UNIVERSITY OF GUAM
UNIBETSEDÅT GUÅHAN
Board of Regents

Resolution No. 19-01

RELATIVE TO APPROVING THE BACHELOR OF SCIENCE IN CIVIL ENGINEERING PROGRAM

WHEREAS, the University of Guam (UOG) is the primary U.S. Land Grant institution accredited by the Western Association of Schools and Colleges (WASC) Senior College and University Commission (WSCUC) serving the post-secondary needs of the people of Guam and the Western Pacific region;

WHEREAS, the Board of Regents (BOR) is incorporated to approve academic programs as one of its powers to be duly exercised;

WHEREAS, UOG desires to establish a new undergraduate degree program, Bachelor of Science (BS) in Civil Engineering under the School of Engineering (SENG);

WHEREAS, Guam and the region need qualified engineers to support existing infrastructure and expanding population needs;

WHEREAS, UOG has the responsibility to lead the Western Pacific Region in meeting these challenges by offering a degree program that addresses the most critical engineering needs faced by the region and the island;

WHEREAS, the SENG Advisory Council voiced strong support for this program; the Good to Great Implementation Plan included completing this program; UOG expanded faculty resources for this program; and UOG conducted a dedication ceremony for the construction site of a facility for SENG;

WHEREAS, this curriculum was crafted with the standards of the Accreditation Board for Engineering and Technology (ABET) in mind;

WHEREAS, the enclosed BS in Civil Engineering Program proposal was recommended by the SENG Academic Affairs Committee and Dean; endorsed by the Undergraduate Curricula Review Committee and the Faculty Senate; and was reviewed and recommended for approval by the Senior Vice President for Academic and Student Affairs and the President; and

WHEREAS, the Academic, Personnel and Tenure (AP&T) Committee has reviewed the enclosed proposal and recommends approval of this program to the BOR.

NOW, THEREFORE, BE IT RESOLVED, that the BOR hereby approves the BS in Civil Engineering Program, effective AY2019-2020.

Adopted this 13th day of February, 2019.

Christopher K. Felix, Chairperson

ATTESTED:

Thomas W. Krise, Ph.D., Executive Secretary

UNIVERSITY OF GUAM
UNIBETSEDÅT GUAHAN

SENIOR VICE PRESIDENT
Academic & Student Affairs

December 18, 2018

MEMORANDUM

TO: Dr. Thomas W. Krise, President

FROM: Dr. Anita Borja Enriquez
Senior Vice President, Academic and Student Affairs

SUBJECT: Approval of New Degree Program: Bachelor of Science in Civil Engineering

I am pleased to report that the Faculty Senate endorsed the request for new degree program: Bachelor of Science in Civil Engineering and all the subsequent requests for new courses related to this program.

The request is an expansion of the current 2-year Pre-Engineering program to a 4-year Civil Engineering degree program. It comes at an opportune time to meet the professional and military buildup needs for engineers on Guam and throughout the region. There is tremendous support for the School of Engineering's Advisory Council, a representative body of all industry sections. It is the intent of the School to work towards achieving external review and accreditation from Accreditation Board for Engineering and Technology (ABET).

I fully support this request and look forward to your favorable approval for the BOR AP&T committee review and subsequent approval by the full Board of Regents.

Thank you.

APPROVED:

Dr. Thomas W. Krise
President

Attachment: Bachelor of Science in Civil Engineering (Log No. 6019)

Office of Academic and
Student Affairs
University of Guam

Received By:
12/17/18 3:20 pm
Date & Time

ORIGINAL

UNIVERSITY
OF GUAM
Unibetsedåt GUAHAN

No. 6019
Office of Academic and Student Affairs

REQUEST FOR NEW DEGREE PROGRAM APPROVAL

1. Title of Program: Bachelor of Science in Civil Engineering
2. Credit Hours Required: 127 Semester Credit Hour
3. Level of Program: [X] Undergraduate [ ] Graduate
4. Proposed Effective Date (Catalog/Bulletin): Fall 2019
5. Proposal Document: Attach proposal document to this form. See "Procedure for Proposals to Establish New Programs".
   Attached
6. APPROVAL Recommended by:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program	M/O M alw	9-13-2018
Division Chair	M/O M alw	9-13-2018
Chair, College AAC/CC	M/O M alw	9-13-2018
Dean, of College		9/13/2018
UCRC/GCRC Chair	Dr. Suzanne Bells	DEC 11 2018
President, Faculty Senate (if substantive)	Dr. Mary Therese F. Cruz (Endorsement of UCRC/GCRC Recommendation)	DEC 11 2018

APPROVED:

Dr. Anita B. Enriquez
SENIOR VICE PRESIDENT
ACADEMIC AND STUDENT AFFAIRS

DEC 18 2018
DATE

Dr. Thomas W. Krise
PRESIDENT

1-4-19
DATE

Mr. Christopher K. Felix
CHAIRPERSON, BOARD OF REGENTS

FEB 13 2019
DATE

No. 6019

UNIVERSITY OF GUAM
UNIBETSEDÅT GUAHAN

SCHOOL OF ENGINEERING (SENG)

September 17, 2018

To: *Dr. Mary Therese F. Cruz, President, Faculty Senate*

From: *Dr. Shahram Khosrowpanah, Interim Dean (SENG)*

Subject: *Request for Endorsement for a New Degree Program: Bachelor of Science in Civil Engineering*

Dear Dr. Cruz,

The *AAC*, School of Engineering (SENG) is requesting endorsement of a new degree program: *Bachelor of Science in Civil Engineering. The AAC members including the Dean met on September 14 and approved the Bachelor of Science in Civil Engineering* major along with the new and revised courses that are included in the request package.

The *Bachelor of Science in Civil Engineering degree at University of Guam,* which is an expansion to the 2-year *Pre-Engineering program (established in 1989)* to a full 4-year civil engineering degree program, will meet the needs of local students and the work force requirements of Guam, Micronesia and the neighboring regions of the Pacific and Asia. In the future, this program will attract students from neighboring islands and countries and the revenue generated will help the School of Engineering (SENG) to become self-sufficient to run by itself without much financial support from Government of Guam.

As stated in the program proposal, in order to eventually become licensed as a Professional Engineer, graduating from an ABET-accredited program is critical. The proposed Bachelor of Science in Civil-Environmental Engineering Program has been designed to satisfy the path to licensure that meets the ABET requirements. ABET accredits academic programs at universities and colleges preparing graduates for entry into professional disciplines of applied science, engineering, and technology.

When the Pre-Engineering Program was established in 1989 at CNAS, the courses were given the pre-fix of ES. The courses in the Civil and Environmental Engineering program (proposal package) will now be designated by CEE to distinguish from CE (Continuing Education). This designation will be assigned when the program approved, retroactively. All transcripts with these courses will reflect the CEE designation. We are looking for the Senate endorsement.

cc: Dr. Pyo-Yoon Hong, Dr. Ujwalkumar Patil, Dr. Joseph Rouse

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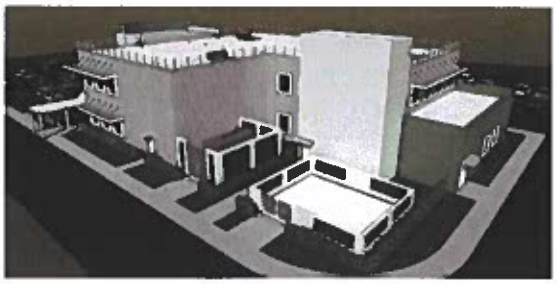
Bachelor of Science in Civil Engineering

School of Engineering

Department of Civil & Environmental Engineering

SCHOOL OF ENGINEERING



MISSION & VISION

The mission of the School of Engineering is to provide outstanding undergraduate instruction in the fundamentals of engineering and those specialties of engineering that are most important to Guam and other island communities of the West Pacific region. The School will be offering a Bachelor of Science in Civil Engineering degree that will meet the needs of local students and the work force requirements of Guam, Micronesia and the neighboring regions of the Pacific and Asia. The graduates would be valuable for Guam construction companies, consulting companies, municipalities, Guam Department of Public Works, Guam Environmental Protection agency, and more. The graduates would be primarily involved with the analysis, design and development of structural systems, construction projects, transportation projects, environmental treatment facilities, and project management.

DEGREE PROGRAM

The School of Engineering will be offering a four-year Bachelor of Science in Civil Engineering (B.S.C.E) Degree program that will be accredited by the Accreditation Board for Engineering and Technology (ABET). The School will have faculty with expertise in each of the basic civil engineering field. A new building will house the new program that provide state of the art space for classrooms, laboratories, office space for faculty, administration, and students.

HISTORY OF THE SCHOOL

The School Engineering had its beginning in the University of Guam Pre-Engineering Program, which was established in 1989 to help fill the chronic need for local engineers for Guam and the other islands in the Western Pacific. The Pre-Engineering Program produced students prepared for admission as juniors into any four-year engineering school accredited by ABET. On October 29, 2009, the President of UOG expressed his vision for establishing a four-year accredited engineering degree program to help meet the current and growing demand for engineering expertise in Guam and the region's private and public sectors. In September 2016, the University of Guam Board of Regents formally established the new School of Engineering.

ADMINISTRATION

The Dean of the School of Engineering serves to direct and supervise the teaching, research, and service activities of the School of Engineering. Questions may be directed to:

Dr. Shahram Khosrowpanah, Interim Dean
School of Engineering,
303 University Drive, UOG Station
Mangilao, Guam 96923
Tel: 735-2694/2761

Email: khosrow@triton.uog.edu

ADVISEMENT

The School of Engineering faculty is responsible for the academic advisement of the students who have that declared as a major in the engineering program. Students may contact the School of Engineering at 735-2761 for available faculty for advisement.

ADMISSION REQUIREMENTS

First-time college student applicants to the undergraduate program in Engineering will be admitted if they obtain:

Required High School Units

The following units of study in high school are required to be considered for admission to SENG:

English (3 with substantial composition): 4 units
Mathematics (Algebra 1 level and above): 4 units
Natural Science (2 with lab): 3 units
Social Science: 3 units
Foreign Language (of the same language): 2 units
Academic Electives: 2 units
Total: 18 units

An ACT mathematics score of at least 25 and An ACT composite score of at least 24

A minimum 1210 SAT combined score or minimum 24 ACT combined score or class ranking in top 25 percent of high school class.

First-time college student applicants who do not meet the above criteria but do meet UOG general admission requirements will have their applications reviewed by a faculty committee for admission.

Students without the prerequisite preparation must take the needed coursework before enrolling in courses required for the bachelor's degree. Students seeking re-admission must have been in good academic standing when last enrolled. Otherwise, re-admission requires a formal review by the undergraduate program committee.

Transfer applicants must have at least an overall 2.0 GPA in all coursework, which includes repeated coursework, attempted at previous institutions. Transfer applicants without a 2.0 or higher college GPA must submit a petition for admission.

Students who are planning to enroll in the program should be familiar with the general requirements and procedures for admission to the University (www.uog.edu/admissions/undergraduate-students).

MATHEMATICS PREPARATION

Students who are interested in enrolling in the engineering program must have solid preparation in mathematics. All UOG students enrolling in mathematics courses must take the mathematics placement test before enrolling in their first mathematics course. Arrangements may be made for the placement examination may contact the Mathematics Science Office at 735-2825.

STUDENT ASSISTANSHIPS & OPPORTUNITIES

Engineering students have opportunities to work as research assistants or interns at organizations such as UOG's Water and Environmental Research Institute of the Western Pacific (WERI), Guam Waterworks Authority, Guam Power Authority, and Government of Guam agencies such as the Department of Public Works or Guam Environmental Protection Agency. There are also opportunities for internships and part-time work with private consulting firms.

STUDENT ORGANIZATION

Engineering students have opportunities for joining various professional organizations such as the Society of American Military Engineers (SAME), for which the School of Engineering hosts a student chapter. Clubs associated with the school include: Engineering, Mathematics, and Computer Science Club (EMC^2). For initial information, contact the School.

Degree Requirements

Students enrolled in the degree program are required to complete the University of Guam's General Education requirements. To receive the (B.S.C.E) degree, students complete 127 semester credit hours.

Curriculum for the BS in Civil – Environmental Engineering

Mathematics: 14 Credits

- MA 203* Calculus I — *5 Credits*
- MA 204 Calculus II — *5 Credits*
- MA 205 Calculus III — *4 Credits*

Sciences: 21 Credits

- CH 102/L* General Chemistry — *4 Credits*
- CH 103/L* General Chemistry — *4 Credits*
- PH 251/L University Physics — *5 Credits*
- PH 252/L University Physics — *5 Credits*
- GenEd Tier II Direction Building — *3 Credits*

General Engineering, Computer Science: 8 Credits

- CEE 100 Introduction to Engineering — *1 Credits*
- CEE 101 Engineering Graphics — *3 Credits*
- CS 201 Programming I — *4 Credits*

Humanities and Social Science: 30 Credits

- EN 110* Freshmen Composition — *3 Credits*
- EN 111* Writing for Research — *3 Credits*
- CT 101* Critical Thinking — *3 Credits*
- CO 210 Fundamentals of Communication — *3 Credits*
- GenEd Tier II Humanities and Social Sciences — *12 Credits*
- GenEd Tier II Uniquely UOG — *6 Credits*

Civil Engineering: 54 Credits

- CEE 201* Engineering Statics — *3 Credits*
- CEE 202 Engineering Dynamics — *3 Credits*
- CEE 203 Mechanics of Materials — *3 Credits*
- CEE 204 Mechanics of Fluids — *3 Credits*
- CEE 301 Structural Analysis — *3 Credits*
- CEE 302/L Engineering Hydraulics — *4 Credits*
- CEE 303/L Geotechnical Engineering — *4 Credits*
- CEE 304/L Civil Engineering Materials — *4 Credits*
- CEE 305 Earth Structures Design — *3 Credits*
- CEE 306 Reinforced Concrete Design — *3 Credits*
- CEE 307 Introduction to Environmental Engineering — *3 Credits*
- CEE 308 Introduction to Survey — *2 Credits*
- CEE 401 Steel Structures Design — *3 Credits*
- CEE 402 Foundation Engineering — *3 Credits*
- CEE 404 Civil Engineering Design I — *2 Credits*
- CEE 405 Civil Engineering Design II — *2 Credits*
- CEE 406 Fundamental of Transportation Engineering — *3 Credits*
- *CEE xxx Elective* — *3 Credits*

Total 127

- *CEE xxx* Introduction to Construction Management — *3 Credits*
- *CEE xxx* Engineering Economy — *3 Credits*
- *CEE xxx Water and Wastewater Treatment Design* — *3 Credits*

Note: The courses marked with an asterisk (*) may apply to General Education requirements.

The University will confer the Bachelor's degree when the following conditions have been met:

- Recommendation of the faculty of the School of Engineering.
- Certification by the Dean of the School that all requirements of the degree being sought have been completed.
- A minimum of 127 semester hours in acceptable coursework is required for the BS in Civil Engineering.
- A residency requirement also must be fulfilled. To earn a BS, a student must complete a minimum of 30 credits at the School of Engineering at the junior or senior level. These credits must include the design project, CEE 404 and CEE 405. Exceptions (normally not to exceed six hours) may be made in advance by the Dean.
- The requirements of the core curriculum and the CE program must be satisfied.
- Earned a cumulative GPA of 2.0 or higher at the University.
- Transfer credits in civil engineering and other technical areas are evaluated by the faculty of the Department of Civil Engineering.
- Transfer students can be awarded transfer credits for courses with a C grade or better and then only for courses that are applicable toward the BS in Civil Engineering curriculum.
- Students must earn a 2.0 average in all CEE courses.
- Earning the grade requirements for major, core courses, and course sequences established by the School of Engineering.

REQUEST FOR APPROVAL OF A NEW DEGREE PROGRAM
UNIVERSITY OF GUAM
SCHOOL OF ENGINEERING
BACHELOR OF SCIENCEE IN CIVIL ENGINEERING

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2.9 Assurance that courses and programs are planned both for optima learning and accessible scheduling

3. Need for the Proposed Program

3.1 Primary reason for requesting the proposed program

3.2 Professional uses of the program

3.3 Results of a survey of serious interest in enrolling under the proposed program

3.4 Enrollment figures during the past two years

3.5 Estimate the number of students completing the proposed program

3.6 Total FTE lower division and upper division

3.7 Advantages to the college of offering the proposed program

4. Resources for the Proposed Program

4.1 List of all present faculty members

4.2 Number and types of additional faculty and other staff positions

4.3 Estimate of additional faculty and other staff positions needed

4.4 List of courses now offered

4.5 List of additional courses not now offered

4.6 University library resources

4.7 Plans for developing university library resources

4.8 Other instructional material. if any, needed in support of the proposed program

4.9 Special classrooms, laboratories and other capital outlay facilities

5. Appendix

Appendix 1: Letters of Support and Petitions

Appendix 2: Course Schedule

Appendix 3: Faculty curriculum vitae

Appendix 4: Request for New Course Forms & Syllabi

Appendix 5: New Course Outline Forms

Appendix 6: Approved Courses

Appendix 7: School of Engineering Advisory Council Bylaws

Appendix 8: Result of Student Survey

Appendix 9: External Review

6. UCRC Report

Proposal

Bachelor of Science in Civil Engineering

School of Engineering

Department of Civil & Environmental Engineering

Bachelor of Science in Civil Engineering
Proposal

1. Definition of the proposed program.

1.1 Full and exact designation for the proposed program.

Bachelor of Science in Civil Engineering

1.2 Name of college submitting the request.

School of Engineering (SENG)

1.3 Name of the department, department's division, or other unit of the college which would offer the proposed program.

Department of Civil and Environmental Engineering

1.4 Name, title and rank of the individuals primarily responsible for drafting the proposed program.

This document was drafted by the School of Engineering (SENG) administrator and faculty:

i. Shahram Khosrowpanah, Ph.D., P.E., Professor and Interim Dean, School of Engineering

ii. Pyo-Yoon Hong, Ph.D., P.E., Associate Professor and Division Chair, School of Engineering

iii. Ujwalkumar D. Patil, Ph.D., P.E., Assistant Professor, School of Engineering

iv. Joseph D Rouse, Ph.D., P.E., Professor, Water and Environmental Research Institute

In addition, the draft proposal of the program was reviewed by the School of Engineering (SENG) Advisory Council members, UOG faculty, and administration (Appendix 9). The members of the advisory council are senior officials and chief executive from federal and public agencies, private sector, and School of Engineering Pre-Engineering Curriculum Alumni, (Appendix 7- School of Engineering Advisory Council by Laws).

1.5 Goals and Objectives of the proposed program.

The Bachelor of Science in Civil Engineering degree at University of Guam will meet the needs of local students and the work force requirements of Guam, Micronesia and the neighboring regions of the Pacific and Asia. The graduates would be valuable for Guam construction companies, consulting companies, municipalities, Guam Department of Public Works, Guam Environmental Protection agency, and more. The graduates would be primarily involved with the analysis, design and development of structural systems, construction projects, transportation projects, environmental treatment facilities, and project management.

The program's educational objectives are specifically defined as expectations of alumni 3-6 years after graduation. The educational objectives of the program in civil engineering, that are consistent with the mission of University of Guam, are the following:

a. Successfully engage in the practice of civil or environmental engineering (private, public, or academic sectors) to solve important engineering and environmental problems, while upholding the code of ethics for engineers,

b. Pursue ongoing professional development opportunities including professional licensure (PE), advanced studies, research, participation in conferences or workshops, and continuing education,

c. Advance the profession by pursuing leadership positions, membership in professional societies, and teaching opportunities,

d. Participate in and contribute to service to society through public, private, or academic organizations addressing important societal issues and needs.

Program learning outcomes are specifically defined statements that describe what students are expected to attain by the time of graduation. Students completing the civil engineering program must demonstrate the:

a. Ability to apply knowledge of mathematics, science, and engineering, including: mathematics through differential equations, calculus-based physics, chemistry, biology, and four technical areas appropriate to civil engineering,

b. Ability to design and conduct civil engineering experiments, as well as to analyze and interpret the resulting data,

c. Ability to design a system, component, or process to meet desired needs in more than one civil engineering context and within realistic constraints.

d. Ability to function on multidisciplinary teams,

e. Ability to identify, formulates, and solves engineering problems,

f. Understanding of professional ethical responsibility, including the importance of professional licensure,

g. Ability to communicate effectively by written, verbal, and visual (plans/PowerPoint) means,

h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context,

i. Need for, and an ability to engage in life-long learning,

j. Knowledge of contemporary issues as they relate to civil engineering,

k. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice, and

l. Understanding of basic concepts in management, business, public policy, and leadership.

1.5. a Specify the subject matter to be covered.

Engineering Statics
Engineering Dynamics
Mechanics of Materials
Mechanics of Fluids
Surveying
Structural Analysis
Engineering Hydraulics
Geotechnical Engineering
Civil Engineering Materials
Earth Structures Design
Steel Structures Design
Environmental Engineering
Fundamental of Transportation Engineering
Reinforced Concrete Design
Foundation Engineering
Civil Engineering Design I: Site Planning and Design
Civil Engineering Design II: Structural Analysis
Engineering Economy
Introduction to Construction Management
Water and Wastewater Treatment Design

1.5.b Specify the intellectual skills and learning methods to be acquired.

The students will successfully engage in the practice of civil or environmental engineering (private, public, or academic sectors) to solve important engineering and environmental problems, while upholding the code of ethics for engineers. Engineering students are instructed to obtain conceptual understanding of engineering concepts. To build up ability to apply the engineering concepts to real-world situations, students will be asked to solve problems, analyze situations and evaluate alternatives and their consequences. The students will be taught how to design and conduct engineering experiments and analyze and interpret experimental data. The students will also be taught in individual, group and cooperative learning situations.

1.5. c Specify the affective and creative capabilities to be developed.

Affective and creative capabilities to be developed with engineering students are critical in their professions. The affective capabilities to be developed are:

- Identification or clarification of values
- Development of appreciation and empathy
- Motivation of self and others; and acquisition of respect for diversity.

The creative capabilities to be developed are:

- Oral, written, non-verbal and listening communication skills
- Organizational skills
- Ability to recognize and understand problems, solution approaches, and alternatives
- The skills to empower creativity in others

1.5. d Specify, if relevant, the specific career-preparation practices to be mastered.

The best way that this program connects students to apply their classroom knowledge to real situations and reinforces concepts taught in classes and pre-employment career preparation opportunities is through our Advisory Council Board (Appendix 7). Each summer, our students have internships in local private and public sectors and with that the opportunity to demonstrate their skills and competencies to future employers.

1.6 List of all courses, by catalog number, title and units of credit to be required for a major under the proposed program.

Curriculum

Table 1: Curriculum for the BS in Civil – Environmental Engineering

Mathematics: 14 Credits

• MA 203	Calculus I	*5 Credits*
• MA 204	Calculus II	*5 Credits*
• MA 205	Calculus III	*4 Credits*

Sciences: 21 Credits

• CH 102/L	General Chemistry	*4 Credits*
• CH 103/L	General Chemistry	*4 Credits*
• PH 251/L	University Physics	*5 Credits*
• PH 252/L	University Physics	*5 Credits*
• GenEd Tier II Direction Building		*3 Credits*

General Engineering, Computer Science: 8 Credits

• CEE 100	Introduction to Engineering	*1 Credits*
• CEE 101	Engineering Graphics	*3 Credits*
• CS 201	Programming I	*4 Credits*

Humanities and Social Science: 30 Credits

• EN 110	Freshmen Composition	*3 Credits*
• EN 111	Writing for Research	*3 Credits*
• CT 101	Critical Thinking	*3 Credits*
• CO 210	Fundamentals of Communication	*3 Credits*
• GenEd Tier II	Humanities and Social Sciences	*12 Credits*
• GenEd Tier II	Uniquely UOG	*6 Credits*

Civil Engineering: 54 Credits

• CEE 201	Engineering Statics	*3 Credits*
• CEE 202	Engineering Dynamics	*3 Credits*
• CEE 203	Mechanics of Materials	*3 Credits*
• CEE 204	Mechanics of Fluids	*3 Credits*
• CEE 301	Structural Analysis	*3 Credits*
• CEE 302/L	Engineering Hydraulics	*4 Credits*
• CEE 303/L	Geotechnical Engineering	*4 Credits*
• CEE 304/L	Civil Engineering Materials	*4 Credits*
• CEE 305	Earth Structures Design	*3 Credits*
• CEE 306	Reinforced Concrete Design	*3 Credits*
• CEE 307	Introduction to Environmental Engineering	*3 Credits*
• CEE 308	Introduction to Survey	*2 Credits*
• CEE 401	Steel Structures Design	*3 Credits*
• CEE 402	Foundation Engineering	*3 Credits*

- CEE 404 Civil Engineering Design I 2 Credits
- CEE 405 Civil Engineering Design II 2 Credits
- CEE 406 Fundamental of Transportation Engineering 3 Credits
- *CEE xxx Elective* *3 Credits*

Total Credits for Degree: 127

1.7 Clarification of number and types of electives, if any, under the proposed program, including special options.

Students are to choose a minimum of 3 credits from the following Electives:

- **CEE xxx Introduction to Construction Management** *3 Credits*
- **CEE xxx Engineering Economy** *3 Credits*
- **CEE xxx Water and Wastewater Treatment Design** *3 credits*

1.8 Special Option: Non-Thesis Certificate Program

N/A

1.9 Justification of any unusual characteristics of the proposed program, e.g., in terminology, units of credit required, types of course work, etc.

