceptional adjunct faculty members who teach specific courses in their area of expertise while maintaining their professional practice in various segments of the industry.

The current faculty members in the construction programs administer the BS degrees in Construction Management and Construction Engineering, an MSCE degree with an emphasis in Construction Engineering and Management, a Master's of Construction Management (MCM) degree, a PhD Degree in Engineering with a concentration in Civil Engineering, and an area of interest in Construction Engineering, as well as a minor program in Construction Management that is popular among Management and Architecture students. Academic advising of undergraduate construction management students is divided between construction faculty members and the Department of Civil Engineering Advisement Coordinator. The

current undergraduate CM student enrollment is in the upper 20's, more or less steady since the last ACCE visit. The Master of Construction Management Program is being offered 100% online starting Fall 2017. This program has been exponentially growing and is expected to get close to 30 students in 2018. Construction faculty members teach many of the construction courses, but rely on the remainder of the CE faculty, adjunct faculty, supporting departments at the University of New Mexico, and construction faculty in the ACCE accredited Construction Management Associate Degree Program at the Central New Mexico Community College (CNMCC) for teaching other courses required in this program.

The BSCE program made revisions to the curriculum twice since the last general review. Effective in the 2013-2014 academic year, the curriculum was revised to include breadth and depth electives in the senior year. These electives replaced required upper-division courses in specific subject areas (e.g., structures or water resources) and instead allowed students to select electives in four of the six subject areas taught in the department (construction, environmental, geotechnical, structures, transportation, or water resources). This change was made to better align with the civil engineering program criteria, which require students to "solve problems in at least four technical areas appropriate to civil engineering." Effective in the 2015-2016 academic year, the curriculum was further revised and the total number of credits required was reduced from 130 credits to 124 credits. This revision was prompted by the change in University policy that reduced the required number of credits to graduate for undergraduate programs from 128 credits to 120 credits. On the graduate level, the MSCE program has been offered regularly along with the MENG degree and the MCM degrees. The two later degrees are 30 credit degree programs offered as course-based Master degrees. The MCM degree is also a course-based Masters degree that is only offered online.

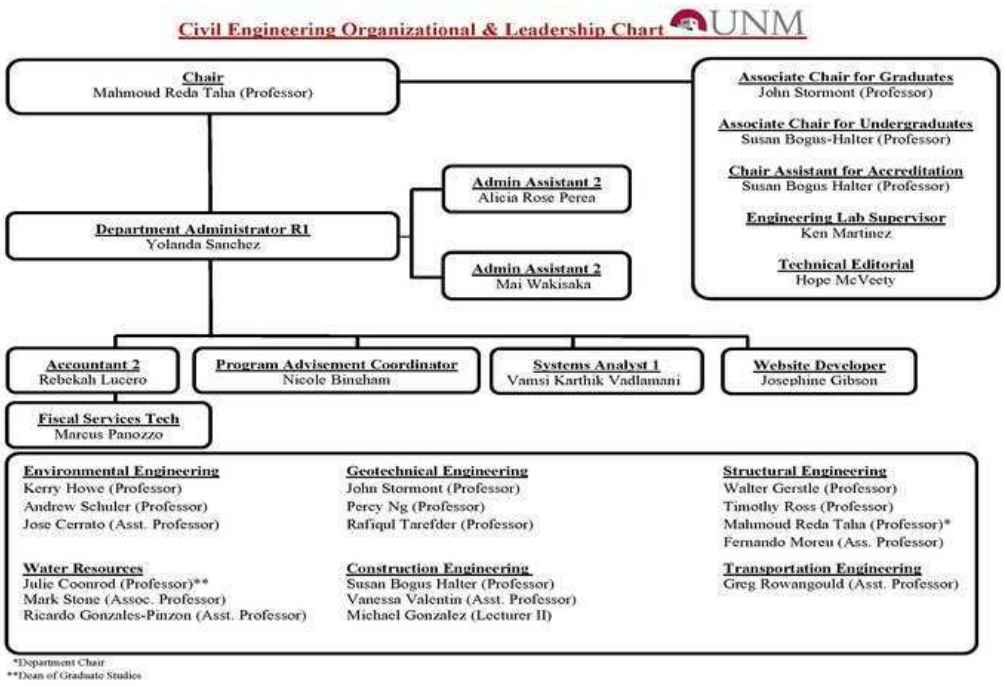
The other major program change since the last general review is that Dr. Mahmoud R. Taha is now the Department Chair and the head of the BSCE program. Dr. Taha became Department Chair in 2014 after the former Chair, Dr. John Stormont, completed his 5-year appointment. Dr. Taha is very familiar with the program, having been a faculty member in the Department since 2004.

0C . Organizational Structure and Governance

A brief description of the organizational structure and governance of the unit, including a diagram of the organizational structure.

From 1962 through his retirement in 1985, Dr. Cornie Hulsbos, a structural engineer with previous faculty experience at the University of Iowa, Iowa State University, and Leigh University, served as department chairman. From 1985 through his position resignation in 1990, Dr. Stephen Shelton, an environmental engineer with previous experience at the University of Texas - El Paso, served as the department chairman; he has since resigned from UNM. Between 1990 and 1997, Jerome Hall, a transportation engineer with previous faculty experience at the University of Maryland, served as department chairman. From 1997 through 2005, Timothy Ward, a hydraulics engineer with previous faculty experience at New Mexico State University in Las Cruces, served as the department chairman; Dr. Ward has since left UNM for an administrative position at another university. Dr. Arup Maji, a structural engineer, was appointed chair of the department in 2005 until 2009 when he was appointed as an interim Dean at UNM School of Engineering. From 2009 to 2014 Dr. John Stormont, a geotechnical engineer, with previous faculty experience at the University New Mexico was appointed as the department chair and served until 2014 and then stepped down back to serve as a Professor in the department. In 2014, Dr. Mahmoud Reda Taha, a structural engineer with pervious experience at UNM since 2004, was appointed as the department chair and he continues to serve until today. The Chart below provides the current leadership chart for the department.

While Dr. Taha asssumes the Department Chair responsibilities, Dr. John Stormont is the current associate chair for graduate program overseeing all graduate program details including program assessment. Dr. Susan Bogus Halter is the associate chair for undergraduate program focused on undergraduate curriculum and accreditation. Mrs. Yolanda Sanchez is the department adminstrator and the head of staff including accounting, IT and student advising and two front desk adminstators. Dr. Kerry Howe has assumed the responsiblity of Director of Center of Water and Environment (CWE). CWE is a school of engineering research center. Since its inception, CWE has worked with the department to share resources and co-hired some of the department staff members. The department faculty covers six subdisciplines of Civil Engineering including Structural Engineering, Environmental Engineering, Geotechnical Engineering, Water Resources, Construction Engineering and Transportation Engineering. The department has 17 faculty members and is immediately hiring 2 faculty members in construction and transportation engineering.



0D . Specialized and/or External Accreditations

Information regarding specialized/external program accreditation(s) associated with the unit, including a summary of findings from the last review, if applicable. If not applicable, indicate that the unit does not have any specialized/external program accreditation(s).

BS in Civil Engineering program

The BSCE program is accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET). The last general review was conducted during the last site visit that took place in October 2016. The ABET review team acknowledged the quality undergraduate programs in civil engineering offered by the department. The department was also praised for its state of the art facilities, interacting and high profiles faculty members and dedicated staff. The department received the highest level of accrediation and it was granted accreditation until 2023. There are no deficiencies, weaknesses, or concerns remaining from the ABET Final Statement for the 2016 site visit.

BS in Construction Engineering program

The BSConE program is accredited by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET). The last general review was conducted during the last site visit occurring in October 2016. The ABET review team acknowledged the quality undergraduate programs in construction engineering offered by the department. The department was also praised for its state of the art facilities, interacting and high profiled faculty members and dedicated staff. The department received the highest level of accrediation and it was granted accreditation until 2023. There are no deficiencies, weaknesses, or concerns remaining from the ABET Final Statement for the 2016 site visit.

BS in Construction Management program

The BSCM program is accredited by the Engineering Accreditation Commission (EAC) of the American Council of Construction Education (ACCE). The last general review was conducted during the last site visit occurring in October 2014. The ACCE accreditation was granted to the department until 2021. The ACCE review team acknowledged the quality undergraduate programs in construction management offered by the department. The department was also praised for its state of the art facilities, interacting and high profiles faculty members and dedicated staff. The department received the highest level of accrediation and it was granted accreditation until 2021. There are no deficiencies, weaknesses, or concerns remaining from the ACCE Final Statement for the 2014 site visit.

The curriculum in Civil Engineering was initially accredited by the predecessor to the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology, Inc. (ABET) in 1936, and has continuously maintained the accreditation since then. The EAC of ABET initially accredited the curriculum in Construction Engineering in 1989. Both programs were reviewed and accredited by the EAC of ABET in Fall 2016 and will have their next comprehensive review in 2022-2023. The curriculum in construction management program has been accredited by ACCE since its inception. The construction management program will seek accreditation by ABET for its next cycle starting 2021.

0E . Overview of Previous Academic Program Review

A brief description of the previous Academic Program Review Process for the unit. The description should (1) note when the last review was conducted; (2) provide a summary of the findings from the Review Team Report; (3) indicate how the Unit Response Report and Initial Action Plan addressed the findings; and (4) provide a summary of actions taken in response to the previous APR.

The last APR review committee was conducted Spring 2009. The committee provided a set of recommendations to the department that can be summarized in the following 5 recommendations:

Recommendation 1 - It is reasonable to maintain graduate programs in all areas.

Recommendation 2 - Department should establish its outlook and direction.

Recommendation 3 - The Department should devote resources to transportation.

Recommendation 4 - Rename department as Civil, Construction, and Environmental Engineering.

Recommendation 5 - Promote areas of existing or emerging strengths.

Conclusions

The Department largely agrees with the recommendations and observations in the Review Team Report.

The Department needs, at a minimum, an instructor to provide our construction programs sufficient faculty to cover the curriculum and address accreditation issues.

The Department is actively directing research and education efforts toward topics related to sustainable infrastructure, which can be grouped into the construction/transportation, water/environment, and structures/materials areas. These are growth areas that are critical to our future security and standard of living and are well aligned with the University's mission. Achieving a critical mass in sustainable infrastructure would require two additional faculty. The department has selected sustainability as a focal area where many of its subdisciplines integrate their efforts.

The department is initiating a strategic planning effort to reconsider our strategic plans from 2001 and 2005 and refocus our research and educational missions. We believe our planning efforts, coupled with additional resources such as those mentioned above, will continue to strengthen what is already a strong department.

Academic Program Review Action Plan

Instructor needed for Construction program (related to APR Recommendation 1)
Individual responsible - Dean, Provost
Target date for completion - Fall 2010

Strategic planning within Department (related to APR recommendations 2, 3, 4, 5)
Individual responsible - Faculty
Target date for completion - End of Spring 2010

Hire two new faculty in sustainable infrastructure (related to APR recommendations 3 and 5)
Individual responsible - Dean, Provost
Target completion date - not specified

Actions Taken by Department to Address Last Academic Program Review

1- The department has conducted two strategic planning sessions in 2010 and 2014. The current strategic plan is available on the department website. The department plans to conduct its third strategic plan session in Fall 2018. The department

has chosen sustainability as its focus.

2- The department hired a construction lecturer in 2012 who served the program until 2015, then resigned. The department launched a new national search for a construction faculty will hire a new construction faculty in July 2018. Three construction faculty candidates have been interviewed in Spring 2018 and a new hire will be announced very soon.

3- The department collective efforts integrated in the field of sustainable infrastructure has resulted in significant research expenditure growth reaching an annual research expenditure of $5.5M for the last three years.

4- The department also launched a national faculty search in the field of transportation engineering to fill the gap created by the resignation of one faculty in this field. The objective is to devote resources to the field of transportation engineering. The department has just hired Dr. Nick Ferenchak a new PhD graduate from University of Colorado with specialization in unnmanned vehcular technology to join the department as a new transportation faculty.

5- The department has voted for a name change to "Department of Civil, Construction and Environmental Engineering". The change has been approved by the UNM Faculty Senate and is in the queue for approval by the UNM Provost.

6- The department hired a faculty in the field of smart structures and structural health monitoring. The department is also in the process of hiring a new faculty member in the field of autonomous vehicles with a focus on transportation engineering. Finally, the department is about to announce its second endowed chair in the field of "Advanced Construction Materials and Technologies".

Criterion 1 . Student Learning Goals and Outcomes

The unit should have stated student learning goals and outcomes for each degree/certificate program and demonstrate how the goals align with the vision and mission of the unit and university. (Differentiate for each undergraduate and graduate degree and certificate program offered by the unit.)

1A . Vision and Mission

Provide a brief overview of the vision and mission of the unit and how each offered degree/certificate program addresses the vision and mission of the unit.

Mission of the Department of Civil Engineering

The Department of Civil Engineering has the following mission statement, which is published on the Department's website and in the University catalog.

The Department of Civil Engineering at the University of New Mexico provides a high-quality learning environment for its undergraduate and graduate students, and promotes life-long learning for practicing professionals. The Department's focus is on quality instruction in engineering and construction management, innovative research, and community engagement.

The seven degree programs offered by UNM Civil Engineering: BS in Civil, BS in Construction Engineering, BS in Construction Management, MS in Civil Engineering, Master of Engineering (MENG), Master of Construction Management (MCM) and PhD in Engineering fit the department mission of providing high quality learning for all our students and promotes life-long learning for practicintg Engineers. Our BS degree programs enables the department to provide the quality engineering education for community members interested in the civil engineering profession. Our MS and PhD programs allow the department to foster innovative research and to solve challenging engineering problems. Finally, our MEng and MCM degree programs are specifically designed to engange the department in our community by enabling quality learning environments to community professionals in civi engineering, construction engineering and construction management and by offering degree programs that are accessible for working professional where most of the learning can takes place online.

BS Civil Engineering (CE)

The BSCE program educational objectives are as follows:

- Graduates will meet high professional and ethical standards of employers of civil engineers
- Graduates will pursue professional licensure and/or participate in advanced study
- Graduates will pursue leadership positions in their communities and professions

Program educational objectives are available to the public in the following locations:

- Civil Engineering Department website: http://civil.unm.edu/accreditation/index.html
- UNM Catalog: http://catalog.unm.edu/catalogs/2016-2017/colleges/engineering/civil/undergraduate-program.html

BS Construction Engineering (ConE)

The BSConE program educational objectives are as follows:

- Graduates will meet high professional and ethical standards of employers of construction engineers
- Graduates will pursue professional licensure and/or participate in advanced study
- Graduates will pursue leadership positions in their communities and profession

Program educational objectives are available to the public in the following locations:

- Civil Engineering Department website: http://civil.unm.edu/accreditation/index.html
- UNM Catalog: http://catalog.unm.edu/catalogs/2016-2017/colleges/engineering/civil/undergraduate-program.html

BS Construction Management (CM)

The BSCM program educational goals are as follows

- Develop and deliver diverse learning opportunities in construction management at both undergraduate and graduate levels
- Create and deliver quality professional development opportunities for diverse practicing professionals in the construction industry
- Provide a neutral forum within which to carry on discourse about critical issues associated with construction
- Expand and disseminate the knowledge of construction through research
- Maintain and increase faculty excellence

Program educational goals and objective are available to the public in the following locations:

- Civil Engineering Department website: http://civil.unm.edu/common/documents/goals-and-objectives.pdf
- UNM Catalog: http://catalog.unm.edu/catalogs/2016-2017/colleges/engineering/civil/undergraduate-program.html

1B . Relationship between the Unit and University's Vision and Mission

Describe the relationship of the unit's vision and mission to UNM's vision and mission. In other words, to assist the university in better showcasing your unit, please explain the importance of its contribution to the wellbeing of the university, including the impact of the unit's degree/certificate program(s) on relevant disciplines/fields, locally, regionally, nationally, and/or internationally?

Mission Statement of the University

The University will engage students, faculty, and staff in its comprehensive educational, research, and service programs. UNM will provide students the values, habits of mind, knowledge, and skills that they need to be enlightened citizens, to contribute to the state and national economies, and to lead satisfying lives. Faculty, staff, and students create, apply, and disseminate new knowledge and creative works; they provide services that enhance New Mexicans' quality of life and promote economic development; and they advance our understanding of the world, its peoples, and cultures. Building on its educational, research, and creative resources, the University provides services directly to the City and State, including health care, social services, policy studies, commercialization of inventions, and cultural events.

Mission of the Department of Civil Engineering

The Department of Civil Engineering has the following mission statement, which is published on the Department's website and in the University catalog:

The Department of Civil Engineering at the University of New Mexico provides a high-quality learning environment for its undergraduate and graduate students, and promotes life-long learning for practicing professionals. The Department's focus is on quality instruction in engineering and construction management, innovative research, and community engagement.

BS Civil Engineering (CE)

The program educational objectives are consistent with the Mission of the University as illustrated by matching similar concepts between the Mission and the program educational objectives.

University Mission	Program Educational Objectives
Educate and encourage students to develop the values, habits of mind, knowledge, and skills that they need to be enlightened citizens, contribute to the state and national economies, and lead satisfying lives.	Graduates will meet high professional and ethical standards of employers of civil engineers

Discover and disseminate new knowledge and creative endeavors that will enhance the overall well being of society.	Graduates will pursue professional licensure and/or participate in advanced study
Deliver health care of the highest quality to all who depend on us to keep them healthy or restore them to wellness.	Not applicable
Actively support social, cultural, and economic development in our communities to enhance the quality of life for all New Mexicans.	Graduates will pursue leadership positions in their communities and professions

BS Construction Engineering (ConE)

The program educational objectives are consistent with the Mission of the University as illustrated by the arrows matching similar concepts between the Mission and the program educational objectives.

University Mission	**Program Educational Objectives**
Educate and encourage students to develop the values, habits of mind, knowledge, and skills that they need to be enlightened citizens, contribute to the state and national economies, and lead satisfying lives.	Graduates will meet high professional and ethical standards of employers of civil engineers
Discover and disseminate new knowledge and creative endeavors that will enhance the overall well being of society.	Graduates will pursue professional licensure and/or participate in advanced study
Deliver health care of the highest quality to all who depend on us to keep them healthy or restore them to wellness.	Not applicable
Actively support social, cultural, and economic development in our communities to enhance the quality of life for all New Mexicans.	Graduates will pursue leadership positions in their communities and professions

BS Construction Management (CM)

University Mission	**Program Educational Goals**
Educate and encourage students to develop the values, habits of mind, knowledge, and skills that they need to be enlightened citizens, contribute to the state and national economies, and lead satisfying lives.	Develop and deliver diverse learning opportunities in construction engineering and management at both undergraduate and graduate levels
Discover and disseminate new knowledge and creative endeavors that will enhance the overall well being of society.	Provide a neutral forum within which to carry on discourse about critical issues associated with construction
Deliver health care of the highest quality to all who depend on us to keep them healthy or restore them to	Not applicable

wellness.	
Actively support social, cultural, and economic development in our communities to enhance the quality of life for all New Mexicans.	Create and deliver quality professional development opportunities for diverse practicing professionals within the construction industry

1C . Unit Goals and Student Learning Outcomes

List the overall program goals and student learning outcomes for each degree/certificate program within the unit. Include an explanation of how they are current and relevant to the associated discipline/field. In accordance with the Higher Learning Commission's criteria for accreditation, student learning goals and outcomes should be articulated and differentiated for each undergraduate and graduate degree and post-graduate and certificate program.

For all undergraduate programs learning outcomes are assessed through a detailed outcome assessment process conducted by all faculty teaching the different courses. The detailed outcome assessment protocol is based on department long-term accreditation history with ABET and ACCE. In this protocol, courses are selected by Associate Chair for Undergraduate in the start of each semester and courses are selected to assess all the learning outcomes. Following learning outcome assessment, the faculty meets each year to make necessary changes in the undergraduate degree programs in light of learning outcome assessment data. The outcome assessment process is a continuous process that aims at improving learning outcomes and ensuring that our programs are accomplishing their learning outcomes.

BS Civil Engineering (CE)

The student outcomes for the BSCE program are the same as those identified by EAC of ABET and are as follows:

1. An ability to apply knowledge of mathematics, science and engineering.
2. An ability to design and conduct experiments as well as to analyze and interpret data.
3. An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.
4. An ability to function on multi-disciplinary teams.
5. An ability to identify, formulate and solve engineering problems.
6. An understanding of professional and ethical responsibility.
7. An ability to communicate effectively.
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
9. A recognition of the need for and an ability to engage in lifelong learning.
10. A knowledge of contemporary issues.
11. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice

Student outcomes are available to the public in the following location:
Civil Engineering Department website: http://civil.unm.edu/accreditation/index.html

Program Educational Objectives			
	Graduates will meet high professional and ethical standards of employers of civil engineers	Graduates will pursue professional licensure and/or participate in advanced study	Graduates will pursue leadership positions in their communities and professions
Student Outcomes			
1. An ability to apply knowledge of mathematics, science and engineering.	X	X	
2. An ability to design and conduct experiments as well as to analyze and	X	X	

interpret data.			
3. An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.	X	X	X
4. An ability to function on multi-disciplinary teams.	X	X	X
5. An ability to identify, formulate and solve engineering problems.	X	X	
6. An understanding of professional and ethical responsibility.			X
7. An ability to communicate effectively.	X	X	X
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.	X	X	X
9. A recognition of the need for and an ability to engage in lifelong learning.		X	X
10. A knowledge of contemporary issues.	X	X	X
11. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.	X	X	

BS Construction Engineering (ConE)

The student outcomes for the BSConE program are the same as those identified by EAC of ABET and are as follows:

1. An ability to apply knowledge of mathematics, science and engineering.
2. An ability to design and conduct experiments as well as to analyze and interpret data.
3. An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.
4. An ability to function on multi-disciplinary teams.
5. An ability to identify, formulate and solve engineering problems.
6. An understanding of professional and ethical responsibility.
7. An ability to communicate effectively.
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
9. A recognition of the need for and an ability to engage in lifelong learning.

10. A knowledge of contemporary issues.
11. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice

Student outcomes are available to the public in the following location:
Civil Engineering Department website: http://civil.unm.edu/accreditation/index.html

Program Educational Objectives			
	Graduates will meet high professional and ethical standards of employers of civil engineers	Graduates will pursue professional licensure and/or participate in advanced study	Graduates will pursue leadership positions in their communities and professions
Student Outcomes			
1. An ability to apply knowledge of mathematics, science and engineering.	X	X	
2. An ability to design and conduct experiments as well as to analyze and interpret data.	X	X	
3. An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.	X	X	X
4. An ability to function on multi-disciplinary teams.	X	X	X
5. An ability to identify, formulate and solve engineering problems.	X	X	
6. An understanding of professional and ethical responsibility.			X
7. An ability to communicate effectively.	X	X	X
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.	X	X	X
9. A recognition of the need for and an ability to engage in lifelong learning.		X	X
10. A knowledge of contemporary issues.	X	X	X
11. An ability to use the			

techniques, skills and modern engineering tools necessary for engineering practice.	X	X	

BS Construction Management (CM)

The University requires compliance with their Assessment Program which involves periodic reporting and review. The applicable plan, schedule, and most recent report are available at the program website: http://civil.unm.edu. In summary, at the end of each semester, the instructors are required to complete an Outcome Assessment Report. Each course has specific Student Learning Outcomes that relate to the Topical Contents recommended by the ACCE requirements. The Student Learning Outcomes are as follows:

1. An ability to communicate effectively both oral and written.
2. An understanding of the ethical impacts of decisions
3. An ability to apply knowledge of mathematics and sciences to solve construction problems.
4. An understanding of the broad concepts of business management to include accounting, economics, and business law.
5. An ability to interpret basic construction designs for mechanical and electrical systems
6. An understanding of structural properties and the design of construction related systems.
7. An ability to apply knowledge of construction materials, methods and equipment to safely and effectively plan and sequence construction activities and processes
8. Be able to operate computer aided drafting equipment and understand the applicable specifications.
9. An understanding of survey principles and construction site organization.
10. An ability to perform construction material take offs and estimates.
11. An ability to develop construction project planning and scheduling.
12. An understanding of construction accounting and finance principles.
13. An understanding of construction law principles.
14. An ability to develop and implement a site specific construction safety plan
15. An understanding of the roles and techniques to effectively manage a construction project.

