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| **California State University, Fresno**  **Lyles College of Engineering**  **Civil and Geomatics Engineering Department/ Geomatics Engineering Program**  **Department/Program Assessment Coordinator: Dr. Mike Mustafa Berber** |
| **Student Outcomes Assessment Plan (SOAP)** |
| Mission Statement |
| The mission of the Geomatics Engineering (GME) Program is to provide a unique educational experience that enriches the lives of GME students. The program teaches necessary discipline-related knowledge and skills to prepare students for their competency in the profession. Students learn how to protect the health and welfare of the public while expanding their base of knowledge through research and scholarship. Graduates of the program serve throughout the state, the nation and the world at large. |

## Institutional Learning Outcomes, Program Learning Outcomes/Goals, and SLO’s [a,b,c]

* 1. Institutional Learning Outcomes. Fresno State ILO’s are posted on the following webpage: <http://fresnostate.edu/academics/oie/assessment/fresno-state-assessment.html>

Student who graduate from California State University, Fresno will demonstrate the importance of discovery, diversity, and distinction by

* + 1. **developing a foundational, broad and integrative knowledge** of the humanities, the arts, the sciences, and social sciences, and their integration with their major field of study. Students will consolidate learning from different fields and explore the concepts and questions that bridge those essential areas of learning. Graduate students will articulate the significance, implications and challenges within their field in a societal and global context. In fields in which interdisciplinarity is fundamental, graduate students will further draw from the perspectives of other domains of inquiry/practice so as to assess a problem better and offer solutions to it.
    2. **acquiring specialized knowledge** as identified by program learning outcomes in their major field. Students will demonstrate expertise in a specialized area of study, including integration of ideas, methods, theory and practice. Graduate students will demonstrate further mastery of the field’s theories, research methods, and approaches to inquiry. They will also show the ability to assess major contributions to the field, as well as expand on those contributions through empirical research or aesthetic exploration.
    3. **improving intellectual skills** including critical thinking, effective oral and written communication, information literacy and quantitative reasoning. Students will demonstrate fluency via application of these skills to everyday problems and complex challenges. Graduate students will hone these skills further, demonstrating coherent arguments, analysis, insight, creativity, and acumen as they address local, regional, and global issues in their respective fields of study.
    4. **applying knowledge** by integrating theory, practice, and problem solving to address real world issues using both individual and team approaches. Students will apply their knowledge in a project, paper, exhibit, performance, or other appropriate demonstration that links knowledge and skills acquired at the university with those from other areas of their lives. Graduate students will integrate knowledge and skills from coursework, practicum, and research to address critical issues in their field and demonstrate advanced application of knowledge through a culminating experience that validates, challenges, and/or expands the profession’s body of knowledge.
    5. **exemplifying equity, ethics, and engagement.** Students will form and effectively communicate their own evidence-based and reasoned views on public issues, interact with others to address social, environmental and economic challenges, apply knowledge of diversity and cultural competencies to promote equity and social justice in the classroom and the community, value the complexity of ethical decision making in a diverse society, acknowledge the importance of standards in academic and professional integrity, and demonstrate honesty, tolerance, and civility in social and academic interactions. Building upon this at the graduate level, students will apply these values in the creation of scholarly and/or aesthetic works that enrich the human experience.
  1. ABET Student Outcomes
     1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
     2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
     3. an ability to communicate effectively with a range of audiences
     4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
     5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
     6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
     7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.
  2. The GME program learning objectives (also known as Goals) and related SLO’s:

a. The graduates of the Geomatics Engineering (GME) program should demonstrate competency in one or more of the following GME competency areas: boundary/land surveying, photogrammetry, geodesy, GIS, and digital mapping.

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

2. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

3. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

b. The graduates of the GME program should demonstrate continued capacity for employment in one or more GME specialty area.

1. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

2. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts

3. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives

4. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

c. The graduates of the GME program shall demonstrate capacity for graduate education.

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

3. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

d. The graduates of the GME program shall demonstrate continued membership in professional organizations.

1. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

e. The graduates of the GME program shall demonstrate a continuing commitment to lifelong learning.

1. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

f. The graduates of the GME program shall demonstrate a continuing commitment to serving and protecting the health and welfare of the public.

1. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors

g. The graduates of the GME program shall demonstrate an ability to pass professional licensing or certification examinations after achieving requisite professional experience.

1. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions

## Curriculum Map [d]: Courses in which SLO’s are addressed and evaluated

|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| --- | --- | --- | --- | --- | --- | --- | --- |
| GME 1 | I |  | I | I |  |  | I |
| GME15 | I | I |  |  |  | I |  |
| GME 15L | I | I | I |  | D | I | I |
| GME 16 | D | D |  | I |  | D | I |
| GME 16L | D | D | I |  | D | D | D |
| GME 34 | D |  |  |  |  | D |  |
| GME 40 | D |  | D |  | D |  | D |
| GME 50 | D |  |  | M |  | M | D |
| GME 61 | D |  | I |  |  | I | I |
| GME 66 | D | D |  | I | I | M | D |
| GME 102 | D |  | I |  |  | D | I |
| GME 108 | M |  |  |  |  | M |  |
| GME 123 | M |  | D |  |  | M | I |
| GME 125 | M |  | D |  |  | M | I |
| GME 126 | D | D | I |  | M | M | D |
| GME 135 | M |  |  |  |  | M |  |
| GME 143 | M |  |  |  |  | M |  |
| GME 145 | M |  |  |  | M | M |  |
| GME 151 |  |  | D | M |  |  | M |
| GME 159 |  | M | D | M |  | M | M |
| GME 173 | I |  | D |  | M |  | M |
| GME 174 | D | D | D |  | M |  | M |
| GME 180 | M | M | M |  |  | M | M |
| GME 181 |  | M | M | M | M |  | M |

For courses in the major, using the abbreviations below, indicate which outcomes are introduced, which are developed, and which are mastered in that particular course.

| **I = Introduced** | **D = Developed** | **M=Mastered** |  |
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## SLO’s Mapped to Assessment Measures and Methods [e]

| Assessment Measure | Evaluation Method | SLO 1 | SLO 2 | SLO 3 | SLO 4 | SLO 5 | SLO 6 | SLO 7 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| (Assignment or survey) | Criteria, Rubric, Score |  |  |  |  |  |  |  |
| Competency area\* | Direct | X | X | X | X | X | X | X |
| Professional Exam | Direct | X |  |  |  |  | X |  |
| Employment Rates | Direct | X | X | X | X | X | X |  |
| Exit interview | Indirect | X | X | X | X | X | X | X |
| Course evaluation | Indirect | X | X | X | X | X | X | X |
| Junior surveys | Indirect | X | X | X | X | X | X | X |
| Senior surveys | Indirect | X | X | X | X | X | X | X |
| Alumni surveys | Indirect | X | X | X | X | X | X | X |
| Employer surveys | Indirect | X | X | X | X | X | X | X |
| Advisory Council | Indirect |  | X |  | X | X |  |  |

\* Competency area assessment courses include GME 34, 40, 61, 66, 102, 108, 123, 125, 135, 143, 145, 151, 152, 174 and 181.

Note: Since GME program is an accredited program, GME SOAP does not need to measure PLOs.

## Assessment Measures: Description of Assignment and Method (rubric, criteria, etc.) used to evaluate the assignment [f]

* 1. Direct Measures (Department/Program must use a minimum of three different direct measures)

1. Competency area assessment by faculty

2. Professional Exam passing statistics

3. Employment rates

* 1. Indirect Measures (Department/Program must use a minimum of one indirect measure)
     1. Exit interview surveys
     2. Course evaluation surveys
     3. Junior surveys
     4. Senior surveys
     5. Alumni surveys
     6. Employer surveys
     7. Advisory Council

## Assessment Schedule/Timeline [g]

| Academic  Year | Measure | SLO 1 | SLO 2 | SLO 3 | SLO 4 | SLO 5 | SLO 6 | SLO 7 |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2017-2018 | A1, B1 | X | X | X | X | X | X | X |
| 2018-2019 | A1, B1 | X | X | X | X | X | X | X |
| 2019-2020 | A1, B1 | X | X | X | X | X | X | X |
| 2020-2021 | A1, B1, B2, B3, B4 | X | X | X | X | X | X | X |
| 2021-2022 | A1, B1 | X | X | X | X | X | X | X |
| 2022-2023 | A1, B1 | X | X | X | X | X | X | X |
| 2023-2024 | A1, B1 | X | X | X | X | X | X | X |
| 2024-2025 | A1, A2, A3, B1, B2, B3, B4, B5, B6,B7 | X | X | X | X | X | X | X |

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| Closing the Loop [h,j,k] |
| **Fresno State Closing the Loop process is described immediately below.** |
| A major assessment report, which focuses on assessment activities carried out the previous academic year, is submitted in September of each academic year and evaluated by the Learning Assessment Team and Director of Assessment at Fresno State. |
| Program/Department Closing the Loop process:  Formal written assessment input is received from the constituent groups, consolidated and processed under the direction of the program coordinator. All GME faculty receive informal and oral communication relating to our on-going assessment process.  The numerical assessment results are evaluated to determine how well the student learning objectives are being met. The direct input is also evaluated to determine whether the established outcomes are appropriate or perceived as viable by each constituent group. All indications before and since our program assessment startup strongly suggests that student learning objectives are appropriate for the program at this time. Fine tuning, when necessary, may be required as the assessment process continues. |