The Bachelor of Science in Engineering Program requires a minimum of 127 credit hours. This conflicts with the G2G bachelors programs (124) at UOG. The 127 credits should be viewed as a minimum for engineering and not as something extra or above the norm. Most Accreditation Board for Engineering & Technology (ABET)- Certified Engineering School the minimum credit hours are in range of 124-133: University of Iowa (131), University of Florida (128), North Dakota State University (133).

1.10 Prerequisites and criteria for admission of students to the proposed program, and for their continuation in the program.

Prerequisites and criteria for admission of students shall be the same as for admission to the University, as specified in the Undergraduate Catalog. Continuation in the program requires that the student maintain a minimum cumulative grade point average (GPA) of 2.5.

1.11 Evidence that the degree program has a coherent design and is characterized by continuity, sequential progression, and a synthesis of learning.

In order to eventually become licensed as a Professional Engineer, graduating from an ABET-accredited program is critical. The proposed Bachelor of Science in Civil-Environmental Engineering Program has been designed to satisfy the path to licensure proposed in the ASCEE Policy Statement 465 and supported by the National Council of Examination for Engineers and Land Surveyors (NCEES) Model Law. The program structure and content was informed by the ASCEE Body of

Knowledge, ABET requirements, recent changes to the Fundamentals of Engineering exam, similar co-terminal programs at others schools, faculty background and university general education requirements. Continuity, sequential progression and a synthesis of learning is monitored by the Dean, Division Chair, Academic Affair Committee as well as ABET and culminated in Capstone Project by taking skills learned in the classroom and applying them to real-world engineering situations.

1.12 Describe how educational effectiveness of program is to be measured.

The program must regularly use appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained. The results of these evaluations must be systematically utilized as input for the continuous improvement of the program. Other available information may also be used to assist in the continuous improvement of the program. The following criteria and methods will be utilized for the program assessment and evaluation of the engineering program.

a. The quality and performance of the students and graduates are important considerations in the evaluation of the engineering program. Data will be kept on quality of the incoming students and the placement of engineering graduates, which includes statistics on retention, placement, career advancement of students and employer satisfaction.

b. The assessment process will be designed to evaluate the program outcomes important to the mission of the institution and the program educational objectives. Working with ABET and the industrial advisory board, the content of the program will be continuously evaluated and updated to maintain the appropriate scholarly activity. ABET criteria require such measures be taken.

c. The professional component requirements specify subject areas appropriate to the field of engineering and the engineering faculty will ensure the development of the program in a timely manner consistent with the objectives of the institution.

d. The faculty has adequate expertise to cover all of the curricular area of the program, including student advising and counseling, university service activities, professional development and interactions with local industry.

Program quality will be evaluated by the Dean of Engineering and Technology in cooperation with the faculty members, the industrial advisory board and the Engineering Accreditation Commission of ABET. Educational effectiveness of the program will also be measured by an annual survey conducted of recent graduates of the program. Graduates will be asked about the nature of their work and their succession enrolling in higher degree programs, as well as their success in obtaining professional employment and the adequacy of the preparation they received at University of Guam. Employers will be surveyed as well to assess the readiness and effectiveness of our graduates. The results of the survey will provide a valuable feedback for future curriculum adjustment.

2. Context of the Proposed Program

2.1 Examples of colleges offering the proposed program.

Civil engineering is the oldest branch of engineering and plays a major role in developing a society and civilization. Employment of civil engineers is projected to grow 20 percent from 2012 to 2022, which is also much faster than the average for all occupations. As infrastructure ages, civil engineers will be needed to manage projects to rebuild bridges, repair roads, and upgrade levees and dams. Due to such a continuous high demand for civil engineers the majority of universities offer civil engineering degree programs.

2.2 Endorsements from university or community elements

The letters contained in Appendix 1 show the community representatives that support the Bachelor of Science in Civil Engineering.

2.3 Differences of the proposed program, if any, from similar programs in other institutions.

Civil engineering is among the most diversified of the traditional engineering disciplines. The proposed BS program is a typical civil engineering undergraduate program administered within a well-established and constrained four-year curriculum.

2.4 Relation of the proposed program to the total educational program of the respective college.

The School of Engineering (SENG) pursues to inspire the advancement of regional knowledge through teaching, research and industry consulting. The program provides a strong foundation in the areas of mathematics, basic and engineering sciences, and the humanities and social sciences while promoting further critical reading and thinking, self-development and life-long intellectual achievement. The program also seeks to build student skills in written and oral communication, and a sense of poise and professionalism. The educational objectives for the civil engineering program clearly supports the mission of University of Guam by providing hands-on practice-oriented education and reflects the importance placed on successful professional practice, the ability to pursue advanced degrees, the assumption of professional and societal leadership roles.

2.5 Relation of the proposed program to the planned curricular development of the respective instructional area (department, department's division).

The new program is the first engineering degree program of its kind in Guam and the Western Pacific. The program, however, will soon to have evolved into a diverse department that encompasses research, undergraduate and graduate education in environmental and water resources, geotechnical, structural, and transportation engineering etc. In this context, the proposed program is to provide students a unique opportunity to acquire the essential knowledge and skills needed for lifelong learning in fields associated with civil engineering.

2.6 List of other programs currently offered which are closely related to the proposed program.

The Two-Plus-Two Engineering Program (2+2) is a joint program offered by School of Engineering at University of Guam. This program allows students that are interested in the other engineering disciplines to complete the first two years of an engineering curriculum at UOG, qualify for transfer to Mapua Institute of Technology, Iowa State University, University of Alaska at Fair Banks and University of Hawaii and finish their education in two more years at the university of their own choices. The disadvantage one might find in the 2+2 Program is that it requires a transfer and change of location half-way through the curriculum.

2.7 Explanation of how the needs to be met by the proposed program have previously been satisfied.

The need for qualified professionals in the field of Civil Engineering on Guam has never been satisfied. To fill some of the need, off-island hires, short-term contracts and people with limited training who have had to learn on the job were hired. Well-educated and licensed civil engineers are needed on the island and neighboring regions. The combination of importing technical labor, hiring consultants, and providing a few local engineers who must complete their programs at other institutions, does not meet the current demand, and will certainly not meet the future demand. In the next few years, normal population growth and the military buildup will increase the need and demand for engineering skills many folds. The School of Engineering had its beginning in the Pre-Engineering Program. The Pre-Engineering Program, which was established in 1989, had the goal of producing students with course work and skills sufficient to be admitted as juniors into any four-year engineering school accredited by the Accreditation Board for Engineering and Technology (ABET). Those Pre-Engineering students that were successful to complete their degrees and return to Guam are listed below:

Table 1. Placement of Pre-Engineering Students (from instructors' notes – Dr. K)

Student Name	Year Completed UOG Pre-Eng	Transferred To	Degree Completed	Work Status
Iriarte, Francis	1990	University of Hawaii	BS, PE Mechanical Engineering	GPA, Guam
Pangelinan, Joseph	1990	University of Arizona	MS Architecture	Guam, Korea
Dumalhang, Peter	1991	State University System of New York	BS, PE Aerospace Engineering	Engineer, EPA Washington D.C
Cruz, Tom	1992	University of Kansas	BS, PE Civil Engineering	Chief Engineer GWA, Guam
Lauron, Carol	1992	University of Michigan	MS Chemical Engineering	
Garcia, Eileen	1996	University of Hawaii	BS, PE Civil Engineering	Engineer, DCK Pacific Guam
Matote, George	1996	University of Hawaii	Civil Engineering	Seattle Public Works
Natnat, Pedro	1996	University of Hawaii	BS, PE Civil Engineering	California
Rekdahl, Ken	1998	University of Southern California	MS, PE Civil Engineering	Engineer DCA Guam
Diaz, Agapito	2003	Cal Poly State University San Luis Obispo, California	MS, PE Civil Engineering	AECOM, Guam
Taitano, John	2004	University of Hawaii	BS Civil Engineering	W B Flores and Associates, Guam
Damian, Charles Omar	2012	University of Hawaii	MS Civil Engineering	Engineer T G Engineering, Guam

On October 29, 2009, the President of UOG recognized, the time has come for the

university to step up and create the opportunity for local and regional students to become engineers, in a setting that will encourage them to make long-term professional and personal commitments to the prosperity and quality of life for the island of Guam and the rest of the region served by the University of Guam.

2.8 Applicability of course work taken under the proposed program to other programs currently offered.

A total of 73 credit hours courses (57%) of the 127 credit for this program can be applicable for other degree program at University, such as: math, computer program.

2.9 Assurance that courses and programs are planned both for optima/learning and accessible scheduling and are offered in a manner that ensures students the opportunity to complete the entire program as announced.

The degree program is designed to satisfy the path to licensure proposed in the ASCEE Policy Statement 465 and supported by the NCEEES Model Law. The program structure and content were informed by the ASCEE Body of Knowledge, ABET requirements, recent changes to the Fundamentals of Engineering exam, similar co-terminal programs at other schools, faculty background and university general education requirements. The student performance is closely monitored by the Dean, Division Chair, Academic Affair Committee, Advisory Committee and ABET.

3. Need for the Proposed Program

3.1 Primary reason for requesting the proposed program.

The Bachelor of Science in Civil Engineering degree at University of Guam will meet the needs of local students and the work force requirements of Guam, Micronesia and the neighboring regions of the Pacific and Asia. The graduates would be valuable for Guam construction companies, consulting companies, municipalities, Guam DOT and more. The graduates would be primarily involved with the analysis, design and development of structural systems, construction projects, transportation projects, environmental projects and water quality.

The faculty and academic advisors visited local high schools to obtain feedback from students about their interest in B.S. engineering programs at UOG. The student survey indicates that the majority of students who have an interest in engineering prefer to study the civil, electrical and mechanical engineering disciplines. In addition, feedback from the local industrial advisory committee revealed a strong need for these disciplines to be provided locally to support the industry and local municipalities in Guam and surrounding regions. Local municipalities also have a need for engineers for water, sewage, environmental and infrastructure. The new engineering program will enhance and contribute positively to the existing natural & applied science programs at UOG. Many students that are not retained in the engineering program may transfer to one of the engineering programs.

3.2 Professional uses of the proposed program.

Our graduates will perform technical and managerial civil engineering tasks: Structural engineer; Site engineer; Consulting civil engineer; Contracting civil engineer; Design engineer; Building control surveyor; Water engineer; Building services engineer; Construction manager; Engineering geologist; Environmental consultant

3.3 Results of a survey of serious interest in enrolling under the proposed program.
Appendix 8.

3.4 Enrollment figures during the past two years in specified courses or programs related to the proposed program, which indicate interest in the proposed program.

Pre-Engineering Program
Undergraduate Student Enrollment
(University of Guam, FACT Book-218, 2017, 2016)

Course Title	Academic Year 2018	Academic Year 2017	Academic Year 2016
ES100 Introduction to Engineering	20	32	33
ES101 Engineering Graphics	25	21	35
ES201 Engineering Statics	16	3	9
ES202 Engineering Dynamics	12	7	9
ES203 Mechanics of Materials	8	7	9
Total Academic year 2016-2018	81	70	92
Declared Eng. students	83	80	70
Total Enrollment to Program	164	150	162

3.5 Estimate of the number of students completing the proposed program in the second year and in the fifth year after its approval.

Student Completed & Estimation
University of Guam – Academic and Student Affairs

Academic Year	Total Enrollment	Freshman	Junior	Percentage %
2015	164	74	31	41
2016	162	71	36	50
2017	150	49	31	63
2018	164			
2019 - Estimate	180			
2020 - Estimate	200			

3.6 Total FTE lower division and in the upper division, enrollments in the specified department, department's division, or other units of the college which would offer the proposed program, as the current semester and as projected five years hence, further divided into lecture FTE and

laboratory FTE where appropriate.

The program requires 4.0 Full Time Equivalent (FTE) faculties to teach most of the courses that are part of the curriculum. A normal load at UOG for faculty is 9 to12 contact hours per semester. Four faculty members are required to fully implement the complete civil engineering program with an expected growth to 3.5 FTE. Some of the courses are cross listed the total FTE cannot be precisely be calculated. The minimum credentials required for each faulty member are a Ph.D. degree along with several years of experience in the discipline. Additionally, part-time faculty with appropriate expertise will be employed as required to teach selected courses.

3.7 Advantages to the college of offering the proposed program.

The proposed program will help generate revenue as there will be increase in student enrollment as the program will expand from 2-year pre-engineering to a full 4-year civil engineering degree program. In future, this program is believed to attract students from neighboring Islands and countries and the revenue generated will help School of Engineering (SENG) to become self-sufficient to run by itself without much financial support from Government of Guam. The internship programs will help build Industry-University collaboration via internship programs that will help student professional development and help them identify their potential employers and vice-versa. Local and federal agencies as well as private engineering firms such as Guam Power Authority, Guam Water Authority, NAVFAC, Brown and Coldwell etc. will benefit from hiring local engineers and this will prevent shortage of skilled labors on Island of Guam. In addition, the local talent will be kept on Island as they will be employed in local firms and Government agencies. Research projects acquired by faculties will help give students financial support in the form of research assistantships.

4. Resources for the Proposed Program

4.1 List all present faculty members, with rank, highest degree earned, publications and professional experience, which would teach in the proposed program.

Curriculum vitae for each faculty member are presented in Appendix 3. A listing of present faculty members follows.

i. Shahram Khosrowpanah, Ph.D., P.E., Professor and Dean, School of Engineering

ii. Pyo-Yoon Hong, Ph.D., P.E., Associate Professor and Division Chair, School of Engineering

iii. Ujwalkumar D. Patil, Ph.D., P.E., Assistant Professor, School of Engineering

iv. Joseph D Rouse, Ph.D., P.E., Professor, Water and Environmental Research Institute

4.2 Number and types of additional faculty and other staff positions, if any, needed to initiate the proposed program.

The program requires up to four (4) Full Time Equivalent (FTE) faculty to teach all of the courses that are part of the curriculum. A normal load at UOG for faculty is 9 to12 contact hours per semester. Four faculty members are required to fully implement the complete civil engineering program with an expected growth to 3.5 FTE. The minimum credentials required for each faulty member are a Ph.D. degree along with several years of experience in the discipline. Additionally, part-time faculty with appropriate expertise will be employed as required to teach selected courses.

4.3 Estimate of additional faculty and other staff positions needed specifically for the proposed program one, two, and five years after its approval.

According to ABET criteria the program must have competencies to cover all of the curricular areas of the program. We have determined that there is need to hire two additional faculty members. Currently, the search is on-going for hiring two new faculty positions (structural and hydrology).

4.4 List of courses now offered, by catalog number, title and units of credit needed in the proposed program.

The courses are listed as they appear in the UOG 2018-2019 Undergraduate Catalog. The recourses include:

Program Core

- CEE 100 Introduction to Engineering *1 Credits*
- CEE 101 Engineering Graphics *3 Credits*
- CEE 201 Engineering Statics *3 Credits*
- CEE 202 Engineering Dynamics *3 Credits*
- CEE 203 Mechanics of Materials *3 Credits*
- CEE 301 Structural Analysis *3 Credits*
- CEE 303 Geotechnical Engineering *3 Credits*
- CEE 303L Geotechnical Engineering Lab *1 Credits*
- CEE 305 Earth Structures Design *3 Credits*

4.5 List of additional courses not now offered, by catalog number, title and units of credit, needed initially and during the first two years after approval of the program, needed to make the program fully operative.

New course request forms and syllabi are in Appendix 4

- CEE 204 Mechanics of Fluids *3 Credits*
- CEE 302 Engineering Hydraulics *3 Credits*
- CEE 302L Engineering Hydraulics Lab *1 Credits*
- CEE 304 Civil Engineering Materials *3 Credits*
- CEE 304L Civil Engineering Materials Lab *1 Credits*

- CEE 306 Reinforced Concrete Structures Design *3 Credits*
- CEE 307 Introduction to Environmental Engineering *3 Credits*
- CEE 308 Introduction to Surveying *2 Credits*
- CEE 401 Steel Structures Design *3 Credits*
- CEE 402 Foundation Engineering *3 Credits*
- CEE 404 Civil Engineering Design I 2 Credits
- CEE 405 Civil Engineering Design II 2 Credits
- CEE 406 Fundamental of Transportation Engineering 3 Credits

4.6 College library resources, available in direct support of the propose program, specified by subject areas, volume count, periodical holdings, etc.

UOG Library Resources (LRC):
Inter-library loan is available to both students and faculty. Some items can be received at no cost, for others LRC is charged for. Both students and faculty may designate if they are willing to pay for an item. Here are links to the online for various types of materials:

Databases
The RFK library has access to more EBSCO data bases than PREL does but the systems are not interchangeable in that if you store something in a folder on the PREL site you cannot access it from the same data base through the UOG. You can reach UOG databases from home if you have your library card up-to-date. You can reach them with the university Wi-Fi if you have the computer center install the software on your personal computer. You access these by clicking on the "Electronic Journal s and Databases" link on the library web page. The LRC has MedlinePius and Pub Med.

Other databases directly related to this field might be:
There are also Newspaper databases such as News Bank which could be helpful and more general academic data bases such as EBSCO Academic Search Premiere.

American Society of Civil Engineering Journal (ASCE), American Water works Association (AWWA) Library:

The members of the School of Engineering Advisory Council will be providing ASCE journals and AWWA publication to the Library.

Because of the multidisciplinary nature of the Master of Science in Sustainable Agriculture, Food and Natural Resources, a wide variety of library subject classes support the proposed program.

4.7 Plans for developing college library resources in support of the proposed program during the first five years of operating the program.

The School of Engineering is in progress of Internet accessibility for students in the teaching classroom and research laboratories. The future computer lab in the new

School of Engineering Building is to accommodate students with online courses and bibliographic research.

4.8 Other instructional materials, if any, needed in support of the proposed program, itemized with cost estimates as projected for the first five years of operating the program.

The laboratories in the new School of Engineering building will include a structural laboratory, geotechnical laboratory, hydraulic laboratory and computer lab. These resources will be exclusively used by engineering programs and provide ideal environments for capstone projects in civil engineering fields.

4.9 Special classrooms, laboratories and other capital outlay facilities, if any, needed in support of the proposed program, itemized and arranged by dates for the first five years of operating program.

The structural laboratory, geotechnical laboratory, hydraulic laboratory and computer laboratory are an integral part of construction of new School of Engineering building.

List of Appendix

Appendix 1
Letters of Support & Petitions

Bachelor of Science in Civil Engineering

School of Engineering
Department of Civil & Environmental Engineering

GUAM POWER AUTHORITY

ATURIDÅT ILEKTRESEDÅT GUAHAN
P.O.BOX 2977 • HAGÅTÑA, GUAM U.S.A. 96932-2977

August 14, 2018

Dr. Thomas W. Krise
President
University of Guam
President's Office
UOG Station
Mangilao, GU 96923

Ref: Letter of Support for the University of Guam School of Engineering

Dear Dr. Krise:

Hafa Adai! This letter is in support of University of Guam's (UOG) efforts in establishing the new Bachelor of Science in Civil Engineering degree program. The Guam Power Authority employs a number of engineers who have earned degrees from off-island universities out of necessity, and it is exciting news that UOG's School of Engineering (SENG) is being established locally.

GPA recognizes UOG as a partner in moving the island forward in the development of professionals to fill much needed skills to promote island sustainability. It is through the development of local talent that will propel the island into the new millennium. GPA will continue to support UOG through membership in the SENG Advisory Council as well as other programs that UOG may develop in the near future.

Sincerely,

John M. Benavente, P.E.
General Manager

August 15, 2018

Dr. Thomas W. Krise
President
University of Guam
UOG Station
Mangilao, GU 96932

Re: Support Letter for the University of Guam School of Engineering

Dear Dr. Krise:

The purpose of this letter is to express support of the University of Guam School of Engineering on behalf of myself and GHD's office in Guam. My name is Aaron Sutton and I am a Civil Engineer and the Office Manager of our office in Guam. GHD has provided civil, structural and electrical engineering services locally for about 35 years. We are excited for and fully support a four-year engineering program at the local university.

Guam has a shortage of engineers. Many of those who move to the island to fill the need are temporary. A School of Engineering would provide a much needed, locally based engineering and technical expertise to the island and region.

Sincerely,

GHD

Aaron Sutton, PE
Office Manager

AS/01

GHD
865 South Marine Corps Drive Suite 202 Orlean Pacific Plaza Tamuning Guam 96913
T 671 472 6792 F 671 477 6229 W www.ghd.com

The Honorable
EDDIE BAZA CALVO
Governor

The Honorable
RAY S. TENORIO
Lieutenant Governor

public works
DIPATTAMENTON CHE'CHO' PUPBLEKO
GLENN LEON GUERRERO
Director
ANDREW S. LEON GUERRERO
Deputy Director

Dr. Thomas W. Krise
President
University of Guam
UOG Station
Mangilao, Guam 96932

Re: Support Letter for the University of Guam School of Engineering Request for New Degree Program

Hafa Adai!

As the Department of Public Works (DPW) representative to the UOG School of Engineering (SENG) Advisory Council, I would like to offer our full support for the establishment of the new Bachelor of Science in Civil Engineering degree program at the University of Guam School of Engineering.

Being the prime institution of higher learning for the Micronesian Islands, Pacific, and abroad, the University of Guam provides the education and institution for higher learning for the civil engineering professionals in our area of expertise (water, highways, buildings, etc). The University will fill both the immediate and sustained need for civil engineering professionals in Guam and Micronesia.

The Department of Public Works is in continuous need of engineering professionals to fill vacancies for new engineers who will move up the ranks to replace our ageing workforce and someday run the department.

The new Civil Engineering degree program is a good first step for the University's School of Engineering and we are looking forward to working with the professional staff of the School of Engineering and its graduates in the years to come.

Best Regards,

Max C. Manzano, P.E.
Chief Engineer
DPW- Capital Improvement Projects

DUEÑAS · CAMACHO

Website: www.dcaguam.com
Email: dca@dcaguam.com

August 22, 2018

Dr. Thomas W. Krise
President
University of Guam
UOG Station
Manilao, Guam 96932

Ref: Support Letter for the University of Guam School of Engineering

Hafa Adai!

My name is Kenneth M Rekdahl, Vice President of Dueñas, Camacho and Associates Inc. (DCA). As a locally owned engineering firm on Guam and we are pound to provide engineering and planning for Guam and the CNMI for over 40 years. I am fortunate to serve as the Chair of the University of Guam's School of Engineering (UOG SENG) Advisory Council that includes members of Guam Department of Public Works, Guam Power Authority, Guam Professional Engineering, Architects, and Land Surveyors Board, Guam Waterworks Authority, Naval Facilities Engineering Command Marianas, President of the Guam Contractors Association, President of the Society of American Military Engineers Guam Post.

I am an alumnus of UOG, educated in the Pre-Engineering Program, and am proud to call myself a Triton. I am now a licensed engineer on Guam and the CNMI. At the time I attended UOG there was no four-year program for engineering on Guam so I had no recourse but to leave home to complete my education as an engineer.

I am both excited and proud to offer my support and my firm's support for the 4-year engineering degree program at UOG. The UOG SENG will help provide much needed locally based engineering and technical experts to our island and region. I am confidant that future graduates of the UOG SENG will improve the quality and safety of all our islanders and neighbors.