Learning Outcomes for Graduate Degrees in Civil Engineering:

For all graduate programs offered by UNM Civil Engineering, all learning outcomes are assessed through the graduation exam at the PhD and MS dissertation/thesis defense. The committee assesses the level to which the student meets the graduate program learning outcomes on a scale of 1 to 5. For MENG and MCM degree programs, students learning outcomes are assesssed in each course students take. Asessemnt is conducted by course instructor. All learning outcome assessment data is provided to the graduate program coordinator and director. The graduate committee meets annually to review learning outcome assessment data and provides a feedback to the department chair and department faculty. Feedback for improvement is made after reviewing the graduate committee recommendation to ensure all graduate programs are meeting their learning objectives.

PhD

1. Knowledge of engineering/science fundamentals appropriate for specialization
2. Depth of knowledge in specialization
3. Ability to independently conduct research
4. Ability to perform critical review of literature in area of specialization
5. Able to communicate effectively

Master of Science

1. Knowledge of engineering/science fundamentals appropriate for specialization
2. Depth of knowledge in specialization
3. Ability to independently conduct research
4. Ability to perform critical review of literature in area of specialization
5. Able to communicate effectively

Master of Engineering

1. Knowledge of engineering/science fundamentals appropriate for discipline
2. Able to communicate effectively

Master of Construction Management

1. Knowledge of management and science fundamentals in construction management
2. Able to communicate effectively
3. Ability to critically assess information in construction management

1D . Constituents and Stakeholders

Describe the unit's primary constituents and stakeholders. Include an explanation of: (1) how the student learning goals and outcomes for each degree/certificate program are communicated to students, constituents, and other stakeholders; and (2) how satisfaction of the student learning goals and outcomes for each degree/certificate program would serve and support students' academic and/or professional aspirations. Provide specific examples.

There are three main stakeholders for the department being the faculty, the industry and alumni. The Civil Engineering Department Advisory Board (CEDAB) as an entity that serves to enable industrial and alumni representatives to provide feedback and get involved in planning of future endeavors of the department. CEDAB meets twice a year and provides advice and feedback to the department chair in all three undergraduate degree programs CE, ConE and CM as well as all graduate degree programs. CEDAB works in very close relation with the department chairman to ensure feedback on department meeting its mission and objectives. CEDAB also helps the department in establishing its connection with the community.

BS Civil Engineering (CE)

Relationship between Program Educational Objectives and Program Constituencies

Program Educational Objective	How PEOs Meet Constituency Needs
Graduates will meet high professional and ethical standards of employers of civil engineers	Faculty: train professional and ethical graduate students for research or project positions Industry: develop professional and ethical employees Alumni: establish high professional and ethical standards to advance in their career
Graduates will pursue professional licensure and/or participate in advanced study	Faculty: develop curriculums for graduates to be interested in advanced study Industry: advises graduates to acquire professional licenses and/or advanced degrees Alumni: pursue professional licenses and/or graduate degrees to be most employable
Graduates will pursue leadership positions in their communities and professions	Faculty: train and encourage graduates to take leadership roles in projects and be leaders in the community Industry: trains and encourages graduates to take leadership roles in projects and be leaders in the community Alumni: pursue leadership skills to be successful in their community and profession

BS Construction Engineering (ConE)

Relationship between Program Educational Objectives and Program Constituencies

Program Educational Objective	How Meets Constituency Needs
Graduates will meet high professional and ethical standards of employers of construction engineers	Faculty: train professional and ethical graduate students for research or project positions Industry: develop professional and ethical employees Alumni: establish high professional and ethical standards to advance in their career
Graduates will pursue professional licensure and/or participate in advanced study	Faculty: develop curriculums for graduates to be interested in advanced study Industry: advises graduates to acquire professional licenses and/or advanced degrees Alumni: pursue professional licenses and/or graduate degrees to be most employable
Graduates will pursue leadership positions in their communities and professions	Faculty: train and encourage graduates to take leadership roles in projects and be leaders in the community Industry: trains and encourages graduates to take leadership roles in projects and be leaders in the community Alumni: pursue leadership skills to be successful in their community and profession

BS Construction Management (CM)

CEDAB members were given an opportunity to review the CM mission, vision, learning objectives and curriculum in its meetings in 2016 and 2017. CEDAB members have enhanced student learning opportunities by participating as guest speakers in various Construction Management classes. Several CEDAB members participated in an industry luncheon arranged for candidates for the construction management position. Don Kawal also represented CEDA as a very active member in the department effort for fund raising to improve facilities and in particular computer facilities to enable teaching advanced construction courses. CEDAB members have been solicited several times for internship opportunities for CM students and have responded very positively to those solicitations.

1E . Primary Constituents and Stakeholders

Describe the unit's primary constituents and stakeholders.

The Department of Civil Engineering constituencies include faculty, industry, and alumni. The primary avenue for interacting with industry and alumni constituents is through the Civil Engineering Department Advisory Board (CEDAB). This board supports all programs in the department. The current members of the advisory board include the following:

- Deanna Archuleta, Archuleta and Associates
- Thomas Baca, Retied, Sandia National Laboratories
- Sandra Begay-Campbell, Sandia National Laboratories (UNM Alum)
- Brian Burnett, Chair of CEDAB, Bohannan Huston (UNM Alum)
- Robert Crossno, New Mexico Department of Transportation (UNM Alum)
- John D'Antonio, U.S. Army Corps of Engineers (UNM Alum)
- Alandren Etlantus, Bohannan Huston (UNM Alum)
- John Garcia, Home Builders Association of Central New Mexico (UNM Alum)
- James Gianelli, Retired, RMCI, Inc.

- Don Kawal, Retired, Klinger Constructors Inc.
- Larry Larranga, New Mexico Legislature
- Bill Lemon, Brycon
- Gerald (Jerry) May, Professor Emeritus, University of New Mexico
- Vicki Mora, AGC New Mexico
- David Ruff, Central New Mexico Community College
- John Stomp, Albuquerque Bernalillo County Water Utility Authority (UNM Alum)
- Benny Shendo, New Mexico Legislature
- Scott Verhines, Occam Engineers, Inc.
- Ken Wylie, AMEC Foster Wheeler

While it is difficult to provide the role for each CEDAB member, the above list of CEDAB membership reflects the breadth of the advisory board and their connection to all subdisciplines of civil engineering and the community in New Mexico at large. CEDAB members work in very close relationship with the department chair to provide feedback on learning outcomes, support department initiatives and help the department to create an innovative and conducive learning environment, to stay competitive and capable to attract top quality faculty and students and to meet community expectations.

1F . Student Learning Goals and Outcomes Strategic Planning

Discuss how the unit's strategic planning efforts have evolved in relation to student learning goals and outcomes of its degree/certificate program(s), serving its constituents and stakeholders, and contributing to the wellbeing of the university and UNM community. Include an overview of the unit's strategic planning efforts going forward. For example, discuss the strengths and challenges of the unit, including the steps it has taken to maximize its strengths and address both internal and external challenges.

The Department of Civil Engineering at the University of New Mexico has a long history of excellence in teaching, research and service that has improved the lives of New Mexicans and those beyond our borders. Our graduates create the infrastructure that enables communities of every size to thrive. The infrastructure built and maintained by civil engineers, construction engineers, and construction managers supplies clean drinking water while protecting water resources, creates a reliable and safe transportation system and delivers the energy that lights our homes and powers our economy. While much has been accomplished with the help of civil engineers, construction engineers, and construction managers there are many existing and emerging challenges. The Department of Civil Engineering at UNM has developed its strategic plan to ensure that the department and its graduates remain well positioned to meet society's demand for safe, reliable and sustainable infrastructure in a rapidly changing world.

The department strategic plan was developed in 2016 and covers the time period of 2016-2020. The department strategic plan can be found in the Appendix of this document, and on the department website at:

http://civil.unm.edu/accreditation/strategic-plan-jan-2018.pdf

Our planned meeting for strategic planning will be in Spring 2019.

Criterion 2 . Teaching and Learning: Curriculum

The unit should demonstrate the relevance and impact of the curriculum associated with each degree/certificate program. (Differentiate for each undergraduate and graduate degree and certificate program offered by the unit.)

2A . Curricula

Provide a detailed description of the curricula for each degree/certificate program within the unit. (1) Include a description of the general education component required and program-specific components for both the undergraduate and graduate programs. (2) If applicable, provide a justification as to why any bachelor's degree program within the unit requires over 120 credit hours for completion.

BS Civil Engineering (CE)

The program provides 32 credits (26% of total credits) of combined mathematics and basic science. The courses included in this calculation are the following:

Subject Area Requirements

Course Number and Name	Credits
CHEM 121 General Chemistry I	3
CHEM 123L General Chemistry I Laboratory	1
PHYC 160 General Physics	3
PHYC 161 General Physics	3
BIOL 110 Biology Non-Majors or EPS 101 How the Earth Works – An Intro to Geology	3
MATH 162 Calculus I	4
MATH 163 Calculus II	4
MATH 264 Calculus III	4
MATH 316 Applied Ordinary Differential Equations	3
CS 151L Computer Programming Fundamentals for Non-Majors	1
STAT 345 Elements of Mathematical Statistics and Probability Theory	3
Total	**32**
	(26%)

The program provides 64 credits (52% of total credits) of combined engineering topics. The courses included in this calculation are the following:

Course Number and Name	Credits
CE 160L Civil Engineering Design	2
CE 202 Engineering Statics	3
CS 151L Computer Programming Fundamentals for Non-Majors	2
CE 283 Surveying and Geomatics	3
ENG 301 Fundamentals of Engineering: Dynamics	1

ENG 302 Fundamentals of Engineering: Electronic Circuits	1
ENG 303 Fundamentals of Engineering: Thermodynamics	1
CE 302 Mechanics of Materials	3
CE 305 Infrastructure Material Science	4
CE 308 Structural Analysis	3
CE 331 Fluid Mechanics	4
CE 335 Environmental and Water Resources Engineering	3
CE 350 Engineering Economy	3
CE 360 Soil Mechanics	4
CE 372 Principles of Construction	3
CE 382 Transportation Engineering	3
Breadth Requirement Elective	3
Breadth Requirement Elective	3
Breadth Requirement Elective	3
Breadth Requirement Elective	3
Depth Requirement Elective	3
Depth Requirement Elective	3
CE 499 Design of Civil Engineering Systems 3	
Total	**64**
	(52%)

The program provides a general education component that is consistent with the University's Core Course requirement and that complements the technical content of the curriculum. The general education component provides students with fundamentals in math and science, which are critical to completing the technical content of the curriculum. The general education component also provides students with the breadth necessary to allow them to better attain the program education objectives relating to high professional standards and leadership in the community. The University Core consists of the following components:

Subject	**Credits**
Writing and Speaking	9
Mathematics	one course
Physical and Natural Sciences	two courses plus one lab
Social and Behavioral Sciences	6
Humanities	6
Foreign Language	3
Fine Arts	3

Major Design Experience

All students in the program are required to take CE 499L (Design of Civil Engineering Systems, 3 credits). The course

provides a culminating capstone design experience for students in their last semester in the program. In this course, teams of three to six students work on comprehensive, creative design of a real-life civil engineering project. The course requires both written reports and oral presentations. Each student team is guided by a mentor from a local consulting company or government agency. The projects are real-world projects selected by the faculty in conjunction with the mentor. The projects always incorporate design elements from numerous fields of civil engineering. For example, a typical bridge design project can involve structures, geotechnical, construction, transportation, and hydrology. The course is restricted to students who are in the final semester of their program.

Starting in 2007, this course has been offered at the same time as CE 497L (Design Construction Integration, a required course for B.S. Construction Management students) which has added an interdisciplinary aspect to each project team by integrating both design and construction elements. By offering both CE 499L and CE 497L at the same time, students can work on interdisciplinary teams made up of civil engineering, construction engineering and construction management students who work collaboratively on a design-build project. The BSCE students are expected to design the project elements while working with the students in Construction Engineering and Construction Management to incorporate appropriate standards and real-life constraints.

There are three main deliverables for the capstone design course. The first deliverable is a Statement of Qualifications and associated presentation by each project team. The second deliverable is an alternatives design and presentation of alternatives. During the alternatives design process, each team is required to identify appropriate standards and project constraints that were considered during the design. The final deliverable is a design-build proposal containing both design documents and construction costs.

Curriculum

Course **(Department, Number, Title)** **List all courses in the program by term starting with the first term of the first year and ending with the last term of the final year.**	**Indicate Whether Course is Required, Elective or a Selected Elective by an R, an E or an SE.[1]**	***Subject Area (Credit Hours)***				**Last Two Terms the Course was Offered:** **Semester (Fall or Spring) and Year**	**Maximum Section Enrollment for the Last Two Terms the Course was Offered [2]**
		Math & Basic Sciences	**Engineering Topics** **Check if Contains Significant Design (√)**	**General Education**	**Other**		
First Year-First Semester							
CE 160L Civil Engineering Design	**R**		**2**		**1**	**F15, S16**	**F15: 72** **S16: 41**
CHEM 121 General Chemistry I (1)	**R**	**3**				**F15, S16**	**180**
CHEM 123L General Chemistry I Laboratory (1)	**R**	**1**				**F15, S16**	**24**
ENGL 110 Accelerated Composition (or ENGL112 or ENGL113) (1)	**R**			**3**		**F15, S16**	**25**

MATH 162 Calculus I (1)	**R**	**4**				**F15, S16**	**32**
First Year- Second Semester							
BIOL 110 Biology Non-Majors or EPS 101 How the Earth Works – An Intro to Geology	**SE**	**3**				**F15, S16**	**196 (BIO) 126 (EPS)**
CS 151L Computer Programming Fundamentals for Non-Majors	**R**	**1**			**2**	**F15, S16**	**200 (lect) 20 (lab)**
ENGL 120 Composition III (1)	**R**			**3**		**F15, S16**	**23**
MATH 163 Calculus II	**R**	**4**				**F15, S16**	**34**
PHYC 160 General Physics (1)	**R**	**3**				**F15, S16**	**300**
Second Year- First Semester							
CE 202 Engineering Statics	**R**		**3**			**F15, S16**	**F15: 87 S16: 52**
CE 283 Surveying and Geomatics	**R**		**3**			**F15, S16**	**F15: 23 S16: 31**
ECON 105 Intro Macroeconomics (1) or ECON 106 Intro Microeconomics (1)	**SE**			**3**		**F15, S16**	**64 (E105) 175 (E106)**
MATH 264 Calculus III	**R**	**4**				**F15, S16**	**33**
PHYC 161 General Physics	**R**	**3**				**F15, S16**	**20**
Second Year- Second Semester							
ENG 301 Fundamentals of Engineering: Dynamics	**R**		**1**			**S16 (new)**	**S16: 102**
ENG 302 Fundamentals of Engineering: Electronic Circuits	**R**		**1**			**S16 (new)**	**S16: 121**

ENG 303 Fundamentals of Engineering: Thermodynamics	**R**		**1**			**S16 (new)**	**S16: 50**
ENGL 219 Technical and Professional Writing (1)	**R**			**3**		**F15, S16**	**25**
MATH 316 Applied Ordinary Differential Equations	**R**	**3**				**F15, S16**	**44**
STAT 345 Elements of Mathematical Statistics and Probability Theory	**R**	**3**				**F15, S16**	**40**
Core Humanities Elective(1)	**SE**			**3**			
Third Year- First Semester							
CE 302 Mechanics of Materials	**R**		**3**			**F15, S16**	**F15: 95** **S16: 58**
CE 305 Infrastructure Material Science	**R**		**4 (√)**			**F14, F15**	**F14: 50** **F15: 52**
CE 331 Fluid Mechanics	**R**		**4 (√)**			**F14, F15**	**F14: 41** **F15: 46**
CE 372 Principles of Construction	**R**		**3**			**F14, F15**	**F14: 52** **F15: 37**
CE 382 Transportation Engineering	**R**		**3 (√)**			**F14, F15**	**F14: 42** **F15: 39**
Third Year- Second Semester							
CE 308 Structural Analysis	**R**		**3 (√)**			**S15, S16**	**S15: 37** **S16: 39**
CE 335 Environmental and Water Resources Engineering	**R**		**3 (√)**			**S15, S16**	**S15: 36** **S16: 46**
CE 350 Engineering Economy	**R**		**3**			**F15, S16**	**F15: 23** **S16: 52**
CE 360 Soil Mechanics	**R**		**4**			**S15, S16**	**S15: 36** **S16: 43**
Open Elective (1)	**SE**			**3**		**F15,**	

Core Fine Arts Elective (1)	**SE**			**3**		**F15, S16**	
Fourth Year- First Semester							
Breadth Requirement Elective (3)(5)	**SE**		**3 (√)**			**F15, S16**	
Breadth Requirement Elective (3)(5)	**SE**		**3 (√)**			**F15, S16**	
Breadth Requirement Elective (3)(5)	**SE**		**3 (√)**			**F15, S16**	
Core Second Language Elective (1)	**SE**			**3**		**F15, S16**	
Core Humanities Elective (1)	**SE**			**3**		**F15, S16**	
Fourth Year- Second Semester							
CE 499 Design of Civil Engineering Systems	**R**		**3 (√)**			**F15, S16**	**F15: 11** **S16: 26**
Breadth Requirement Elective (3)(5)	**SE**		**3 (√)**			**F15, S16**	
Depth Requirement Elective (4)(5)	**SE**		**3 (√)**			**F15, S16**	
Depth Requirement Elective (4)(5)	**SE**		**3 (√)**			**F15, S16**	
Core Social and Behavioral Sciences Elective (1)	**SE**			**3**		**F15, S16**	

Notes:

(1) Specific Core Curriculum requirements.

(2) Students must take the Fundamentals of Engineering exam prior to graduation.

(3) Breadth Requirement Elective: Students must take one elective in four of the possible six sub-disciplines: Construction, Environmental, Geotech, Structures, Transportation, or Water Resources.

(4) Depth Requirement Elective: Students must take two additional electives in an area of concentration within any of the sub-disciplines in which they took Breadth Requirement Electives. Electives must be at least a 400-level Civil Engineering course.

(5) See advisor for a list of approved Breadth and Depth Requirement Electives.

TOTALS-ABET BASIC-LEVEL REQUIREMENTS		**32**	**64**	**27**	**1**		

OVERALL TOTAL CREDIT HOURS FOR COMPLETION OF THE PROGRAM	**124**						
PERCENT OF TOTAL		**26%**	**52%**	**22%**	**0%**		
Total must satisfy either credit hours or percentage	**Minimum Semester Credit Hours**	**32 Hours**	**48 Hours**				
	Minimum Percentage	**25%**	**37.5 %**				

BS Construction Engineering (ConE)

Subject Area Requirements

The program provides 32 credits (26% of total credits) of combined mathematics and basic science. The courses included in this calculation are the following:

Course Number and Name	**Credits**
CHEM 121 General Chemistry I	3
CHEM 123L General Chemistry I Laboratory	1
PHYC 160 General Physics	3
PHYC 161 General Physics	3
BIOL 110 Biology Non-Majors or EPS 101 How the Earth Works – An Intro to Geology	3
MATH 162 Calculus I	4
MATH 163 Calculus II	4
MATH 264 Calculus III	4
MATH 316 Applied Ordinary Differential Equations	3
CS 151L Computer Programming Fundamentals for Non-Majors	1
STAT 345 Elements of Mathematical Statistics and Probability Theory	3
Total	**32**
	(26%)

The program provides 61 credits (49% of total credits) of combined engineering topics. The courses included in this calculation are the following:

Course Number and Name	**Credits**
CE 160L Civil Engineering Design	2

CE 202 Engineering Statics	3
CS 151L Computer Programming Fundamentals for Non-Majors	2
CE 283 Surveying and Geomatics	3
ENG 301 Fundamentals of Engineering: Dynamics	1
ENG 302 Fundamentals of Engineering: Electronic Circuits	1
ENG 303 Fundamentals of Engineering: Thermodynamics	1
CE 302 Mechanics of Materials	3
CE 305 Infrastructure Material Science	4
CE 308 Structural Analysis	3
CE 331 Fluid Mechanics	4
CE 350 Engineering Economy	3
CE 360 Soil Mechanics	4
CE 370 Construction Methods and Equipment	3
CE 376 Cost Estimating	3
CE 377 Construction Scheduling	3
CE 473 Construction Law	3
CE 475 Construction Safety	3
CE 477 Project Controls	3
Technical Electives	6
CE 499 Design of Civil Engineering Systems	3
Total	**61**
	(49%)

The program provides a general education component that is consistent with the University's Core Course requirement and that complements the technical content of the curriculum. The general education component provides students with fundamentals in math and science, which are critical to completing the technical content of the curriculum. The general education component also provides students with the breadth necessary to allow them to better attain the program education objectives relating to high professional standards and leadership in the community. The University Core consists of the following components:

Subject	**Credits**
Writing and Speaking	9
Mathematics	one course
Physical and Natural Sciences	two courses plus one lab
Social and Behavioral Sciences	6
Humanities	6
Foreign Language	3
Fine Arts	3

Major Design Experience

All students in the program are required to take CE 499L (Design of Civil Engineering Systems, 3 credits). The course provides a culminating capstone design experience for both construction engineering students and civil engineering students in their last semester in the program. In this course, teams of three to six students work on comprehensive, creative design of a real-life civil and construction engineering project. The course requires both written reports and oral presentations. Each student team is guided by a mentor from local industry. The projects are real-world projects selected by the faculty in conjunction with the mentor. The projects always incorporate design elements from numerous fields of civil engineering along with design of the construction process. For example, a typical bridge design project can involve structures, geotechnical, construction, transportation, and hydrology. The course is restricted to students who are in the final semester of their program.

Starting in 2007, this course has been offered at the same time as CE 497L (Design Construction Integration, a required course for B.S. Construction Management students) which has added an interdisciplinary aspect to each project team by integrating both design and construction elements. By offering both CE 499L and CE 497L at the same time, students can work on interdisciplinary teams made up of civil engineering, construction engineering and construction management students who work collaboratively on a design-build project. The BSConE students are expected to design the construction process and work with civil engineering students on other elements of design. All students work together to incorporate appropriate standards and real-life constraints.

There are three main deliverables for the capstone design course. The first deliverable is a Statement of Qualifications and associated presentation by each project team. The second deliverable is an alternatives analysis and presentation of alternatives. During the alternatives analysis, each team is required to identify appropriate standards and project constraints that were considered during the analysis. The final deliverable is a design-build proposal containing both design documents and construction costs.