Sincerely,

Kenneth Rekdahl, P.E.
Vice-President
Dueñas, Camacho and Associates, Inc

Cc;

DCA file

CONTRACK WATTS

22 August 2018

Dr. Thomas W. Krise
President
University of Guam
President's Office
UOG Station
Mangilao, Guam 96923

Ref: *Support Letter for the University of Guam School of Engineering Request for New Degree Program*

Hafa Adai, Dr. Krise:

This letter is to offer our firm's full support for the establishment of the new Bachelor of Science in Civil Engineering degree program at the University of Guam (UOG) School of Engineering (SENG).

Contrack Watts, Inc. (CWI) is a full service general and engineering contractor. An established provider of construction services that include general contracting, construction management and design-build, CWI's varied experience ranges in scope from heavy civil projects and large waterfront reconstruction to vertical building construction. Our military construction work includes mission critical facilities for wharves and waterfronts, airfields, and operations and support. Working for state, federal and military agencies as well as private clients, CWI maximizes the involvement wherever possible.

As the cornerstone institution of higher learning for the Micronesia, the Pacific, and abroad, the University of Guam touches and provides the education and institution for higher learning to our entire industry. The establishment of the degree program will further enhance the strong benefits the University already provides to Guam and Micronesia.

674 Harmon Loop Rd., Ste 212
Dededo, GU 96929
P / 671 633-4534
F / 671 633-4545
contrackwatts.com

CONTRACK WATTS

The new Civil Engineering degree program is a natural first step for the UOG SENG. We look forward to welcoming UOG SENG's and new graduates to the construction industry in the years to come.

Go Tritons!

John Sage, P.E.
Vice President/General Manager - Micronesia

674 Harmon Loop Rd., Ste 212
Dededo, GU 96929
P / 671 633-4534
F / 671 633-4545
contrackwatts.com

Dr. Thomas W. Krise
President
University of Guam
UOG Station
Mangilao, Guam 96932

Ref: Support Letter for the University of Guam School of Engineering

Hafa Adai!

My name is Eileen G. Flanagan, Quality Control Manager for Contrack Watts, a General Contractor on Guam. I am fortunate to serve as the Secretary of the University of Guam's School of Engineering (UOG SENG) Advisory Council that includes members of Guam Department of Public Works, Guam Power Authority, Guam Professional Engineering, Architects, and Land Surveyors Board, Guam Waterworks Authority, Naval Facilities Engineering Command Marianas, President of the Guam Contractors Association, President of the Society of American Military Engineers Guam Post.

I am an alumnus of UOG, educated in the Pre-Engineering Program, and am proud to call myself a Triton. I have now worked in the Construction Industry on Guam for over 20 years. At the time I attended UOG there were no four-year programs for Engineering, so I had no recourse but to leave home to complete my education as a Civil Engineer.

I am both excited and proud to offer my support for the 4-year Engineering degree program at UOG. The UOG SENG will help provide much needed locally based engineering and technical experts to our island and region. I am confidant that future graduates of the UOG SENG will improve the quality and safety of all our islanders and neighbors.

Sincerely,

Eileen G. Flanagan
Quality Control Manager
Contrack Watts

GUAM WATERWORKS AUTHORITY
Gloria B. Nelson Public Service Building, 688 Route 15 | Mangilao | Guam 96913

August 23, 2018

Dr. Thomas W. Krise
President
University of Guam
UOG Station
Mangilao, Guam 96932

Ref: Support Letter for the University of Guam School of Engineering

Hafa Adai Dr. Krise,

My name is Thomas Cruz and I am the Chief Engineer for the Guam Waterworks Authority (GWA) and I am happy to offer my support for the 4-year engineering degree program that UOG has been working hard to attain over the last few years. I am also a proud alumni of the Pre-Engineering Program UOG offered back in the early 1990's. I ultimately had to complete my civil engineering education in the US as UOG had no 4-year engineering program back then.

As the Chief Engineer for GWA I currently have the privilege of being a member of the UOG School of Engineering (SENG) Advisory Council where I can provide my input in GWA's experiences with the on-island and off-island engineers as well as my support towards the success of the 4-year engineering degree program. GWA has undertaken, over the last decade, many major capital improvement projects totaling $300M for water and wastewater capital improvements. This endeavor has allowed me, as the Chief Engineer, to gain valuable information on the types of engineers needed for a small island as well as observe the best qualities of the most productive engineering firms. I believe this information can be beneficial to the SENG Advisory Council and I am happy to share my experiences.

I believe the establishment of a 4-year engineering degree program will be good for UOG and ultimately good for Guam and the surrounding region. Thank you for your time in reading my letter of support to the School of Engineering.

Sincerely,

Thomas Cruz, P.E.
Chief Engineer

414 W. Soledad Avenue, Suite 602
Hagatna, Guam 96910
Tel: 671-300-4220

Brown AND Caldwell

August 24, 2018

Dr. Thomas W. Krise, President
University of Guam
UOG Station
Mangilao, Guam 96932

Re: University of Guam School of Engineering

Buenas Yan Håfa Adai!

We are writing to congratulate you and your staff on the admirable undertaking to create the School of Engineering at the University of Guam. We applaud the progress that has been made and we are keenly aware of the support for this endeavor from the local engineering community.

As you may know, for the past four years, Brown and Caldwell has provided $5,000 each year in scholarship funding for deserving students at UOG to help support pre-engineering and science students. Brown and Caldwell has chosen to make this investment in UOG students because we recognize the importance of developing local talent for the betterment of Guam, its residents, and local communities. We stand together with you and your staff as you continue to develop the School of Engineering. Brown and Caldwell staff are supporting your program development as active participants in the UOG SENG Advisory Council.

We are fully supportive of the 4-year engineering degree program at UOG. The UOG SENG will help provide opportunity for college-bound students interested in engineering and bring local talent to the engineering community here on Guam and in the Pacific islands region. We wish you continuing success as you advance the program forward.

Very Truly Yours,

Brown and Caldwell

Raymond N. Matasci
Pacific Area Leader

John Riegel
Guam Local Leader

American Water Works Association
Hawaii Section
Western Pacific Subsection
CNMI, FSM, Guam, ROP

AWWA-HIWPS
Western Pacific Subsection of the Hawaii Section of AWWA
P. O. Box 23534, Barrigada GU 96913
329 Gardenia Avenue, Mangilao, GU 96913-5702
Phone: 671 688 4946

http://www.awwa-hiwps.org
https://hiawwa.org
http://www.awwa.org

August 24, 2018

Dr. Thomas W. Krise
President
University of Guam
President's Office
UOG Station
Mangilao, Guam 96923

Ref: Support Letter for the University of Guam School of Engineering Request for New Degree Program

Hafa Adai!

This letter is to offer our organization's full support for the establishment of the new Bachelor of Science in Civil Engineering degree program at the University of Guam (UOG) School of Engineering (SENG). The American Water Works Association, Hawaii Section, Western Pacific Subsection is a professional non-profit organization whose purpose is to advance and disseminate knowledge concerning the improvement of practice in the design, construction, operation and management of water works and all related activities, and supporting skill-based training and an open exchange of experiences.

As the cornerstone institution of higher learning for Micronesia, the Pacific, and abroad, the University of Guam touches and provides the education and institution for higher learning to our entire subsection. Our subsection realizes first hand, through our annual conferences and meetings of water professionals and engineers, the need for a local and regional school of engineering. The UOG SENG will fill both an immediate and sustained need for water professionals and engineers throughout Guam and Micronesia.

The new Civil Engineering degree program is a natural first step for the UOG SENG and we look forward to working with the SENG's professional staff, students and future graduates in the years to come.

Go Tritons!

George Watson
Chair
AWWA-HIWPS

SAME Guam Post
Society of American Military Engineers
P.O. Box 1438
Hagåtña, GU 96932

August 24, 2018

Dr. Thomas W. Krise
President
University of Guam
President's Office
UOG Station
Mangilao, Guam 96923

Ref: Support Letter for the University of Guam School of Engineering Request for New Degree Program

Hafa Adai!

This letter is to offer our organization's full support for the establishment of the new Bachelor of Science in Civil Engineering degree program at the University of Guam (UOG) School of Engineering (SENG). The Society of American Military Engineers (SAME) leads collaborative efforts to identify and resolve national security infrastructure-related challenges. SAME unites military, public and private sector individuals and organizations from across the architecture, engineering, construction, environmental and facility management, cyber security, project planning, contracting and acquisition, and related disciplines in support of national security.

As the cornerstone institution of higher learning for Guam, Micronesia and the neighboring regions of the Pacific and Asia, UOG prepares students for life by providing opportunities to acquire knowledge, skills, attitudes, and abilities through core curriculums, degree programs, research and outreach. The SAME Guam Post understands the critical need for a local and regional school of engineering to prepare students that are the future of the engineering profession within the Pacific and will be tomorrow's problem solvers who help turn ideas into reality. In light of this, our Post has committed $20,000 towards the construction of the SENG through the UOG Foundation. In another initiative, our Post sponsors and provides mentors for UOG's SAME Guam Post Student Chapter. We are ecstatic to share that the UOG Student Chapter was recognized by our National leadership as a Distinguished Student Chapter for 2017-2018.

The new Civil Engineering degree program is a natural first step for the UOG SENG and we look forward to working with and supporting the SENG's professional staff, students and future graduates in the years to come.

Go Tritons!

Agapito (Pete) Diaz, P.E.
SAME Guam Post, President
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M +1-671-788-6710
pete.diaz@aecom.com
https://www.same.org/Get-Connected/Find-a-Post/Guam

Appendix 2
Course Schedule

Bachelor of Science in Civil Engineering

School of Engineering

Department of Civil & Environmental Engineering

BS in Civil Engineering

University of Guam

127 semester credit hours are required to complete this degree.

Total 127

	Freshman Year	Credits			Credits
	Fall Semester	**16**		**Spring Semester**	**20**
EN 110	Freshmen Composition	3	EN 111	Writing for Research	3
CH 102 + LAB	General Chemistry	4	CT 101	Critical Thinking	3
MA 203	Calculus 1	5	MA 204	Calculus 2	5
CEE 100	Introduction to Engineering	1	CH 103 + LAB	General Chemistry	4
CEE 101	Engineering Graphics	3	PH 251 + LAB	University Physics	5

	Sophomore Year	Credits			Credits
	Fall Semester	**18**		**Spring Semester**	**15**
CO 210	Fundamentals of Communication	3	CEE 202	Engineering Dynamics	3
MA 205	Calculus 3	4	CEE 203	Mechanics of Materials	3
PH 252	University Physics	5	CEE 204	Mechanics of Fluids	3
CS 201	Programming 1	3		Elective (Direction Building)	3
CEE 201	Engineering Statics	3		Elective (Uniquely UOG)	3

	Junior Year	Credits			Credits
	Fall Semester	**18**		**Spring Semester**	**14**
CEE 301	Structural Analysis	3	CEE 305	Earth Structures Design	3
CEE 302/L	Engineering Hydraulics	4	CEE 306	Reinforced Conc. Structures Design	3
CEE 303/L	Geotechnical Engineering	4	CEE 307	Intro. to Environmental Engineering	3
CEE 304/L	Civil Engineering Materials	4	CEE 308	Introduction to Surveying	2
	Elective (Humanities)	3		Elective (Human Science)	3

	Senior Year	Credits			Credits
	Fall Semester	**14**		**Spring Semester**	**12**
CEE 404	Civil Engineering Design 1	2	CEE 405	Civil Engineering Design 2	2
CEE 401	Steel Structures Design	3			
CEE 402	Foundation Engineering	3		Elective (Uniquely UOG)	4
	Engineering Elective	3		Elective (Humanities)	3
	Elective (Humanities)	3	CEE 406	Fundamentals of Transportation Eng.	3

Bachelor of Science in Civil Engineering PLOs

Note: PLO from LOG 6019

Program Components with Learning Outcomes

Students completing the civil engineering program must demonstrate:	CEE100	CEE101	CEE201	CEE202	CEE203	CEE204	CEE301	CEE302	CEE302L	CEE303	CEE303L	CEE304	CEE304L	CEE305	CEE306	CEE307	CEE308	CEE401	CEE3402	CEE3404	CEE3405	CEE3406
a. An ability to apply knowledge of mathematics, science, and engineering.	I		I	I	I	I	D	D	I	D	D	D	I	D	D	I	D	D	M	M	M	M
b. an ability to design and conduct civil engineering experiments, as well as to analyze and interpret data.	I		I	I	D	D	D	D	M	D	M	D	M	M		D	I					
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.		I	I	I	I	I	D	D	D	D	D	D	D	D	M	I	D	D	M	M	M	M
d. an ability to function on multidisciplinary teams.	I		I	I	I	I	I			I				I	D	I			M	M	M	M
e. an ability to identify, formulate, and solve engineering problems			I	I	I	I	D	D		D	I	D		D	M	I			D	M	M	M
f. an understanding of professional and ethical responsibility, including the importance of professional licensure	I	I	I	I	I	I			I	I	I		I	I	D	I			I	M	M	M
g. an ability to communicate effectively		I	I	I	I	I			I	I			I	I	D	I	I		D	M	M	M
h. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context	I						I								D				D	M	M	M
i. the recognition of the need form and an ability to engage in life-long learning	I		I	I	I				I	I	I		I	D	D				D	M	M	M
j. the recognition of contemporary issues in relation to civil engineering	I	I	I	I	I	I	I	I		I		I		D	D	I			D	M	M	M
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	I	I	I	I	I		D		D	D	D		D	D	D		I		D	M	M	M
l. the understanding of basic concepts in management, business, public policy, and leadership	I								I	I	I		I	I	D				D	M	M	M

I = Introduced
D = Developed
M = Mastered

Appendix 3
Faculty Curriculum Vitaes

Bachelor of Science in Civil Engineering

School of Engineering

Department of Civil & Environmental Engineering

Joseph D. Rouse < http://www.weriguam.org/faculty >

UOG Station, WERI; Mangilao, GU 96923, USA; <rousej@triton.uog.edu>

Registrations: **Professional Engineer**: + Minnesota, USA; Reg. No. 19655
+ Guam, USA; Reg. No. 1398 (Civil)

Education:

Ph.D. 1994 Civil (*Environmental*) Engineering
The University of Oklahoma; Norman, OK
"Properties of High Performance Anionic Surfactants Affecting Abiotic and Biotic Remediation of Subsurface Hydrocarbon Contamination" (published 1995, UMI -- # 95-16223).
Research language/ tool: **Japanese language**

M.S. 1983 Civil (*Environmental*) Engineering
The University of Hawaii; Honolulu, HI
"Advanced Secondary Wastewater Treatment using an Anaerobic Fixed Film Process with Broken Glass Medium"

B.S. 1980 Civil Engineering
The University of Missouri; Rolla, MO
"***The Missouri School of Mines***"
(Now: ***Missouri University of Science and Technology***)

Honors:
+ ***Chi Epsilon*** (Civil Engineering Honors Society)
+ ***Tau Beta Pi*** (Engineering Honors Society)
+ ***Tau Alpha Pi*** (Engineering Tech. Honors Society)
+ ***Centennial Scholarship*** (Univ. of Oklahoma)
+ ***Gordon Fellowship*** (Civil Engineering, Univ. of Okla.)

Societies:
+ American Society of Civil Engineers (**ASCE**)
+ Water Environment Federation (**WEF**)
+ International Water Association (**IWA**)

Goals: To have a creative and beneficial impact in activities involving:
+ Innovative *in situ* remediation technologies
+ Nitrogen cycling in natural and engineered environments
+ Sustainable wastewater treatment
+ Environmental science and engineering education

Employment History:

8/2016- present **Professor** of Water Resources & Environmental Engineering

8/2011-8/2016 **Associate Professor**: University of Guam
Water and Environmental Research Institute of the Western Pacific
UOG Station, Mangilao, Guam 96913, USA
Action: Research/ teaching, including outreach to neighboring islands in Micronesia.

9/2003-6/2011 **Senior Technical Staff**: Kuraray Co., Ltd.
Environmental Business Planning Department
Ote Center Bldg., 1-1-3 Otemachi, Chiyoda-ku,
Tokyo 100-8115, Japan
Action: Overseas marketing/ R&D of water treatment products.

4/2001-8/2003 **Private Consultant**: Environmental Engineering & Science
Principal clients:
+ NET Company, Osaka, Japan.
+ Seikai Kankyou Company, Kawasaki, Japan.
+ Kumamoto University, Japan (Adjunct Research Faculty).
+ Osaka Science & Technology Center
(Research Fellow, Government Agency).

2/1999--3/2001 **Associate Professor** (visiting position)
8/1996--2/1999 Assistant Professor of Environmental Engineering
Kumamoto University, Faculty of Engineering
Department of Civil Engineering and Architecture
Kurokami 2-39-1, Kumamoto 860-8555, Japan
Action: Research/ Teaching

8/1995-- 6/1996 **Assistant Professor** (post-doctoral)
New Mexico Institute of Mining & Technology
Department of Environmental Engineering
Socorro, New Mexico 87801
Action: Teaching/ Research

8/1990-- 7/1995 **Research/Teaching Assistant** (during PhD program)
The University of Oklahoma
School of Civil Engineering and Environmental Science
202 West Boyd Street, Room 334
Norman, Oklahoma 73019

4/1985-- 7/1990 **Civil Engineer / Planner** (Principal)
Onuma & Onuma Assoc., Inc.
4-32-4 Nishi-Shinjuku, Shinjuku-Ku, Tokyo 160, Japan
Action: Civil Planning and Design (e.g., storm drainage, wastewater collection, potable water systems, etc.).

1/1984-- 2/1985	**Research Assistant** (on scholarship) Osaka University, Faculty of Engineering Department of Environmental Engineering 2-1 Yamadaoka, Suita, Osaka 565, Japan
8/1980--12/1983	**Teaching Assistant** (while student) The University of Hawaii Department of Civil Engineering Holmes Hall 383, 2540 Dole Street Honolulu, Hawaii 96822
5/1980-- 8/1980 **5/1979-- 8/1979** **5/1978-- 8/1978**	**Civil Engineering Technician** (summer job, while student) U.S. Army Corps of Engineers Geotechnical Branch, Soils Division 210 North Tucker Blvd., St. Louis, Missouri 63101

Peer-reviewed Journal Articles and Book Chapters:

(proceedings, reports, and presentations in subsequent sections)

30. **Rouse, J.D.** "Development of Environmentally Sustainable Methods for Treatment of Domestic Wastewater and Handling of Sewage Sludge on Yap Island." **Sustainability**. **2015**, Vol. 7, 12452-12464.

29. **Sfaelou, S.; Papadimitriou, C.A.; Manariotis, I.D.; Rouse, J.D.; Vakros, J.; Karapanagioti, H.K.** "Treatment of Low-Strength Municipal Wastewater Containing Phenanthrene Using Activated Sludge and Bioflim Process." **Desalination and Water Treatment. 2015,** doi: 10.1080/19443994.2015.1048735, 1-11.

28. **Habana, N.C.; Salvacion, J.L.; Jenson, J.W.; Rouse, J.D.** "VADOCHARGE-N: a Vadose Flow and N-Transport Simulation Model for the Northern Guam Lens Aquifer." **International Journal of Environmental Engineering Science and Technology Research**. November 2013, Vol. 1, No. 11, 268-287, ISSN: 2326-3113.

27. **Rouse, J.D.** "Sustainability of Wastewater Treatment and Excess Sludge Handling Practices in the Federated States of Micronesia." **Sustainability**. **2013**, Vol. 5, 4183-4194.

26. **Levstek, M.; Plazl, I.; Rouse, J.D.** "Estimation of the Specific Surface Area for a Porous Carrier." **Acta Chimica Slovenica. 2010**, Vol. 57, 45–51.

25. **Zhang, W.; Xie, Q.; Rouse, J.D.; Qiao, S.; Furukawa, K.** "Treatment of High-strength Corn Steep Liquor Using Cultivated PVA-gel Beads in an Anaerobic Fluidized-bed Reactor." **J. of Bioscience and Bioengineering**. **2009**, Vol. 107, No. 1, 49-53.

24. Rouse, J.D.; Morita, T.; Furukawa, K.; Shiau, B.J. "Solubilization of Mixed Polycyclic Aromatic Hydrocarbon Systems Using an Anionic Surfactant." **Colloids and Surfaces, A: Physicochemical Engineering Aspects**. **2008**, Vol. 325, 180-185.

23. Zhang, W.; Furukawa, K.; Rouse, J.D. "Bench-scale Study Using PVA Gel as a Biocarrier in a UASB Reactor Treating Corn Steep Liquor Wastewater." **Water Science & Technology**. **2007**, Vol. 56, No. 7, 65-71.

22. Rouse, J.D.; Burica, O.; Strazar, M.; Levstek, M. "Oxidation of Excess Organic Sludge from a Moving-bed Biofilm Process." **Water Practice**. **2007**, Vol. 1, No. 4.

21. Rouse, J.D.; Burica, O.; Strazar, M.; Levstek, M. "A Pilot-plant Study of a Moving-bed Biofilm Reactor System Using PVA Gel as a Biocarrier for Removals of Organic Carbon and Nitrogen." **Water Sci. & Tech**. **2007**, Vol. 55, No. 8-9, 135-141.

20. Hoa, T.T.H.; Khanh, L.N.; Zhijun, Liu.; Fujii, T.; Rouse, J.D.; Furukawa, K. "Nitrogen Removal by Immobilized Anammox Sludge Using PVA Gel as Biocarrier." **Japanese Journal of Water Treatment Biology**. **2006**, Vol. 42, No. 3, 139-149.

19. Rouse, J.D., Bjornen, K.K., Taylor, R.W., Shiau, B.J. "Surfactant-based Technologies Applicable to Remediation of Mercury Pollution in the Subsurface." **Environmental Practice**. **2004**, Vol. 6, No. 2, 157-164.

18. Rouse, J.D.; Yazaki, D.; Cheng, Y.; Koyama, T.; Furukawa, K. "Swim-bed Technology as an Innovative Attached-growth Process for High-rate Wastewater Treatment." **Japan. J. Water Treat. Biology**. **2004**, Vol. 40, No. 3, 115-124.

17. Rouse, J.D.; Nakashima, T.; Furukawa, K. "Maintaining Granulation in a Denitrifying Upflow Sludge-blanket Reactor Treating Groundwater with Low Hardness." **Water Environment Research**. **2003**, Vol. 75, No. 5, 406-411.

16. Furukawa, K.; Rouse, J.D.; Yoshida, N.; Hatanaka, H. "Mass Cultivation of Anaerobic Ammonium-oxidizing Sludge Using a Novel Nonwoven Biomass Carrier." **Journal of Chemical Engineering of Japan**. **2003**, Vol. 36, No. 10, 1163-1169.

15. Rouse, J.D.; Yoshida, N.; Hatanaka, H.; Imajo, U.; Furukawa, K. "Continuous Treatment Studies of Anaerobic Oxidation of Ammonium Using a Nonwoven Biomass Carrier." **Japanese Journal of Water Treatment Biology**. **2003**, Vol. 39, No. 1, 33-41.

14. Fujii, T., Sugino, H.; Rouse J.D.; Furukawa, K. "Characterization of the Microbial Community in an Anaerobic Ammonium-oxidizing Biofilm Cultured on Non-woven Carrier." **Journal of Bioscience and Bioengineering**. **2002**, Vol. 94, No. 5, 412-418.

13. Rouse, J.D.; Sumida, K.; Ohta, M.; Furukawa, K. "Evaluation of a Granular Sludge USB Process for Denitrification of Groundwaters with Low Hardness Including Polluted Field Samples." **Japan. J. Water Treat. Biol. 2002**, Vol. 38, No. 3, 167-173.

12. **Furukawa, K.; Rouse, J.D.; Nakashima, T.; Ohta, M.; Sumida, K.** "Purification of Groundwater Polluted with Nitrate-nitrogen Using an Upflow Sludge-blanket (USB) Process." **Journal of Water and Waste. 2002**, Vol. 44, No. 8, 669-678. [Review article in Japanese.]

11. **Furukawa, K.; Rouse, J.D.; Imajo, U.; Nakamura, K.; Ishida, H.** "Anaerobic Oxidation of Ammonium Confirmed in Continuous Flow Treatment Using a Non-woven Biomass Carrier." **Japan. J. Water Treat. Biology. 2002**, Vol. 38, No. 2, 87-94.