BS Construction Management (CM)

General Education

Course No.	Course Title or Elective Requirements	Credit Hours
Engl 101	Comp I: Exposition	3
Engl 102	Comp II: Analysis & Argumentation	3
CJ 130	Public Speaking	3
Engl 219	Technical Writing	3
	Core Humanities Electives [a]	6
	Core Fine Arts Elective [a]	3
	Core Soc/Behav Science Elective [a]	3
	Core Second Language Elective [a]	3
CE 409	Engineering Ethics	1

Mathematics and Science

Course No.	Course Title or Elective Requirements	Credit Hours

Math 121	College Algebra	3
Math 123	Trigonometry	3
Math 180	Elements of Calculus I	3
Chem 121	General Chemistry	3
Chem 123L	General Chemistry Lab	1
Physics 151	General Physics	3
E&PS 101	Intro to Geology	3
CS 150L	Computing for Business Students	3
Stat 145	Introduction to Statistics	3

Business and Management

Course No.	**Course Title or Elective Requirements**	**Credit Hours**
Econ 105 or 106	Macroeconomics or Microeconomics	3
Mgt 202	Principals of Fin. Accounting	3
Mgt 300	Operations Management	3
Mgt 303	Managerial Accounting	3
Mgt 310	Legal Issues	3
Mgt Elective	Management Electives [b]	3

Construction Science

Course No.	**Course Title or Elective Requirements**	**Credit Hours**
CE 130	Construction Detailing	3
CE 160L	Civil Engineering Design	3
CE 171	Construction Materials & Techniques	3
CE 279	Mechanical & Electrical Systems	3
CE 283L	Surveying & Geomatics	3
CE 305	Infrastructure Materials Science Lab	4
CE 370	Construction Methods & Equipment	3
CE 371	Structures for Construction	3
CE 478	Design of Temporary Structures	3

Construction

Course No.	Course Title or Elective Requirements	Credit Hours
CE 376	Cost Estimating	3
CE 377	Construction Scheduling	3
CE 455	Engineering Project Management	3
CE 473	Construction Law	3
CE 474	Principles of Written Const. Doc.	3
CE 475	Construction Safety	3
CE 477	Project Controls	3
CE 495	Construction Internship	1
CE 497L	Design/Construction Integration	3

Other Requirements

Course No.	Course Title or Elective Requirements	Credit Hours
CE 350	Engineering Economy	3
Const. El	Construction Elective[b]	3

2B . Contributions to other Units

Discuss the significance of the unit's contributions to and/or collaboration with other internal units within UNM, such as offering general education core courses for undergraduate students, common courses for selected graduate programs, courses that fulfill pre-requisites of other programs, courses that are electives in other programs, cross-listed courses, etc.

A number of courses for students at UNM Civil Engineering are taught by faculty from different units across campus. Example courses taught by other units to our students is listed below. Our faculty significantly contribute to other courses taught in Earth and Planetary Sciences (EPS) specifically in the field of water resources, hydrology and geomechanics. Example campus wide class taught by CE faculty is the GIS course taught by Professor Julie Coonrod to a wide variety of students across campus including graduate students from EPS, Geography and other engineering programs. Moreover, our faculty members co-teach undergraduate and graduate courses on meachanics with UNM Mechanical Engineering. Such courses including statics, mechanics of materials, finite element analysis and fracture mechanics. Those classes usually have large student participation from mechanical and nuclear engineering. Some of those courses are pre-requiste courses in mechanical and nuclear engineering programs. Finally, our faculty members co-teach some elective graduate courses with electrical and computer engineering including system optimization, uncertainty quantification and fuzzy logic with engineering application.

Supporting DIsciplines

Course No.	Course Title	Other Discipline Using Course
CE 130	Construction Detailing	CNM CM Associates Degree

CE 171	Construction Materials & Techniques	CNM CM Associates Degree
CE 279	Mechanical & Electrical Systems	CNM CM Associates Degree
Chem 121	General Chemistry I	All campus
Chem 123L	General Chemistry I Lab	All campus
Phyc 151	General Physics	All campus
EPS 101	Introduction to Geology	All campus
Engl 101	Composition I: Exposition	All campus
Engl 102	Composition II: Analysis and Arg.	All campus
Engl 219	Technical Writing	Management Students
CJ 130	Public Speaking	All campus
CS 150	Computing for Business Students	All campus
Math 121	College Algebra	All campus
Math 123	Trigonometry	All campus
Math 180	Elements of Calculus 1	Management Students
Stat 145	Introduction to Statistics	All campus
Econ 106	Micro Economics	All campus
Mgmt 202	Principals of Financial Accounting	Management Students
Mgmt 300	Operations Management	Management Students
Mgmt 303	Managerial Accounting	Management Students
Mgmt 310	Legal Issues for Managers	Management Students

2C . Course Delivery Modes

Discuss the efficiency and necessity of the unit's mode(s) of delivery for teaching courses.

The primary delivery mode used by the program is traditional lecture/laboratory sessions offered Monday through Friday during the day. In some cases, students may choose to take elective courses that are offered during the evening or through distance education. Two years ago, the department has launched its new online program on Master of Construction Management. This program is offered 100% online with all its courses available on 8-week modules over the entire year including summer. The program enrollment has significantly grown. The department faculty are investigating the possible offering of the Master of Engineering (MENG) degree program to be 100% online.

2D . Teaching and Learning: Curriculum Strategic Planning

Discuss the unit's strategic planning efforts going forward for identifying, changing and/or examining areas for improvement in its curricula.

The department has long implemented a teaching peer review system to ensure peer evaluations of the current mode of education delivery. In this system, each faculty is peer reviewed by a peer faculty member from the department or another

department in UNM SOE or another school. The reviewer provides a written report following a specific form available to the faculty. A copy of that review is submitted to the faculty person and the department Chair. The peer review process is conducted each semester (twice a year). The department chair follows up with faculty on comments related to those peer reviews. Moreover, online student evaluations is a system implemented by UNM and is used by all faculty members. The department Chair follows those teaching evaluations and discusses them with faculty member during the annual performance review. Junior faculty members are usually supported by the department to receive training in teaching and education through courses offered by UNM Education Centers and by national societies including ASCE and ASEE.

The faculty has been making incremental changes to the department's curriculum for undergraduate and graduate students. While these changes have helped streamline and modernize the curriculum, improving student success and ensuring that the department's students have the right skills for tomorrow's challenges remain a priority. Achieving these goals brings with it at least two benefits beyond our graduates own success and their contributions to society. Higher achieving graduates will contribute to increasing the department's visibility and a more innovative curriculum may help grow enrollment and increase diversity. Accomplishing the following objectives is expected to move the department toward its goal of continuing to develop an innovative curriculum.

Please refer to Goal 3 and its sub-objectives in the department strategic plan

http://civil.unm.edu/accreditation/strategic-plan-jan-2018.pdf

Goal 3: Continue to Develop an Innovative Curriculum that Creates Engineers and Construction Managers Who Will Change New Mexico and the World

Objective 3A: Improve communication skills.

Strong communication skills, in particular written communication, are essential for student success. The faculty believe that student's communication skills should be improved.

Action Items	***Responsibility***	***Time Frame***
Investigate ways to better integrate core communications courses with each of our degree curricula. For example, align technical writing courses with civil engineering technical electives.	Undergraduate Committee	AY 2016- 2017
Investigate what communication skills students are currently taught in UNM core courses and reinforce these skills in courses offered by the department. For example, hold written work products to the same standards as in core English and communications courses.	Undergraduate Committee	AY 2016- 2017
Enhance curriculum so that communications skills are reinforced throughout the degree program. For example, ensure that there is a writing intensive (or presentation intensive) course each semester in a typical student's schedule. Ensure that written work products and presentations in these courses are rigorously evaluated and detailed feedback are provided to students.		
• Investigate resources required to accomplish this including:	Undergraduate Committee	AY 2016- 2018

o Hiring additional TA's with experience in technical writing instruction to evaluate and provide feedback on writing assignments. o Faculty course release so that additional effort can be placed on developing writing and communication intensive components to existing courses, provide detailed feedback and evaluation, and monitor progress in communication skills.		
Investigate methods to track communications skills. The FE exams provide a great metric for disciplinary core knowledge but we currently have nothing similar for communications skills.	Undergraduate Committee	AY 2016- 2018

Objective 3B: Training engineers and construction managers to be leaders.

Our students can contribute to society not only through professional engineering or construction work but through leadership. Leadership may include engaging in public policy formation, holding public office, creating innovative new technologies and start-up companies, and running a successful business.

Action Items	***Responsibility***	***Time Frame***
Investigate if there are models to follow from other programs at UNM or elsewhere.	Strategic Planning Committee	AY 2016- 2017
Develop a course that can be part of UNM's Innovation Academy.	Undergraduate Committee	AY 2016- 2018
Develop or list courses for inclusion in UNM's Honors College curriculum.	Undergraduate Committee	AY2015-2017
Incorporate service learning opportunities into existing courses.	Interested Faculty	AY 2015- 2020

Continuing Activities

- Maintain and promote student involvement in professional associations and their on-campus student chapters

Objective 3C: Measure student success.

The faculty rely mainly on the outcome of the Fundamentals of Engineering (FE) exam to track engineering student success. However, the FE exam does not fully capture important outcomes, such as student's communication skills, success in fulfilling professional goals (e.g., employment as an engineer or success in graduate school) and the impact they may have on society after they graduate. Furthermore, the results of the FE exam which takes place during a student's final year at UNM are difficult to trace back to specific interventions made by the faculty in prior years. The department should develop performance metrics and collect data that allow the faculty to judge the success or specific interventions, programs or the curriculum as a whole.

Action Items	Responsibility	Time Frame
Improve tracking and reporting of FE exam results to the faculty. For example, provide UNM civil engineering student FE exam results over time by subject area, along with comparable national data, in an easy to access location and format.	Undergraduate Committee	AY 2015- 2020
Track the success of construction management students using the results of the AIC exam.	Undergraduate Committee	AY 2015- 2020
Investigate ideas to measure communication skills.	Strategic Planning Committee	AY 2016- 2018
Investigate ideas to track what students do after they graduate.		
Ensure that plans to change the curriculum include plans to measure expected outcomes.	All Faculty	AY 2015- 2020
Present performance metrics regularly, for example at beginning of academic year department retreats.	Undergraduate & Graduate Committee	AY 2015- 2020

Criterion 3 . Teaching and Learning: Continuous Improvement

The unit should demonstrate that it assesses student learning and uses assessment to make program improvements. In this section, the unit should reference and provide evidence of the program's assessment plan(s) and annual program assessment records/reports. (Differentiate for each undergraduate and graduate degree/certificate program and concentration offered by the unit.)

3A . Overview of Assessment Process

Describe the assessment process and evaluation of the student learning outcomes for each degree/certificate program by addressing the items below. • Describe the overall skills, knowledge, and values are expected of all students at the completion of the program (refer to the program learning goals outlined in Criterion 1)? • Explain how the current direct and indirect assessment methods are established and administered as program-level assessments including how they are used to measure each student learning outcomes. Also, provide a description of the courses in which the assessment methods are administered and the extent to which students are expected to meet each student learning outcomes. • Explain and provide evidence of how the program has progressively improved, evolved and/or maintained the quality and effectiveness of its assessment structure and activities in order to reflect, sustain and/or maximize student learning (i.e., updated assessment plans, annual assessment reports, assessment maturity scores, etc.)

Undergraduate Programs Assessment Process

The department assesses student outcomes on an annual basis for the CE, ConE, and CM programs. The assessments cover the student learning outcomes identified by our accrediting agency – ABET. Each of the outcomes are assessed in 1-2 courses each academic year by the faculty who are teaching that course. Assessment assignments are agreed upon by the Department Faculty at the start of the fall semester. The faculty assess student attainment of the outcomes based on student work in the class (student work can include homework problems, exam questions, lab assignments, or in-class activities). The results of the assessment are written up in an assessment report by the faculty member and forwarded to the Department Undergraduate Director. On an annual basis, the Undergraduate Director summarizes the assessment data for all student outcomes for each of the undergraduate degrees. The annual assessment report is first reviewed by the Department Undergraduate Committee, then the Department Faculty, and finally the Department Advisory Board. Ultimately, the assessment results are submitted to the School of Engineering in the *SoE Annual Program Assessment Report for Civil Engineering* for each of the undergraduate programs.

BS Civil Engineering (CE) and BS Construction Engineering (ConE)

1. An ability to apply knowledge of mathematics, science and engineering.
2. An ability to design and conduct experiments as well as to analyze and interpret data.
3. An ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.
4. An ability to function on multi-disciplinary teams.
5. An ability to identify, formulate and solve engineering problems.
6. An understanding of professional and ethical responsibility.
7. An ability to communicate effectively.
8. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
9. A recognition of the need for and an ability to engage in lifelong learning.
10. A knowledge of contemporary issues.
11. An ability to use the techniques, skills and modern engineering tools necessary for engineering practice

Student outcomes are available to the public in the following location:

- Civil Engineering Department website: http://civil.unm.edu/accreditation/2016-feb-bsce-program-assessment-plan.pdf

Construction Management (CM)

1. Technical Competence - Apply methods to successfully and safely manage construction projects.
    1. Reading and understanding construction documents.
    2. Using construction documents to develop construction estimates & schedule
    3. Using schedule, estimates and construction documents to safely control projects

2. Leadership - Demonstrate the ability to lead through motivating others and applying appropriate technical skills to solve construction management problems.
    1. Breadth of technical skills to communicate across boundaries
    2. Team working
    3. Develop action plans to work with project constraints
3. Innovation - Develop skills in critical thinking and innovation, recognizing the need for continuously learning new skills and competencies.
    1. Utilize online or library resources
    2. Critically assess current technical documents
    3. Develop ability to apply technology to solve construction problems
4. Communication - Employ effective communication skills to deal respectfully and ethically with all people.
    1. Effective at Oral Communications
    2. Effective in Written Communications
    3. Effective at Internet-based Communications

Graduate Programs Assessment Process

Assessment data is collected in two different ways, depending on the program. For graduate degree programs that have exit exams, a rubric is completed by the exam committee at the conclusion of the exam. This approach is applicable to the MS and PhD degrees at the conclusion of the thesis and dissertation defenses, respectively. The rubrics for these degrees are the same for all of the School of Engineering MS and PhD degrees. For degree programs that do not have exit exams (MCM and MEng), we use a different approach. In this case, we collect data for each MEng and MCM student for each course they are enrolled in. The data is in the form of a rubric that is similar to that used for the MS and PhD assessments that are completed by the course instructor.

The assessment data for all programs are collected and reviewed by the graduate committee once per year. For each assessment measure in the rubric, the average score is compared to a criterion for acceptability. Recommendations for changes and improvements are made. The committee review is subsequently presented to the faculty for discussion and a vote of approval of the assessment. After faculty approval, a School of Engineering Annual Program of Assessment of Student Learning Outcomes form is completed and submitted to the SOE.

MS

Student Learning Outcome		**Assessment Measures incl. Measure Type (Direct or Indirect)***	**Performance Benchmark**	**Results**	**Analysis**	**Recommendations for Improvement/ Changes***
Exhibit knowledge of engineering/science fundamentals appropriate for discipline and specialization.		**The exit exam rubric for the SOE. Direct.**	**Score of 1to 4, with 3 being "Acceptable".**	**Results from 6 students had a range of 3 to 4, with an average of 3.6.**	**Score indicates this SLO is being achieved.**	**No recommendations.**
Be able to communicate effectively in oral and/or written form.		**The exit exam rubric for the SOE. Direct.**	**Score of 1to 4, with 3 being "Acceptable".**	**Results from 6 students had a range of 3 to 4, with an average of 3.6.**	**Score indicates this SLO is being achieved.**	**No recommendations.**
Demonstrate the ability to critically assess information in		**The exit exam rubric for the SOE.**	**Score of 1to 4, with 3 being**	**Results from 6 students had a range of 3 to**	**Score indicates this SLO is being**	**No recommendations.**

information in the discipline and/or specialization.		Direct.	"Acceptable".	4, with an average of 3.5.	SLO is being achieved.	

MCM

Student Learning Outcome		Assessment Measures incl. Measure Type (Direct or Indirect)*	Performance Benchmark	Results	Analysis	Recommendations for Improvement/ Changes*
Exhibit knowledge of management and engineering fundamentals in construction management.		Rubric at conclusion of each course for each student in program. Direct.	Score of 1to 4, with 3 being "Acceptable".	Results from 9 evaluations had a range of 3 to 4, with an average of 3.1.	Score indicates this SLO is being achieved.	No recommendations.
Be able to communicate effectively in oral and/or written form.		Rubric at conclusion of each course for each student in program. Direct.	Score of 1to 4, with 3 being "Acceptable".	Results from 9 evaluations had a range of 3 to 4, with an average of 3.5.	Score indicates this SLO is being achieved.	No recommendations.
Demonstrate the ability to critically assess information in construction management.		Rubric at conclusion of each course for each student in program. Direct.	Score of 1to 4, with 3 being "Acceptable".	Results from 9 evaluations had a range of 2 to 4, with an average of 3.4.	Score indicates this SLO is being achieved.	No recommendations.

MENG

Student Learning Outcome		Assessment Measures incl. Measure Type (Direct or Indirect)*	Performance Benchmark	Results	Analysis	Recommendations for Improvement/ Changes*
Exhibit knowledge of engineering/science fundamentals appropriate for discipline		Rubric at conclusion of each course for each student in program.	Score of 1to 4, with 3 being "Acceptable".	Results from 6 evaluations had a range of 2 to 4, with an average of 3.	Score indicates this SLO is being achieved.	No recommendations.

and specialization.		Direct.				
Be able to communicate effectively in oral and/or written form.		Rubric at conclusion of each course for each student in program. Direct.	Score of 1to 4, with 3 being “Acceptable”.	Results from 6 evaluations had a range of 2 to 4, with an average of 3.2.	Score indicates this SLO is being achieved.	No recommendations.

PhD

Student Learning Outcome		Assessment Measures incl. Measure Type (Direct or Indirect)*	Performance Benchmark	Results	Analysis	Recommendations for Improvement/ Changes*
Exhibit knowledge of engineering/science fundamentals appropriate for discipline and specialization.		The exit exam rubric for the SOE. Direct.	Score of 1to 4, with 3 being “Acceptable”.	Results from 6 students had a range of 3 to 4, with an average of 3.6.	Score indicates this SLO was achieved by all students.	No recommendations.
Be able to communicate effectively in oral and/or written form.		The exit exam rubric for the SOE. Direct.	Score of 1to 4, with 3 being “Acceptable”.	Results from 6 students had a range of 3 to 4, with an average of 3.6.	Score indicates this SLO was achieved by all students.	No recommendations.
Demonstrate the ability to critically assess information in the discipline and/or specialization.		The exit exam rubric for the SOE. Direct.	Score of 1to 4, with 3 being “Acceptable”.	Results from 6 students had a range of 3.4 to 4, with an average of 3.6.	Score indicates this SLO was achieved by all students.	No recommendations.
Depth of knowledge in specialization.		The exit exam rubric for the SOE. Direct.	Score of 1to 4, with 3 being “Acceptable”.	Results from 6 students had a range of 3 to 4, with an average of 3.65.	Score indicates this SLO was achieved by all students.	No recommendations.
Ability to independently conduct research.		The exit exam rubric for the SOE. Direct.	Score of 1to 4, with 3 being “Acceptable”.	Results from 6 students had a range of 3 to 4, with an average of 3.6.	Score indicates this SLO was achieved by all students.	No recommendations.

3B . Impact Assessment Process on Unit

Synthesize the impact of the annual assessment activities for each degree/certificate program by addressing the items below. • How have the results of each of the aforementioned program-level assessment methods been used to support and inform quality teaching and learning? • How have the results/data from the program's assessment methods and/or activities been used for program improvement and/or to maximize student learning? • Overall, how does the program utilizes it assessment structure to engage in a coherent process of continuous curricular and program improvement? Include an explanation of how the program strategically monitor the short- and/or long-term effects and/or impact of it changes.

The department faculty members have been consistently involved in the process of assessment and improving the curriculum for all the department degree programs through the outcome assessment process. First, the faculty meet in both the undergraduate and graduate committees and discuss the outcome assessments that is collected from the different tools each semester. The undergraduate and graduate committees then issued a set of recommendations/items to communicate to the entire department. The Associate Chair for Graduate Studies and The Associate Chair for Undergraduate are given time in each department monthly meeting to discuss issues of those two committees. Once a semester each associate chair will share with the department faculty the outcome assessment and the comments and recommendations by the undergraduate and the graduate committees. The department faculty will then suggest a set of improvements/changes to the curriculum in each degree program based on observations from the outcome assessment. The decision is then voted for and implemented and follow up on the decision implementation is conducted by the Associate Chair of Undergraduate and Associate Chair for Graduate through their bi-weekly meeting with the Department Chair. Furthermore, the Associate Chairs and the Department Chair share the outcome assessments as well as the recommended actions. Feedback from discussion with CEDAB members is documented and communicated back to the department faculty members by the Department Chair. Actions taken and changes are typically confirmed or revised based on feedback from CEDAB. The above procedure applies to all degree programs produced by the department. Finally, for the graduate program, the completed assessment rubrics are forwarded to the graduate committee in the department for review and recommendations to the department faculty. The rubrics are also forwarded to the Associate Dean for Academic Affairs who reviews these with the SoE Academic Council periodically.

The student outcomes are closely related to the program educational objectives. Attainment of the student outcomes is necessary for graduates to be able to attain the program educational objectives. Table 3B-1 shows where each of the student outcomes contributes to the success of our graduates in attaining the program educational objectives.

Table 3B-1. Relationship of Student Outcomes to Program Educational Objectives

Program Educational Objectives **Student Outcomes**	**Graduates will meet high professional and ethical standards of employers of civil engineers**	**Graduates will pursue professional licensure and/or participate in advanced study**	**Graduates will pursue leadership positions in their communities and professions**
a) An ability to apply knowledge of mathematics, science and engineering.	**X**	**X**	
b) An ability to design and conduct experiments as well as to analyze and interpret data.	**X**	**X**	
c) An ability to design a			

system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.	**X**	**X**	**X**
d) An ability to function on multi-disciplinary teams.	**X**	**X**	**X**
e) An ability to identify, formulate and solve engineering problems.	**X**	**X**	
f) An understanding of professional and ethical responsibility.			**X**
g) An ability to communicate effectively.	**X**	**X**	**X**
h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.	**X**	**X**	**X**
i) A recognition of the need for and an ability to engage in lifelong learning.		**X**	**X**
j) A knowledge of contemporary issues.	**X**	**X**	**X**
k) An ability to use the techniques, skills and modern engineering tools necessary for engineering practice.	**X**	**X**	

Criterion 4 . Students (Undergraduate and Graduate)

The unit should have appropriate structures in place to recruit, retain, and graduate students. (If applicable, differentiate for each undergraduate and graduate degree and certificate program offered by the unit.)

4A . Student Recruitment and Admissions

Discuss the unit's admission and recruitment processes (including transfer articulation(s)) and evaluate the impact of these processes on enrollment.

Undergraduate Programs

Enrollment and Recruitment

The department has been suffering of declining enrollment for its undergraduate programs for the last two years. Neverthless, the department graduate programs have observed significant increase over the past few years. To address the problem with declining enrollment, the department and the School of Engineering launched a major recruitment effort lead by Engineering Student Success(ESS) center. The effort started in Fall 2017 and we anticipate a significant improvement in undergraduate enrollment to be observed starting Fall 2018.