10. **Rouse, J.D.; Hirata, O.; Furukawa, K.** "Influence of Diphenyloxide Disulfonate Surfactants on Biodegradation of Hydrocarbons." **Global Nest, the International Journal. 2001**, Vol. 3, No. 1, 23-36.

9. **Bhatti, Z.I.; Sumida, K.; Rouse, J.D.; Furukawa, K.** "Characterization of Granular Sludge in a Denitrifying USB Reactor Treating Soft Groundwater." **Journal of Bioscience and Bioengineering. 2001**, Vol. 91, No. 4, 373-377.

8. **Rouse, J.D.; Sumida, K.; Kida, K.; Furukawa, K.** "Maintainability of Denitrifying Granular Sludge in Soft to Marginally Hard Waters With in an Upflow Sludge-blanket Reactor." **Environmental Technology. 1999**, Vol. 20, 219-225.

7. **Rouse, J.D.; Oda, H.; Furukawa, K.** "Autotrophic Biological Transformations of Nitrogen Under Oxygen-stressed and Anaerobic Conditions." **Japanese Journal of Water Treatment Biology. 1998**, Vol. 34, No. 3, 215-230.

6. **Rouse, J.D.; Sabatini, D.A.; Brown, R.E.; Harwell, J.H.** "Evaluation of Ethoxylated Alkylsulfate Surfactants for Use in Subsurface Remediation." **Water Environment Research. 1996**, 68, 162-168.

5. **Rouse, J.D.; Sabatini, D.A.; Deeds, N.E.; Brown, R.E.; Harwell, J.H.** "Micellar Solubilization of Unsaturated Hydrocarbon Concentrations as Evaluated by Semi-equilibrium Dialysis." **Environmental Science and Technology. 1995**, 29, 2484-2489.

4. **Rouse, J.D.; Sabatini, D.A.; Harwell, J.H.** "Influence of Anionic Surfactants on Bioremediation of Hydrocarbons." Surfactant-enhanced Subsurface Remediation: Emerging Technologies, pp. 124-140. **ACS Symposium Series 594**, American Chemical Society, Washington, DC; **1995**.

3. **Shiau, B.J.; Rouse, J.D.; Sabatini, D.A.; Harwell, J.H.** "Surfactant Selection for Optimizing Surfactant-enhanced Subsurface Remediation." Surfactant-enhanced Subsurface Remediation: Emerging Technologies, pp. 65-79. **ACS Symposium Series 594**, American Chemical Society, Washington, DC; **1995**.

2. **Rouse, J.D.; Sabatini, D.A.; Suflita, J.M.; Harwell, J.H.** "Influence of Surfactants on Microbial Degradation of Organic Compounds." Critical Reviews in **Environmental Science and Technology. 1994**, 24, 325-370.

1. Rouse, J.D.; Sabatini, D.A.; Harwell, J.H. "Minimizing Surfactant Losses Using Twin-head Anionic Surfactants in Subsurface Remediation." **Environmental Science and Technology**. **1993**, 27, 2072-2078.

Published Proceedings and Short Communications:

13. Rouse, J.D. "Development of Environmentally Sustainable Methods for Treatment of Domestic Wastewater and Handling of Sewage Sludge on Yap Island." **The 4th World Sustainability Forum, November 2014**. (Same data as similar *Sustainability* paper, above.) Available online: http://www.sciforum.net/conference/wsf-4/wsf-d.

12. Zhang, W.; Zhang, X.; Wang, D.; Koga, Y.; Rouse, J.D.; Furukawa, K. **(Short Communication)** "Trace Elements Enhance Biofilm Formation in UASB Reactor for Solo Simple Molecule Wastewater Treatment." **Bioresource Technology. 2011**, Vol. 102, 9296-9299.

11. Kobayashi, G.; Rouse, J.D.; Sakaguchi, K.; Fujii, H. "Wastewater Reclamation and Excess Sludge Reduction System by Specific MBBR." **Wastewater Reuse, Asia 2011; 1st International Conference on Wastewater Reuse & Reclamation.** Bangkok, Thailand; August **2011**.

10. Zhang, W.; Furukawa, K.; Rouse, J.D. "Bench-scale Study Using PVA Gel as a Biocarrier in a UASB Reactor Treating Corn Steep Liquor Wastewater." **IWA Specialist Conferences: Towards Sustainable Water Resources Management & Use**. Kuala Lumpur, Malaysia; May **2007**, CD-ROM. (Same data as similar *WS&T* paper, above.)

9. Rouse, J.D.; Burica, O.; Strazar, M.; Levstek, M. "Elimination of Excess Organic Sludge from a Moving-Bed Biofilm Process." **WEF/AWWA Joint Residuals and Biosolids Management Conference**. Denver, CO; April **2007**, CD-ROM. (Same data as similar *Water Practice* paper, above.)

8. Rouse, J.D.; Burica, O.; Strazar, M.; Levstek, M. "A Pilot-Plant Study of a Moving-Bed Biofilm Reactor System Using PVA Gel as a Biocarrier for Removals of Organic Carbon and Nitrogen." **IWA Biofilm Systems VI Conf., Hybrid Reactors Session**. Amsterdam; Sept. **2006**, CD-ROM. (Same data as similar *WS&T* paper, above.)

7. Rouse, J.D.; Fujii, T.; Sugino, H.; Tran, H.; Furukawa, K. "PVA-Gel Beads as a Biomass Carrier for Anaerobic Oxidation of Ammonium in a Packed-Bed Reactor." **HELECO'05 Conference, Session 16**. Athens, Greece; February **2005**, CD-ROM.

6. Furukawa, K.; Rouse, J.D.; Imajo, U.; Sugino, H.; Fujii, T. "Establishment of an Anammox Culture in Continuous Flow Treatment With Non-Woven Biomass Carrier." **WEFTEC 2001, 74th Annual Conference on Water Quality and Wastewater Treatment, Water Environ. Federation**. Atlanta, USA; October 13-17, **2001**, CD-ROM.

5. **Imajo, U.; Ishida, H.; Fujii, T.; Sugino, H.; Rouse, J.D.; Furukawa, K.** "Detection of Anammox Activity From Activated Sludges." **Asian Waterqual 2001, International Water Association**. Fukuoka, Japan; September 12-15, **2001**; pp. 887-892.

4. **Furukawa, K.; Rouse, J.D.; Bhatti, Z.I.;** Imajo, U. "Anaerobic Ammonia Oxidation (Anammox) in Continuous Flow Treatment With Non-Woven Biomass Carrier." **ISEB 2000, Fifth International Symposium on Environmental Biotechnology**. Kyoto, Japan; July 9-13, **2000**; CD-ROM.

3. **Rouse, J.D.; Nakashima, T.; Furukawa, K.** "Optimization of a Granular Sludge Upflow Sludge-Blanket Reactor for Denitrification of Groundwater With Low Hardness." **WEFTEC'99, 72nd Annual Conference on Water Quality and Wastewater Treatment, Water Environ. Federation**. New Orleans; Oct. 10-13, **1999**; CD-ROM.

2. **Rouse, J.D.; Shiau, B.J.; Sabatini, D.A.; Harwell, J.H.** "Surfactant Enhanced Subsurface Remediation: Surfactant Selection." in Proceedings of **DOE ER '93 Environmental Remediation Conf**. Augusta, GA; Oct. 24-28, **1993**; pp. 1255-1258.

1. **Rouse, J.D.; Sabatini, D.A.; Harwell, J.H.** "Minimizing Surfactant Losses During Surfactant Enhanced NAPL Remediation." Proceedings of **Third International Conference on Ground Water Quality Research: Subsurface Restoration Conference**. Dallas, TX; U.S. E.P.A. (Ada, OK); June 21-24, **1992**; pp. 260-262.

Research Reports:

11. **Joseph D. Rouse**, "Biofilm Pilot Study for Sewage Treatment with Composting of Waste Sludge on Yap." **University of Guam, WERI.** Technical Report No. 161, Oct. 2016 (23 pages).

10. **J.H. Martinez, J.D. Rouse, Y. Wen, D.H. Rubinstein**, "Management of Fat, Oil, and Grease on Guam." **University of Guam, WERI.** Technical Report No. 159, Dec. 2015 (52 pages).

9. **S. Khosrowpanah, M. Lander, J.D. Rouse, W. Whitman**, "Assessment of Turbidity in the Geus River Watershed in Southern Guam." **University of Guam, WERI.** Technical Report No. 156, June 2015 (40 pages).

8. **Joseph D. Rouse**, "Development of Environmentally Sustainable Methods for Treatment of Domestic Wastewater and Handling of Sewage Sludge on Yap Island." **University of Guam, WERI.** Tech. Report No. 153, Feb. 2015 (21 pages).

7. **Joseph D. Rouse**, "Inventory and Assessment of Existing Sewage Treatment Facilities and Excess Sludge Handling Practices in the Federated States of Micronesia." **University of Guam, WERI.** Tech. Report No. 147, Dec. 2013 (22 pages).

6. **Leena Muller, J.D. Rouse, S. Khosrowpanah**, "GIS-Based Screening for Cumulative and Secondary Impacts from Development Projects in Northern Guam." **University of Guam, WERI.** Tech. Report No. 146, Dec. 2013 (72 pages).

5. **Joseph D. Rouse**; "Evaluation of Biodegradability of Dye Wastewater Under Batch and Continuous Flow Conditions." Project Report FY 2002, Osaka Science & Technology Center (OSTC). **Kumamoto and Kyoto Universities and Suzuki Industries, Ltd., Japan.** March 2003 (pp. 73-85).

4. **Tran Hieu Nhue, Nguyen Van Tin, Do Hai, Nguyen Viet Anh, Leu Tho Bach, J.D. Rouse, Kenji Furukawa**; "Groundwater Contamination With Nitrogenous Compounds in Kumamoto Prefecture and Hanoi City -- Present Conditions and Adopted Countermeasures." Annual Report FY 2001, Core University Program Between Japan Society for the Promotion of Science (JSPS) and National Centre for Natural Science and Technology (NCST). **Vietnam National University, Hanoi, and Osaka University, Japan.** 2003 (pp. 239-249).

3. **Kenji Furukawa, J.D. Rouse, Tran Hieu Nhue, Nguyen Van Tin, Nguyen Viet Anh, Do Hai, Leu Tho Bach**; "Water Quality Survey of Vietnam." Annual Report FY 2000, Core University Program Between Japan Society for the Promotion of Science (JSPS) and National Centre for Natural Science and Technology (NCST). **Vietnam National University, Hanoi, and Osaka University, Japan.** 2002 (pp. 80-93).

2. **Rouse, J.D.; Furukawa, K; Morimura, K.** "Surfactant Solubilization of Multi-Component Hydrocarbon Contamination in Subsurface Remediation." Japanese Ministry of Education (Monbusho). **Kumamoto University, Japan** (17401). Term: 1999~2000. Project number: 11680576 (40 pages).

1. **Rouse, J.D.; Furukawa, K; Morimura, K.** "Bioremediation of Petroleum Hydrocarbon Contaminants Using Anionic Surfactants." Japanese Ministry of Education (Monbusho). **Kumamoto University, Japan** (17401). Term: 1997~1998. Project number: 09680549 (50 pages).

Invited/Keynote Lectures (by Rouse):

2. "Surfactant-Based Remedial Technologies Applicable to Mercury Contamination." **13th Ariake Yatsushiro Kai (Kumamoto Inland Sea) Research Meeting**. Kumamoto, Japan; October 22, **2001**. (***in Japanese***)

1. "Advanced Remedial Technologies for Groundwater Pollution Mitigation." **12th Ariake Yatsushiro Kai (Kumamoto Inland Sea) Research Meeting**. Kumamoto, Japan; December 8, **2000**. (***in Japanese***)

Conference/Seminar Presentations (Talks/Posters):

* Published abstract ! Oral presentation by Rouse

40. ! **Rouse, J.D.,** ! **Hahm, H.J.** "Beneficial Use of Piggery Waste with a Focus on Energy Production." **2017 Island Sustainability Conference: Cultivating Communities for Sustainable Action**, of the Univ. of Guam, Center of Island Sustainability. Tumon, Guam; April 19-21, **2017**.

39. ! **Rouse, J.D.** "Use of Sustainable Methods for Municipal Wastewater Treatment and Reuse of Excess Sludge on the Island of Yap." **2016 Island Sustainability Conference: Islanded Communities**, of the Univ. of Guam & the Univ. of Alaska Fairbanks. Tumon, Guam; April 11-15, **2016**.

38. ! **Rouse, J.D.** "Studies on Enhancement of Sewage Treatment and Composting of Sludge on Yap Island." **Second Conference on Water Resource Sustainability Issues on Tropical Islands**. Honolulu, Hawaii; December 1-3, **2015**.

37. ! **Rouse, J.D.** "Wastewater Treatment Practices in the FSM with a Focus on Pilot Testing on Yap." **First Annual Conference, American Water Works Association**, Hawaii Section, Western Pacific Sub-Section. Tumon, Guam; April 13-14, **2015**.

36. ! **Rouse, J.D.** "Sustainability of Effective Wastewater Treatment Practices on Yap Island." **2014 Island Sustainability Conference of the University of Guam**. Tumon, Guam; April 15-16, **2014**.

35. ! **Rouse, J.D.** "Sustainability of Wastewater Treatment Practices in Micronesia" **2013 Island Sustainability Conference of the University of Guam**. Tumon, Guam; April 17-19, **2013**.

34. ! **Rouse, J.D.** "Assessment of Wastewater Treatment Facilities and Excess Sludge Handling Practices in the FSM." **35th Annual Conference of the Hawaii Water Environment Association**. Honolulu, Hawaii; February 4-6, **2013**.

33. ! **Rouse, J.D.** **(VIRTUAL Participant)** "Assessment of Wastewater Treatment and Excess Sludge Handling Practices in the Federated States of Micronesia: Sustainability of Treatment Practices." **Ninth International Conference on Environmental, Cultural, Economic & Social Sustainability**. Hiroshima, Japan; Jan. 23-25, **2013**. www.youtube.com/playlist?list=PL428534F575A9451A&feature=view_all: (#50).

32. ! **Rouse, J.D.** "Elimination of Sludge from Wastewater Treatment Plants, or Development of Sludge as an Energy Resource: Which is better?" **2012 Island Sustainability Conference of the Univ. of Guam**. Tumon, Guam; April 18-19, **2012**.

31. ! **Rouse, J.D.** "Elimination of Sludge from Wastewater Treatment Plants, or Development of Sludge as an Energy Resource: Which is Better? **33rd Annual Research Conference of the University of Guam.** Mangilao, Guam; March 13, **2012**.

30. * Rouse, J.D.; Kobayashi, G.; Fujii, H. "High-rate Biological Treatment Coupled with Sludge Reduction." **Water Resource Sustainability Issues on Tropical Islands.** Honolulu, HI; November 14-16, **2011**.

29. !* Rouse, J.D.; Burica, O.; Strazar, M.; Levstek, M. "Elimination of Excess Organic Sludge from a Moving-Bed Biofilm Process." **WEF/AWWA Joint Residuals and Biosolids Management Conference**. Denver, CO; April **2007**. (Also shown as proceeding, above.)

28. !* Rouse, J.D.; Burica, O.; Strazar, M.; Levstek, M. "A Pilot-Plant Study of a Moving-Bed Biofilm Reactor System Using PVA Gel as a Biocarrier for Removals of Organic Carbon and Nitrogen." **IWA Biofilm Systems VI Conference**, Hybrid Reactors Session. Amsterdam; September **2006**. (Also shown as proceeding, above.)

27. !* Furukawa, K.; Rouse, J.D.; Sumida, K.; Ohta, M. "Denitrification of Contaminated Groundwater With Low Hardness Using an Upflow Sludge-blanket Reactor." **Japanese Society of Water Treatment Biology, 38th Annual Symposium**. Kobe, Japan; November 14-16, **2001**.

26. !* Rouse, J.D.; Shiau, B.J.; Karapanagioti, H.K.; Bjornen, K.K. "Surfactant-Based Remedial Technologies Applicable to Mercury Environmental Contamination." **6th International Conference on Mercury as a Global Pollutant**. Minamata, Japan; October 15-19, **2001**.

25. !* Furukawa, K.; Rouse, J.D.; Bhatti, Z.I.; Imajo, U. "Anaerobic Ammonia Oxidation (Anammox) Using Non-Woven Biomass Carrier in Continuous Treatment." **Japanese Society of Water Treatment Biology, 37th Annual Symposium**. Sagami, Japan; November 8-11, **2000**.

24. ! Rouse, J.D.; Furukawa, K. "Influence of Diphenyloxide Disulfonate Surfactants on Biodegradation of Hydrocarbons." **ISEB 2000, Fifth International Symposium on Environmental Biotechnology**. Kyoto, Japan; July 9-13, **2000**.

[*etc.*]

University Courses Taught:

UOG: University of Guam
NMT: New Mexico Institute of Tech.
OU: University of Oklahoma
KU: Kumamoto University, Japan

UOG EV 542 Hydrology—Engineering Hydrology
UOG EV 511 Environmental Science—Hydrology Section (team teach)
UOG ES 202 Engineering Mechanics—Dynamics
UOG ES 201 Engineering Mechanics—Statics (team teach)
OU ENGR 3001 Engineering Computing—FORTRAN
OU CE 3112 Intro. to Hydro-science
OU CE 4233 Design of Water and Wastewater Treatment Processes
NMT ES 110 Graphics and Computer Skills—Lab
NMT ENVE 201 Intro. to Environmental Engineering
NMT ENVE 491 Special Topics (AutoCAD)
NMT ENVE 302 Environmental Law
NMT ES 111 Computer Aided Design/Programming—Lab
NMT ES 301 Engineering Mechanics—Statics
KU Water Quality/Sanitary Engr. Lab (team teach)
KU Environmental System Engineering (team teach)
KU Computer Software Applications
KU Technical English

Global Tour (of Rouse)—1999:

Acknowledgment: Funding provided by **Nishida Tekko Corp.** for Overseas Research Development is gratefully appreciated.

Presentation Topics:
(A) Use of Surfactants in Subsurface Bioremediation of Petroleum Hydrocarbons.
(B) Optimization of Granule Formation in a Denitrifying USB Reactor.
(C) Anaerobic Oxidation of Ammonia With Concurrent Lithotrophic Reduction of Nitrite.

Sept. 16 ~ Depart Japan, arrive Bangkok, Thailand, Mahidol University (contact, Dr. Inthorn): ***Presentation B***

Sept. 18 ~ Bangkok, Thailand, Chulalongkorn University: Discussions with Dr. Thongchai (wastewater treatment) and Dr. Sumaeth (surfactant chemistry).

Sept.20 ~ Chania, Greece, Technical University of Crete (contact, Dr. Kalogerakis): ***Presentation A***

Sept. 22 ~ Athens, Greece, University of the Aegean (Athens Office): Discussion with Dr. Lekkas, Rector (Director of Global Nest).

Sept. 23 ~ Mytilene, Greece, University of the Aegean, Lesvos Island (contact, Dr. Karapanagioti): ***Presentations B and C***

Sept. 24 ~ Oklahoma, USA, University of Oklahoma (Norman) / EPA Lab (Ada): Interactive visits with personnel of the School of Civil Engineering and Environmental Science, Institute of Applied Surfactant Research, Surbec-Art Environmental Co. and R.S. Kerr Research Lab.

Sept. 28 ~ University of Oklahoma (contact, Dr. Knox): ***Presentation A***

Oct. 4 ~ R.S. Kerr EPA Lab (contact, Dr. Hutchins): ***Presentation A***

Oct. 7 ~ University of Oklahoma (contact, Dr. Sabatini): ***Presentations B and C***

Oct. 11 ~ New Orleans, USA, WEFTEC'99 Conference: ***Presentation B***

Oct. 14 ~ Honolulu Hawaii, USA, University of Hawaii, Water Resources Research Center (contact, Dr. Fujioka): ***Presentation A***

Oct. 17 ~ Return to Japan, Conclusion of one-month tour -- over 20,000 miles.

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Ujwalkumar Patil., Ph.D., P.E., M. ASCE.

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Tel. 671-987-1822
Email: patilu@triton.uog.edu; patil_ujwal@yahoo.com

SUMMARY

- Currently working as Assistant Professor at School of Engineering, University of Guam, USA
- Worked as Post-Doctoral Research Associate for 2 years at University of Texas at Arlington, TX USA
- Attained PhD degree in Civil Engineering (Geotechnical Engineering).
- Attained two master's Degree (Geotechnical) with thesis; published several technical reports, journal papers, conference papers and made professional presentations at International conferences.
- Worked for 3+ years as a Civil (Geotechnical) Engineer in two reputed USA firms.
- Registered Professional Engineer (P.E. civil) in the state of Texas, USA.
- Taught several courses at Undergraduate level.
- Official reviewer for several esteemed International Journal papers

EDUCATION

2011 – 2014 Ph.D. in Civil Engineering (Geotechnical) at University of Texas at Arlington, TX USA

2007 - 2008 M.S. in Civil Engineering (Geotechnical) at San Diego State University, CA, USA

1997 - 1999 M.E. in Civil Engineering (Geotechnical) at COE Pune, India

1994 - 1997 B.S. in Civil Engineering at North Maharashtra University, India

COURSES TAKEN

Foundation Analysis & Design, In-situ Testing Methods, Soil Dynamics, Theoretical Soil Mechanics, Experimental Soil Mechanics, Unsaturated Soil Mechanics, Design of Earth Structures, Advanced Soil Mechanics, Geotechnical Explorations and Instrumentation, Finite Element Analysis of Structures, Constitutive Modeling, Mathematical Statistics-I, Statistical Methods, Earthquake Analysis of Structures.

EXPERIENCE

2017 (September) – Present: Assistant Professor, University of Guam, GU, USA

- Currently working on writing proposals for National Science Foundation, US Geological Survey, and several local agencies including Guam Power Authority, and Guam Public Work Division. Teaching undergraduate courses such as Engineering Orientation, and designing courses such as Geotechnical engineering, Foundation engineering, Earth retaining structures and several other 3rd and 4th year civil engineering courses. Advising undergraduate students.
- Principle Investigator (PI) of a research project titled "Aerial survey and field instrumentation for investigation of landslide threat to tropical watershed in southern Guam" funded by Guam Hydrological Survey (GHS).
- Assisting the PI (Dr. Khosrowpanah) on his research project titled "Developing hydrological data for Toguan watershed management." Grant name - CRI-GU-15, Contract # C160600440, Funded by National Oceanic and Atmospheric Administration (NOAA).

2015 (September) – 2017 (September): Post-Doctoral/Faculty Research Associate, University of Texas at Arlington, TX, USA

- Worked on remote sensing project (TxDOT project # 06944) using Unmanned Aerial Vehicle for TxDOT to develop UAV based guidelines and evaluate pavement forensics (project still under progress); Worked on NSF funded project in area of unsaturated soil mechanics (NSF grant # 1039956) until its completion; Assisted the PI (Dr. Anand Puppala) in writing research proposals for NSF, TxDOT, and guided doctoral students with research interest in area of unsaturated soil mechanics, ground improvement, and sustainability of infrastructures.

2014 (September) – 2015 (August): Staff Geotechnical Engineer, Terracon Inc, Tulsa Oklahoma, USA.

- Develop plans, specifications, and inspection reports as needed on assigned tasks to see that these items are complete, accurate, and in accordance with good engineering practice.
- Technical involvement in the resolution of design problems that include performing field investigation or inspections, detailed design work, and detailed checking of design computations done by others, or general coordination of specific design aspects into a project.
- Work closely with other disciplines on multi-discipline projects. Implement technical requirements to complete client projects by directing field staff to sample, test, and collect data and/or document on-site activities at various client sites.
- Assist in compiling the scope of work for both routine and more complex lab or field investigations to measure and sample physical and non-physical properties of soil from a geotechnical, geological, or environmental standpoint or the analysis of construction materials.

2011 – 2014 (August): Doctoral candidate in Civil Engineering, University of Texas at Arlington, Texas, USA.

- Experience with Basic and Advanced Laboratory Soil Testing.
- Performed field instrumentation and monitoring using the "Bender Element Senor" to witness sulfate heaving in chemically treated soils.
- Worked on National Science Foundation funded research project to develop standard protocol for triaxial testing of unsaturated silty sands over wider range of soil suction states including constitutive soil modeling as a part of PhD dissertation.
- Relevant research topics: Unsaturated silty sands, shear-induced stiffness, strength and volume-change behavior of unsaturated soils under triaxial conditions, dilational behavior of sands, constitutive-soil modeling using cam-clay and Barcelona basic model.

2008 (August) – 2011 (Jan): Professional (Civil Engineer) at Kleinfelder Inc., San Diego, CA.

- Interpretation of bore logs and scheduling of laboratory testing program.
- Report preparation and laboratory testing of engineering materials such as soil, asphalt, concrete, steel, bolts, slurry seal etc.
- Hot Mix Asphalt job mix verification, QA/QC, Hot mix asphalt design for clients such as Caltrans Transportation Department etc.

2007 – 2008: Graduate Research Assistant at San Diego State University, CA (USA).

- MS Thesis research concerns the use of granulated recycled tire rubber for the mitigation of wetting-induced expansion in swelling soils.
- Relevant topics: soil behavior, clay chemistry, mineralogy, mixture behavior, percolation, unsaturated soils.
- Taught senior-level Geotechnical Engineering Laboratory course in Dept. of Civil Engineering SDSU.
- Responsibilities: To teach and conduct experiments including Atterberg limits, sieve analyses, permeability, proctor compaction, consolidation, swell, direct shear test, unconfined compression, triaxial test, CBR., etc.

2000 – 2007: Lecturer at D. N. Patel College of Engineering, India.

- Taught theory and experimental courses to undergraduate students in civil engineering including Geotechnical Engineering, Foundation Engineering, Fluid Mechanics, and Engineering Mechanics.
- Guided senior level civil engineering undergraduate students in their senior class project.

1999 – 2000: Lecturer at Navalnagar College of Engineering, India.

- Taught theory and experimental courses to undergraduate students in civil engineering including Geotechnical Engineering, Foundation Engineering and Engineering Mechanics.
- Guided senior level civil engineering undergraduate students in their senior class project.

PUBLICATIONS (Link to google scholar: https://scholar.google.com/citations?user=1y0r91oAAAAJ&hl=en)

Thesis/Dissertation

- Response of unsaturated silty sand over a wider range of suction states using a novel double-walled triaxial testing system." Ph.D. Dissertation, Funded by NSF grant # 1039956, University of Texas at Arlington, TX, USA.
- "Mitigation of clay swelling with granulated tire rubber: Experimental study," MS Thesis (2008).
- "Graphical solution for sheet pile embedment," MECE Thesis (1999).

Journal papers

- Patil, U., Valdes, J. R., and Evans, T. M. (2011). "Swell mitigation with granulated tire rubber." *Journal of Materials in Civil Engineering* (ASCE), Vol. 23, No. 5, pp. 721-727. http://dx.doi.org/10.1061/(ASCE)MT.1943-5533.0000229.
- Patil, U. D., Hoyos, L. R., and Puppala, A. J. (2016). "Modeling essential elastoplastic features of compacted silty sand via suction-controlled triaxial testing." *International Journal of Geomechanics*, 16(6), pp. 22, https://doi.org/10.1061/(ASCE)GM.1943-5622.0000726.
- Patil, U. D., Puppala, A. J., and Hoyos, L. R. (2016). "Characterization of compacted silty sand using a double-walled triaxial cell with fully automated relative humidity control." Vol. 39, No. 5, *Geotechnical Testing Journal*, ASTM, pp. 742-756, http://dx.doi.org/10.1520/GTJ20150156, ISSN 0149-6115.
- Patil, U. D., Puppala, A. J., Hoyos, L. R., and Pedarla, A. (2017). "Modeling critical-state shear strength behavior of compacted silty sand via suction-controlled triaxial testing." *Engineering Geology*, Vol. 231, pp. 21-33, http://dx.doi.org/10.1016/j.enggeo.2017.10.011.
- Bach, V. H. L., Nguyen, H. M., Puppala, A. J., Nguyen, C. M., and Patil, U. D. (2017). "Comparing the response of static loading tests on two model pile groups in soft clay." *Geotechnical and Geological Engineering*, An International Journal from Springer International Publishing (available online), pp. 1-14, https://link.springer.com/article/10.1007/s10706-017-0298-5.
- Qianmi, Yu., Jiankun, Liu, Patil, U.D., and Puppala, A. J. (2018). "A new approach for predicting particle breakage of granular material using the grey system theory." **Accepted for publication (In Press)**, *Journal of Materials in Civil Engineering* (ASCE) (draft available from authors).
- Patil, U. D., Puppala, A. J., Hoyos, L. R., and Banerjee, A. (2017). "Strength, stiffness and radial anisotropy of compacted silty sand under suction-controlled axisymmetric shearing." Under II review, *Geotechnical and Geological Engineering* (draft available from authors), Springer International Publishing.
- Patil, U. D., Hoyos, L. R., Puppala, A. J. and Bheemasetti, T. (2017). "Modeling stress-dilatancy behavior of compacted silty sand under suction-controlled axisymmetric shearing." Under II review, *Geotechnical and Geological Engineering* (draft available from authors), Springer International Publishing.
- Patil, U. D., Puppala, A. J., Morvan, M. M., Hoyos, L. R. (2017). "Bounding surface modeling of compacted silty sand exhibiting suction dependent post-peak strain softening." Under II review, *International Journal for Numerical and Analytical methods in Geomechanics* (draft available from authors).
- Nguyen, H., Puppala, A. J., Bheemasetti, TV, and Patil, U. D. (2018). "P-cone: A novel cone penetration device for pile design." Under preparation (draft available from authors).

Conference papers

- Le, M., Pedarla, A., Chitoori, B. S., Patil, U., Hoyos, L. R., Puppala, A. J., and Perrin, L. (2013). "Slope stability assessment using field moisture data for North Texas clay soil." Geo-Congress 2013 (ASCE): *Stability and Performance of Slopes and Embankments III – Proceedings of 2013 Congress*, GSP No 231, pp. 383-393, San Diego, CA, USA, March 3-7, https://ascelibrary.org/doi/10.1061/9780784412787.038
- Patil, U. D., Puppala, A. J., and Hoyos, L. R. (2014). "Assessment of suitable loading rate for suction-controlled triaxial testing on compacted silty sand via axis-translation technique." *Geo-Congress 2014 Technical Papers*, GSP no. 234, pp. 1307-1316. https://ascelibrary.org/doi/10.1061/9780784413272.127, Atlanta, Georgia, USA, February 23-26.

- Patil, U. D., Puppala, A. J., and Hoyos, L. R. (2014). "Strength/volume change behavior of compacted silty sand using a novel double-walled suction-controlled triaxial system." *Unsaturated Soils: Research and Applications – Proceedings of the 6th Int. Conf. on Unsaturated Soils*, UNSAT 2014, Sydney, NSW, 2-4 July 2014, Vol. 2, pp. 1727-1733, ISBN 9781138001503 - CAT# K22693.

- Patil, U. D., Puppala, A. J., and Hoyos, L. R. (2015). "Suitable shearing rate for triaxial testing of intermediate soils under vapor induced/controlled medium to high suction range." *International Foundations Congress and Equipment EXPO* (IFCEE 2015), Geotechnical Special Publication, GSP no. 256, March 17-21, San Antonio, TX. USA, pp. 2141-2150. http://dx.doi.org/10.1061/9780784479087.198.

- Caballero, S., Acharya, R., Banerjee, A., Bheemasetti, T., Puppala, A., and Patil, U. (2016). "Sustainable slope stabilization using biopolymer-reinforced soil." *Geo-Chicago 2016*, GSP 269, Chicago, Illinois, USA, August 14-18, 2016, pp. 116-126, https://ascelibrary.org/doi/10.1061/9780784480120.013

- Patil, U. D., Hoyos, L. R., and Puppala, A. J. (2016). "Essential features of compacted silty sand behavior via suction-controlled triaxial testing." *3rd European Conference on Unsaturated Soils – "E-UNSAT 2016,"* Vol. 9, Article # 17009, pp. 6, DOI: http://dx.doi.org/10.1051/e3conf/20160917009, September 12-14, 2016, Paris, France.

- Patil, U. D., Hoyos, L. R., and Puppala, A. J. (2016). "Characterization of compacted silty sand via relative humidity-controlled triaxial testing system." *3rd European Conference on Unsaturated Soils – "E-UNSAT 2016,"* Vol. 9, Article # 09012, pp. 5, DOI: http://dx.doi.org/10.1051/e3conf/20160909012, September 12-14, 2016, Paris, France.

- Nguyen, H. M., Puppala, A. J., and Patil, U. D. (2016). "Multi-level O-cell Test at The Phu My Bridge in Vietnam." Accepted for publication, *The 2nd National Conference on Transport Infrastructure and Sustainable Development - TISDC'2016*, September 17-18, Da Nang City, Vietnam, Vol. 1, pp. 281-288, Construction Publisher of Vietnam, ISBN: 978-604-82-1809-6.

- Nguyen, H. M., Puppala, A. J., and Patil, U. D., and Bach V. H. L. (2016). "Problems of cycle head-down pile load tests in soft soil region." Geotec Hanoi 2016: *The 3rd International Conference on Geotechnics for Sustainable Infrastructure Developement*, Phung (edt), Section 1: Deep Foundations, Paper no. 18, pp. 157-162, November 24-25, Hanoi, Vietnam, ISBN 978-604-82-1821-8.

- Nguyen, H. M., Puppala, A. J., Patil, U. D., Leila, M., and Banerjee, A. (2017). "Multi-level O-cell Tests on the instrumented bored piles in Mekong Delta." Geo-Frontiers 2017 (ASCE) Technical Papers, pp. 274–283, March 12-15, Orlando, Florida, USA, http://dx.doi.org/10.1061/9780784480465.029.

- Patil, U. D., Banerjee, A., Puppala, A. J., and Hoyos, L. R. (2017). "Shear strength prediction of compacted silty sand at peak/critical state failure over wider suction range." PanAm – UNSAT 2017: *2nd Pan American Conference on Unsaturated Soils*, 12th–15th November 2017, Dallas, Texas, In Press.

- Banerjee, A., Patil, U. D., Puppala, A. J., and Hoyos, L. R. (2017). "Evaluation of Liquefaction Resistance in Silty Sand via Suction Controlled Cyclic Triaxial Tests." PanAm – UNSAT 2017: *2nd Pan American Conference on Unsaturated Soils*, 12th–15th November 2017, Dallas, Texas, In Press.

PROFESSIONAL PRESENTATIONS

- ASCE Geo-Congress, San Diego, 2013; ASCE Geo-Congress, Atlanta, Georgia (2014); UNSAT 2014, 6th International Conference on Unsaturated Soils, Sydney, Australia; ASCE Geo-Congress, IFCEE, San Antonio, TX (2015), 9th University of Guam Regional Conference on Island Sustainability (2018).

SCHOLARSHIPS AND HONORS

- **2011- 2014** Doctoral Research STEM Assistantship, University of Texas Arlington, USA.
- **2007-08** Graduate Teaching Assistantship at San Diego State University, CA, USA.

MEMBERSHIP & LICENSES

- Member of American Society of Civil Engineers (ASCE, ID # 9475379)
- Professional Engineer, P.E. Civil (Texas, License # 122233)
- Engineer-in-Training. E.I.T. (Texas, EIT # 51536)
- Member of American Society for Military Engineers (SAME), Guam.

COMPUTER SKILLS

- MS Office, AutoCAD, Geo-Slope, GSTABLE, Driven, ABAQUS, Flac 3D, Plaxis, SAP 2000, Mathcad, gINT.

PROFESSIONAL SERVICE AS A REVIEWER

- Geotechnical Testing Journal (ASTM)
- International Journal of Geomechanics (ASCE)
- Journal of Materials in Civil Engineering (ASCE)
- Journal of Geotechnical & Geoenvironmental Engineering (ASCE)
- Journal of Geological Resource and Engineering (David Publishing) (http://www.davidpublisher.org/index.php/Home/Journal/detail?journalid=19&jx_JGRE&cont_reviewers)
- Sustainable Civil Infrastructures (Springer)
- Ships and Offshore Structures (Taylor & Francis Group)
- British Journal of Applied Science & Technology (Sciencedomain International)
- Transport Infrastructure and Systems: Proceedings of AIIT International Congress 2017, Rome, Italy.
- Geo-Chicago International Conference (ASCE), 2016, Chicago, USA.
- IFCEE 2015 (ASCE): International Foundations Congress and Equipment EXPO, GSP, March 17-21, 2015, San Antonio, TX, USA.
- UNSAT 2014, International Conference on Unsaturated Soils: July 2-4, 2014, Sydney, Australia
- GeoShanghai 2014, International Conference: May 26-28, 2014, Shanghai, China.
- GeoShanghai 2018, International Conference: May 27-30, 2018, Shanghai, China.
- Geo-Chicago 2016, GSP 269, Chicago, Illinois, USA, August 14-18
- Geo-Congress 2014 Technical Papers, GSP no. 234, Atlanta, Georgia, USA, February 23-26
- GeoMEast 2018 International Congress & Exhibition, November 24-28, 2018, Cairo, Egypt.

TECHNICAL COMMITTEE MEMBERSHIP

- GI Technical Committee Member: Unsaturated Soils
- GI Technical Committee Member: Soil Properties & Modeling

Pyo-Yoon Hong, Ph.D.

1. Biographical Information

A. Name	:	Pyo-Yoon Hong
B. Program	:	School of Engineering
C. Present Title	:	Associate Professor
D. Initial Appointment	:	August 17, 2015
E. Tenure Status	:	Non-Tenured

F. Academic Degrees:

Doctor of Philosophy (May 1995)
University of Oklahoma, Department of Civil Engineering and Environmental Science
Major: Structural Engineering

Master of Science in Engineering (December 1992)
University of Oklahoma, Department of Civil Engineering and Environmental Science
Major: Structural Engineering

Master of Science in Engineering (February 1986)
Pusan National University in S. Korea, Department of Architectural Engineering
Major: Architectural Engineering

Bachelor of Science in Engineering (February 1982)
Pusan National University in S. Korea, Department of Architectural Engineering
Major: Architectural Engineering

G. Prior Employment:

Assistant Professor (August 2008 thru August 2015)
Department of Architecture, Kennesaw State University, Marietta, GA 30060

Structural Engineer (December 2008 thru August 2015) – Part-time
Obelisk Engineering, Inc., 226 NE 2nd St, Oklahoma City, Oklahoma, OK 73104

Adjunct Professor (Summer 2007 thru Spring 2008)
School of Architecture, CET & Construction, Southern Polytechnic State University

Assistant Professor (August 2000 thru August 2006)
Department of Architecture, University of Hartford, West Hartford, CT 06117-1599

Structural Engineer (April 2001 thru Dec 2005) – Part-time
S/L/A/M Collaborative, 80 Glastonbury Blvd., Glastonbury, CT 06033-4415

Adjunct Professor (Fall 1998 thru Spring 2000)
Department of Engineering, Oklahoma City Community College, OKC, OK 73157

Structural Engineering Systems Analyst (June 1995 to August 2000)
Technical Services, NCI Building Systems.
8600 S. I-35 Service Rd., Oklahoma City, OK 73149

Research Associate (January 1995 to May 1995)
School of Civil Engineering, University of Oklahoma, Norman, OK 73139

Research Assistant (September 1992 to December 1994)
School of Civil Engineering, University of Oklahoma, Norman, OK 73139

Structural Engineer (November 1990 to May 1991)
CLB Enterprises Inc., 2 Morley Ct., North Hills, NY 11507

Teaching Assistant (January 1989 to November 1990)
School of Civil Engineering, University of Oklahoma, Norman, OK 73139

Construction Site Engineer (March 1988 to September 1988)
Bill Harbert International Construction Co., PO Box 531390, Birmingham, AL 35253

Adjunct Professor (September 1986 to September 1988)
Department of Architectural Engineering, Kyung-Nam University, Masan, S. Korea.

Full-Time Teaching Assistant (April 1986 to April 1987)
Department of Architectural Engineering, Pusan National University, Pusan, S. Korea.

Site Engineer (December 1981 to September 1983)
Doosan Engineering & Construction, Inc., Kang-Nam, Seoul, S. Korea.

H. Professional Registration:

Professional Engineer **2015** in **Guam**
Professional Engineer 2008 in Georgia
Professional Engineer 1997 in Oklahoma

2. Teaching

Course Taught:

1. Engineering Mechanics – Statics (UOG)
2. Engineering Mechanics – Dynamics (UOG)
3. Mechanics of Materials (UOG)
4. Introduction to Engineering (UOG)
5. Engineering Graphics (UOG)
6. Pre-Calculus (UOG)
7. College Algebra (UOG)
8. Design of Steel Structures
9. Design of Wood Structures
10. Design of Reinforce Structures
11. Lateral Load Resisting Systems

Textbooks, Instructional Materials:

1. PDF Textbook for Wood Structures
2. PDF Textbook for Steel Structures
3. PDF Textbook for Reinforced Concrete Structures
4. PDF Textbook for Lateral Force Resisting Systems
5. Instruction Manual for Wood Truss Testing
6. Instruction Manual for Plate Girder Testing
7. Instruction Manual for Small-Scale Reinforced Concrete Beam Testing
8. Multiple 3-Dimensional Interactive Demonstrators for three Structural courses
9. Manual Shake Table for testing Earthquake Resistant Building Models
10. Single Degree of Freedom model for Spectral Acceleration Demonstration

3. Academic Achievement

1. "Workbook Strategy in Structural Engineering by Incorporating Visual Understanding and Interactive Learning.", 2017 American Society of Engineering Education Annual Conference Zone II, San Juan, Puerto Rico
2. "Use of Visual Worksheets in Structural Engineering Classes.", ***presented*** in 2014 American Society of Engineering Education, Gulf Southwest Annual Conference, New Orleans, GA
3. "Quantitative and Qualitative Understanding in Structural Engineering.", ***presented*** in 2014 ASEE Southeast Section Annual Conference, Macon, GA

4. "Roles of Visual Understanding in Developing Conceptual Understanding of Structural Principles.", 2014 RoseEvaluation Annual Conference and ASEE IN-IL Annual Conference, Terre Haute, IN
5. Design of Reinforced Concrete Structures, A Primer Workbook, ISBN-13: 978-0-9895112-1-6, Matthias & Alex Publishing, 2014
6. "Connection between mathematical and visual approaches in structural engineering classes.", ***presented*** in American Society of Engineering Education, 2014 Annual Conference, Atlanta, GA
7. Design of Steel Structures, A Primer Workbook, ISBN-13: 978-0-9895112-1-6, Matthias & Alex Publishing, 2013
8. Design of Wood Structures, A Primer Workbook, ISBN-13: 978-0-9895112-0-9, Matthias & AlexPublishing, 2013
9. "Sweetening Structural Principles for Architectural Students.", ***presented*** in American Society of Engineering Education, 2011 Annual Conference, Vancouver, BC, Canada
10. Fridley, K.J., Rosowsky, D.V., and Hong, P. 1998. "Time-Dependent Service-Load Behavior of Wood Floors: Analytical Model." Computers & Structures, Vol. 66, Issue 6, 847-860.
11. Fridley, K.J., Rosowsky, D.V. and Hong, P., "Time Dependent Service Load Behavior of Wood Floors: Experimental Results.", In Press, Journal of Structural Engineering, ASCE, 1996
12. Rosowsky, D.V., Fridley, K.J., and Hong, P., "Reliability Based System Factor for Serviceability Design of Wood Floors.", Wood and Fiber Science, Vol. 28, No. 3, 1996.
13. Fridley, K.J., Rosowsky, D.V. and Hong, P., "Serviceability System Factor for Design of Wood Floors.", Proceedings of 1996 ASCE Structures Congress XIV, Vol. 2., 792-797.
14. Hong, P., Fridley, K.J., and Rosowsky, D.V., "Time Dependent Behavior of Wood Joist Floor Assemblies.", Proceedings of 1994 Pacific Timber Engineering Conference, 144-148.
15. Hong, P., Fridley, K.J., and Rosowsky, D.V., "Time Dependent Load Distribution Behavior of Parallel Member Wood Systems.", ***presented*** in 1994 ASCE Structures Congress XII, Vol. 2, 1088-1093.

4. Services

A. University Services

i. Division Chair of Department of Civil Engineering, 2017 – Present
ii. Chair of Academic Affairs Committee (AAC) of School of Engineering, 2016 - present
iii. Member of Graduate Curriculum Review Committee, 2017 - Present
iv. Development of BS in Civil Engineering Program
v. Development of 5 new courses for BS in Civil Engineering Program, 2017

CE 301, CE 304, CE304, CE 401, CE 404

vi. Curriculum Development of Four Year Civil Engineering Program in School of Engineering, 2016-2017
vii. Architectural Review service for the new construction of School of Engineering Building, 2016 - 2017
viii. Member of Search Committee for hiring Dean of Enrollment Management and Student Success, October 2017
ix. Member of Search Committee for hiring a new faculty for School of Engineering, 2017
x. Member of Academic Affairs Committee (AAC) of College of Natural and Applied Sciences, 2015 - 2016
xi. Assist launching of Student Chapter of SAME (Society of American Military Engineers Guam Post, 2017
xii. Class Observation by CNAS Faculty, ES203 Mechanics of Materials Class, April 25, 2016
xiii. Invitation of Japanese Students to Engineering Class (ES203) for Observation on request by Professional and International Programs, University of Guam, March 14, 2016
xiv 2016 Spaghetti Bridge Contest for School of Engineering students
xv. Student Advisor of Student Chapter of SAME Guam Post, 2016 - present

xvi. Structural Consulting to repair Green House Structures of Agricultural Department of CNAS damaged by Typhoon, September 2015

xvii. Assist Developing the UOG-Mapua Transfer 2 year +2 year Articulation Program with Mapua Institute of Technology, 2015

xviii. 2015 Spaghetti Bridge Contest for School of Engineering students

xix. Presentation in CNAS Open House to high school students and public. The title was "*Structures, Visualized*", 2015

xx. Advising Pre-Engineering students on course planning and career consulting, since 2015

B. Profession Services

i. Assist SAME/GHD on Engineering Week (E-Week) events, 2017

ii. Review of the paper title of "A Simple Experiment to Enhance Student Learning in the Area of Fins" published in American Association of Engineering Education Conference 2017 Proceedings.

iii. Review of the paper title of "A Case Study of Decision Making Model for Assignment Evaluation using Text Analytics" published in American Association of Engineering Education Conference 2017 Proceedings.

iv. Review of the paper title of "Managing Engineering and Engineering Technology Summer Internships for Academic Credit" published in American Association of Engineering Education Conference 2017 Proceedings.

v. Certified as a Professional Engineer (Civil) by The Guam Board of Registration, 2015 (License No. 1879)

vi. Member of Society of American Military Engineers Guam Post, since 2015

vii. Participated in CORE Engineering meetings, since 2015

C. Community Services

i. Judge in the Science Fair at Harvest Christian Academy, February 24, 2018.

ii. Presentation at Harvest Christian Academy, The title was "*Engineering as a Career*", February 21, 2018.

iii. Judge in the Science Fair at Harvest Christian Academy, February 25, 2017.

iv. Presentation at Notre Dame High School. The title was "*Basics of Truss Bridges*", February, 2017.

v. Presentation at Notre Dame High School. The title was "*Engineering as a Career*", February, 2017.

vi. Provide advising to a student (Jos Maligon) at JFK high school, regarding a research assignment about potential careers. March, 2016

5. Professional Growth and Development

1. Structural Engineering Institute Seminar, April 25, 2013, "Georgia SE Licensure Laws." By John Hann, PE; KSI Structural Engineers
2. Structural Engineering Institute Chapter Seminar, March 28, 2013, "Ali M. Ghalib, P.E. PhD.; ATKINS North America, Inc." by Jim W. Case, P.E.; Uzun & Case Engineers, LLC.
3. Structural Engineering Institute Seminar, February 26, 2013, "Structural Assessment of a Cable Stayed Bridge with an Irregular (folded) Deck Profile." by Ali M. Ghalib, P.E. PhD.; ATKINS North America, Inc.
4. Structural Engineering Institute Seminar, November 08, 2012, "A New Approach to Stability Bracing Requirements." by Cliff D. Bishop, E.I.T.; Graduate Research Assistant and Donald W. White, PhD; Professor
5. Structural Engineering Institute Seminar. October 11, 2012, Tour of Standard Concrete Products Atlanta Facility by Martin Porges and Jimmy Haas
6. Structural Engineering Institute Seminar, September, 2012. "Separating Junk Science from Sound Engineering Principles During Forensic Assessments of Hurricane Damage." by Ralf Leistikow, PE; Principal and Atlanta Unit Manager, Michael Horst, PE; Associate Principal and Darren Howard, PE; Senior