BS Civil Engineering (CE) and BS Construction Engineering (ConE)

Admission

For first-time college students seeking to major in School of Engineering undergraduate programs there are two stages to the admissions process. Admission to engineering pre-major status is handled by the UNM Admissions office. When students apply to UNM, they choose a proposed major. If they choose engineering as a major, they are placed into one of seven pre-major categories: pre-chemical engineering, pre-civil engineering, etc.

Admission to the BSCE program occurs when students have successfully completed the technical courses required for admission consideration. Admission requirements to the BSCE program are as follows:

- Completion of at least 26 credit hours toward the degree and good standing in the university
- An overall GPA of at least 2.5
- Completion of at least the 19-25 credit hours of technical courses required in the first year curricula (for course list, please see http://civil.unm.edu/admissions/undergraduate-admissions/bs-civil-application-jan-2016.pdf)
- A GPA of at least 2.75 and grades of C- or better in each of those 19-25 hours of technical courses
- Completion of English 110 (Note: prior to 2014 this was ENGL 101)

The admissions application form for the BSCE program can be found on the Department website (http://civil.unm.edu/admissions/undergraduate-admissions/index.html).

Transfer Students and Transfer Courses

Approximately one-third of students graduating from School of Engineering Bachelor's degree programs began their college careers at other institutions, many from 2-year colleges within New Mexico. Transfer students apply through the Office of Admissions and are considered for admission to the BSCE program under the same conditions outlined in Section 1.A "Student Admissions." Students applying for admission to the University with at least 24 transferrable credits must have at least a "C" average (2.0 on a 4.0 scale) in all transferrable college work attempted. Students applying for admission to the University with fewer than 24 transferrable credit hours must meet both transfer and freshmen admission requirements. Transfer students applying to UNM who indicate an interest in majoring in a School of Engineering program are automatically placed into the School of Engineering by UNM Admissions and are placed into pre-major status. Transfer students who have sufficient credits to apply to the degree program are evaluated by the department advising staff, and when ready, are admitted to the program. Students who do not have sufficient credits to apply, stay in pre-major status and are advised by the staff in their intended major until they are admitted to the degree program.

In order to facilitate the transfer of credit, UNM Admissions maintains a database of courses from other institutions and their UNM equivalent. For courses in this database, Admissions processes the equivalency automatically to a student's transcript and degree audit. The equivalency table includes courses from all higher education institutions in New Mexico and also includes courses from numerous out-of-state institutions. Courses that are not in this database are evaluated for

equivalency by the department at UNM that offers similar courses. For example, the civil engineering department at UNM evaluates the equivalency of civil engineering courses from other universities; the math department evaluates math courses, etc. Once equivalency of a particular course from another institution is established, the course is placed in the UNM Admissions equivalency database so subsequent students transferring from that institution will not need to have their courses evaluated, but rather the transfer will be automatic.

The state of New Mexico has a general education transfer module that must be accepted by all higher-ed institutions in the state. This includes 1st and 2nd year courses in five areas: communications, mathematics, laboratory science, social/behavioral science, and humanities/fine arts. Generally, these courses substitute for courses in the UNM core curriculum, and depending on the course, can substitute for required courses in engineering curricula. In addition, UNM maintains articulation agreements with institutions both within New Mexico, and in other states in order to facilitate student transfer.

BS Construction Management (CM)

Every student who wishes to pursue a degree offered in the Civil Engineering (CE) Department must be formally admitted to the department. Admission to the Bachelor of Science program in Construction Management (BSCM) requires that the applicant complete the following list of 7 technical courses with a GPA of at least 2.50 and a grade of C- or better in each course.

- Math 180 Elements of Calculus I 3 hours
- Physics 151 General Physics 3 hours
- Chemistry 121-123L 4 hours
- E&PS 101 3 hours
- Computer Science 150 Computing for Business Students 3 hours
- CE 160L (Civil Engineering Design) 3 hours

As discussed in the University Catalog, students may apply to the Civil Engineering Department after they have completed 26 hours of credit acceptable toward a degree in the School of Engineering. Of these 26 hours of credit, at least 18 must be in the courses required in the first year curricula, excluding English, humanities, social and behavioral sciences, fine arts and foreign languages. These students must have a GPA of 2.5, and a grade of C- or better in each course. Any courses required for the School of Engineering curriculum cannot have been attempted more than three times. Students with slightly lower records of academic performance are occasionally admitted on probationary status. All of these conditions are applicable to students applying to the construction management program. Early admission may be granted to exceptional students who achieve a GPA in excess of 3.5 in 5 of the 7 courses listed above. In certain cases (e.g., when a student demonstrates good performance in sophomore-level technical courses), they may be admitted to the department on probation if their GPA for these 7 courses falls below 2.50.

Graduate Programs (MS, MENG, MCM and PhD)

Recruitment

The graduate programs in the UNM Civil Engineering department have grown significantly. Current enrollment is +120 students with +50 PhD students. Significant growth in research funding has resulted in significant growth in our graduate programs.

Recruitment of graduate students is conducted in a number of ways. With respect to our own undergraduates, faculty very often approach students to explain the benefits of a graduate degree and perhaps encourage them to get involved with their research team as an undergraduate student. Further, the shared credit program in the department is another means by which many undergraduates in our programs become aware of the graduate programs. Recruitment of potential graduate students outside of the department can be from students contacting faculty (typically by email) or by recommendations from faculty from other institutions. For MCM students, the university has some advertising and promotion through Online Programs. Motivated by a desire to make the department better known and accessible to potential students, a major revision of the department's web site was undertaken in 2012-2013. The information on the site was reorganized in a more logical manner, and much information that had not been available before on the web was added. Students can now access all the necessary information pertaining to admission including entrance requirements, prerequisites, test scores, documents required, deadlines, and possible funding opportunities.

Three additional efforts toward recruitment can be identified. First, faculty are making a more concerted effort to entice our promising undergraduates into our graduate programs. They do so by identifying strong undergraduates in their classes, then providing mentorship and discussing opportunities at the graduate level. The School of Engineering has formalized a 4+1 program allowing high-achieving undergraduates with a GPA of 3.5 and above to enroll in graduate programs and transfer up to 12 credits. This allows students to finish their master's degree in one year after obtaining the BS degree. This allowed the department to keep its most talented students in its master's programs. Second, for the last 6 years, the department offers a limited number of graduate assistantships to highly qualified applicants if funding from individual faculty members is not available. During their first semester at UNM, the students are expected to identify a funded research program from which to continue their support. Third, the faculty are encouraging students who need funding to apply well before the university application deadlines. This permits identifying and committing funding to the better students earlier in the process in the hope of their acceptance of an offer. In the past, the department may have lost students because it offered them funding too late in the process, after they had already been offered funding and accepted admission from other institutions.

In 2018, the School of Engineering began a coordinated graduate recruitment event. Selected potential graduate students are included in a program of on campus events over the course of two days. These students can be out-of-town or local students.

Admission

All graduate students apply through the university's application system. Once university reviews their applications, they forward the applications to the department. The graduate director and academic advisor screen the applications based on the department's requirements. For applicants interested in MCM and MEng degree programs, the decision to admit is based on meeting the department requirements. For applicants interested in MS and PhD degrees, after a preliminary screening of the admission packages by the academic advisor and graduate director, the admission packages are then sent to faculty in the area of interest to the student. Faculty are given the opportunity to evaluate the student, and provide feedback as to whether they are interested in supporting the student as part of their research program and/or advising the student. If there is no interest in advising the student from any faculty, the student is not accepted into the program.

4B . Enrollment Trends, Persistence, and Graduation Trends

Provide an analysis of the unit's enrollment, persistence/retention, and graduation trends, including an explanation of the action steps or initiatives the unit has taken to address any significant challenges or issues highlighted in these trends.

Enrollment and graduation trends

The enrollment and graduation data of UNM civil engineering undergraduate and graduate programs in the last 10 years is provided in the appendix in Tables and charts format. There is an obvious increase in graduate programs enrollment while the undergraduate programs enrollment is slightly declining. The graduaation trends stayed constant over the years. Part of the declining undergraduate enrollment is related to demographics of New Mexico and declining population in the state. The focus of population in the Albuquerque/Santa Fe corrodior also does not help the department with the tendency of freshmen to join out of town schools. The department of civil engineering has made recently significant initiatives for all faculty involvement in outreach activity. The department has joined the school of engineering in its recent efforts to improve enrollment. Department faculty outreach is now counted as part of service activity. The graduate program has been improving but loss of faculty lines affected that in the last two years. The department research expenditure growth and hiring of two new faculty shall help the department to maintain strong graduate program in the near future. The undergraduate and graduate graduation trends stayed steady over the past 10 years.

4C . Advisement Process

Discuss the unit's advisement process for students, including an explanation of how the unit has attempted to improve or address issues regarding its advising practices (i.e. refer to the outcomes established by the Office of University Advisement, the unit's advising maturity scores—which can be obtained from the unit's designated academic advising, etc.).

BS Civil Engineering (CE) and BS Construction Engineering (ConE)

The School of Engineering requires students in all undergraduate programs to meet with an advisor in both the fall and spring semesters. To enforce this policy, all students have an advisement hold placed on their account so that they are not allowed to register for the following semester until they meet with an advisor. Prior to the summer of 2016, School of Engineering students were split into two categories for advising purposes: pre-majors and admitted majors. All School of Engineering programs require students to complete a set of introductory level courses with a specified GPA in order to be admitted to the program. Students not yet admitted to their program are classified as pre-majors and prior to summer 2016 were advised by professional advising staff in Engineering Student Services. Once admitted to the degree program, students were advised by professional advising staff and faculty in each department.

During the 2015-16 academic year, the Provost's office reorganized undergraduate advising throughout the university. Beginning in the summer of 2016, the School of Engineering reorganized its advising process to more fully align with the UNM advising structure. Both pre-major students and students admitted to the major are now advised by professional advisors and faculty within their intended department. This provides student access to discipline-specific advisors immediately upon arrival at UNM and gives students a sense of belonging to their major from the beginning of their academic career.

In the Department of Civil Engineering, students admitted to the BSConE program are advised by faculty members, and pre-major students are advised by the Department Advisement Coordinator.

The standard advising period runs for two weeks near the end of the current semester. Prior to the advising period, the Director of Undergraduate Programs and the Advisement Coordinator for the Department arrange a meeting of all faculty advisors in the Department. The purpose of this meeting is to discuss any issues that all advisors should be aware of so that students receive consistent information. In addition, the Department has developed an Academic Advising Sheet that is filled out between the student and the faculty advisor. Both the student and advisor receive copies of this sheet for future reference.

BS Construction Management (CM)

All SOE Students must complete curriculum advisement (in person) every semester with an academic advisor. In the Academic Advisement sessions, students:

- Receive help with course selection based on their intended degree program and schedule balancing; and, apply to their respective department once the required courses are completed or in progress.
- Get a thorough explanation of curriculum sheets, selecting electives, choosing a major, obtaining tutoring, etc.
- Obtain answers to general questions on academic policies
- Receive information on the UNM engineering and computer science departments, student groups and professional organizations
- Have their "Advisement Hold" removed that was placed on their registration during the 12th week of each semester. This hold must be lifted by their advisor before classes are added or dropped.
- Work with the advisor to discuss the student's current courses and grades and deal with any issues that arise during the semester.
- Offer any assistance with potential failing grades through ESS' tutoring program or the university's CAPS program.

  Students in pre-major status are advised by professional advising staff housed in ESS. Students may also choose to be advised by staff in their intended degree program while in pre-major status. Once a student is admitted into one of the degree programs in SOE, he/she is advised by staff in the departments

- Once admitted to the Department, every undergraduate student is **required** to participate in academic advisement provided by the Department in November/December for the upcoming Spring Semester and in April/May for the Summer Term and the Fall Semester. The SOE imposes a registration **Hold** that will not be lifted by the Department's program advisement coordinator until a student has been advised, as evidenced by a two-part advisement form signed and dated by both the student and the advisor, indicating courses taken in the current semester, courses planned for the upcoming semester, and in many cases, courses that should be taken in the following semester. One

copy of the advisement form is retained by the student and the other is used as a receipt to remove the hold and is placed in the student's file.

During the advisement periods, advisors have the student's academic file, which has admission information records, transfer/AP/CLEP credit, and all courses taken at UNM. The file also contains the curriculum sheet that tracks a student's completion of the B.S. program. The Department's senior advisor initially prepares this sheet for each entering student and the program advisement coordinator updates each student's spreadsheet at the conclusion of the Fall and Spring Semesters, and at the end of the Summer Term.

Each undergraduate student who has been admitted to the Department of Civil Engineering is assigned to a faculty advisor or to the Coordinator of Program Advisement. Students who are pursuing the degree program in Construction Management are assigned to one of the construction faculty or to the Coordinator of Program Advisement. Prior to registering for courses for the subsequent semester, students are required to meet with their advisor who reviews their academic file (see previous page) and recommends a set of courses. While the Construction Management program has several required courses, there are opportunities for the student to select elective courses in other areas. The advisor works with the students to assure that the program will be acceptable.

Students use the University on-line registration system to register for classes. To assure that students in the School of Engineering have sought advisement prior to registration, the system puts a "Hold" on the file. Once the student has been advised, the Department's Coordinator of Program Advisement removes the hold.

Graduate Students

Graduate students are assigned advisors when they join the department. For MS and PhD students, advisors are usually the faculty that are supporting the students on their research team. For MCM and MEng students, the graduate director serves as the advisor unless a student has another faculty serve as their advisor. At a minimum, advisors are responsible for providing guidance on courses, and must approve Program of Studies forms (Master's) and Application for Candidacy forms (PhD).

4D . Student Support Services

Discuss any student support services that are provided by the unit and evaluate the relevancy and impact of these services on students' academic success.

The department's web site contains several sections relevant to student support services. For the undergraduates, current information is available about the Fundamentals of Engineering Exam and the American Institute of Constructors Exam. A list of organizations and competitions allows students to seek involvement in student activities. The officers of the organizations are also available so students may contact them. A web page that lists internships, part-time jobs, and student research opportunities is maintained and updated. Under our employment section, current position openings are listed for students to consider professional positions either during their degree program or when they graduate.

Career guidance is provided through several channels. During the semester advising meeting, advisors ask students to report the technical experience they are receiving through internships, co-ops, or research with a faculty member. This information can be used by advisors to discuss future career opportunities. In addition, all students are required to take the freshman-level course – CE160 – that provides information on different career opportunities for students in our three undergraduate degree programs. Other career guidance is provided to students through the student chapters of ASCE and ACG. These student chapters regularly host talks and site visits to local engineering and construction companies. Lastly, the Engineering Student Services Department works closely with several organizations and departments to ensure that students are prepared to interview for internships and full-time careers in their field of study. Students have opportunities to network through several student organizations by participating in a variety of career fairs. In addition, students are encouraged to sign up with UNM Career Services for Lobo Career Connection.

4E . Student Success and Retention Initiatives

Discuss the success of graduates of the program by addressing the following questions (1) Where graduates are typically placed in the workforce? (2) Are placements consistent with the program's learning goals? (3) What methods are used to measure the success of graduates? (4) What are the results of these measures?

Undergraduate Students

The faculty rely mainly on the outcome of the Fundamentals of Engineering (FE) exam to track engineering student success. However, the FE exam does not fully capture important outcomes, such as student's communication skills, success in fulfilling professional goals (e.g., employment as an engineer or success in graduate school) and the impact they may have on society after they graduate. Furthermore, the results of the FE exam, which takes place during a student's final year at UNM, are difficult to trace back to specific interventions made by the faculty in prior years. The department should develop performance metrics and collect data that allow the faculty to judge the success or specific interventions, programs or the curriculum as a whole.

Almost all undergraduate students in the program are hired during their junior year as interns and then continue their employment with this employer. No specific tools are used to measure the success of graduates except the feedback from the employers including members of the Civil Engineering Department Advisory Board (CEDAB) who employs many of the department graduates from the different degree programs. Most of the feedback indicators show that the placements are consistent with the program's goals. Some of the key employers include the construction firms in New Mexico, consulting firms and the Department of Energy national laboratories specifically Sandia National Laboratories and the Air Force Research Laboratory (AFRL). Some placement data are provided below for the BS in Construction Management.

Type of Employer	No. Graduates
Construction related employment	1
Construction or construction management firm	8
Material or equipment supplier	
Owner (utility, R.R., etc.)	
Design or development	
Other	
Continuing education	1 graduate student – staying at UNM
Other	
Non-construction employment	
Seeking employment	3
No information	2
Total	

Comments: There were 15 students who graduated with the BS in Construction Management for Fall 2013, Spring 2014, and Summer 2014.

Graduate Students

Graduate students success is measured through the outcome assessment process described before. Through this process a focus is placed on a specific set of rubrics related to the level of knowledge student gained and his/her ability to communicate effectively and to conduct research independently (for MS/PhD). The rubrics for these degrees are the same for all of the School of Engineering MS and PhD degrees. Similar rubrics are assessed by course instructors for the MENG and MCM degree programs.

4F . Student Strategic Planning

Discuss the unit's strategic planning efforts going forward to improve, strengthen and/or sustain its structures, processes, and/or rates for recruiting, retaining, and graduating students.

Recruitment of graduate students:

The graduate programs in the UNM Civil Engineering department have grown significantly. Curent enrollment is +120 students with +50 PhD students. Significant growth in research funding has resulted in significant growth in our graduate programs.

The quality and quantity of graduate students are recognized as important factors in the success of the graduate program.

Motivated by a desire to make the department better known and accessible to potential students, a major revision of the department's web site was undertaken in 2013-2014. The information on the site was reorganized in a more logical manner, and much information that had not been available before on the web was added. Students can now access all the necessary information pertaining to admission including entrance requirements, prerequisites, test scores, documents required, deadlines, and possible funding opportunities.

Three additional efforts toward recruitment can be identified. First, faculty are making a more concerted effort to entice our promising undergraduates into our graduate programs. They do so by identifying strong undergraduates in their classes, then providing mentorship and discussing opportunities at the graduate leveL The School of Engineering has formalized a 4+1 program allowing high-achieving undergraduates with a GPA of 3.5 and above to enroll in graduate programs and transfer up to 12 credits. This allows students to finish their master's degree in one year after obtaining the BS degree. This allowed the department to keep its most talented students in its master's programs. Second, for the last 6 years, the department offers a limited number of graduate assistantships to highly qualified applicants if funding from individual faculty members is not available. During their first semester at UNM, the students are expected to identify a funded research program from which to continue their support. Third, the faculty are encouraging students who need funding to apply well before the university application deadlines. This permits identifying and committing funding to the better students earlier in the process in the hope of their acceptance of an offer. In the past, the department may have lost students because it offered them funding too late in the process, after they had already been offered funding and accepted admission from other institutions.

Criterion 5 . Faculty

The faculty (i.e., continuing, temporary, and affiliated) associated with any of the unit's degree/certificate program(s) should have appropriate qualifications and credentials. The faculty should be of sufficient number to cover the curricular requirements of each degree/certificate program. Also, the faculty should be able to demonstrate sufficient participation in relevant research and service activities. (If applicable, differentiate for each undergraduate and graduate degree and certificate program offered by the unit.)

5A . Faculty Composition and Credentials

After completing the Faculty Credentials Template discuss the composition of the faculty and their credentials. Include an overall analysis of the percent of time devoted by each faculty to the relevant degree/certificate program(s) and his/her roles and responsibilities.

As of the end of the 2017-2018 academic year, there are seventeen full-time faculty in the Department. Of the faculty, eleven are tenured (ten professors and one associate professor), six are tenure-track assistant professors, and one lecturer (lecturer is the official UNM rank; these faculty are listed as non-tenure track instructors). All of the tenured or tenure-track faculty have a Ph.D., one lecturer has a masters degree. Thirteen of the faculty are licensed Professional Engineers. Please see "Faculty Credentials Template" in Appendix.

The teaching and research interests of the faculty cover a broad range of engineering: construction (3 faculty), environmental (3 faculty), geotechnical (3 faculty), structural (4 faculty), transportation (1 faculty), and water resources (3 faculty). This distribution is sufficient to cover all curricular areas of the program. The department is in the process of hiring two faculty: a tenure track faculty member in the field of Transportation and a lecturer in the field of construction management. The Department also uses four regular adjunct faculty members to teach mostly construction-related courses (the same faculty have taught these courses for several years) and one-time adjuncts when necessary to cover additional courses (mostly necessary when faculty are on sabbatical or are released from teaching a course for research purposes).

The School of Engineering has established guidelines for balancing teaching and research for full-time faculty. Faculty whose academic activities are centered on teaching (e.g., lecturers) have a base teaching load of 6 classes per year. Faculty, whose academic activities include both teaching and research, have a base teaching load of 4 classes per year. Faculty may reduce their teaching load by supervising a large number of graduate students or by having significant administrative duties. Faculty members supervising more than 6 full time graduate students will have a reduced teaching load of 3 classes per year. Faculty may further reduce their teaching load by using research funding to buy out of a course. Faculty who wish to reduce their teaching load below 1 course per year must have the approval of the Department Chair and SOE Dean. Finally, faculty with significant administrative duties (e.g. Department Chair, Center Director, etc.) will have a teaching load of 2 courses per year.

5B . Faculty Course-Load

Explain the process that is utilized to determine and assign faculty course-load. Discuss the efficiency of this process (i.e., how does the unit determine faculty assignment to lower division vs. upper division courses). Include an analysis of faculty-to-student ratio and faculty-to-course ratio (based on the total number of credit hours taught).

The School of Engineering has established guidelines for balancing teaching and research for full-time faculty. Faculty whose academic activities are centered on teaching (e.g., lecturers) have a base teaching load of 6 classes per year. Faculty whose academic activities include both teaching and research have a base teaching load of 4 classes per year. Faculty may reduce their teaching load by supervising a large number of graduate students or by having significant administrative duties. Faculty members supervising more than 6 full time graduate students will have a reduced teaching load of 3 classes per year. Faculty may further reduce their teaching load by using research funding to buy out of a course. Faculty who wish to reduce their teaching load below 1 course per year must have approval of the Department Chair. Finally, faculty with significant administrative duties (e.g. Department Chair, Center Director, etc.) will have a teaching load of 2 courses per year. Along with the above, the Department Chair considers special requests from faculty for a temporary reduced teaching load (1 less course than the load) for developing a new special course or when taking a significant service load (e.g. recruitment activities). This is done on case-by-case basis. The following table provides information on student-faculty ratio for undergraduate and graudate programs.

	2013	2014	2015	2016	2017
UG only	**7.4**	**7.5**	**7.1**	**16.6**	**16.0**
UG + Grad	**12.4**	**12.9**	**12.9**	**22.9**	**22.7**

It is important to note that the significant increase in student/faculty ratio starting in 2016 is attributed to the fact that there were many Civil Engineering students who were housed in University College and who didn't count in our numbers. Starting in 2016, Civil Engineering (and all departments at the school of engineering) owned all of the freshman including those who were formerly in UC and so all SOE programs experienced an increase in UG numbers. For Civil, the numbers jumped up by about 150.

5C . Faculty Professional Development

Discuss and provide evidence of the professional development activities for faculty within the unit including how these activities particularly have been used to sustain research-related activities, quality teaching, and support students learning and professional development at the undergraduate and graduate level.

Detailed descriptions of professional development activities for each faculty member are included in the resumes, web links see 5F, and in Table 5C-1 below. In addition, the Department has a formal mentoring process for junior faculty to assist with their professional development. The formal mentoring process is based on two sources for mentoring junior faculty –senior faculty members and the department chair.