Associate, Wiss, Janney, Elstner Associates

7. Structural Engineering Institute Seminar, April 05, 2012, "Adhesive Anchor Design Requirements per ACI 318-11 Appendix D." by Kevin Davenport, PE, Field Engineer, Simpson Strong-Tie
8. Structural Engineering Institute Seminar, April 25, 2012, "Georgia SE Licensure Laws." by John Hann, PE; KSI Structural Engineers, Joshua Orton, PE; Heath & Lineback Engineers, Luis Babler, PE; Geo Hydro Engineers and George Kelley, Tennessee Valley Authority
9. Structural Engineering Institute Chapter Seminar, March 08, 2012, "Carbon Fiber Mesh (C-Grid or CarbonCast) in Precast Concrete." by Harry A. Gleich, PE, FACI, FPCI – VP of Engineering Metromont Corporation
10. Structural Engineering Institute Seminar, February 09, 2012, "17th Street Bridge Canopy-Fence Collapse" by Paul Liles, PE – Assistant Division Director of Engineering, Georgia Department of Transportation
11. Structural Engineering Institute Seminar, January 12, 2012, "Innovations of Steel Sheet Piles – Used to take vertical loads in both underground parking structures and bridge abutments." by Douglass Ford – Business Development Manager, Skyline Steel
12. Structural Engineering Institute Seminar, December 8, 2011, "Ask a Geotechnical Engineer." By Don Hill, PE – Chief Engineer, United Consulting
13. Structural Engineering Institute Seminar, November 03, 2011, "Sustainability Guidelines for the Structural Engineer." by Don Allen, PE - Technical Director, Steel Framing Alliance, Steel Stud Manufacturers Association & Cold-Formed Steel Engineers Institute
14. Structural Engineering Institute Seminar, October 13, 2011, "Why Structures Fail (Common Causes of Collapses)?" by Predrag L. Popovic, SE, PE, Vice President and Senior Principal, Wiss, Janney, Elstner Associates
15. Structural Engineering Institute Seminar, September 22, 2011, "Ultra-high Performance Concrete (UHPC) and its Application for Bridge Structures." by Lawrence F. Kahn, PhD, PE, Professor, School of Civil & Environmental Engineering, Georgia Institute of Technology
16. Structural Engineering Institute Seminar, June 9, 2011, "Construction Engineering for Transportation Projects." by John Heath, PE & Joshua Orton, PE, Heath & Lineback Engineers, Inc.
17. American Society of Civil Engineers Georgia Section Seminar, May 14, 2010, "Georgia Department of Transportation"
18. Structural Engineering Institute Georgia Chapter Seminar, April 28, 2011, "The Evolution of the AASHTO Seismic Design Specifications and Their Effect on Georgia's Bridges."
19. ***Presentation***, at Structural Engineering Institute Georgia Chapter Seminar, March 29, 2011, "Introduction to Geotechnical Engineering – Foundation Failure." By P. Hong, S. Kim and I. Oh
20. Structural Engineering Institute Georgia Chapter Seminar, February 24, 2011, "Cost Effective and Sustainable Concrete Flatwork"
21. Structural Engineering Institute Georgia Chapter Seminar, January 27, 2011, "Implementing Building Information Modeling (BIM)
22. Structural Engineering Institute Georgia Chapter Seminar, May 13, 2010, "FRP Composite Strengthening of Structures"
23. Structural Engineering Institute Georgia Chapter Seminar, December 9, 2010,
24. Structural Engineering Institute Georgia Chapter Seminar, November 11, 2010, "Wind Design for Non-Residential Wood Structures"
25. Structural Engineering Institute Georgia Chapter Seminar, October 27, 2010, "Tour of the Georgia Tech Structural Engineering and Materials Research Laboratory
26. Structural Engineering Institute Georgia Chapter Seminar, September 30, 2010, "Ground Treatment: Design, Construction and Some Pitfalls to Avoid."
27. Structural Engineer Association of Georgia Seminar, August 9, 2010, "Observations from Structural Engineers on Haiti Earthquake."

SHAHRAM KHOSROWPANAH
Professor of Civil Engineering
Interim Dean, School of Engineering
University of Guam, Mangilao, Guam 96923
Phone: (671) 735-2694; e-mail: khosrow@triton.uog.edu

EDUCATION

Ph.D. Civil Engineering, Colorado State University, 1984
M.S. Civil Engineering, Colorado State University, 1979
B.S. Irrigation Engineering, Rezaieh University, 1974

PROFESSIONAL REGISTRATION

Registered Professional Civil Engineer, Territory of Guam

EXPERIENCE

In Educational Institutions

2016 - Present	Interim Dean, University of Guam, School of Engineering
2012-2016	Director, University of Guam, Water and Environmental Research Institute of the Pacific
1998-Present	Professor, University of Guam, Water and Environmental Research Institute of the Western Pacific
1997-1998	Associate Professor, University of Guam, Water and Environmental Research Institute of the Western Pacific
1989-1997	Director, University of Guam, Water and Environmental Research Institute of the Pacific.
1985-1989	Assistant Professor, University of Guam, Water and Environmental Research Institute of the Western Pacific.

Other Professional:

Consultant Engineer, (Partner),
Pacific Rim Engineering, Guam, 1989-Present.
Consultant Engineer, Baran Construction Co., Tehran, Iran, 1974-75.

CURRENT POSITION

Interim Dean, School of Engineering (SENG). Duties include: provide leadership for school operation and planning, develop and administer the academic program and support functions of the school including the international programs, develop external relationships for enhancing student placement opportunity and funding support for the SENG, develop and managing the budget, provide the student recruitment and advisement, oversee the construction of the SENG, and coordinate and promote academic matters with the other deans at university, and provide recommendation for nomination, promotion, hiring for faculty and staff at the school.

COURSES TAUGHT

Engineering Fluid Mechanics, Engineering Hydraulics and Sedimentation, Engineering Statics, Engineering Dynamics, Engineering Graphics (using AutoCAD), Introduction to Engineering, Environmental Science-Geology/Engineering, and Environmental Science-Hydrology, Environmental Impact Assessment.

PUBLICATIONS AND REPORTS

Heitz, L. F., Shahram Khosrowpanah, and Jay Nelson, Sizing of Surface Water Runoff Detention Ponds for Water quality Improvement, Journal of the American Water Resources Association, Vol. 36, No. 3, June 2000, pp. 541-548.

Sh. Khosrowpanah., L. Heitz, & C. Beausoliel, The Application of Slow Sand Filtration Technology for Kosrae State, FSM: A Pilot Project, University of Guam/WERI, Technical Report No. 91, May 2001.

Sh. Khosrowpanah, "Rainfall Erosivity Factors for Selected Islands in the Federated States of Micronesia", Proceedings of the Coastal Water resources, American Water Resources Association, New Orleans, Louisiana, pp. 225-230, May 2002.

Sh. Khosrowpanah, L. Heitz, "Water Resources Management: A Challenging Issue for Tropical Islands in the Western Pacific", Journal of Water Resources, American Water Resources Association, Vol. 5, No. 3, May 2003.

Sh. Khosrowpanah, N. Scheman, "Badland Erosion rates and Sources in a Tropical Watershed", Proceedings of 2003 Annual Conference, Soil and Water Conservation Society, Spokane, Washington, July 2003.

Sh. Khosrowpanah, Mark Lander, and L. Heitz, "Pohnpei-the wettest island on earth? Tools for managing watershed", Proceeding of the Institutions for sustainable watershed management, American Water Resources Association, Honolulu, Hawaii, June 27-29, 2005.

Sh. Khosrowpanah, and John Jocson, 2005. "Environmental Assessment for Non-Point Sources of Pollution for Ugum Watershed", University of Guam/WERI, Technical Report No.109, December 2005.

Sh. Khosrowpanah, Leroy Heitz, and Michael Park, 2007. "Developing a GIS-Based Erosion Potential Model for Ugum Watershed", University of Guam/WERI, Technical Report No.117, March 2007.

Sh. Khosrowpanah, 2009. "The Impact of Guam's Population growth on Island Water Resources". Proceeding of the International Workshop on Sustainable City Region, Bali, Indonesia, February 2009, pp. 137-142.

Sh. Khosrowpanah, 2009."Development of Junction Water Demands for the Saipan Water Dist. System numerical Model". Proceeding of the 2009 American Water Works Association AWWA DDS Conference, Reno, Nevada, August 30, 2009.

Heitz, Leroy, Sh. Khosrowpanah, 2010. Prediction of Flow Duration Curves for Use in Hydropower Analysis for Ungaged Sites in Pohnpei, FSM. University of Guam/WERI, Technical Report No. 129, July, 24 pp.

Luo, Qiang Charles, Sh. Khosrowpanah, 2010. Calibration and Application of Luom in Southern Guam Watersheds with and without Flow Data. University of Guam/WERI, Mangilao, Guam, Technical Report No. 128, April, 93 pp.

Sh. Khosrowpanah, Yuming Wen, and Danko Taborosi, 2010. "Development digital Watershed Atlas of natural resources of Southern Guam". Proceedings of 9th International Conference on Hydroinformatics, Tianjin, China, pp. 1593-1598, September 7-10, 2010.

Wen, Yuming, Sh. Khosrowpanah, and Leroy Heitz, 2011. "Land Cover Change of watersheds in Southern Guam from 1973 to 2001". Journal "Environmental Monitoring and Assessment", Volume 179, Numbers 1-4, August 2011, pp. 521-529(9).

Qiang Charles Luo, Sh., Khosrowpanah, 2012. "Continuing Calibration and Application of Luom in the Southern Guam Watersheds not covered in the preceding project", Water and Environmental Research Institute (WERI), University of Guam, Mangilao, Guam, Report No. 131, 68 pp.

Heitz, F. Leroy, Shahram Khosrowpanah, 2012. "Prediction of Flow Duration Curves for use in Hydropower Analysis at Ungaged Sites in Kosrae, FSM", Water and Environmental Research Institute (WERI), University of Guam, Mangilao, Guam, Report No. 137, 28 pp.

Sh. Khosrowpanah, Mark Lander, Mohammad Golabi, Sydonia Manibusan, 2012. "A GIS-Based Watershed Management Plan for the Piti-Asan Watersheds", Water and Environmental Research Institute (WERI), University of Guam, Mangilao, Guam, Report No. 139, 76 pp.

Sh. Khosrowpanah, 2013. "Watershed Management: Ugum and Piti-Asan Watersheds", Presented at 27th Pacific Islands Environment Conference, Guam, June 26-28, 2013.

Heitz, F. and Shahram Khosrowpanah, 2013, "Improving the Weno, Chuuk Water Distribution System Using Hydraulic Modeling and Geographic Information Systems", Water and Environmental Research Institute of the Western Pacific (WERI), University of Guam, Report No 140, 50 pages

Heitz, F. Leroy, Shahram Khosrowpanah, 2014. "Improving the Pohnpei Island Water Distribution System Using Hydraulic Modeling and Geographic Information Systems", Water and Environmental Research Institute of the Western Pacific (WERI), University of Guam, Report No 148, 50 pages.

Sh. Khosrowpanah, 2015. "Watershed Management: Manell-Geus Watershed", 2015 Island Sustainability Conference, Guam, April 15-16, 2015.

Heitz, F. and Shahram Khosrowpanah, 2015, "Prediction of Flow Duration Curves at Ungaged Sites in Guam", Water and Environmental Research Institute of the Western Pacific (WERI), University of Guam, Report No 154, 34 pages

Sh. Khosrowpanah, 2015, "Assessment of Turbidity in the Geus River Watershed in Southern Guam", Water and Environmental Research Institute of the Western Pacific (WERI), University of Guam, Report No 156, 40 pages

Khosrowpanah, S. (2016). UOG's Emerging School of Engineering: Training Tomorrow's Engineers to meet Today's Community Needs . *Asian Pacific Academy of Sciences, Education, Environmental Management.* Abstracts. Saipan, November 10, 2016.

Khosrowpanah, S., Heitz, L. (2016). Prediction of Flow Duration Curves at Ungaged Stream Sites in Guam. *American Water Works Association (AWWA). Abstracts. Lotte Guam Hotel , Guam, April 11-12, 2016.Abstracts.*

Khosrowpanah, S., Lander, M. (2017). Water in Changing Environment. *University Council on Water Resources (UCOWR), Fort Collins, Colorado, June 13-15, 2017.*

Khosrowpanah, S., Bearden, B. (2018). Optimizing Operation of the Saipan W.D.S. Using Diurnal Demand Pattern and System Pressure. *American Water Works Association (AWWA). Abstracts. Hyatt Hotel , Guam, March 27, 2018.*

Appendix 4a
Request for New Course Forms

Bachelor of Science in Civil Engineering

School of Engineering

Department of Civil & Environmental Engineering

Faculty Senate Office
University of Guam

No. 6019a

Received By: cm

Date & Time: 9/25/18 4:45 pm

UNIVERSITY OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR NEW COURSE

1. Title: Mechanics of Fluids
2. Catalog Number: CEE 204 (New course may not duplicate active or inactive course number.)
3. Course Type: [X] Addition to the Curriculum
   [ ] Special Needs (Workshop, seminar, special topic,...94 series, etc.)
4. Level of Instruction: [X] Undergraduate [ ] Graduate (/G) [ ] Both
5. Credit Hours: 3
6. Is this course cross-listed with another department? NO
   If so, list the cross-listed catalog number (s)? _____
7. What session(s) will the course be offered? [X] Fall [ ]Spring [ ] Summer [ ] All
8. What will be the yearly cycle for this course?
   [X] All Years [ ] Even Years [ ] Odd Years [ ] One (1) Term Only
9. First term and year for this course: FALL, 2019; Length of Instruction (Weeks): 1 SEMESTER
10. Prerequisites:
    A. Instructor / Advisor consent required? [ ] Yes [X]No
    B. Prerequisites Catalog # Prerequisite Course Title
       MA204 CALCULUS II
    C. Additional Prerequisites: _____
11. CATALOG DESCRIPTION: Use complete sentences and present tense. Physical properties of fluids, fluid statics. mass momentum and energy conversation, Bernoulli equation. dimensional analysis, friction and head loss, flow in closed conduits, forces over immersed bodies.

12. DESCRIBE LIBRARY AND INFORMATION TECHNOLOGY RESOURCES AVAILABLE TO SUPPORT COURSE: If insufficient library sources are available, describe alternatives that will be used. Notes required for the course will be provided by Instructor.

13. SUBSTANTIATE THE COMPELLING NEED FOR THE NEW COURSE
This is the first basic course of fluid mechanics. The main objective of this course is to understand the fundamentals of the fluid mechanics such as fluid and flow properties, fluid behavior at rest and in motion and fundamental equations like mass, energy and momentum conservation of the fluid flow.

14. WHAT IS THE ANTICIPATED CLASS SIZE AND DOCUMENT INDICATIONS ON HOW THE NEW COURSE WILL MEET ITS PRJECTED SIZE.
The anticipated class size is 10 to 20.

15. STATE HOW THE NEW COURSE WILL BE COVERED BY EXISTING PROGRAM FACULTY.
A new faculty member majoring in this field will be hired and he will teach this class.

16. ADDITIONAL INFORMATION:

17. ATTACH COURSE OUTLINE

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2018
Administrative Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		DEC 11 2018
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	DEC 11 2018

APPROVED:

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

DEC 18 2018
DATE

Faculty Senate Office
University of Guam

lm
Received By:
9/25/18 4:45 pm
Date & Time

60196

UNIVERSITY
OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR NEW COURSE

1. Title: Engineering Hydraulics
2. Catalog Number: CEE 302 (New course may not duplicate active or inactive course number.)
3. Course Type: [X] Addition to the Curriculum
   [ ] Special Needs (Workshop, seminar, special topic,...94 series, etc.)
4. Level of Instruction: [X] Undergraduate [ ] Graduate (/G) [ ] Both
5. Credit Hours: 3
6. Is this course cross-listed with another department? NO
   If so, list the cross-listed catalog number (s)? _____
7. What session(s) will the course be offered? [X] Fall [ ]Spring [ ] Summer [ ] All
8. What will be the yearly cycle for this course?
   [X] All Years [ ] Even Years [ ] Odd Years [ ] One (1) Term Only
9. First term and year for this course: FALL, 2018; Length of Instruction (Weeks): 1 SEMESTER
10. Prerequisites:
    A. Instructor / Advisor consent required? [ ] Yes [X]No
    B. Prerequisites Catalog # Prerequisite Course Title
       CEE 204 MECHANICS OF FLUID
       CEE 302L (concurrent enrollment ENGINEERING HYDRAULICS LAB
    C. Additional Prerequisites: _____
11. CATALOG DESCRIPTION: Use complete sentences and present tense. Hydraulics of closed conduits and open channel flow with the emphasis on engineering applications. Pump hydraulics, urban drainages, and flood plain management. Prerequisite: ES 204, and concurrent enrollment in ES302

12. DESCRIBE LIBRARY AND INFORMATION TECHNOLOGY RESOURCES AVAILABLE TO SUPPORT COURSE: If insufficient library sources are available, describe alternatives that will be used.
Notes required for the course will be provided by Instructor. Reference books will be available

11. SUBSTANTIATE THE COMPELLING NEED FOR THE NEW COURSE
Civil engineers are often involved in designing hydraulic structures such as dams, water distribution system, sewer system, flood control, and pump design. The principle of hydraulics forms the basis for the design and construction of all these systems.

12. WHAT IS THE ANTICIPATED CLASS SIZE AND DOCUMENT INDICATIONS ON HOW THE NEW COURSE WILL MEET ITS PRJECTED SIZE.
The current enrollment in the prerequisite course are 7-12.

13. STATE HOW THE NEW COURSE WILL BE COVERED BY EXISTING PROGRAM FACULTY.
A new faculty member majoring in this field has been hired and he will teach this class.

14. ADDITIONAL INFORMATION:

15. ATTACH COURSE OUTLINE

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2018
Administrative Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UGRC/GGRC		DEC 11 2018
President, Faculty Senate (if substantive)	(Endorsement of UGRC/GGRC Recommendation)	DEC 11 2018

APPROVED:

SENIOR VICE PRESIDENT ACADEMIC & STUDENT AFFAIRS — DEC 18 2018 — DATE

UNIVERSITY
OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR NEW COURSE

1. Title: Engineering Hydraulics Laboratory
2. Catalog Number: CEE 302L (New course may not duplicate active or inactive course number.)
3. Course Type: [X] Addition to the Curriculum

   [ ] Special Needs (Workshop, seminar, special topic,…94 series, etc.)

4. Level of Instruction: [X] Undergraduate [ ] Graduate (/G) [ ] Both
5. Credit Hours: 1
6. Is this course cross-listed with another department? NO

   If so, list the cross-listed catalog number (s)? _____
7. What session(s) will the course be offered? [X] Fall [X] Spring [ ] Summer [ ] All
8. What will be the yearly cycle for this course?

   [X] All Years [ ] Even Years [ ] Odd Years [ ] One (1) Term Only
9. First term and year for this course: FALL, 2019/Spring 2020; engtth of Instruction (Weeks): 1 SEMESTER
10. Prerequisites:

    A. Instructor / Advisor consent required? [ ] Yes [ ] No

    B. Prerequisites Catalog # Prerequisite Course Title

    CEE302 (concurrent enrollment ENGINEERING HYDRAULICS)

    C. Additional Prerequisites: _____
11. CATALOG DESCRIPTION:
    This course involves conducting a number of lab experiments to support and verify the principles taught in Fluid Mechanics and Hydraulics courses

12. DESCRIBE LIBRARY AND INFORMATION TECHNOLOGY RESOURCES AVAILABLE TO SUPPORT COURSE: If insufficient library sources are available, describe alternatives that will be used.
Notes required for the course will be provided by Instructor and experiments will be conducted at the hydraulic lab..

13. SUBSTANTIATE THE COMPELLING NEED FOR THE NEW COURSE
Practical experience that helps to understand the concepts of hydraulics.

14. WHAT IS THE ANTICIPATED CLASS SIZE AND DOCUMENT INDICATIONS ON HOW THE NEW COURSE WILL MEET ITS PRJECTED SIZE.
7-15 students that will fits in hydraulic lab.

15. STATE HOW THE NEW COURSE WILL BE COVERED BY EXISTING PROGRAM FACULTY.
A new faculty member that will be hire for spring 2019 will be the course.

16. ADDITIONAL INFORMATION:

17. ATTACH COURSE OUTLINE

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2018
Administrative Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		DEC 11 2018
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	DEC 11 2018

APPROVED:

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

DEC 18 2018
DATE

Faculty Senate Office
University of Guam

No 6019

Received By: im
9/25/18 4:45 pm
Date & Time

UNIVERSITY OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR NEW COURSE

1. Title: Civil Engineering Materials
2. Catalog Number: CEE 304 (New course may not duplicate active or inactive course number.)
3. Course Type: [X] Addition to the Curriculum
   [ ] Special Needs (Workshop, seminar, special topic,...94 series, etc.)
4. Level of Instruction: [X] Undergraduate [ ] Graduate (/G) [ ] Both
5. Credit Hours: 4
6. Is this course cross-listed with another department? NO
   If so, list the cross-listed catalog number (s)? _____
7. What session(s) will the course be offered? [X] Fall [ ]Spring [ ] Summer [ ] All
8. What will be the yearly cycle for this course?
   [X] All Years [ ] Even Years [ ] Odd Years [ ] One (1) Term Only
9. First term and year for this course: FALL, 2019; Length of Instruction (Weeks): 1 Semester
10. Prerequisites:
    A. Instructor / Advisor consent required? [ ] Yes [X]No
    B. Prerequisites Catalog # Prerequisite Course Title
       CEE 203 Mechanics of Materials
       _____ _____
    C. Additional Prerequisites: _____
11. CATALOG DESCRIPTION: A study of the principal materials used for engineering purposes with special attention to mechanical properties and their importance to the engineer. Topics include introduction to mechanical behavior of materials, characteristics of metals, characteristics of wood, evaluation of aggregates,

design of Portland cement concrete and asphalt concrete, and hands-on experience in testing of civil engineering materials.

12. DESCRIBE LIBRARY AND INFORMATION TECHNOLOGY RESOURCES AVAILABLE TO SUPPORT COURSE: If insufficient library sources are available, describe alternatives that will be used.
Notes required for the course will be provided by Instructor. Reference books will be available.

11. SUBSTANTIATE THE COMPELLING NEED FOR THE NEW COURSE
To expand the current 2 year engineering program to 4 year program.

12. WHAT IS THE ANTICIPATED CLASS SIZE AND DOCUMENT INDICATIONS ON HOW THE NEW COURSE WILL MEET ITS PRJECTED SIZE.
The current enrollment in the prerequisite course are 7-12.

13. STATE HOW THE NEW COURSE WILL BE COVERED BY EXISTING PROGRAM FACULTY.
A new faculty member majoring in this field has been hired and he will teach this class.

14. ADDITIONAL INFORMATION:

15. ATTACH COURSE OUTLINE

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2018
Administrative Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		DEC 11 2018
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	DEC 11 2018

APPROVED:

YES

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

DEC 18 2018
DATE

Faculty Senate Office
University of Guam

№ 60194

im
Received By:

9/25/18 4:45 pm
Date & Time

UNIVERSITY
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Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR NEW COURSE

1. Title: Reinforced Concrete Structures Design

2. Catalog Number: CEE 306 (New course may not duplicate active or inactive course number.)

3. Course Type: [X] Addition to the Curriculum

   [ ] Special Needs (Workshop, seminar, special topic,…94 series, etc.)

4. Level of Instruction: [X] Undergraduate [ ] Graduate (/G) [ ] Both

5. Credit Hours: 3

6. Is this course cross-listed with another department? NO

   If so, list the cross-listed catalog number (s)? _____

7. What session(s) will the course be offered? [ ] Fall [X] Spring [ ] Summer [ ] All

8. What will be the yearly cycle for this course?

   [X] All Years [ ] Even Years [ ] Odd Years [ ] One (1) Term Only

9. First term and year for this course: Spring, 2020; Length of Instruction (Weeks): 1 SEMESTER

10. Prerequisites:

    A. Instructor / Advisor consent required? [ ] Yes [X] No

    B. Prerequisites Catalog # Prerequisite Course Title

    CEE 203 Mechanics of Materials

    _____ _____

    C. Additional Prerequisites: _____

11. CATALOG DESCRIPTION: The course includes an introduction to structural systems and basic analysis methods for beams, frames, and trusses. Topics covered include the analysis of statically determinate

and indeterminate structures, deflection calculations, influence lines, and an introduction to the stiffness method and a software package for structural analysis.