Senior faculty mentoring of junior faculty

Each junior faculty is assigned to a senior faculty as his/her mentor. The selection is made after mutual discussion with both sides. The mentor is to provide overall career mentoring to the junior faculty and not only advise on technical aspects. The mentor and mentored are supposed to meet a few times during the semester. At least one formal meeting is expected to take place. In this formal meeting, the mentor is supposed to discuss with the junior faculty his/her prior accomplishments and progress as well as short and long-term objectives and plans. A short report is then written by the mentor to discuss the above specifics. This report shall be signed by both the mentor and the mentored faculty. This report/letter is directed to the Department Chair who might discuss some of the details of it with the mentor or the junior faculty member. This report is not used for evaluation, tenure or promotion purposes. It is merely used for mentoring purposes. The process is repeated each semester. The mentor and mentored faculty are encouraged to meet on a monthly/regular basis for informal lunch or so to continue the dialogue.

Department Chair mentoring of junior faculty

In addition to the above, the department chair plans to meet with each junior faculty individually for lunch once a year for discussing progress and plans as part of the mentoring effort. In some occasions, where further follow up is required, another meeting might be arranged. The Department Chair plans to meet with a sub-group or all of junior faculty members for discussing, encouraging or celebrating a submission of group proposal or individual proposals by a group of junior faculty or to discuss issues pertaining to this specific cohort (e.g. concerns of a group of junior faculty, new teaching experiment, office space or PhD student hiring). The Department Chair will organize along with one or two other senior faculty member(s) brown bag lunches with junior faculty to discuss topics of interest (e.g. preparation for CAREER proposal, using interactive teaching methods, etc.). The Department Chair will ensure that all junior faculty are provided with the opportunity to participate in effective teaching workshops or groups organized by UNM, ASCE and ASEE before their mid-tenure review.

Table 5C-1. Faculty Professional Development Activities

Faculty Member	Professional Development Activities
Bogus Halter, Susan	Jan 2017 : TRB Annual Meeting, Washington DC May 2017: Canadian Society of Civil Engineering Annual Meeting, Vancouver, BC April 2016: Construction Research Congress, San Juan, PR

	Summer 2016: UNM course on designing and teaching online courses Jan 2018: TRB Annual Meeting, Washington, DC
Cerrato, Jose	Nov. 2016: Co-organizer for the Faculty Development Institute for the Society of Hispanic Engineers National Meeting, Seattle, WA. Nov. 2017: Co-organizer for the Faculty Development Institute for the Society of Hispanic Engineers National Meeting, Kansas City, MO. Mar. 2018: Co-organizing a symposium (together with Drs. Zimeng Wang from Louisiana State University, Yandi Hu from the University of Houston, and Teng Zeng from Syracuse University for the ACS 2018 Spring Meeting, New Orleans, LO.
Coonrod, Julie	Council of Graduate Schools annual meeting and workshops Regular attendance at professional conferences (approximately two per year) Teaching evaluations by students Teaching evaluations by peers
Gerstle, Walter	2016–2017: President, New Mexico Society for Professional Engineers 2017- 2018: Past-President, New Mexico Society for Professional Engineers 2017-2021: President, UNM 21 Club June, 2017: Conference Organizer, Annual Conference of New Mexico Society for Professional Engineers November, 2017: Ethics Speaker, New Mexico Society for Professional Engineers Issues Conference 2017- 2020: Governor-Appointed Member, New Mexico Board of Licensure for Professional Engineers and Professional Surveyors January 2018: Invited Speaker, US Association for Computational Mechanics, Thematic Conference on Nonlocal Methods in Fracture
Gonzales-Pinzon, Ricardo	June 2018: Will attend and present at the Association for the Sciences of Limnology and Oceanography Meeting, Vancouver, Canada April 2018: Will attend and present at the European Geoscience Union Meeting, Vienna, Austria Dec 2017: Convened a session, attended and presented at the American Geophysical Union Meeting, New Orleans, LA Sept 2017: Invited speaker at the 2nd International Water Conference, Armenia, Colombia

	March 2017: Attended and presented at the Association for the Sciences of Limnology and Oceanography Meeting, Honolulu, HI
Gonzalez, Michael A.	Apr 2017: Attended and presented 11th BIM Academic Symposium, Boston, MA Jan 2017: Attended IBS Annual Trade Show & Competition, Orlando, FL Sept 2016: Co-Chaired 3rd Annual UNM-BIM Summit, Albuquerque, NM Apr 2016: Attended and presented 10th BIM Academic Symposium, Orlando, FL Feb 2016: Attended AGC Annual Meeting & Competition, Reno, NV Jan 2016: Attended IBS Annual Trade Show & Competition, Las Vegas, NV
Howe, Kerry	March 2018: Presenting at the 255th ACS National Meeting, New Orleans, LA. March 2018: Presenting at AWWA/AMTA Membrane Technology Conference, West Palm Beach, FL. January, 2018: Attending the NFS INCLUDES Summit, Washington, DC. June 2017: Presented at the Association of Environmental Engineering and Science Professors Conference, Ann Arbor, MI. June, 2017: Attended the AWWA Annual Conference and Exposition, Philadelphia, PA. March-May, 2017: Sabbatical at University of British Columbia, Vancouver, BC, Canada. January-March, 2017: Sabbatical at RMIT University, Melbourne, Australia.
Moreu, Fernando	April 2018: structural performance monitoring of railroad infrastructure: an stakeholder point of view, ASCE-SEI Annual Congress, Fort Worth, Texas, August 2017: Innovation in displacement measurement: 3rd Huixian International Forum on Earthquake Engineering for Young Researchers. Champaign, Illinois July 2017: 7th International Conference on Experimental Vibration Analysis for Civil Engineering Structures, San Diego, University of San Diego, California.
	August 2017: Attended and Presented (invited speaker) at the 7th International Conference on Discrete Element Method, August 1-4, Dalian, China.

Ng, Tang-Tat Percy	July 2016: Attended and Presented (invited speaker) at the 3rd National Conference on Computational Mechanics of Granular Materials, CMGM May 2016: Attended and Presented at the Engineering Mechanics Institute Conference 2016, Vanderbilt University, Nashville, TN
Ross, Timothy J.	2015: Presenter - Bamboo Seminar, ASCE meeting, Albuquerque, NM Jun 2014: Presenter - Bamboo Seminar, Rio de Janeiro, Brazil
Rowangould, Gregory	Jan 2017: Presenter and ADC20 Paper Review Co-Chair - TRB Annual Meeting, Washington, DC Jan 2017: Presenter – Paving and Transportation Conference, Albuquerque, NM Aug 2017: Invited Speaker – “Smart Cities – Governing Accessibility, Air Pollution and Equity” workshop, University of Sao Paulo, Brazil Oct 2017: Attended and also a Member of the Scientific Committee Member – 2017 International Cycling Safety Conference, University of California, Davis, CA Nov 2017: Invited Speaker – Driving School Association of the America’s Annual Meeting, Albuquerque, NM Jan 2018: Presenter and ADC20 Research Subcommittee Vice Chair - TRB Annual Meeting, Washington, DC Jan 2018: Presenter – Paving and Transportation Conference, Albuquerque, NM Feb 2018: Presenter – American Association for the Advancement of Science (AAAS) Annual Meeting, Austin, TX
Schuler, Andrew	March 2017: Presenter – NSF CREST PI Meeting, Washington, D.C. April 2017: Attendee – New Mexico Water Workshop, Albqueruqe, NM. April 2017: Participant – Roundtable discussion with Senator Martin Heinrich on NSF funding at UNM. April 2017: Participant – New Mexico EPSCoR All-Hands Meeting, Albquerque, NM June 2017: Presenter – Water Environment Federation Nutrient Symposium, Ft Lauderdale, Fl August 2017: Steering committee, Water Environment Federation Intensification of Resrouce Recovery Forum, Manhatten College, NY

Stone, Mark	March 2018: Keynote speaker and member of the scientific committee, International Conference on Integrated Natural Disaster Management, Amman, Jordan March 2018: Invited Speaker, 2018 Land & Water Summit January 2018: Provided a course on Watershed and Stream Protection and Restoration, University of Chile, Santiago Dec 2017: Attended American Geophysical Union Annual Meeting, San Francisco, CA Oct 2017: Participated in Colorado River: Building a Science Agenda Workshop, Tucson, Arizona
Stormont, John C.	January 2017: Transportation Research Board Annual Meeting, Washington DC April 2017: Presenter, Solution Mining Research Institute Annual Meeting, Albuquerque June 2017: Presenter, American Rock Mechanics Association, San Francisco December 2017: Presenter, American Geophysical Union Meeting, New Orleans May 2018: Presenter, Interpore Conference, New Orleans
Taha, Mahmoud R.	Jan 2017: Presented, TRB Annual Meeting, Washington DC. April 2017: Presenter - American Concrete Institute Convention, Detroit, MI. July 2017: Invited, NSF Workshop on 3D Printed Structures, Washington DC. October 2017: Presenter - American Concrete Institute Concrete Convention, Anaheim, CA March 2018: Presenter - American Concrete Institute Concrete Convention, Salt Lake City, UT April 2018: Chairman - 16th International Congress on Polymers in Concrete - ICPIC 2018, Washington DC
Tarefder, Rafiqul	2017: Eighth AHFE International Conference on Human Factors, Software, and Systems Engineering, Los Angeles, California. Dec 2017: Southern Plan Transportation Leadership Meeting Jan 2018: TRB Annual Meeting, Washington, DC Jan 2018: Organized Annual Paving and Transportation Conference, Albuquerque, NM
	April 2018: Chairman - 16th International Congress on

Valentin, Vanessa	Polymers in Concrete - ICPIC 2018, Washington DC March 2018: Presenter - American Concrete Institute Concrete Convention, Salt Lake City, UT October 2017: Presenter - American Concrete Institute Concrete Convention, Anaheim, CA July 2017: Invited, NSF Workshop on 3D Printed Structures, Washington DC. April 2017: Presenter - American Concrete Institute Convention, Detroit, MI. Jan 2017: Presented, TRB Annual Meeting, Washington DC.

5D . Faculty Research and Creative Works

Discuss and provide evidence of the research/creative work and efforts of the faculty within the unit at the undergraduate and graduate level. Explain the adequacy and/or significance of the research/creative work and efforts in supporting the quality of the unit and/or the program(s).

The faculty at UNM Civil Engineering has been extensively involved in scholarly research involving undergraduate and graduate students. The department research expenditures has been exceeding $5.5M for the last three years marking an average of $300k per faculty a number that exceeds the national standards for top research active programs in the US. Below is an example of scholarly publications by the department faculty members in 2017. This list is posted on the department website and is updated monthly.

https://civil.unm.edu/faculty-staff/recent-publications.html

Recent Journal Publications By Civil Engineering Faculty

The UNM Department of Civil Engineering prides itself on a highly research-active faculty, with publications appearing in nationally and internationally respected journals. Publications appearing within approximately the last year are included here, with Civil Engineering Faculty names in bold. See individual faculty web pages for more complete publication lists and additional information about faculty research.

Construction

Bogus, Susan

Zhang, Su, Lippitt, Christopher, **Bogus, Susan M.** (2017) “Pavement Surface Condition Estimation Based on Geospatial Modeling” *Annals of GIS* , doi: 10.1080/19475683.2017.1325404.
http://www.tandfonline.com/eprint/nCheeH9gBtWJfstw5Hhd/full

Zhang, Su, **Bogus, Susan M.**, Lippitt, Christopher D., and Migliaccio, Giovanni C. (2017) “Estimating Location Adjustment Factors for Conceptual Cost Estimating Based on Nighttime Light Satellite Imagery.” *ASCE Journal of Construction Engineering and Management*, 143(1), January 2017, doi: 10.1061/(ASCE)CO.1943-7862.0001216.

Environmental

Cerrato, Jose

Lopez Moruno, Francisco, Rubio, Juan E., Santoro, Carlo, Atanassov, Plamen, **Cerrato, José M**., and Arges, Christopher

G., (2017) Investigation of patterned and non-patterned poly(2,6-dimethyl 1,4- phenylene) oxide based anion exchange membranes for enhanced desalination and power generation in a microbial desalination cell. *Solid State Ionics,* Accepted. DOI: 10.1016/j.ssi.2017.11.004
https://doi.org/10.1016/j.ssi.2017.11.004

Avasarala, Sumant, Lichtner, Peter, Ali, Abdul-Mehdi S., González-Pinzón, R., Blake, Johanna M., and **Cerrato, José M.** (2017) Reactive Transport of U and V from Abandoned Uranium Mine Wastes. Environmental Science and Technology, Accepted. DOI: 10.1021/acs.est.7b03823 http://pubs.acs.org/doi/10.1021/acs.est.7b03823

Ilgen A.G., Kukkadapu R.K., Dunphy D.R., Artyushkova K., **Cerrato J.M.**, Kruichak J.N., Janish M.T., Sun C. J., Argo J. M., and Washington R. E. (2017). Synthesis and characterization of redox-active ferric nontronite. Chemical Geology, Accepted.https://doi.org/10.1016/j.chemgeo.2017.07.010

Blake, Johanna, DeVore, Cherie, Avasarala, Sumant, Ali, Abdul-Mehdi, Roldan, Claudia, Bowers, Fenton, Spilde, Michael, Artyushkova, Kateryna, Kirk, Matthew F., Peterson, Eric, Rodríguez-Freire, Lucia, and **Cerrato, José M.,** (2017). Uranium mobility and accumulation along the Rio Paguate, Jackpile Mine in Laguna Pueblo, New Mexico. Environmental Science: Processes & Impacts, DOI: 10.1039/C6EM00612D. http://pubs.rsc.org/en/content/articlelanding/2017/em/c6em00612d#!divAbstract

Saup, Casey, Williams, Kenneth, Rodríguez-Freire, Lucia, **Cerrato, José M.,** Johnston, Michael D., and Wilkins, Michael J. (2017). Anoxia stimulates microbially catalyzed metal release from Animas River sediments. Environmental Science: Processes & Impacts, DOI: 10.1039/C7EM00036G.
http://pubs.rsc.org/en/content/articlelanding/2014/EM/C7EM00036G#!divAbstract

Geotech/Pavements

Ng, Tang-Tat Percy

Ma, G., Zhang, Y., Zhou, W., **Ng, T.-T.,** Wang, Q. and Chen, X. (2017) "The effect of different fracture mechanisms on impact fragmentation of brittle heterogeneous solid," International Journal of Impact Engineering, https://doi.org/10.1016/j.ijimpeng.2017.11.016.

Rashidyan, S., **Ng, T.-T.** and Maji, A. (2017) "Estimating the Depth of Concrete Pier Wall Bridge Foundations Using Nondestructive Sonic Echo," Journal of Nondestructive Evaluation, 36(56). https://doi.org/10.1007/s10921-017-0433-5.

Ng, T.-T., Zhou, W., and Chang X.-L. (2017) Closure to "Effect of Particle Shape and Fine Content on the Behavior of Binary Mixture." Journal of Engineering Mechanics ASCE, 143(9), 10.1061/(ASCE)EM.1943-7889.0001324.

Ng, T.-T., Zhou, W., Ma, G., and Chang, X.-L. (2017), "Macroscopic and Microscopic Behaviors of Binary Mixtures of Different Particle Shapes and Particle Sizes", International Journal of Solids and Structures, https://doi.org/10.1016/j.ijsolstr.2017.11.011

Ali, Yousefi; **Ng, T.-T**. (2017) "Dimensionless input parameters in discrete element modeling and assessment of scaling techniques," Computers and Geotechniques, 88, 164-173 (dx.doi.org/10.1016/j.compgeo.2017.03.017)

Structures

Moreu, Fernando

Gomez, J. A., Ozdagli, A. I., & **Moreu**, F. (2017). Reference-free dynamic displacements of railroad bridges using low-cost sensors. *Journal of Intelligent Material Systems and Structures* , 1045389X17721375.

Ozdagli, A. I., Gomez, J. A., & **Moreu**, F. (2017). Real-Time Reference-Free Displacement of Railroad Bridges during Train-Crossing Events. *Journal of Bridge Engineering* , *22*(10), 04017073. https://doi.org/10.1061/(ASCE)BE.1943-5592.0001113

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bridge using DIC and accelerometers. *SMART STRUCTURES AND SYSTEMS* , *19*(2), 225-236.

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5E . Faculty Involvement in Student Retention and Academic Success

Explain and provide evidence of the efforts and strategies by the unit to involve faculty in student retention and ensure students’ academic success at the undergraduate and graduate level (i.e., advising efforts, student engagement activities, etc.)

The department has a permanent staff member: Nicole Bingham who works as a student advisor. In addition, almost all the department faculty members get involved in undergraduate student advising. This allows direct interaction between the department faculty and undergraduate students. This also enables the faculty to be involved in department efforts in student retention and ensure academic success. A similar arrangement takes place in the graduate program but the interaction between graduate students and faculty members are at a higher level. All graduate degree programs by the department require graduate students to have a direct faculty advisor.

5F . Faculty Experience

Provide an abbreviated vitae (two pages or less) or summary of the educational background and professional experiences of each faculty member. (If the unit has this information posted on-line, then provide links to the information.)

Jose Cerrato http://civil.unm.edu/faculty-staff/faculty-profiles/cvs/cerrato-cv-nov-2017.pdf

Julie E. Allred Coonrod http://www.unm.edu/~jcoonrod/

Walter Gerstle http://civil.unm.edu/faculty-staff/faculty-profiles/cvs/walter-gerstle-cv.pdf

Michael Gonzalez http://civil.unm.edu/faculty-staff/faculty-profiles/michael-gonzalez.html

Ricardo Gonzalez-Pinzon http://civil.unm.edu/faculty-staff/faculty-profiles/cvs/ricardo-gonzalez-cv.pdf

Susan Bogus Halter http://civil.unm.edu/faculty-staff/faculty-profiles/cvs/susan-bogus.pdf

Kerry Howe http://civil.unm.edu/faculty-staff/faculty-profiles/cvs/kerry-howe-cv.pdf

Fernando Moreu http://civil.unm.edu/faculty-staff/faculty-profiles/cvs/fernando-moreu-cv.pdf

Tang-Tat Percy Ng http://civil.unm.edu/faculty-staff/faculty-profiles/cvs/percy-ng-cv.pdf

Timothy J. Ross http://civil.unm.edu/faculty-staff/faculty-profiles/cvs/timothy-ross-cv.pdf

Gregory M. Rowangould http://civil.unm.edu/faculty-staff/faculty-profiles/cvs/gregory-rowangould-cv.pdf

Andrew Schuler http://www.unm.edu/~schuler/

Mark C. Stone http://www.unm.edu/~stone/

John C. Stormont http://civil.unm.edu/faculty-staff/faculty-profiles/cvs/john-stormont-cv.pdf

Mahmoud Reda Taha http://civil.unm.edu/faculty-staff/faculty-profiles/cvs/taha-vitae-nov-2017.pdf

http://civil.unm.edu/faculty-staff/faculty-profiles/cvs/mahmoud-taha.pdf

Rafiqul A. Tarefder http://www.unm.edu/~tarefder/

Vanessa Valentin http://civil.unm.edu/faculty-staff/faculty-profiles/cvs/vanessa-valentin.pdf

5G . Faculty Strategic Planning

Discuss the unit's strategic planning efforts going forward to improve, support, and/or optimize its faculty.

The faculty believe that achieving many of its goals, including those not specially discussed in the strategic plan, requires reconsidering support for its core academic missions: education and research. A goal of adjusting support so that it is commensurate with that of the top 50 civil engineering departments is considered a desirable target. The faculty identified the following as priorities for consideration for additional support.

- Research facilities and laboratory space
- Teaching loads
- Faculty salaries
- New faculty and staff positions
- Faculty support for international student recruitment
- More TA positions for PhD students, taking place of courses taught by adjuncts
- Improve junior faculty mentoring, specifically with regard to developing externally funded research programs.

Details on this section can be found in the department stratetic plan in the Appendix of this document, or at department website:

https://civil.unm.edu/accreditation/strategic-plan-jan-2018.pdf

Criterion 6 . Resources and Planning

The unit has sufficient resources and institutional support to carry out its mission and achieve its goals.

6A . Resource Allocation and Planning

Explain how the unit engages in resource allocation and planning that are effective in helping it carry out its mission and achieve its goals. If the unit has an advisory board, describe the membership and charge and discuss how the board's recommendations are incorporated into decision-making. Include a discussion of how faculty research is used to generate revenue or apply for grants. How is the revenue gained from research being distributed to support the unit and its degree/certificate programs?

Overall, the program enjoys sufficient facilities, tools, and equipment to ensure program success. The department research productivity (above $5.5M) for FY 2015-2016 enables the department to acquire and maintain current testing and computing facilities, which also helps the department to deliver its education mission. The facility maintenance plan explained above is updated annually by the Equipment committee and checked by the Department Chair and is used to ensure that facilities and equipment used in the program are safe for their intended purposes.

Furthermore, the department, with the support of SOE and help of the UNM Foundation, has launched a major fundraising campaign aiming to raise $12M in the next 12 years to produce a significant improvement in the department facilities and to acquire a number of endowed positions that will provide additional resources to the department faculty to function and excel. This includes an immediate fundraising of $2M including $500k to be used for improving department facilities.

6B . Budget and Funding

Provide an analysis of information regarding the unit's budget including support received from the institution and external funding sources. Include a discussion of how alternative avenues (i.e., external and grant funding, summer bridge programs, course fees, differential tuition, etc.) have been explored to generate additional revenue to maintain the quality of the unit's degree/certificate program(s) and courses.

The department budget allocation from UNM School of Engineering for the last four years are

FY2015 $2,025,378

FY2016 $2,044,239

FY2017 $2,116,345

FY2018 $2,062,180

The department budget allocation from the school of engineering has been around $2.0M for the last 5 years. This budget allocation is used to cover regular faculty and staff salary, adjunct faculty compensation and a limited number of teaching assistants (4 TAs), and also a limited number of graders (about 10 graders) each fiscal year. The funding is hardly enough to cover the required operations of the department. Another main funding resource is the research overhead funding. The department research expenditures have been in the range of $5.5M for the last three years and that enables an annual research overhead in the range of $150k. It is noted that the department faculty generates about 3 times the budget allocated to the department from SOE. The overhead funds are used to cover other necessary operations including the department overhead that accumulates from the allocation of research funding overhead. On some occasions, the department shares part of the overhead with the faculty members who generate the awards, but in recent years this becomes harder as the department financial resources are limited. In addition, the department houses the Center of Water and the Environment, which is a research center operating on extramural research funds. As a School of Engineering center, CWE receives an annual budget allocation from the School of Engineering. The department works in close collaboration with CWE to share space and staff and thus CWE helps supporting staff members in the department that work for both the department and CWE. Two years ago, UNM allowed the SOE to acquire undergraduate, then graduate, differential tuition fees. Those funds are used to support some faculty salaries, support additional teaching assistants and graders. The SOE is currently discussing the use of graduate differential tuition for funds necessary for faculty retention. Additional funding available is funding generated as laboratory and equipment fees and this is typically used for upgrading the laboratory facilities, updating software licenses and other facilities upgrade for educational improvement. An additional

source of funding is special tuition allocation the department signed two years ago with the UNM Extended Learning Universities that allows the department to keep 65% of the tuition for online learning programs. This allows the department to keep 65% of its MCM program tuition which helps to grow the MCM program and leverage costs of course development and teaching of the MCM degree program. This resource, however, is limited to the online degree program but is used to leverage for those courses shared between the MCM degree program and the undergraduate civil and construction engineering programs. One other source of funding is the Chair accounts by the UNM Foundation. These accounts generate annual funding and are used by the department Chair to cover other department activities. In the last few years, the Chair accounts have been used to cover necessary faculty and student activities such as graduate students' travel grants, faculty awards, junior faculty educational training and professional development and in special cases as cost share with special funding to junior faculty. The department also has the AGC endowment and endowed chair, which is typically used to leverage construction management students and faculty activities. The last source of funding is department scholarships. The department has about $1.5M of endowed scholarships that generate about $100k annually and usually supports students with financial needs and rewards high achieving students. Finally, the department has recently launched a major fundraising campaign aiming to raise $12M in the next 12 years with the aim of providing additional resources to faculty members through an endowed chair position and through raising enough funding to allow facilities upgrades to maintain the department competitiveness.