12. DESCRIBE LIBRARY AND INFORMATION TECHNOLOGY RESOURCES AVAILABLE TO SUPPORT COURSE: If insufficient library sources are available, describe alternatives that will be used.
Notes required for the course will be provided by the Instructor.

13. SUBSTANTIATE THE COMPELLING NEED FOR THE NEW COURSE
To expand the current 2 year engineering program to 4 year program

14. WHAT IS THE ANTICIPATED CLASS SIZE AND DOCUMENT INDICATIONS ON HOW THE NEW COURSE WILL MEET ITS PRJECTED SIZE.
7 – 15 The current enrollment in the prerequisite course are 7-12.

15. STATE HOW THE NEW COURSE WILL BE COVERED BY EXISTING PROGRAM FACULTY.
Dr. Pyo-Yoon Hong is majoring in this field and he will reach this class.

16. ADDITIONAL INFORMATION:

17. ATTACH COURSE OUTLINE
Attached.

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-20
Administrative Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		DEC 11 2018
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	DEC 11 2018

APPROVED:

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

DEC 18 2018
DATE

Faculty Senate Office
University of Guam

No. 60196

Received By: lm

9/25/18 4:45 pm
Date & Time

UNIVERSITY
OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR NEW COURSE

1. Title: **INTRODUCTION TO ENVIRONMENTAL ENGINEERING**
2. Catalog Number: **CEE 307** (New course may not duplicate active or inactive course number.)
3. Course Type: [**X**] Addition to the Curriculum
   [ ] Special Needs (Workshop, seminar, special topic,…94 series, etc.)
4. Level of Instruction: [**X**] Undergraduate [ ] Graduate (/G) [ ] Both
5. Credit Hours: **3**
6. Is this course cross-listed with another department? **NO**
   If so, list the cross-listed catalog number (s)? _____
7. What session(s) will the course be offered? [ ] Fall [X] Spring [ ] Summer [ ] All
8. What will be the yearly cycle for this course?
   [**X**] All Years [ ] Even Years [ ] Odd Years [ ] One (1) Term Only
9. First term and year for this course: SPRING, 2019; Length of Instruction (Weeks): **16 weeks**
10. Prerequisites:
    A. Instructor / Advisor consent required? [ ] Yes [**X**] No
    B. Prerequisites Catalog # Prerequisite Course Title

CH 103	**GENERAL CHEMISTRY**
MA 203	**CALCULUS I**

    C. Additional Prerequisites: _____
11. CATALOG DESCRIPTION: **See Course Syllabus**

12. DESCRIBE LIBRARY AND INFORMATION TECHNOLOGY RESOURCES AVAILABLE TO SUPPORT COURSE: If insufficient library sources are available, describe alternatives that will be used.
Online information will be sufficient.

13. SUBSTANTIATE THE COMPELLING NEED FOR THE NEW COURSE.
To expand the current 2 year engineering program toward the 4-year requirement. This course will be required by all engineering students.

14. WHAT IS THE ANTICIPATED CLASS SIZE AND DOCUMENT INDICATIONS ON HOW THE NEW COURSE WILL MEET ITS PRJECTED SIZE.
7 – 15 students. Current enrollment in other required engineering courses are 7-12 students.

15. STATE HOW THE NEW COURSE WILL BE COVERED BY EXISTING PROGRAM FACULTY.
Searches for two new faculty members are to commence immediately and even more searches are to start soon thereafter. In the meantime, a WERI faculty will be available to fill in.

16. ADDITIONAL INFORMATION: **This course will be a required course for all students that plan to graduate from the 4-year Civil and Environmental Engineering program.**

17. ATTACH COURSE OUTLINE. **See New Course Outline form.**

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-20
Administrative Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		DEC 11 2018
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	DEC 11 2018

APPROVED:

MCS

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

DEC 18 2018
DATE

Faculty Senate Office
University of Guam

No. 6019

Received By: lm

Date & Time: 9/25/18 4:45 pm

UNIVERSITY OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR NEW COURSE

1. Title: INTRODUCTION TO SURVEYING

2. Catalog Number: CEE 308 (New course may not duplicate active or inactive course number.)

3. Course Type: [X] Addition to the Curriculum

   [ ] Special Needs (Workshop, seminar, special topic,...94 series, etc.)

4. Level of Instruction: [X] Undergraduate [ ] Graduate (/G) [ ] Both

5. Credit Hours: 2

6. Is this course cross-listed with another department? NO

   If so, list the cross-listed catalog number (s)? _____

7. What session(s) will the course be offered? [ ] Fall [X] Spring [ ] Summer [ ] All

8. What will be the yearly cycle for this course?

   [X] All Years [ ] Even Years [ ] Odd Years [ ] One (1) Term Only

9. First term and year for this course: SPRING, 2019; Length of Instruction (Weeks): 1 SEMESTER

10. Prerequisites:

   A. Instructor / Advisor consent required? [ ] Yes [X] No

   B.

Prerequisites Catalog #	Prerequisite Course Title
PH251	UNIVERSITY PHYSICS
MA203	CALCULUS I
EN111	WRITING FOR RESEARCH

   C. Additional Prerequisites: _____

11. CATALOG DESCRIPTION: This is an introductory course to surveying techniques and includes theory as well as lab sessions. Principles of plane surveying. Measurement of horizontal distance, difference in elevation, and angles. Traverse surveys and computations. Horizontal and vertical curves. Principles of stadia. Topographic surveys. Cross-sectioning & Earthwork.

12. DESCRIBE LIBRARY AND INFORMATION TECHNOLOGY RESOURCES AVAILABLE TO SUPPORT COURSE: If insufficient library sources are available, describe alternatives that will be used.
Notes required for the course will be provided by Instructor.

13. SUBSTANTIATE THE COMPELLING NEED FOR THE NEW COURSE
To expand the current 2-year engineering program to 4-year degree program.

14. WHAT IS THE ANTICIPATED CLASS SIZE AND DOCUMENT INDICATIONS ON HOW THE NEW COURSE WILL MEET ITS PRJECTED SIZE.
7 – 15 The current enrollment in the prerequisite course are 7-12.

15. STATE HOW THE NEW COURSE WILL BE COVERED BY EXISTING PROGRAM FACULTY.
A new faculty member/adjunct majoring in this field or with industry experience will be hired and he will teach this class.

16. ADDITIONAL INFORMATION:

17. ATTACH COURSE OUTLINE
This is an introductory course to field surveying and techniques. General surveying principles and theories/fundamentals of physical measurements of spatial quantities, the use of surveying instruments: tape measurements, leveling, electronic distance measurement, total stations, traverse surveys, satellite positioning, introduction to geomatics, horizontal control surveys; construction applications: grade, highway curves, street construction surveys.

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2018
Administrative Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		DEC 11 2018
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	DEC 11 2018

APPROVED:

WCS

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

DEC 18 2018
DATE

Faculty Senate Office
University of Guam

№ 60199

Received By: cm

9/25/18 4:45 pm
Date & Time

UNIVERSITY OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR NEW COURSE

1. Title: Steel Structures Design
2. Catalog Number: CEE 401 (New course may not duplicate active or inactive course number.)
3. Course Type: [X] Addition to the Curriculum

   [ ] Special Needs (Workshop, seminar, special topic,...94 series, etc.)

4. Level of Instruction: [X] Undergraduate [ ] Graduate (/G) [ ] Both
5. Credit Hours: 3
6. Is this course cross-listed with another department? NO

   If so, list the cross-listed catalog number (s)? _____
7. What session(s) will the course be offered? [X] Fall [ ] Spring [ ] Summer [ ] All
8. What will be the yearly cycle for this course?

   [X] All Years [ ] Even Years [ ] Odd Years [ ] One (1) Term Only
9. First term and year for this course: Fall, 2020; Length of Instruction (Weeks): 1 SEMESTER
10. Prerequisites:

    A. Instructor / Advisor consent required? [ ] Yes [X] No

    B. Prerequisites Catalog # Prerequisite Course Title

    CEE 203 Mechanics of Materials

    C. Additional Prerequisites: _____

11. CATALOG DESCRIPTION: Introduction to the design of structural elements found in steel buildings with emphasis on theories necessary for a thorough understanding of the design procedure. In particular, steel tension members, beams, columns, beam columns, and connections are considered. Emphasizes the

AISC-LRFD Specifications for steel design, though reference is made to the ASD specification with comparisons made where appropriate.

12. DESCRIBE LIBRARY AND INFORMATION TECHNOLOGY RESOURCES AVAILABLE TO SUPPORT COURSE: If insufficient library sources are available, describe alternatives that will be used.
Notes required for the course will be provided by the Instructor.

13. SUBSTANTIATE THE COMPELLING NEED FOR THE NEW COURSE
To expand the current 2 year engineering program to 4 year program

14. WHAT IS THE ANTICIPATED CLASS SIZE AND DOCUMENT INDICATIONS ON HOW THE NEW COURSE WILL MEET ITS PRJECTED SIZE.
7 – 15 The current enrollment in the prerequisite course are 7-12.

15. STATE HOW THE NEW COURSE WILL BE COVERED BY EXISTING PROGRAM FACULTY.
Dr. Pyo-Yoon Hong is majoring in this field and he will teach this class.

16. ADDITIONAL INFORMATION:

17. ATTACH COURSE OUTLINE
Attached.

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2
Administrative Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		DEC 11 2018
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	DEC 11 2018

APPROVED:

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

DEC 18 2018
DATE

Faculty Senate Office
University of Guam

No. 60190

un
Received By:

9/25/19 4:45 pm
Date & Time

UNIVERSITY OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR NEW COURSE

1. Title: FOUNDATION ENGINEERING

2. Catalog Number: CEE 402 (New course may not duplicate active or inactive course number.)

3. Course Type: [X] Addition to the Curriculum

   [ ] Special Needs (Workshop, seminar, special topic,...94 series, etc.)

4. Level of Instruction: [X] Undergraduate [ ] Graduate (/G) [ ] Both

5. Credit Hours: 3

6. Is this course cross-listed with another department? NO

   If so, list the cross-listed catalog number (s)? _____

7. What session(s) will the course be offered? [X] Fall [ ] Spring [ ] Summer [ ] All

8. What will be the yearly cycle for this course?

   [X] All Years [ ] Even Years [ ] Odd Years [ ] One (1) Term Only

9. First term and year for this course: FALL, 2019; Length of Instruction (Weeks): 1 SEMESTER

10. Prerequisites:

    A. Instructor / Advisor consent required? [ ] Yes [X] No

    B. Prerequisites Catalog # Prerequisite Course Title

       CEE 303 GEOTECHNICAL ENGINEERING

       _____ _____

    C. Additional Prerequisites: _____

11. CATALOG DESCRIPTION: Use complete sentences and present tense.

12. DESCRIBE LIBRARY AND INFORMATION TECHNOLOGY RESOURCES AVAILABLE TO SUPPORT COURSE: If insufficient library sources are available, describe alternatives that will be used. Notes required for the course will be provided by the Instructor.

13. SUBSTANTIATE THE COMPELLING NEED FOR THE NEW COURSE
To expand the current 2 year engineering program to 4 year program

14. WHAT IS THE ANTICIPATED CLASS SIZE AND DOCUMENT INDICATIONS ON HOW THE NEW COURSE WILL MEET ITS PRJECTED SIZE.
7 – 15 The current enrollment in the prerequisite course are 7-12.

15. STATE HOW THE NEW COURSE WILL BE COVERED BY EXISTING PROGRAM FACULTY.
A new faculty member majoring in this field has been hired and he will teach this class.

16. ADDITIONAL INFORMATION:

17. ATTACH COURSE OUTLINE
Effect of geotechnical conditions on the behavior, proportioning, and choice of foundation type; analysis and design of shallow and deep foundations; bearing capacity and settlement analysis of shallow, mat and deep foundations, study of foundation case histories.

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2018
Administrative Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		DEC 11 2018
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	DEC 11 2018

APPROVED:

NB

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

DEC 18 2018
DATE

Faculty Senate Office
University of Guam

No. 6019j

LM
Received By:

9/25/18 4:45 pm
Date & Time

UNIVERSITY
OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR NEW COURSE

1. Title: Civil Engineering Design 1
2. Catalog Number: CEE 404
3. Course Type: [X] Addition to the Curriculum

   [ ] Special Needs (Workshop, seminar, special topic,…94 series, etc.)

4. Level of Instruction: [X] Undergraduate [ ] Graduate (/G) [ ] Both
5. Credit Hours: 2
6. Is this course cross-listed with another department? NO

   If so, list the cross-listed catalog number (s)? _____
7. What session(s) will the course be offered? [X] Fall [ ] Spring [ ] Summer [ ] All
8. What will be the yearly cycle for this course?

   [X] All Years [ ] Even Years [ ] Odd Years [ ] One (1) Term Only
9. First term and year for this course: Fall, 2021; Length of Instruction (Weeks): 1 SEMESTER
10. Prerequisites:

    A. Instructor / Advisor consent required? [X] Yes [ ] No

    B. Prerequisites Catalog # Prerequisite Course Title

    All 300-level Courses _____

    _____ _____

    C. Additional Prerequisites: _____

11. CATALOG DESCRIPTION: This course is a one-year independent study under the supervision of a faculty member, which includes analytical, experimental, computational, or case-study type work. A final report must be submitted near the end of the second semester accompanied with an A3 size poster. The

project will be assessed through both report writing and oral presentation. The mark will be given as a single unit for both the courses "CE 404 Civil Engineering Project 1" and "CE 404 Civil Engineering Project 2", with a total of 4 credits.

12. DESCRIBE LIBRARY AND INFORMATION TECHNOLOGY RESOURCES AVAILABLE TO SUPPORT COURSE: If insufficient library sources are available, describe alternatives that will be used. Notes required for the course will be provided by the Instructor.

13. SUBSTANTIATE THE COMPELLING NEED FOR THE NEW COURSE
To expand the current 2 year engineering program to 4 year program

14. WHAT IS THE ANTICIPATED CLASS SIZE AND DOCUMENT INDICATIONS ON HOW THE NEW COURSE WILL MEET ITS PRJECTED SIZE.
7 – 15 The current enrollment in the prerequisite course are 7-12.

15. STATE HOW THE NEW COURSE WILL BE COVERED BY EXISTING PROGRAM FACULTY.
All 4 faculty members are registered Professional Engineers and they are well qualified to supervise this Capstone Project course.

16. ADDITIONAL INFORMATION:

17. ATTACH COURSE OUTLINE
Attached.

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2018
Administrative Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018 DEC 11 2018
UCRC/GCRC		
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	DEC 11 2018

APPROVED:

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

DEC 18 2018
DATE

Faculty Senate Office
University of Guam

No. 6019K

Received By: VM

9/25/19 4:45 pm
Date & Time

UNIVERSITY
OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR NEW COURSE

1. Title: Civil Engineering Design 2
2. Catalog Number: CEE 405
3. Course Type: [X] Addition to the Curriculum

   [ ] Special Needs (Workshop, seminar, special topic,…94 series, etc.)

4. Level of Instruction: [X] Undergraduate [ ] Graduate (/G) [ ] Both
5. Credit Hours: 2
6. Is this course cross-listed with another department? NO

   If so, list the cross-listed catalog number (s)? _____
7. What session(s) will the course be offered? [ ] Fall [X] Spring [ ] Summer [ ] All
8. What will be the yearly cycle for this course?

   [X] All Years [ ] Even Years [ ] Odd Years [ ] One (1) Term Only
9. First term and year for this course: Spring, 2022; Length of Instruction (Weeks): 1 SEMESTER
10. Prerequisites:

    A. Instructor / Advisor consent required? [X] Yes [ ] No

    B. Prerequisites Catalog # Prerequisite Course Title

    CEE 404 Civil Engineering Design 1

    C. Additional Prerequisites: _____

11. CATALOG DESCRIPTION: This course is a one-year independent study under the supervision of a faculty member, which includes analytical, experimental, computational, or case-study type work. A final report must be submitted near the end of the second semester accompanied with an A3 size poster. The

project will be assessed through both report writing and oral presentation. The mark will be given as a single unit for both the courses "CE 404 Civil Engineering Project 1" and "CE 404 Civil Engineering Project 2", with a total of 4 credits.

12. DESCRIBE LIBRARY AND INFORMATION TECHNOLOGY RESOURCES AVAILABLE TO SUPPORT COURSE: If insufficient library sources are available, describe alternatives that will be used.
Notes required for the course will be provided by the Instructor.

13. SUBSTANTIATE THE COMPELLING NEED FOR THE NEW COURSE
To expand the current 2 year engineering program to 4 year program

14. WHAT IS THE ANTICIPATED CLASS SIZE AND DOCUMENT INDICATIONS ON HOW THE NEW COURSE WILL MEET ITS PRJECTED SIZE.
7 – 15 The current enrollment in the prerequisite course are 7-12.

15. STATE HOW THE NEW COURSE WILL BE COVERED BY EXISTING PROGRAM FACULTY.
All 4 faculty members are registered Professional Engineers and they are well qualified to supervise this Capstone Project course.

16. ADDITIONAL INFORMATION:

17. ATTACH COURSE OUTLINE
Attached.

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2018
Administrative Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		DEC 11 2018
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	DEC 11 2018

APPROVED:

MS

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

DEC 18 2018
DATE

№ 60192

Faculty Senate Office
University of Guam

Received By:
9/25/18 4:45 pm
Date & Time

UNIVERSITY OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR NEW COURSE

1. Title: FUNDAMENTALS OF TRANSPORTATION ENGINEERING
2. Catalog Number: CEE 406 (New course may not duplicate active or inactive course number.)
3. Course Type: [X] Addition to the Curriculum
   [ ] Special Needs (Workshop, seminar, special topic,…94 series, etc.)
4. Level of Instruction: [X] Undergraduate [ ] Graduate (/G) [ ] Both
5. Credit Hours: 3
6. Is this course cross-listed with another department? NO
   If so, list the cross-listed catalog number (s)? _____
7. What session(s) will the course be offered? [X] Fall [X] Spring [ ] Summer [ ] All
8. What will be the yearly cycle for this course?
   [X] All Years [ ] Even Years [ ] Odd Years [ ] One (1) Term Only
9. First term and year for this course: FALL/SPRING, 2018; Lengtl
10. Prerequisites:
    A. Instructor / Advisor consent required? [ ] Yes [X] No
    B. Prerequisites Catalog # Prerequisite Course Title

Prerequisites Catalog #	Prerequisite Course Title
CEE 301	STRUCTURAL ANALYSES
CEE303	GEOTECHNICAL ENGINEERING
CEE306 (Co-requisite)	REINFORCED CONCRETE STRUCTURES DESIGN

    C. Additional Prerequisites: _____
11. CATALOG DESCRIPTION: Use complete sentences and present tense.

12. DESCRIBE LIBRARY AND INFORMATION TECHNOLOGY RESOURCES AVAILABLE TO SUPPORT COURSE: If insufficient library sources are available, describe alternatives that will be used.
Notes required for the course will be provided by Instructor.

13. SUBSTANTIATE THE COMPELLING NEED FOR THE NEW COURSE
To expand the current 2 year engineering program to 4 year program

14. WHAT IS THE ANTICIPATED CLASS SIZE AND DOCUMENT INDICATIONS ON HOW THE NEW COURSE WILL MEET ITS PRJECTED SIZE.
We expect an enrollment of 7-12.

15. STATE HOW THE NEW COURSE WILL BE COVERED BY EXISTING PROGRAM FACULTY.
A new faculty member majoring in this field has been hired and he will teach this class.

16. ADDITIONAL INFORMATION:

17. ATTACH COURSE OUTLINE
This is an introductory course in Transportation engineering. This course will provide an introduction to planning, design, and operation of transportation systems with an emphasis on highways and streets. Focus will be on first principles and basic, practical tools as a foundation for further coursework and practice in transportation engineering.

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2018
Administrative Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		DEC 11 2018
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	DEC 11 2018

APPROVED:

NHS

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

DEC 18 2018
DATE

Appendix 4b
Request for New Course
Syllabi

Bachelor of Science in Civil Engineering

School of Engineering

Department of Civil & Environmental Engineering

University of Guam, School of Engineering

Course Syllabus

CEE 204: Fluid Mechanics

Instructor: Dr. Shahram Khosrowpanah. P.E.

Catalog Description:
This course covers the physical properties of fluids. fluid statics. mass momentum and energy conversation. Bernoulli equation. dimensional analysis. friction and head loss. flow in closed conduits. forces over immersed bodies.

Prerequisites: The course requires materials in MA204 including differential. and integration.

Required Textbook:
Fundamentals of Fluid Mechanics -- 8th edition. by Philip Gerhard, Andrew Gerhard and John Hochstein, John Wiley and Sons, 2016. ISBN 10: 0201114100 / ISBN 13: 9780201114102.

Required Materials & Tools:
Laptop computer with Windows 7 or newer operating system

Course Objectives:
This is the first basic course of fluid mechanics. The main objective of this course is to understand the fundamentals of the fluid mechanics such as fluid and flow properties. fluid behavior at rest and in motion and fundamental equations like mass. energy and momentum conservation of the fluid flow.

Homework and Class Work:
Homework will be assigned each time new material is introduced. Also. there will be daily classroom worksheets. sometimes more than one. **There are no make-ups on classroom worksheets** because class attendance and participation are mandatory and extremely important.

Quiz, and Exams:
There will be a 5 min. quiz on the contents covered in the previous class. Also. there is one mid-term exam based on the material covered. The final exam will be comprehensive. and based on all material of the semester. You must contact your instructor immediately if you have a legitimate excusable reason for missing class and wish to be considered for a make-up test or exam.

Classroom Policies:
1. All work in the exams. tests. quiz. homework and class work must be done **neatly** using **"Standard Engineering Format"** solution.
2. Attendance will be kept and counted towards participation.
3. Homework must be submitted on time. Late submissions may incur penalties.
4. Timing. method. and format for submissions will be outlined in class.
5. Some assignments will require the use of engineering paper. which the student will be responsible for obtaining.

6. If you miss a submission deadline, quiz, or exam, if possible notify the instructor in advance, otherwise in a timely manner as soon as possible thereafter.

Grade Calculation:

Quizzes & Homework	40%
Mid-term Exam	40%
Final Exam	20%

Special Accommodations:

If you are a student with a disability who will require an accommodation(s) to participate in this course, please contact me or the Institutional Compliance Officer privately to discuss your specific needs. You will need to provide me with documentation concerning your need for accommodation(s) from the EEO/ADA & TITLE IX Office. If you have not registered with the EEO/A DA & TITLE IX Office, you should do so immediately at 735-2244. (TTY) 735-2243 to coordinate your accommodation request.

Notification of Rights under FERPA:

The Family Educational Rights and Privacy Act (FERPA) afford students certain rights with respect to their education record. The right for students, parent and school officials can be viewed at http://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html.

Curriculum Mapping:

Course SLOs	Program PLOs	UOG ILOs	Method of Assessment
SLO 1	a, e, j	ILO 1, 2, 6	Homework, Presentation, Quiz, Test
SLO 2	a, e, k	ILO 1, 2, 5, 6	Homework, Presentation, Quiz, Test
SLO 3	a, e, k	ILO 1, 2, 5, 6	Homework, Presentation, Quiz, Test
SLO 4	a, b, c	ILO 1, 2, 5, 6	Homework, Presentation, Quiz, Test
SLO 5	a, b, k	ILO 1, 2, 4, 6	Homework, Presentation, Quiz, Test
SLO 6	a, b, k	ILO 1, 2, 5, 6	Homework, Presentation, Quiz, Test
SLO 7	a, b, c, e, g, j, k	ILO 1, 2, 3, 5, 6	Project, Presentation

Student Learning Outcomes (SLO):

Students who successfully complete this class will be able to:

- SLO 1: Understand the fundamentals of fluid mechanics, including concepts of mass and momentum conservation.
- SLO 2: Use fluid properties correctly to solve the problems.
- SLO 3: Apply the Bernoulli equation to solve problems in fluid mechanics.
- SLO 4: Apply control volume analysis to problems in fluid mechanics.
- SLO 5: Perform dimensional analysis for problems in fluid mechanics.
- SLO 6: Understand the laminar and turbulent boundary layer fundamentals.
- SLO 7: An ability to apply the concepts developed for fluid flow analysis to issues such as environment, structure, and hydrology areas.
- SLO 8: Determine pressure drops for pipe systems and choose appropriate pumps and turbine depending on the application.