6C . Staff Composition and Responsibilities

Discuss the composition of the staff assigned to the unit and their responsibilities (including titles and FTE). Include an overall analysis of the sufficiency and effectiveness of the staff in supporting the mission and vision of the unit.

The department currently employs 10 staff persons, including .5 FTE Systems Analyst (student employee). The department is well staffed and staff personnel provides excellent support to the department instructional and research missions. Nine staff members are funded through the annual department budget and one is funded through research funds to support the growing research activities in the department.

Please see: OC. Organizational Structure and Governance, for a diagram of the organizational structure.

Civil Engineering Staff

Yolanda Sanchez
Dept. Administrator R2
1.0 FTE
Oversees and administers programs, strategies, and initiatives designed to develop, enhance, and support the missions of a larger, more complex Research Intensive* academic department of the University, as measured by annual revenue and number of faculty and staff. Oversees all internal and external business activities, accounting and finance, grant administration, and human resources. Coordinates the administrative activities of the post-award contracts and grants functions of all units within the department. Manages and coordinates facility and resource management, information services, and general department administration. Participates with the Chair and senior departmental faculty in strategic and operational decision making as a member of the department's leadership team. *Having or requiring a relatively large expenditure on research and development in comparison to capital and labor. Research programs, including all grants and contracts are $3 million or more.

Rebekah Lucero
Accountant 2
1.0 FTE
Performs advanced, multifaceted accounting and related functions in such areas as ledger maintenance and analysis, cost and/or financial analysis, fund reconciliation, posting, and inventory control. Analyzes complex financial and operating data and prepares management reports, financial statements, and projections. Oversees departmental proposal process. Responsible for managing all departmental and research expenditures. Supervises department Accountant I.

Marcus Panozzo
Accountant 1
1.0 FTE
Performs basic accounting functions such as ledger/fund analysis, cost analysis, departmental and research fund reconciliation, posting, and fiscal control of inventory. Prepares financial reports from standard operating statistics and/or financial data. Investigates and resolves problems related to funds, budgets, expenditures, and/or procurement. Prepares budgets for research proposals. Oversees all departmental research expenditures, develops process for purchasing

materials, supplies, equipment and services.

Nicole Bingham
Program Advisement Coordinator
1.0 FTE
Provides, oversees, and coordinates undergraduate and a combination of either graduate and/or pre-professional academic and associated student advisement, admission/graduation eligibility assessment, recruitment, financial aid, and associated administrative/liaison activities within the department and School of Engineering. Assists with curriculum planning and program evaluation. Assesses eligibility for admission into degree programs, evaluates transfer credits, and works with students to resolve admission issues and blockages; analyzes student needs and assists students to integrate interests and aptitudes into individualized programs, including working with interdisciplinary students whose programs may span several schools and colleges. Reviews undergraduate transcripts to determine eligibility for graduation, and provides signature approval on all associated paperwork required by the college. Develops and maintains academic records on students and provides a range of periodic and ad-hoc statistical reports and program data to committees; participates in interdisciplinary committee meetings.

Alicia Perea
Department Administrator II
1.0 FTE
Provides administrative/secretarial support for the department such as answering telephones, assisting visitors, and resolving and/or referring a range of administrative problems and inquiries. Requisitions supplies, printing, maintenance, and other services. Schedules and coordinates meetings, events, interviews, appointments, and/or other similar activities for department administration, which may include coordinating travel and lodging arrangements. Purchasing agent/PCard holder, responsible for purchasing materials, supplies, and equipment for departmental research projects. Reconciles monthly PCard statements, department timekeeper, entering all staff and student timesheets. Responsible for hiring student employees.

Mai Wakisaka
Department Administrator II
1.0 FTE
Provides administrative/secretarial support for the department such as answering telephones, assisting visitors, and resolving and/or referring a range of administrative problems and inquiries. Requisitions supplies, printing, maintenance, and other services. Schedules and coordinates meetings, events, interviews, appointments, and/or other similar activities for department administration, which may include coordinating travel and lodging arrangements. Purchasing agent/PCard holder, responsible for purchasing materials, supplies, and equipment for centers reporting to the Civil Engineering Department. Conference coordinator, managing registration, accounts receivables and payables for departmental annual conferences. Sorts, screens, reviews, and distributes incoming and outgoing mail.

Josephine Gibson
Web Developer
.25 FTE
Develops and maintains plan for organization's Internet presence, based on management priorities, policy directions, and goals. Creates enhancements and modifications to web sites; organizes and maintains the sites. Ensures that web sites are accessible from a variety of different environments. Develops, researches, writes/edits and creates layout for new sections/features. Assists with the development of departmental newsletter, program announcements. Develops recruitment material for the department’s various programs.

Kenny Martinez
Supervisor/Engineering Lab
1.0 FTE
Provides technical and logistic support for engineering laboratories, including supervision of personnel engaged in engineering research, design and implementation of experiments and protocols, and design, development, and construction of related equipment or technologies. Designs, builds, tests, and maintains complex laboratory equipment including all structural, geotechnical and materials testing laboratories. Supervises graduate students working in the labs and provides outlines for safe work environment. He is the Safety Officer for both Materials and Structures laboratories.

Hope McVeety
Technical Editor
.75 FTE
Provides technical editing for two faculty and their research teams as well as assistance to the department and Chair. The position also supports the department and its annual conferences. Under indirect supervision, assists in writing,

development, and editing of research proposals, progress and final reports for contracts and grants, papers and articles for publication including books, journals, and manuscripts. Ensures that all materials meet established standards of appearance and content. Oversees production schedule for various deadlines related to publications, contract and grant reports, research proposals and proceedings. This position is funded 100% by research contracts.

Vamsi Karthik Vadamani
Systems Analyst
Student Employee
.50 FTE
Under direct supervision, provides basic professional level support in routine to moderately complex areas such as system and/or network, hardware and software tools, including installation, configuration, maintenance, and support of these systems and/or networks. Serves as technical resource to department users in the planning and implementation of small-scale applications, systems or networks projects. Manages all departmental and center servers, and software. Supports departmental computer lab, and computer lab classes. Assists with software installation for department faculty, staff, and students.

6D . Library Resources

Discuss and provide evidence of the adequacy of the library resources that are available and/or utilized to support the unit's academic and research initiatives.
The University Libraries system at UNM is comprised of four libraries: Centennial Science and Engineering Library, Fine Arts and Design Library, Parish Memorial Library for Business and Economics, and Zimmerman Library. University Libraries is a member of the Association of Research Libraries, an organization of the largest research libraries in North America, HathiTrust Digital Library, Center for Research Libraries, Greater Western Library Alliance, New Mexico Consortium of Academic Libraries and other consortial groups. The University Libraries also serves as the regional depository of federal government publications for the state of New Mexico.

The University Libraries has an extensive collection that is adequate to support student and faculty needs. Books, magazines, newspapers, and scholarly journals make up a substantial portion of the collections, but many other formats of information are included. Microforms, maps, DVDs, and posters are vital parts of the research and instructional process at UNM. Many parts of the collections are now available beyond the walls of any library in online digital formats. The acquisition of these materials accelerates with each year, now surpassing print and other tangible formats in terms of the number of titles available. A wide selection of ejournals, ebooks, digital music, and streaming video are available to all UNM students, faculty, and staff. The University Libraries also leads the effort in developing processes to curate, store, and preserve research data created by UNM faculty and students and make it available to the world.

UNM collaborates with many libraries in the U.S. to expand the availability of information. Cooperative initiatives include interlibrary loan, cooperative purchase of electronic resources, and shared preservation and digitization projects.

The University Libraries has also designated a Subject Librarian who is familiar with the needs of the Civil Engineering Department. This is the point of contact for faculty wanting to order new books or subscriptions.

6E . Resources and Planning Strategic Planning

Discuss the unit's strategic planning efforts going forward to improve, strengthen, and/or sustain the sufficient allocation of resources and institutional support towards its degree/certificate program(s), faculty, and staff.

The faculty believes that achieving many of its goals, including those not specially discussed in the strategic plan, requires reconsidering support for its core academic missions: education and research. A goal of adjusting support so that it is commensurate with that of the top 50 civil engineering departments is considered a desirable target. The faculty identified the following as priorities for consideration for additional support.

- Research facilities and laboratory space
- Teaching loads
- Faculty salaries
- New faculty and staff positions
- Faculty support for international student recruitment
- More TA positions for PhD students, taking place of courses taught by adjuncts

- Improve junior faculty mentoring, specifically with regard to developing externally funded research programs.

The Department chair has used the above items working with SOE and UNM administration to explain the department needs for resources. Despite budget cuts, we have successfully, with the SOE leadership, acquired additional resources through graduate and undergraduate differential tuition fees providing the department annual budget with an additional $200k. Furthermore, the department, with the support of SOE and help of the UNM Foundation, has launched a major fundraising campaign aiming to raise $12M in the next 12 years to produce a significant improvement in the department facilities and to acquire a number of endowed positions that will provide additional resources to the department faculty to function and excel.

Criterion 7 . Facilities

The facilities associated with the unit are adequate to support student learning as well as scholarly and research activities.

7A . Unit's Allocated Facilities

Provide an updated listing from UNM's current space management system of the spaces assigned to your unit. Discuss the evolution and sufficiency of the amount of space your unit has been assigned by category (e.g., offices, support spaces, conference rooms, classrooms, class laboratories, computing facilities, research space, specialized spaces, etc.). (1) Include an analysis of the square footage-to-student ratio and square footage-to-faculty ratio. (2) Explain if the unit has any spaces outside or in other locations that are not documented in UNM's space management system.

Offices

The Department occupies over 30,000 square feet of the Centennial Engineering Center (CENT), including an administrative suite, faculty offices, graduate student offices, computer laboratory, teaching and research laboratories, conference room and student lounge/study area. The administrative suite is located on the third floor of the CENT and includes a reception area, a mailroom, a copier and fax room, and a file storage room. The administrative suite includes offices for the Department Administrator, Department Accountant, Department Advisement Coordinator and Department Chair.

Faculty has individual offices, and most are co-located in one hallway on the third floor of CENT. Each faculty member has an individual computer and access to the office color printer through the network. In addition, many faculty members have individual printers in their offices. There is an open area located in the middle of the hallway with tables and chairs as well as a whiteboard. This area is used for discussions, student study, or as a waiting area for faculty appointments and consults. The Department also has control over two conference rooms on the third floor, one large and one small.

Graduate students, including teaching assistants, are provided space in a number of different locations throughout the building, including three main rooms that have been furnished with individual student carrels. A number of offices have been converted to student space as well. Undergraduate students who work for faculty may be provided office space depending on the nature of their duties. A student lounge, adjacent to the administrative suite, provides an area for group study, student gatherings, and student organization meetings. The lounge includes a number of large tables for group study as well as a refrigerator, sink, storage and student lockers. There is also a large "commons" area on the first floor of CENT that is available to students.

Classrooms

Central scheduling assigns classroom space for all courses within the University. Currently, there is adequate classroom space to accommodate all courses offered by the program. Each classroom has an instructor technology desk that is connected to an overhead projector. The technology desk includes a computer, a document projector, a VHS-DVD player and a connection for a laptop. The Department has a computer classroom/lab on the third floor that includes PCs for student use. In addition to these classrooms, the Department has control over one smaller classroom adjacent to the first-floor laboratories.

Laboratories

The Department has several laboratories used for undergraduate education. The Hydraulics Lab, located in Centennial Engineering Center B119, is a combined teaching and research facility. This lab is used for CE 331 – Fluid Mechanics lab sessions. The lab houses equipment for various experiments to assist in teaching and demonstrating the fundamentals of fluid mechanics to undergraduate and graduate students. The lab's centerpiece is an 8 foot wide by 50-foot long tilting table that allows construction of scale models of hydraulic structures at various slopes.

The undergraduate Geotechnical Laboratory (Room 1010) has standard geotechnical testing equipment and is used for CE 360 – Soil Mechanics lab sessions. The following tests can be performed in the Geotechnical laboratory: water content, specific gravity, grain size distribution analysis (mechanical sieve analysis and hydrometer analysis), Atterberg Limits, standard and modified Proctor, constant head permeability, variable head permeability, direct shear, consolidation, unconfined compression and triaxial tests.

The Concrete Laboratory (1,370 square feet) is used for both education and research. It contains all necessary equipment for the batching, curing (separate curing room), and testing of fresh and hardened concrete samples. This lab is used for CE 305 – Infrastructure Materials Science lab sessions. The CE 305 class also uses the Structural Laboratory (2,200 square feet) for testing samples.

The Surveying Lab mostly provides storage for state-of-the-art surveying equipment used by undergraduate students in CE 283 – Surveying and Geomatics. This equipment includes four total station instruments for obtaining angle and distance measurements, four automatic engineering levels, a tripod-mounted laser level, a hand-held laser distance meter, and three hand-held, mapping grade GPS units. Ancillary equipment, such as tripods, reflective prisms, and level rods are also available.

Computing Resources

The Department's Computer Laboratory (Room 3002) is used for several courses taken by students in the program. These courses include CE160 – Civil Engineering Design, which teaches AutoCAD and is taken by all students in the program. Currently, the program must offer multiple sections of this course to accommodate all students. The Department is proposing to expand the lab into the adjacent student lounge and move the student lounge to the current computer lab space. The lab currently contains 15 Desktop Intel Core i7 computers running Windows 7, 1 laser printer, 1 plotter, 1 scanner, gigabit ethernet network, 802.11 b/g/n wireless network, a wireless LCD projector, and a Windows Server 2012. Software on these computers includes Microsoft Office, Microsoft Project, ABAQUS, SAP2000, MathCAD, MatLAB, AutoCAD, ArcGIS, Microstation InRoads, ANYSYS, GMS, Primavera and Timberline Estimating Products. Students obtain accounts from the Department System Administrator. Students are allocated 100 printer pages per month free of charge, additional pages cost $0.05 per page.

University IT manages eight computer pods (or labs) and 13 computer classrooms around the main campus. All are open to all UNM students, faculty and staff. All locations are equipped with different hardware and software and have their own hours. A University ID is required to print in IT pods and classrooms. Pods are staffed by Student Consultants who are trained to answer general computing questions.

7B . Ability to Meet Academic Requirements with Facilities

Discuss the unit's ability to meet academic requirements with the current facilities. Explain the unit's unmet facility needs. If applicable, describe the facility issues that were raised or noted in the last APR. What were the outcomes, if any?

Overall, the program enjoys sufficient facilities, tools, and equipment to ensure program success. The department research productivity (above $5.5M) for FY 2017 enables the department to acquire and maintain current testing and computing facilities, which also helps the department to deliver its education mission. The facility maintenance plan explained above is updated annually by the Equipment committee and checked by the Department Chair and is used to ensure that facilities and equipment used in the program are safe for their intended purposes. The department also has access to annual equipment fees that allows it to maintain its operational facilities. As explained in the next section, the department has launched a major fund raising campaign to upgrade its facilities to maintain its competitive edge with an immediate need for $500k to upgrade facilities to enable teaching advanced technology courses in civil engineering, construction engineering and construction management degree programs.

7C . Space Management Planning Efforts

Discuss any recent space management planning efforts of the unit relative to the teaching, scholarly, and research activities of the faculty associated with the unit. Include an explanation of any proposed new initiatives that will require new or renovated facilities.

The department has access to state-of-the-art research facilities in the different subfields. However, realizing the fast pace of technological development and its impact on civil engineering education, the department has launched a major fundraising campaign in 2017-2018 with the objective to raise $12M in the next 12 years to enable the department to upgrade its facilities and keep its competitiveness. This includes an immediate raise of $500k for upgrading the department laboratory facilities to enable including 3D printing in the undergraduate curriculum and to enable establishing a state of the art computer laboratory that enables teaching advancing CAD courses including BIM. Facilities upgrade using fundraising is planned to start in Summer 2018.

Furthermore, to accommodate the significant growth in the department research and graduate enrollment, the department has upgraded all graduate students offices and post-doctoral research offices to enable accommodating the high number of researchers. The department has also requested from the School of Engineering Dean additional office space to accommodate the growth in the Center for Water and the Environment. SOE has promised the department with additional space in Spring 2018.

7D . Unit Facility Goals and Strategic Planning

Discuss the unit's facility goals and priorities for the future and the timelines associated with them. Include a description of short-term goals (1 – 3 years) (e.g. renovation requests) and long-term goals (4 – 10 years) (e.g. new facilities) and how they align with UNM's strategic planning initiatives. Explain the funding strategies associated with any of the unit's facility goals.

Information about the department current facilities are available on the department website

https://civil.unm.edu/research/laboratory-facilities/index.html

The department has access to state of the art research facilities in the different subfields. However, realizing the fast pace of technological development and its impact on civil engineering education, the department has launched a major fundraising campaign in 2017-2018 with the objective to raise $12M in the next 12 years to enable the department to upgrade its facilities and keep its competitiveness. This includes an immediate raise of $500k for upgrading the department laboratory facilities to enable including 3D printing in the undergraduate curriculum and to enable establishing a state of the art computer laboratory that enables teaching advancing CAD courses including BIM. Facilities upgrade using fundraising is planned to start in Summer 2018.

Criterion 8 . Peer Comparisons

The degree/certificate program(s) within the unit are of sufficient quality compared to relevant peers. (If applicable, differentiate for each undergraduate and graduate degree and certificate program offered by the unit.)

8A . Unit's Distinguishing Characteristics

Discuss the distinguishing characteristics of the degree/certificate program(s) within the unit after completing the Peer Comparison Template provided as Appendix H (i.e., examination of student enrollment rates, degrees/certificates offered, number of tenure-track faculty, research/creative work of faculty, etc.). Include an analysis of the unit's degree/certificate program(s) based on comparisons with similar or parallel programs: (1) at any of UNM's 22 peer institutions; (2) at other peer institutions identified by the unit; and (3) designated by relevant regional, national, and/or professional agencies.

Please review the attached comparison in the table below. The data below shows that UNM Civil Engineering is in bar with its peer institutions. Improvement of number of awarded degrees will require increase in resources inclusing number of faculty members. The department is working closeley with the school of engineering and UNM leaderships to increase number of faculty members by increasing the current student enrollment, through improved research expenditures and overheads and via non-traditional resources such as endowments.

Table 8A-1. Peer Institution Comparison of Department of Civil Engineering at UNM with 22 Peer Institutions

University	**Degrees Awarded**	**Number of Tenure-Track/Tenured Faculty**
University of New Mexico	UG: 50 MS: 16 PhD: 5	**17**
New Mexico State University	UG: 47 MS: 13 PhD: 3	15
Arizona State University	UG: 131 MS: 82 PhD: 8	60
University of Arizona	UG: 40 MS: 3 PhD: 4	12
University of Colorado at Boulder	UG: 70 MS: 62 PhD: 31	50
University of Colorado Denver	UG: 19 MS: 42 PhD: 2	16
Colorado State University	UG: 71 MS: 52 PhD: 6	36
Colorado School of Mines	UG: 31 MS: 32 PhD: 6	26
University of Nevada Las Vegas	UG: 28 MS: 12 PhD: 7	20

University of Nevada Reno	UG: 66 MS: 26 PhD: 9	20
University of Texas at El Paso	UG: 52 MS: 30 PhD: 3	21
Texas Tech University	UG: 109 MS: 11 PhD: 6	28
University of Texas at Austin	UG: 124 MS: 87 PhD: 43	60
University of Huston	UG: 62 MS: 44 PhD: 13	23
University of Iowa	UG: 50 MS: 20 PhD: 7	26
University of Utah	UG: 65 MS: 26 PhD: 7	20
Louisiana State University	UG: 71 MS: 16 PhD: 11	29
University of Nebraska Lincoln	UG: 81 MS: 22 PhD: 11	40
Oklahoma State University	UG: 34 MS: 25 PhD: 7	22
University of Tennessee, Knoxville	UG: 70 MS: 27 PhD: 2	30
Missouri University of Science & Technology	UG: 97 MS: 38 PhD: 8	26
University of Kansas	UG: 66 MS: 23 PhD: 8	31
University of Cincinnati	UG: 52 MS: 9 PhD: 1	23

8B . Strategic Planning in Relation to Peer Institutions

Discuss the unit's strategic planning efforts going forward to improve, strengthen, and/or sustain the quality of its degree/certificate program(s) in relation to peer institutions.

The department of civil engineering faculty believes that achieving many of its goals, including those not specially discussed in the strategic plan, requires reconsidering support for its core academic missions: education and research. A

goal of adjusting support so that it is commensurate with that of the top 50 civil engineering departments is considered a desirable target. The faculty identified the following as priorities for consideration for additional support.

- Research facilities and laboratory space
- Teaching loads
- Faculty salaries
- New faculty and staff positions
- Faculty support for international student recruitment
- More TA positions for PhD students, taking place of courses taught by adjuncts
- Improve junior faculty mentoring, specifically with regard to developing externally funded research programs.

Please review the department strategic plan in the Appendix: University of New Mexico Department of Civil Engineering 2015-2020 Strategic Plan, or at the department's website below:

https://civil.unm.edu/accreditation/strategic-plan-jan-2018.pdf

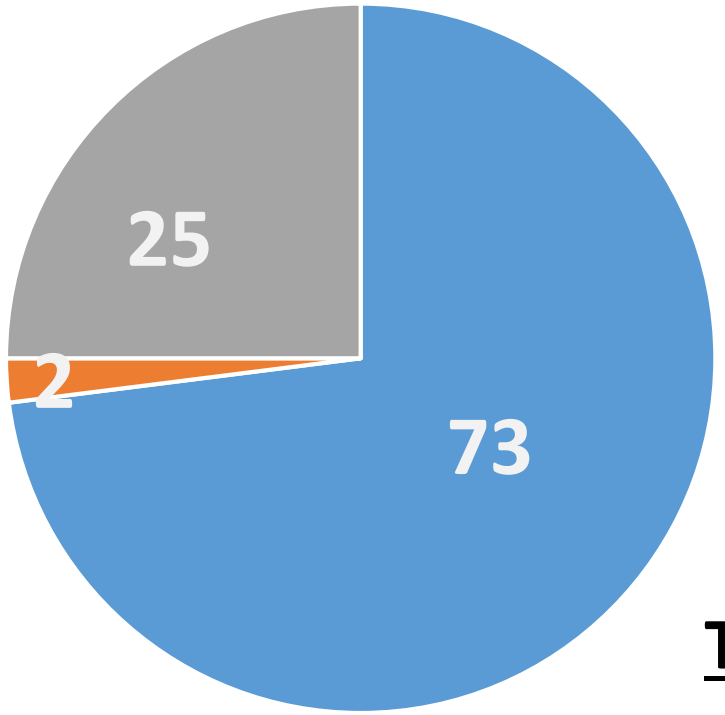
Appendices

UNM CE Undergraduate Program

Civil Engineering BSCE

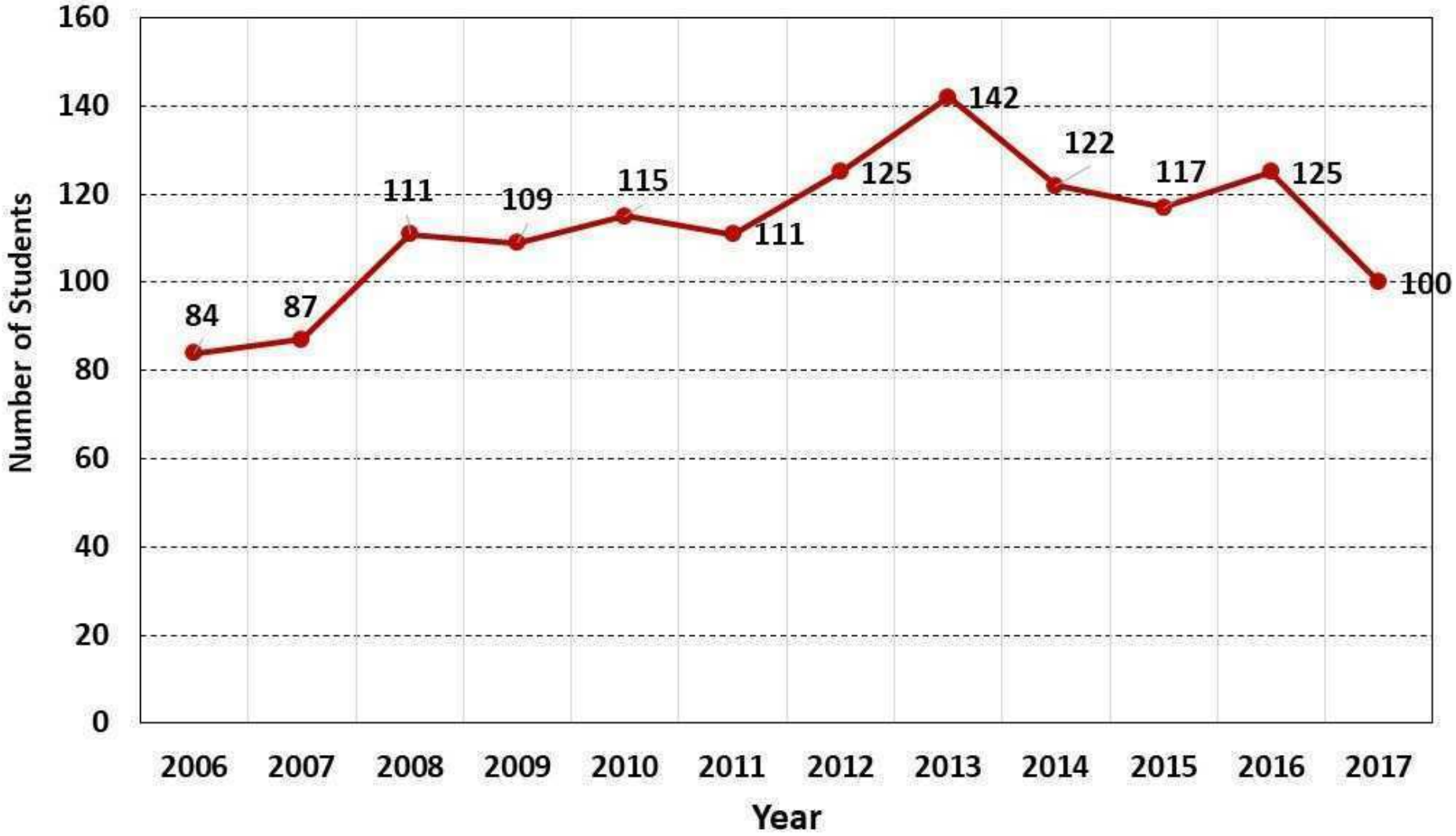
Construction Engineering BSConE

Construction Management BSCM

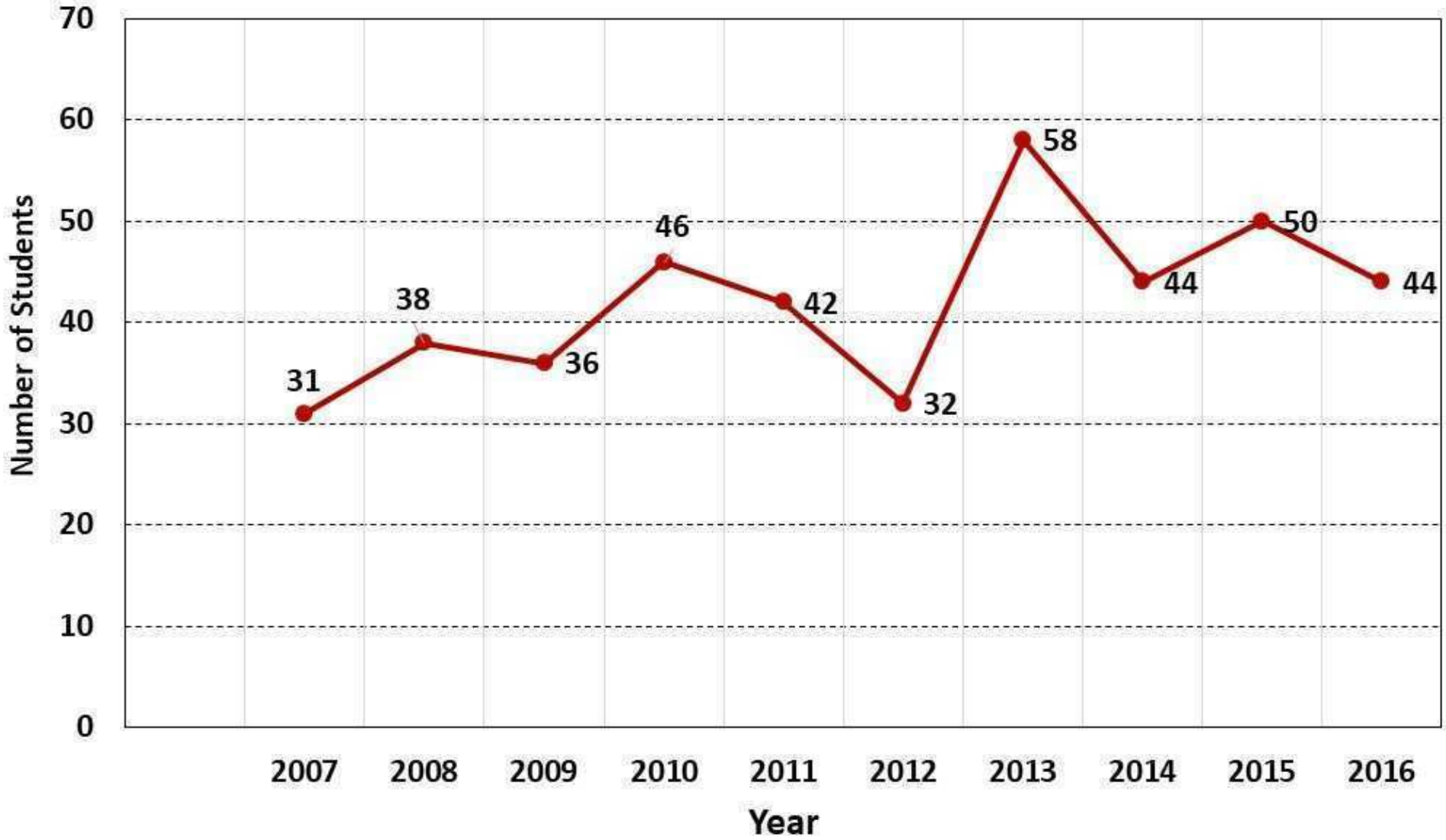


Total of 100 students

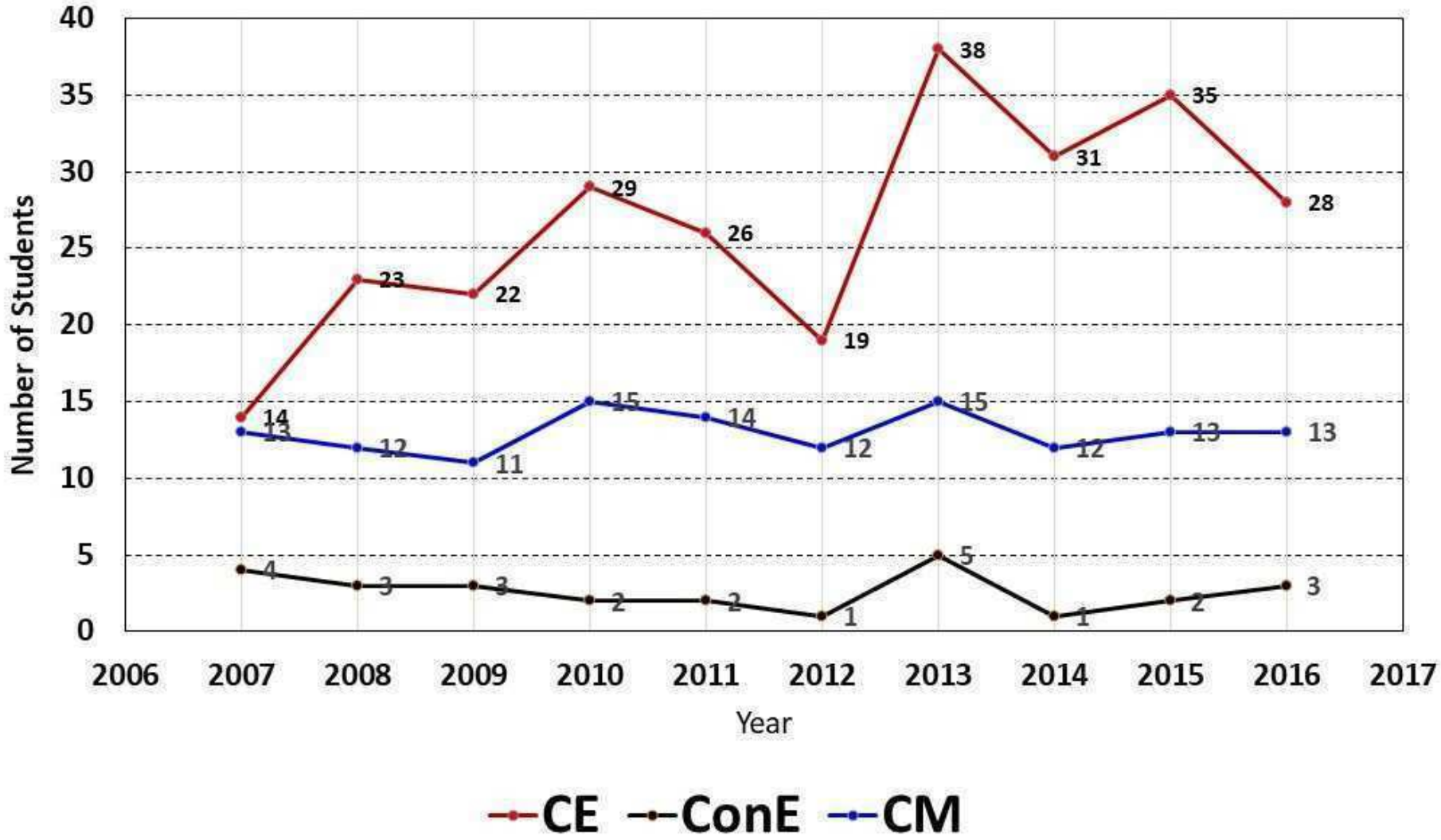
Undergraduate Enrollment



BS degrees granted



BS degrees granted



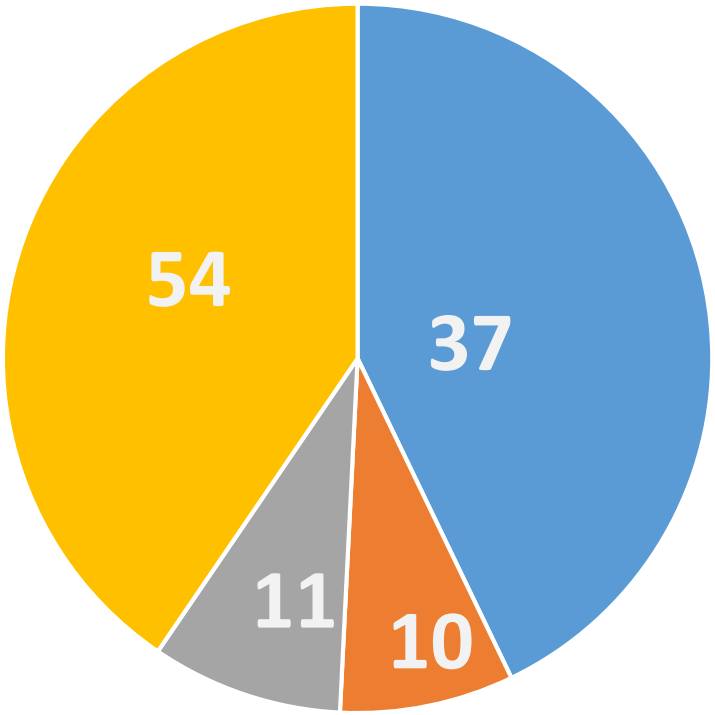
UNM CE Graduate program

Master of Science in CE (MSCE)

Master of Construction Management (MCM)

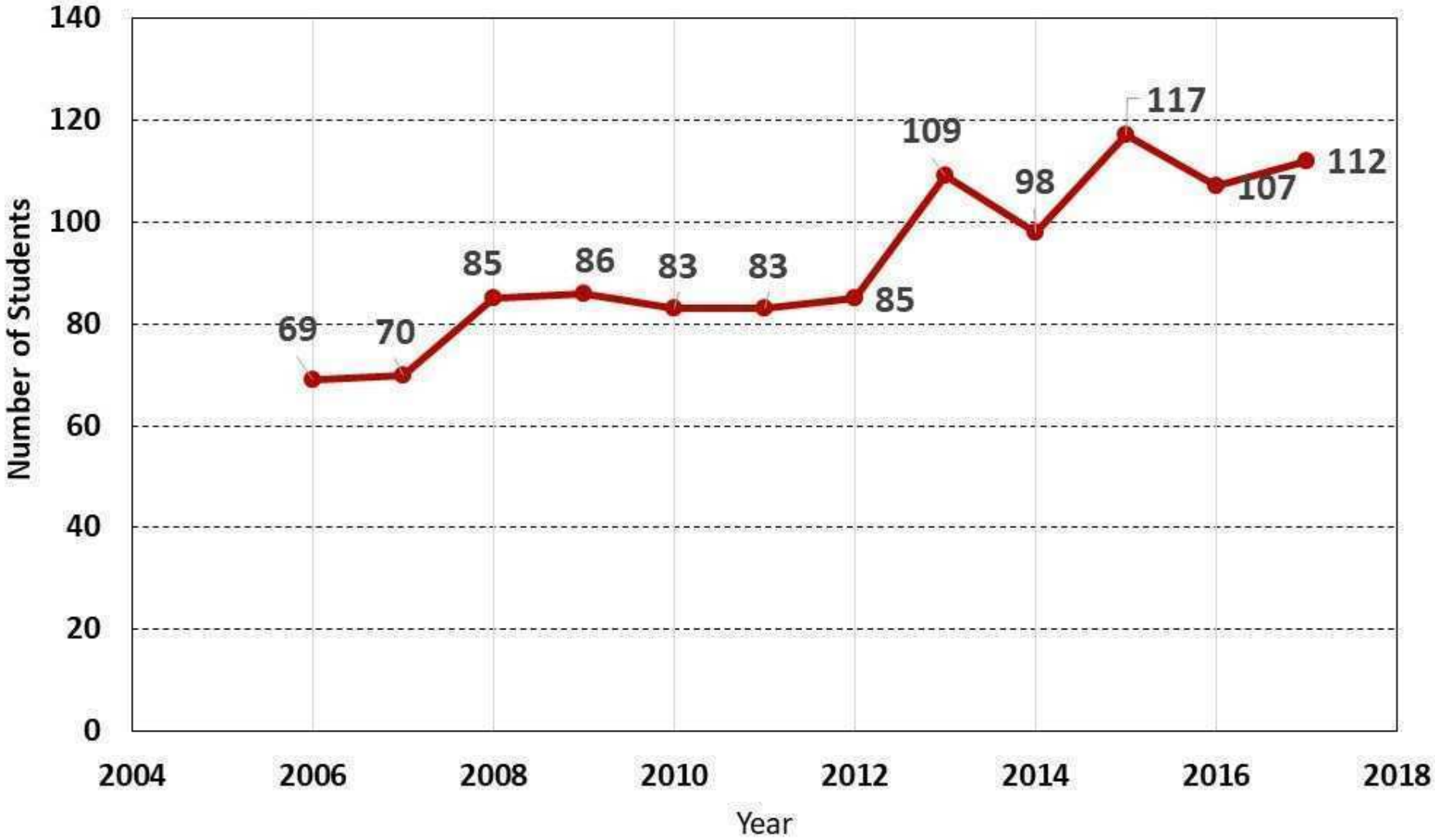
Master of Engineering (MEng)

Doctor of Philosophy (PhD)

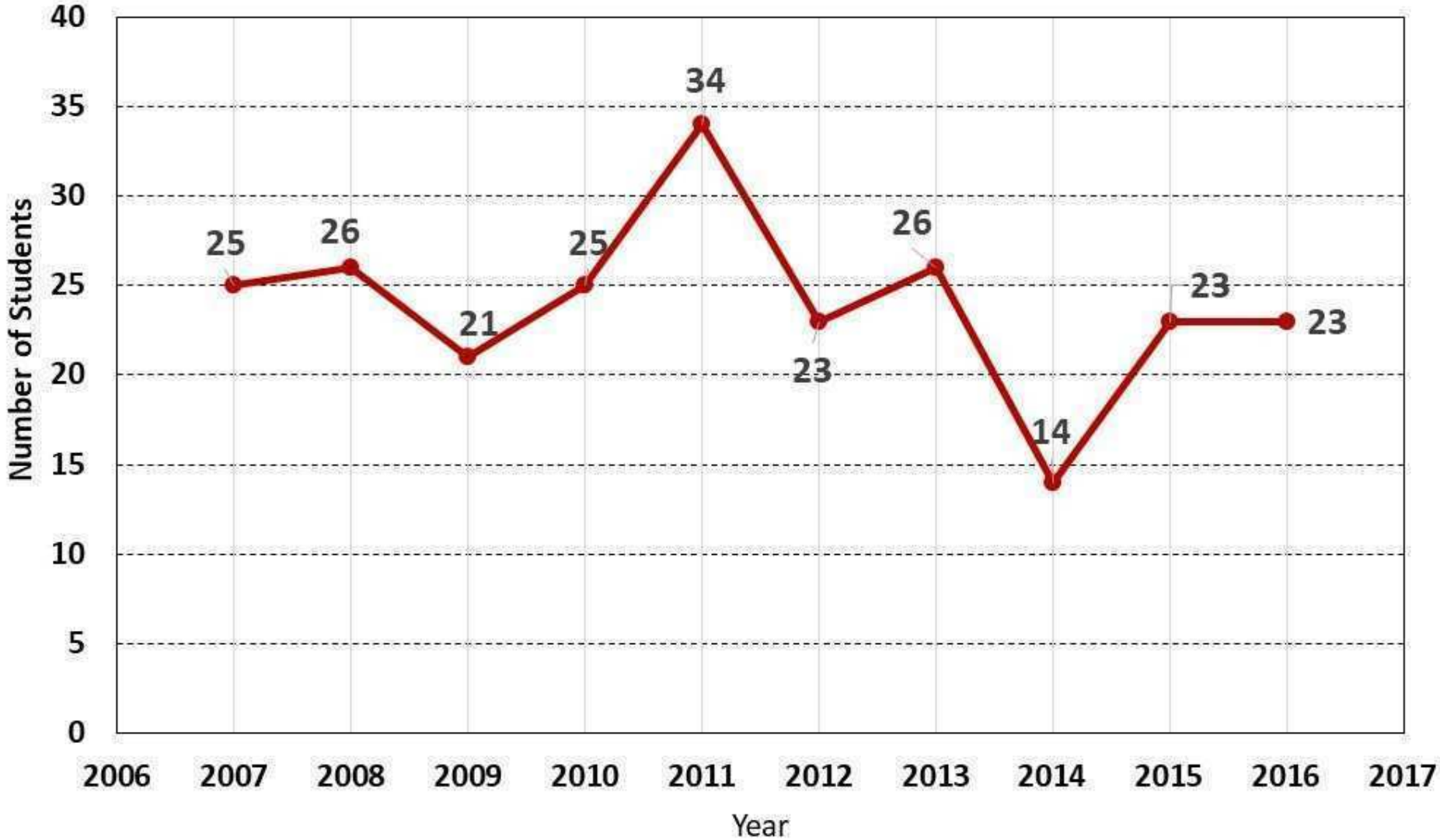


Total of 112 students

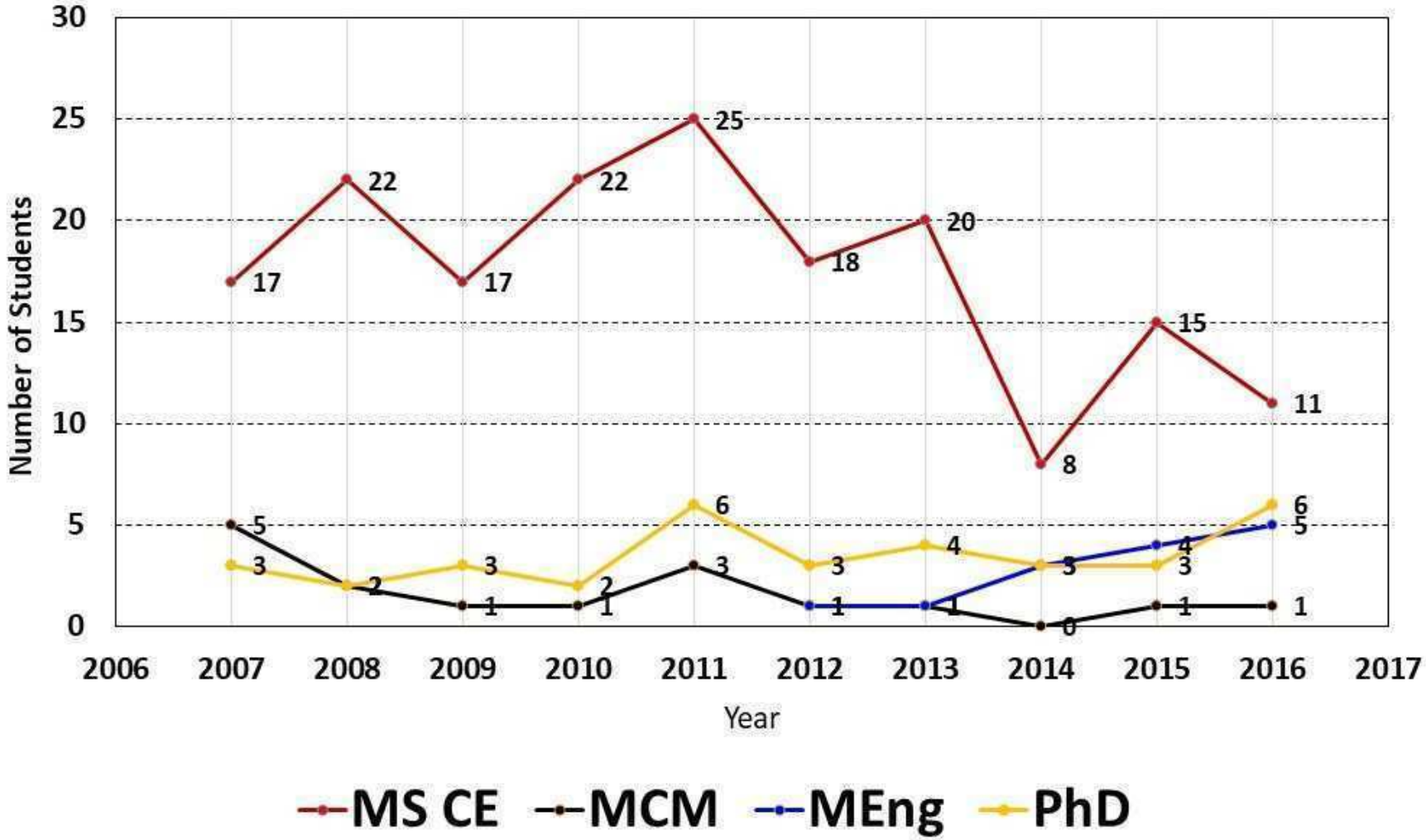
Graduate Enrollment



Graduate degrees



Graduate degrees



Tables for APR report

Graduate Student Enrollment in Fall Semesters

Fall	2012	2013	2014	2015	2016	2017
Master's	51	50	54	58	60	71
Doctoral	26	35	41	44	47	43
Postdoctoral						
Total						

Degree Recipients from 2012-2013 through 2016-17 Academic Years

Fall	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Master's	28	14	22	12	15	17
Doctoral	6	4	4	1	5	6
Total2-	34	18	26	13	20	23

Bachelor of Science Degrees Awarded

Major	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Civil Engineering	26	19	36	30	34	28
Construction Engineering	14	12	14	10	14	13
Construction Management	2	1	4	1	2	3

Recent Enrollments in Bachelor of Science Degree Programs

Undergraduate – Civil Engineering Department						
	Fall 2012	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017
Undergraduate – Civil Engineering						
Sophomore	3	10	24	36	22	12
Junior	22	43	48	34	33	35
Senior	57	33	11	23	32	29
Total	84	86	83	93	87	76
Undergraduate – Construction Engineering						
Sophomore	1	3	0	0	1	1
Junior	1	2	5	3	0	1
Senior	9	3	0	0	3	0
Total	11	8	5	3	4	2
Undergraduate – Construction Management						
Sophomore	0	5	2	14	7	3
Junior	3	8	16	18	17	16
Senior	25	16	5	5	11	12
Total	28	29	23	37	35	31

APR Criterion 5: Faculty Credentials Template

Directions: Please complete the following table by: **1**) listing the full name of each faculty member associated with the designated department/academic program(s); **2)** identifying the faculty appointment of each faculty member, including affiliated faculty (i.e., LT, TTI, TTAP, AD, etc.); **3**) listing the name of the institution(s) and degree(s) earned by each faculty member; **4)** designating the program level(s) at which each faculty member teaches one or more course (i.e., "X"); and **5)** indicating the credential(s) earned by each faculty member that qualifies him/her to teach courses at one or more program levels (i.e., TDD, TDDR, TBO or Other). Please include this template as an appendix in your self-study for Criterion 5A.

Name of Department/Academic Program(s): Department of Civil Engineering

NOTE: Please add rows to the table as needed.

Full First and Last Name	**Faculty Appointment** Continuing • Lecturer (LT) • Probationary/Tenure Track - Instructor (TTI) or Asst. Prof. (TTAP) • Tenured - Assoc. Prof. (TAP), Prof. (TP), or Dist. Prof. (TDP) • Prof. of Practice (PP) Temporary • Adjunct (AD) • Term Teacher (TMT) • Visitor (VR) • Research Faculty (RF)	**Institution(s) Attended, Degrees Earned, and/or active Certificate(s)/Licensure(s)** (e.g., University of New Mexico—BS in Biology; University of Joe Dane—MS in Anthropology; John Doe University—PhD in Psychology; CPA License—2016-2018)	**Program Level(s)** (Please leave blank or provide "N/A" for each level(s) the faculty does not teach at least one course.)		**Faculty Credentials** • Faculty completed a terminal degree in the discipline/field (TDD); • Faculty completed a terminal degree in the discipline/field and have a record of research/scholarship in the discipline/field (TDDR); • Faculty completed a terminal degree outside of the discipline/field but earned 18+ graduate credit hours in the discipline/field (TDO); OR • Other (Explain)
1. Jose Cerrato	TTAP	National Autonomous University of Honduras, BS Civil Engineering; Virginia Tech, MS Environmental Engineering; Virginia Tech, PhD Civil Engineering	Undergraduate		
			Graduate		
			Doctoral		TDDR
2. Julie E. Allred Coonrod	TP	Vanderbilt University, BE Civil Engineering; UNM, MS Civil Engineering; University of Texas at Austin, PhD Civil Engineering	Undergraduate		
			Graduate		
			Doctoral		TDDR
3. Walter Gerstle	TP	University of Colorado, Boulder, BS Civil Engineering; Cornell University, MS Civil Engineering; Cornell University, PhD Civil Engineering	Undergraduate		
			Graduate		
			Doctoral		TDDR
4. Michael Gonzalez	LT	UNM, BS Civil Engineering; UNM, MPA Management	Undergraduate		TDD
			Graduate		
			Doctoral	Na	
5. Ricardo Gonzalez-Pinzon	TTAP	National University of Colombia, BS Agricultural Engineering; National University of Colombia, MS Water Resources Engineering; Oregon State	Undergraduate		
			Graduate		
			Doctoral		TDDR

Full First and Last Name	**Faculty Appointment** Continuing • Lecturer (LT) • Probationary/Tenure Track - Instructor (TTI) or Asst. Prof. (TTAP) • Tenured - Assoc. Prof. (TAP), Prof. (TP), or Dist. Prof. (TDP) • Prof. of Practice (PP) Temporary • Adjunct (AD) • Term Teacher (TMT) • Visitor (VR) • Research Faculty (RF)	**Institution(s) Attended, Degrees Earned, and/or active Certificate(s)/Licensure(s)** (e.g., University of New Mexico—BS in Biology; University of Joe Dane—MS in Anthropology; John Doe University—PhD in Psychology; CPA License—2016-2018)	**Program Level(s)** (Please leave blank or provide "N/A" for each level(s) the faculty does not teach at least one course.)		**Faculty Credentials** • Faculty completed a terminal degree in the discipline/field (TDD); • Faculty completed a terminal degree in the discipline/field and have a record of research/scholarship in the discipline/field (TDDR); • Faculty completed a terminal degree outside of the discipline/field but earned 18+ graduate credit hours in the discipline/field (TDO); OR • Other (Explain)
		University, PhD, Water Resources Engineering			
6. Susan Bogus Halter	TP	University of Wisconsin-Madison, BS Civil and Environmental Engineering; University of Madison-Wisconsin, MS Civil and Environmental Engineering; University of Colorado at Boulder, PhD Civil Engineering	Undergraduate		
			Graduate		
			Doctoral		TDDR
7. Kerry Howe	TP	University of Wisconsin-Madison, BS Civil and Environmental Engineering; University of Texas at Austin, MS, Environmental Health Engineering; University of Illinois at Urbana-Champaign, PhD Environmental Engineering	Undergraduate		
			Graduate		
			Doctoral		TDDR
8. Fernando Moreu	TTAP	University of Granada, Spain, BS Civil and Environmental Engineering; University of Illinois at Urbana-Champaign, MS Structural Engineering; University of Illinois at Urbana-Champaign, PhD Structural Engineering	Undergraduate		
			Graduate		
			Doctoral		TDDR
9. Tang-Tat Percy Ng	TP	National Taiwan University, BS Civil Engineering; Carnegie Mellon University, MS Civil Engineering; Rensselaer Polytechnic Institute, PhD Civil Engineering	Undergraduate		
			Graduate		
			Doctoral		TDDR
10. Timothy Ross	TP	Washington State University, BS Civil Engineering; Rice University, MS Civil Engineering; Stanford University, PhD Civil Engineering	Undergraduate		
			Graduate		
			Doctoral		TDDR
11. Gregory M. Rowangould	TTAP	University of Maine, BS Chemical Engineering; University of Maine, MS Resources Economics and Policy; University of California-Davis, PhD Civil and Environmental Engineering	Undergraduate		
			Graduate		
			Doctoral		TDDR
12. Andrew Schuler	TP	University of Colorado at Boulder, BS Civil and Environmental Engineering; University of California at Berkeley, MS	Undergraduate		
			Graduate		
			Doctoral		TDDR

Full First and Last Name	**Faculty Appointment** Continuing • Lecturer (LT) • Probationary/Tenure Track - Instructor (TTI) or Asst. Prof. (TTAP) • Tenured - Assoc. Prof. (TAP), Prof. (TP), or Dist. Prof. (TDP) • Prof. of Practice (PP) Temporary • Adjunct (AD) • Term Teacher (TMT) • Visitor (VR) • Research Faculty (RF)	**Institution(s) Attended, Degrees Earned, and/or active Certificate(s)/Licensure(s)** (e.g., University of New Mexico—BS in Biology; University of Joe Dane—MS in Anthropology; John Doe University—PhD in Psychology; CPA License—2016-2018)	**Program Level(s)** (Please leave blank or provide "N/A" for each level(s) the faculty does not teach at least one course.)		**Faculty Credentials** • Faculty completed a terminal degree in the discipline/field (TDD); • Faculty completed a terminal degree in the discipline/field and have a record of research/scholarship in the discipline/field (TDDR); • Faculty completed a terminal degree outside of the discipline/field but earned 18+ graduate credit hours in the discipline/field (TDO); OR • Other (Explain)
		Civil and Environmental Engineering; University of California at Berkeley, PhD Civil and Environmental Engineering			
13. Mark Stone	TAP	University of Nebraska, BS Biological Systems Engineering; Washington State University, MS Civil and Environmental Engineering; Washington State University, PhD Civil and Environmental Engineering	Undergraduate		
			Graduate		
			Doctoral		TDDR
14. John C. Stormont	TP	University of Wisconsin, BS Mining Engineering; University of Arizona, MS Mining Engineering; University of Arizona, PhD Geological Engineering	Undergraduate		
			Graduate		
			Doctoral		TDDR
15. Mahmoud Reda Taha	TP	Ain Shams University, BS Structural Engineering; Ain Shams University, MS Structural Engineering; University of Calgary, PhD Civil and Environmental Engineering	Undergraduate		
			Graduate		
			Doctoral		TDDR
16. Rafiqul A. Tarefder	TP	Bangladesh University of Engineering and Technology, BS Civil Engineering; Bangladesh University of Engineering and Technology, Master of Engineering, Geotechnical Engineering; University of Oklahoma, PhD Civil Engineering	Undergraduate		
			Graduate		
			Doctoral		TDDR
17. Vanessa Valentin	TTAP	University of Puerto Rico, BS Civil Engineering; Purdue University, MS Civil Engineering; Purdue University, PhD Civil Engineering	Undergraduate		
			Graduate		
			Doctoral		TDDR

University of New Mexico Department of Civil Engineering 2015-2020 Strategic Plan

The Department of Civil Engineering at the University of New Mexico has a long history of excellence in teaching, research and service that has improved the lives of New Mexicans and those beyond our borders. Our graduates create the infrastructure that enables communities of every size to thrive. The infrastructure built and maintained by civil engineers, construction engineers, and construction managers supplies clean drinking water while protecting water resources, creates a reliable and safe transportation system and delivers the energy that lights our homes and powers our economy. While much has been accomplished with the help of civil engineers, construction engineers, and construction managers there are many existing and emerging challenges. This strategic plan is designed to ensure that the department and its graduates remain well positioned to meet society's demand for safe, reliable and sustainable infrastructure in a rapidly changing world.

Strategic Focus Areas

Transportation

The department's transportation engineering program takes a wide look at the technology, infrastructure, policy, and human behavior that affect the safety, reliability and sustainability of transportation systems. Our teaching, research, and outreach focus on two broad areas: Intelligent Transportation Systems, and Sustainable Transportation System Planning. The intelligent transportation systems (ITS) area focuses on finding more efficient ways to use our existing physical transportation infrastructure by applying advanced sensor and communications technology coupled with adaptive computer control systems to ease congestion, improve safety, and collect new travel information to support planning decisions and research. The sustainable transportation system planning area focuses on developing new methods for evaluating the effectiveness and efficiency of regional transportation system plans and policies with the aim of discovering more environmentally and financially sustainable solutions. These aims are supported by collecting new travel behavior information, developing novel forecasting and prediction models, and evaluating decision making frameworks.

Environmental & Water Resources

Water is a critical issue to the State of NM and water systems are a fundamental element of local, state, and national infrastructure. We will focus on the relationship between water, energy, and the environment, including collaborations with other researchers at UNM that are focusing on energy. We will focus on watershed response and implications to infrastructure from climate change, including changing patterns of drought and flood. We will focus on the use of algal fuel cells for energy production, minimizing the environmental impacts of water and wastewater treatment, and treatment of contaminants in the environment.

Structural/Geotechnical/Materials

Our research efforts are focused on developing quantifiable metrics for sustainable structural design and integrating those metrics and principles in our undergraduate curriculum. We are investigating alternative cementing materials that have a lower carbon footprint than current Portland cement. We will also focus on developing methods to enhance durability and longevity of construction materials using nanotechnology. Finally, we will direct our efforts towards developing robust methods for structural health monitoring of current energy infrastructure such as nuclear power plants, developing multi-scale computational models to predict structural performance of energy infrastructure, and introduce a new generation of structural materials (e.g. ultra high performance concrete – UHPC) for developing sustainable energy infrastructure.

Construction Engineering and Management

Construction engineering and management professionals have a principle role in creating sustainable infrastructure. We will focus on educating a workforce and conducting research in project delivery methods that integrate the design and construction processes (e.g., design-build; concurrent engineering and construction; lean construction), systems dynamics in construction (such as modeling and simulation of construction operations; risk management; and overcoming uncertainties in construction), and sustainable construction practices.

Strategic Planning Goals

The faculty met for an all-day planning retreat during the spring semester of 2015. While many needs and priorities were discussed, several common themes emerged. The faculty identified increasing the department's visibility and student success as being critical to the department's future. The faculty also expressed a need to remain competitive with leading institutions. These three items are considered the department's strategic goals. The importance of each goal is explained below, along with specific objectives and action items to help the department achieve each goal.

Goal 1: Increase Department Visibility

While the department has contributed significantly to the wellbeing of New Mexicans as well as those outside our borders, and continues to do so, it remains unclear how well this is understood. The faculty expressed a need to increase the visibility of the department's contributions to decision makers, industry, prospective students and society in general. The aim of this goal is to expand support for the department's educational, research and service activities while also attracting a larger and more diverse cohort of students. Accomplishing the following objectives is expected to move the department towards its goal of increasing visibility.

Objective 1A: Consider changing the department's name.

A new department name that describes the department's activities in more detail may increase visibility.

Action Items	***Responsibility***	***Time Frame***
Determine UNM process for changing the department's name	Strategic Planning Committee & Department Chair	AY 2015-2016

Solicit proposals from the faculty for a new name
• Each proposals shall include:
  ○ The proposed name
  ○ A clear rationale for the proposed name change including, the expected benefits to the department, school or university.
• Distribute proposals to the faculty for review
• Hold a faculty meeting to discuss proposals and name change process
  ○ Conduct faculty vote or iterate if necessary
	Strategic Planning Committee & Department Chair	AY 2015-2016

Objective 1B: Create a public identity for the department that concisely describes the importance of our diverse research and academic programs in today's society and the future.

The department's faculty engage in a diverse range of research topics. Those outside of the field, including government officials, businesses, colleagues in other disciplines, and potential students may not know the full range of our research and educational activities or understand the common themes that tie them together.

Action Items	*Responsibility*	*Time Frame*
Create a short narrative (e.g., like the first paragraph on this strategic planning document) or info graphic that can be placed on our website and other promotional materials that explains the importance of what we all do in everyday terms.	Strategic Planning Committee	AY 2015-2016

Objective 1C: Promote the department's research accomplishments and activities.

Action Items	*Responsibility*	*Time Frame*
Proactively seek opportunities for publicity. • Coordinate with UNM Media Relations (https://ucam.unm.edu/media-relations/index.html) to promote new research findings and publications. • Karen Wentworth, Senior University Communications Representative,	All Faculty	AY 2015-2020
Continuing Activities		
• Produce department newsletters on a regular schedule. • Advertise department at external events such as the paving and transportation conference, the BIM conference, and lectures that the department sponsors. • Invite nationally recognized scholars to provide seminars and visit the department.		

Goal 2: Increase Enrollment of Well Prepared Students

Objective 2A: Identify how students view the department's academic programs.

It is currently unclear what factors affect a student's decision to major in Civil Engineering, Construction Engineering, or Construction Management and choose UNM. A better understanding of these factors would help the department target its marketing activities to grow its enrollment and may also inform changes to our curriculum.

Action Items	*Responsibility*	*Time Frame*
Survey our current students, ask about factors involved in their decision to attend UNM and major in Civil Engineering, Construction Engineering, or Construction Management.	Strategic Planning Committee & Instructors	AY 2016-2017
Investigate the possibility of surveying potential (i.e., high school students or freshman) students about their views of civil engineering at UNM. • Before/after first semester (or year) survey to understand if expectations were met & reasons why students leave the department.	Strategic Planning Committee and Instructor for CE160	AY 2016-2017
Investigate current UNM and SOE marketing information and strategies.	Strategic Planning Committee	AY 2016-2017

Objective 2B: Attract well prepared students.

Continuing Activities
• Provide judicious use of scholarships • Regularly review entrance requirements • Maintain an active and up to date website

Objective 2C: Increase online education.

Online education is an opportunity to reach new students and expand access to education.

Action Items	*Responsibility*	*Time Frame*
Evaluate success of MCM online degree program	Graduate Committee	AY 2016-2020
Investigate potential to offer additional degrees and courses online and departmental incentives to encourage faculty to develop online courses.	Graduate Committee	AY 2017-2020
Continuing Activities		
• Offer MCM degree completely online. • Develop marketing strategy for online degrees (and courses).		

Goal 3: Continue to Develop an Innovative Curriculum that Creates Engineers and Construction Managers Who Will Change New Mexico and the World

The faculty have been making incremental changes to the department's curriculum for undergraduate and graduate students. While these changes have helped streamline and modernize the curriculum, improving student success and ensuring that the department's students have the right skills for tomorrow's challenges remain a priority. Achieving these goals brings with it at least two benefits beyond our graduates own success and their contributions to society. Higher achieving graduates will contribute to increasing the department's visibility and a more innovative curriculum may help grow enrollment and increase diversity. Accomplishing the following objectives is expected to move the department towards its goal of continuing to develop an innovative curriculum.

Objective 3A: Improve communication skills.

Strong communication skills, in particular written communication, are essential for student success. The faculty believe that student's communication skills should be improved

Action Items	*Responsibility*	*Time Frame*
Investigate ways to better integrate core communications courses with each of our degree curricula. For example, align technical writing courses with civil engineering technical electives.	Undergraduate Committee	AY 2016-2017
Investigate what communication skills students are currently taught in UNM core courses and reinforce these skills in courses offered by the department. For example, hold written work products to the same standards as in core English and communications courses.	Undergraduate Committee	AY 2016-2017
Enhance curriculum so that communications skills are reinforced throughout the degree program. For example, ensure that there is a writing intensive (or presentation intensive) course each semester in a typical student's schedule. Ensure that written work products and presentations in these courses are	Undergraduate Committee	AY 2016-2018

rigorously evaluated and detailed feedback are provided to students.
• Investigate resources required to accomplish this including:
  o Hiring additional TA's with experience in technical writing instruction to evaluate and provide feedback on writing assignments.
  o Faculty course release so that additional effort can be placed on developing writing and communication intensive components to existing courses, provide detailed feedback and evaluation, and monitor progress in communication skills.		

Investigate methods to track communications skills. The FE exams provides a great metric for disciplinary core knowledge but we currently have nothing similar for communications skills.	Undergraduate Committee	AY 2016-2018

Objective 3B: Training engineers and construction managers to be leaders.

Our students can contribute to society not only through professional engineering or construction work but through leadership. Leadership may include engaging in public policy formation, holding public office, creating innovative new technologies and start-up companies, and running a successful business.

Action Items	***Responsibility***	***Time Frame***
Investigate if there are models to follow from other programs at UNM or elsewhere.	Strategic Planning Committee	AY 2016-2017
Develop a course that can be part of UNM's innovation academy.	Undergraduate Committee	AY 2016-2018
Develop or list courses for inclusion in UNM's honors college curriculum.	Undergraduate Committee	AY2015-2017
Incorporate service learning opportunities into existing courses.	Interested Faculty	AY 2015-2020
Continuing Activities		
• Maintain and promote student involvement in professional associations and their on-campus student chapters		

Objective 3C: Measure student success.

The faculty rely mainly on the outcome of the FE exam to track engineering student success. However, the FE exam does not fully capture important outcomes, such as student's communication skills, success in fulfilling professional goals (e.g., employment as an engineer or success in graduate school) and the impact they may have on society after they graduate. Furthermore, the results of the FE exam which takes place during a student's final year at UNM are difficult to trace back to specific interventions made by the faculty in prior years. The department should develop performance metrics and collect data that allow the faculty to judge the success or specific interventions, programs or the curriculum as a whole.

Action Items	*Responsibility*	*Time Frame*
Improve tracking and reporting of FE exam results to the faculty. For example, provide UNM civil engineering student FE exam results over time by subject area, along with comparable national data, in an easy to access location and format.	Undergraduate Committee	AY 2015-2020
Track the success of construction management students using the results of the AIC exam.	Undergraduate Committee	AY 2015-2020
Investigate ideas to measure communication skills.	Strategic Planning Committee	AY 2016-2018
Investigate ideas to track what students do after they graduate.		
Ensure that plans to change the curriculum include plans to measure expected outcomes.	All Faculty	AY 2015-2020
Present performance metrics regularly, for example at beginning of academic year department retreats.	Undergraduate & Graduate Committee	AY 2015-2020

Goal 4: Increase Competitiveness with Leading Institutions

The faculty believe that achieving many of its goals, including those not specially discussed in the strategic plan, requires reconsidering support for its core academic missions: education and research. A goal of adjusting support so that it is commensurate with that of the top 50 civil engineering departments is considered a desirable target. The faculty identified the following as priorities for consideration for additional support.

- Research facilities and laboratory space
- Teaching loads
- Faculty salaries
- New faculty and staff positions
- Faculty support for international student recruitment
- More TA positions for PhD students, taking place of courses taught by adjuncts
- Improve junior faculty mentoring, specifically with regard to developing externally funded research programs.

Action Items	*Responsibility*	*Time Frame*
Develop a series of regular junior faculty mentoring workshops or meetings that target specific needs of civil engineering junior faculty.	Senior Faculty	AY 2015-2020
Identify courses which may be taught by TAs and standards for selecting TAs.	Undergraduate and Graduate Committees	AY 2015-2017