Program Learning Outcomes (PLOs):

PLO a: an ability to apply knowledge of mathematics, science, and engineering
PLO b: an ability to design and conduct experiments, as well as to analyze and interpret data
PLO 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
PLO d: an ability to function on multidisciplinary teams
PLO e: an ability to identify, formulate, and solve engineering problems
PLO f: an understanding of professional and ethical responsibility
PLO g: an ability to communicate effectively
PLO h: the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
PLO i: recognition of the need for, and an ability to engage in life-long learning
PLO j: knowledge of contemporary issues
PLO k: an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Institutional Student Learning Outcomes (ILOs):

ILO 1: Mastery of critical thinking & problem solving
ILO 2: Mastery of quantitative analysis
ILO 3: Effective oral and written communication
ILO 4: Understanding & appreciation of culturally diverse people, ideas & value in a democratic context
ILO 5: Responsible use of knowledge, natural resources, and technology
ILO 6: An appreciation of the arts & sciences
ILO 7: An interest in personal development & lifelong learning

Class Schedule (tentative)

Week	Date	Chapter	Topics
1			Introduction to Fluid mechanics, Dimensions, Units, Analysis of Fluid Behavior, Fluid Properties
2			Fluid Properties, Fluid Statics – Pressure Distribution,
3			Fluid Statics – Gages, Manometers, Force on Plane Surface, Force on Curved Surface,
4			Fluid Statics – Buoyancy, Flotation and Stability, Pressure Variation in a Fluid with Rigid-Body Motion, Bernoulli Equation
5			Pressure Variation Normal to a Streamline, Static, Stagnation, Dynamic and Total pressure, Energy line and Hydraulic Grade Line, Restrictions
6			Differential Balances: Differential equation of mass conservation, Differential equation of linear momentum, Nervier-Stokes equations.
7			Fluid Kinematics, Control Volumes and Reynolds Transport Theorem
8			Conservation of Mass – The Continuity Equation, The Linear Momentum Equation
9			The Principle of Linear Momentum, Energy Equation,
10			Fluid Meters: Local velocity measurement, Volume flow measurement, Thin-Plate orifice, flow nozzle, venture meter.
11			Pumps and Compressors: Pump types and characteristics, Required head, Cavitations and NPSH, isothermal compression, isentropic compression, Staged operation, Efficiency
12			Open-Channel Flow - Surface Waves, Energy Considerations
13			Open Channel Flow – Uniform Depth Channel Flow, Review,
14			Course Review
15			

Course Syllabus

CEE302: ENGINEERING HYDRAULICS

Email: faculty@triton.uog.edu

Class Schedule: Tue & Th9:00 – 11:00 AM

Office Hours: Tue & Th11-1 pm (Office: EA # xx)

Instructor: Dr. Shahram Khosrowpanah. P.E.

Catalog Description:

This is a three credit-hour course that serves as a quantitative introduction to the principles of hydrology, hydraulics, and water resource engineering. The course covers the fundamentals of hydraulics, including properties of water, hydrostatic forces / pressures, fluid statics / dynamics, head losses, and related phenomena in closed conduit flow. Additional topics to be covered include: hydraulic machinery (pumps), open channel flow, statistical methods, and the design of hydraulic structures.

Prerequisites:

Fluid Mechanics (CEE204) and concurrent enrollment in CEE302L.

Required Textbook:

Basic Hydraulics by Andrew L. Simon. published by John Wiley & Sons. SBN-13: 978-0471079651. ISBN-10: 0471079650

Open Channel Hydraulics by Ven Te Chow. Published by McGraw-Hill. Inc.. U.S.A.. 1959. ISBN-3: 978-1932846188. ISBN-10: 1932846182

Laboratory Work in Hydraulic Engineering. New Age International Publisher (2006). ISBN-10: 8122418104. ISBN-13: 978-8122418101

Course Objectives:

Provide students a basic understanding of hydrology, hydraulics, and water resource engineering. The analysis of the flow and pressure distribution of flowing water and wastewater is critical to many fundamental engineering tasks. such as sizing pipes between tanks and taps. picking pumps. and assuring a good flow distribution in water or wastewater treatment works. This course is designed for those who wish to learn how to solve such problems and how to think practically about the flow of water in engineered systems.

Major Assignment and Examination:

A series of homework assignments. Quizzes. one midterm and the comprehensive final exams. All homework assignment must be turn in at the start of the class period in which they are due.

Grade Calculation:

Quizzes	10%
Home works	25%
Midterm exam	25%
Final exam	40%

Tentative Course Outline:

1. Introduction / Fundamental Properties of Water
2. Pressure Forces / Fluid Mechanics
3. Energy Equation, Head loss
4. Flow in closed conduits a. Single pipes b. Pipe networks c. Water Hammer
5. Pump performance and selection
6. Open channel flow a. Fundamental principals b. Channel Design c. Back water curve
7. Hydraulic Structures

Classroom Policies:

1. All work in the exam. I reports, and homework must be done neatly using "Standard Engineering Format" solution.
2. All students are responsible for reading the appropriate portions of the text before the class session in which it is discussed. This will enable class sessions to be interactive. with lots of student involvement.
3. Class Attendance are required.
4. Professional conduct will be expected at ALL TIMES.

Special Accommodations:

If you are a student with a disability who will require an accommodation(s) to participate in this course, please contact me or the Institutional Compliance Officer privately to discuss your specific needs. You will need to provide me with documentation concerning your need for accommodation(s) from the EEO/ADA & TITLE IX Office. If you have not registered with the EEO/A DA & TITLE IX Office, you should do so immediately at 735-2244, (TTY) 735-2243 to coordinate your accommodation request.

Notification of Rights under FERPA:

The Family Educational Rights and Privacy Act (FERPA) afford students certain rights with respect to their education record. The right for students, parent and school officials can be viewed at http://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html.

Student Learning Outcomes:

Curriculum Mapping:

Course SLOs	Program PLOs	UOG ILOs	Method of Assessment
SLO 1	a, b ,c ,e	ILO 1, 2, 6	
SLO 2	a, b, e, k	ILO 1, 2, 5, 6	
SLO 3	a, b, c, k	ILO 1, 2, 5, 6	
SLO 4	b, e, k	ILO 1, 2, 5, 6	
SLO 5	a, b, k	ILO 1, 2, 4, 6	
SLO 6	c, b, e, k	ILO 1, 2, 5, 6	
SLO 7	a, b, c, e, g, j, k	ILO 1, 2, 3, 5, 6	
SLO 8	a, b, c, e, g, j, k	ILO 1, 2, 3, 5, 6	

Student Learning Outcomes (SLO):

Students who successfully completed this course will be able to:

- SLO 1: use the energy and momentum equations.
- SLO 2: Analyze flow in closed pipes, and design and selection of pipes including sizes.
- SLO 3: Design and select pumps (single or multiple) for different hydraulic applications.
- SLO 4: Become familiar with open channel cross sections, hydrostatic pressure distribution and Manning's law.
- SLO 5: Determine water surface profiles for gradually varied flow in open channels.
- SLO 6: Familiar with drainage systems and wastewater sources and flow rates.
- SLO 7: Analyze and design a sanitary sewer system using modern engineering.
- SLO 8: Think more intuitively (through laboratory experience) about hydraulic phenomena

Program Learning Outcomes (PLOs):

PLO a: an ability to apply knowledge of mathematics, science, and engineering
PLO b: an ability to design and conduct experiments, as well as to analyze and interpret data
PLO 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
PLO d: an ability to function on multidisciplinary teams
PLO e: an ability to identify, formulate, and solve engineering problems
PLO f: an understanding of professional and ethical responsibility
PLO g: an ability to communicate effectively
PLO h: the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
PLO i: a recognition of the need for, and an ability to engage in life-long learning
PLO j: a knowledge of contemporary issues
PLO k: an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Institutional Student Learning Outcomes (ILOs):

ILO 1: Mastery of critical thinking & problem solving

ILO 2: Mastery of quantitative analysis
ILO 3: Effective oral and written communication
ILO 4: Understanding & appreciation of culturally diverse people, ideas & value in a democratic context
ILO 5: Responsible use of knowledge, natural resources, and technology
ILO 6: An appreciation of the arts & sciences

Course Syllabus

CEE302L: ENGINEERING HYDRAULICS-LAB

Email: faculty@triton.uog.edu

Class Schedule: Tue & Th

Office Hours: Tue & Th (Office: # xx)

Instructor: Dr. Shahram Khosrowpanah. P.E.

Catalog Description:
The lab session is designed to give the students hands-on experience with the equipment. methods. and procedures to be followed in Hydraulic engineering lab.

The main objective of this course is to understand the laminar and turbulent flow. flow losses in pipes. characteristics of the centrifugal pump. and computer modeling using EPANET.

Prerequisites: CEE302- concurrent enrollment

Required Textbook:
Basic Hydraulics by Andrew L. Simon published by John Wiley & Sons. SBN-13: 978-0471079651. ISBN-10: 0471079650

References:
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Class notes. images. videos from the internet and state of the art software. Assignments' and projects' solutions are uploaded on the blackboard for the students use

Required Materials & Tools: TBA

Course Objectives:

The main objective of this course is to understand the theories and applications of Fluid & Hydraulics as it applies to pipes. pumps. water distribution networks and open channels. The lab session is designed to give the students hands-on experience with the equipment. methods. and procedures to be followed in Hydraulic engineering lab.

Homework and Class Work:

The instructor presents the concepts and basic required to conduct the experiments and how to analyze and interpret the data obtained from the test. Encourage students for submitting their assignment. The anticipated class size is 5 to 7 students. The experiments that will be cover in lab are: 1) Energy losses in pipes. 2) Energy losses in bends. 3) Laminar flow visualization. and 4) Centrifugal pumps characteristics.

Lab Reports and Final Exam:
Students will receive written guidance before each lab experiment. including a specification of reporting requirements. Reports are due within one week of the laboratory. Each report has 10 points. The late report will not be accepted. There will be a final exam that will count 30%. and

attendance 20%.

Laboratory Policies:

1. Always read the experiment in the manual before you come to class so, we can complete the lab as quickly as possible.
2. Laboratory reports are due the next time your lab group meets. Late reports will not be accepted.
3. All laboratory reports must have a cover sheet as a first sheet.
4. All drawing must be neat.
5. At least two references outside of the laboratory manual, class notes, and text must be incorporated into and cited in each report.
6. Always maintain a high level of professionalism. Be honest and truthful with the assistant and your fellow student.
7. If you miss an experiment or a test, a zero grade will be assigned for that experiment or test.
8. If you feel an error has been made in grading experiment, it must be turned-in at the end of the lab period it was distributed.
9. To maintain a positive environment, please come on time, switch off mobile phone, and avoid side discussions in the class.

Grade Calculation:

Lab Report: 10 points for each lab report.	50%
Final Exam:	30%
Attendance and lab regulations:	20%
TOTAL	100%

Special Accommodations:

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SLO 4	b, e. k	ILO 1, 2, 5, 6	
SLO 5	a, b, k	ILO 1, 2, 4, 6	
SLO 6	c. b. e. k	ILO 1, 2, 5, 6	
SLO 7	a. b. c. e. g. j. k	ILO 1, 2, 3, 5, 6	
SLO 8	a. b. c. e. g. j. k	ILO 1, 2, 3, 5, 6	

Student Learning Outcomes (SLO):

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Program Learning Outcomes (PLOs):

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ILO 6: An appreciation of the arts & sciences
ILO 7: An interest in personal development & lifelong learning

Course Schedule CEE302 & CEE302L

Week	Date	Class Presentation	Laboratory	Reports
1		Introduction. Outline of course and review syllabus. Fluid definition and their properties.	Introduction. Objective of course. how to prepare the reports. Lab policy. and review syllabus.	
2		Fluid statics. hydrostatics force	Fluid definition and their properties. Pressure review and measurements.	
3		Fluid Dynamics	Energy losses in Pipes	Report-1
4		Pressure. velocity and flow measurements	Energy losses in Bends	Report-2
5		Concepts. equations of energy degradations	Pressure. velocity and flow measurements	Report-3
6		Head loss and measurements	Laminar flow visualization	Report-4
7		Head Loss and Flow Measurement Lab Book 12.13. 14. 25	Head Loss and Flow Measurement Lab Book 12.13. 14. 25	Report-5
8		Pipe flow Friction	Centrifugal Pumps and its characteristics	Report-6
9		Introduction to network models EPANET manual (skim) available from http://www.epa.gov/nrmrl/wswrd/dw/epanet.html#down	Introduction to network models EPANET manual (skim) available from http://www.epa.gov/nrmrl/wswrd/dw/epanet.html#down	Report
10		Introduction to Pumping Systems.	Pump computations. system-head curve Water Hammer and Capitation	Report-7
11		Pump computations. system-head curve Water Hammer and Cavitations	Pump computations. system-head curve Water Hammer and Cavitations	Report-8
12		Introduction to Open Channel Flow: qualitative difference from pressure flow. Concept of normal flow	Introduction to Open Channel Flow: qualitative difference from pressure flow. Concept of normal flow	
13		Normal flow design computations Open Channel Flow Lab	Normal flow design computations Open Channel Flow Lab	
14		Specific Energy. subcritical. supercritical & critical flow. channel design. backwater concepts	Specific Energy. subcritical. supercritical & critical flow. channel design. backwater concepts	Report-9
15		EXAM		

Syllabus

CEE 304/L: Civil Engineering Materials (4 credits)

Professor:	Pyo-Yoon Hong, PhD, PE
Email:	hongp@triton.uog.edu
Class Schedule:	Tue, Thurs 1 pm – 3:00 pm
Office Hours:	Tue, Thurs 1 pm – 2 pm &
(Office: 102 ELI)	Wed 11 am – 2 pm

Catalog Description

A study of the principal materials used for engineering purposes with special attention to mechanical properties and their importance to the engineer. Topics include introduction to mechanical behavior of materials, characteristics of metals, characteristics of wood, evaluation of aggregates, design of Portland cement concrete and asphalt concrete, and hands-on experience in testing of civil engineering materials.

Prerequisites: CEE 203 Mechanics of Materials

Required Textbook

Materials for Civil and Construction Engineers, 3rd edition, Mamlouk and Zaniewski (2011) Prentice Hall. ISBN: 0-13-611058-4.

Course Objectives:

- Make measurements of behavior of various materials used in Civil Engineering.
- Provide physical observations to complement concepts learned in.
- Introduce experimental procedures and common measurement equipment.
- Exposure to a variety of established material testing techniques.

ABET Requirements

This course is designed to meet the following program outcomes established by the Accreditation Board of Engineering and Technology (ABET) which will be assessed as part of this class:

1. Criterion b: an ability to design and conduct civil engineering experiments and analyze and interpret the resulting data.
2. Criterion k: an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Exams

The course will include one midterm exam and a final exam. These will cover material presented in the lectures, assigned reading, homework problems, and laboratory assignments. Exams will be closed book/closed notes, unless otherwise noted, and are to be done individually. Help sheets will be provided if warranted. The final exam is non-cumulative and will be given on the last class day.

If you must miss an exam for an emergency, please let the instructor know as soon as possible. If you skip an exam, you will not have an opportunity to make it up, you will receive a score of 0 (zero). If you have a valid (according to the instructor) time conflict and you let the instructor know in advance, there is the possibility of taking an exam at an alternate time..

Attendance

Each student is expected to participate in the class. Participation includes coming to class and laboratory sections on time, being prepared for class, participating in class discussions and

laboratory assignments, and interacting in a courteous, respectful, and professional manner in accordance with the policies prescribed by the University. If you do miss class, it is your responsibility to find out what was covered and any administrative information presented.

Labs

Your attendance at laboratory sessions is MANDATORY. If you MISS a laboratory WITHOUT prior arrangement with the Instructor AND the GTA, you will receive a score of 0 (zero) for that entire laboratory report, even if it is a multi-week laboratory. There will be four lab reports covering the topical areas of aggregates, portland cement concrete, metals and hot-mix asphalt. The wood laboratory report will be a very concise "mini-report" completed during lab and turned in at the end of the wood lab period since it occurs so near the end of the quarter. Instructions for completing lab exercises and reports will be provided throughout the term and posted to Blackboard. Lab exercises and reports are to be accomplished in groups determined during the lab session during the first week of the term. The laboratory handouts will provide grading criteria and guidance for preparation of laboratory reports.

In-Class Assignments

There may be several in-class assignments throughout the term covering subject matter presented during lectures. In-class assignments will be due during the class period assigned and will count toward class participation.

Exams

There will be two exams in total given during the course of the semester. The final exam will be non-comprehensive. If throughout the semester a student has accumulated enough percentage points to earn a B or better in the class, he or she can opt out of the final. To qualify for this the student must meet ALL of the following requirements: • 84% or better on both exams • Turn in ALL of the homework and have an average of no less than 90% • 84% or better on ALL labs An additional opportunity to opt out of the final exam will be given, regardless of these requirements, for the members of the group which achieves the highest 7-day compressive strength in the High Strength Competition. You will be informed of your eligibility once the second exam has been graded.

Course Grading

Grades will be based upon examination of course work. A breakdown is as follows:

☐ Homework/In-class assignments	25%
☐ Lab participation and reports	25%
☐ Midterm exam	25%
☐ Final exam	25%

Grading Scale

A	90% 100
B	80% 89%
C	70% 79%
D	60% 69%
F	0% - 59%

Tobacco-free/ Smoke-free campus

UOG is a tobacco-free campus. Thank you for not using tobacco products on campus, and for helping make UOG a healthy learning and living environment.

Special Accommodations
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Course SLOs	Program PLOs	UOG ILOs	Method of Assessment
SLO 1	CE PLO a, b, e, g, j, k	ILO 1, 2, 3, 5, 6	Homework, Presentation, Quiz, Test
SLO 2	CE PLO a, b, e, g, j, k	ILO 1, 2, 3, 5, 6	Homework, Presentation, Quiz, Test
SLO 3	CE PLO a, b, e, g, j, k	ILO 1, 2, 3, 5, 6	Homework, Presentation, Quiz, Test
SLO 4	CE PLO a, b, e, g, j, k	ILO 1, 2, 3, 5, 6	Homework, Presentation, Quiz, Test
SLO 5	CE PLO a, b, e, g, j, k	ILO 1, 2, 3, 5, 6	Homework, Presentation, Quiz, Test
SLO 6	CE PLO a, c, d, e, g, j, k	ILO 1, 2, 3, 5, 6	Project, Presentation

Course SLOs
You should learn about:
SLO 1: Planning an experimental program, selecting the test configuration, selecting the test specimens and collecting raw data.
SLO 2: Documenting the experimental program including the test procedures, collected data, method of interpretation and final results.
SLO 3: Operating the laboratory equipment including the electronic instrumentation, the test apparatus and the data collection system.
SLO 4: Measuring physical properties of common structural and geotechnical construction materials.
SLO 5: Interpreting the laboratory data including conversion of the measurements into engineering values and derivation of material properties (strength and stiffness) from the engineering values. and
SLO 6: Observing various modes of failure in compression, tension, and shear.
SLO 7: Observing various types of material behavior under similar loading conditions.

Civil Engineering PLOs
PLO a: an ability to apply knowledge of mathematics, science, and engineering
PLO b: an ability to design and conduct experiments, as well as to analyze and interpret data
PLO 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
PLO d: an ability to function on multidisciplinary teams
PLO e: an ability to identify, formulate, and solve engineering problems
PLO f: an understanding of professional and ethical responsibility

PLO g: an ability to communicate effectively
PLO h: the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
PLO i: a recognition of the need for, and an ability to engage in life-long learning
PLO j: a knowledge of contemporary issues
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UOG ILOs

ILO 1: Mastery of critical thinking & problem solving
ILO 2: Mastery of quantitative analysis
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ILO 6: An appreciation of the arts & sciences
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List of Laboratory Experiment

Topic	Lab	Due
Course Overview, Writing, Aggregates	**No Lab**	
Concrete, fresh and hardened properties, mixture proportioning	**Lab 1 Part 1:** Aggregates	
Mixture Proportioning, Microstructure, Supplementary Cementitious Materials	**Lab 1 Part 2:** Aggregates	
Volume Stability	**Lab 2 Part 1:** Concrete Batching & Mixing	*Lab 1 Due*
Concrete Durability & Metals	**Lab 2:** Brief Resistivity Measure	
Mid-Term Exam: (Aggregates and Concrete Only)		
Metals	**Lab 3:** Metals	
Asphalt Intro; Binder Specifications; HMA Characterization	**Lab 4:** Pavement Evaluation/ Sensors	*Lab 3 Due*
Damage and Deterioration, Mixture Design	**Lab 2 Part 2:** Concrete Tests/DCP Worksheet	*Lab 4 Due*
Asphalt Mixture Design & QA/QC	**No Lab**	*Lab 2 Due*
Wood & Wrap-Up/Review	**Lab 5:**	*Wood - Data sheet due*
Final Exam: Non-cummulative		

Syllabus

CEE 306: Reinforced Concrete Design

Professor:	Pyo-Yoon Hong, PhD, PE
Email:	hongp@triton.uog.edu
Class Schedule:	Tue, Thurs 11 am – 1:00 pm
Office Hours:	Tue, Thurs 1 pm – 2 pm &
(Office: 102 ELI)	Wed 11 am – 2 pm

Catalog Description
Flexural analysis and design of reinforced concrete beams including singly and doubly reinforced rectangular beams and T-beams, shear and diagonal tension, serviceability, bond, anchorage and development length, short and slender columns, slabs, footings, and retaining walls, including computer applications.

Prerequisites: CEE 301

Required Textbook
Design of Reinforced Concrete" 10th Ed. by McCormac, (2015), Wiley (ISBN: 1118879104)
ACI 318-14 "Building Code Requirements for Structural Concrete"

Course Objectives:
The goal of CE 306 is to introduce the student to the behavior and design of reinforced concrete structures, encountered in the practice of Civil Engineering.

Required Materials & Tools
1. **Laptop computer** with Windows 7 or newer operating system
2. Download and install ***SUTStrutor***.
3. **Engineering Calculator** with Simultaneous Equation Solver
4. 2 inch 3-Hole Binder
5. 5 color pencils and ruler.

Homework and Class Work
Homework will be assigned each time new material is introduced (literally every day). Also, there will be daily classroom worksheets, sometimes more than one. **There are no make-ups on classroom worksheets** because class attendance and participation are mandatory and extremely important. Homework assignments are graded for completion and are **not** returned.

Quiz, Tests and Exams
There will be a 5 min. quiz every day on the contents covered in the previous class. Also, there are two mid-term exams, based on the material covered since the previous test. The final exam will be comprehensive, and based on all material of the semester. The tests and the final will take place in the regular meeting room. **No makeup tests will be considered** for any circumstances. You must contact your instructor immediately if you have a legitimate excusable reason for missing class and wish to be considered for a make-up test or exam.

Classroom Policies
1. All work in the exams, tests, quiz, homework and class work must be done **neatly** using **pencils** (not pens). Do the work as neatly as possible. Being neat generally stimulates clear and orderly thinking, and vice versa. Only **legible** and **orderly** writing will be graded.
2. All work must be **stapled** and **dated** with the **class ID** (Look at the class attendance sheet). The students are responsible for any materials submitted without being stapled, dated or a class ID.

3. All students are responsible for **reading** the appropriate portions of the text **before** the class session in which it is discussed. This will enable class sessions to be interactive, with lots of student involvement. While classroom discussions may not always cover every item in the text, they will be designed so that students can achieve understanding of the material.
4. **Professional conduct** will be expected at ALL TIMES and disruptive talking or behavior will NOT be allowed because a high level of concentration is essential for the successful progress in this highly calculation-intensive course. Thus, no food is allowed in the classroom but a drink is. You are going to be asked to leave the classroom for the other students' classroom achievements if you violate this class policy once. When you violate this rule for the second time during the semester you will get an administrative **F** for the semester.
5. **No laptop, tablet or cell phone** is allowed in the classroom. This will be regarded as an unprofessional conduct and subjected to the punishments explained in the item #4.

Grade Calculation:

Mid-term 1 (1.5 hours)	20%
Mid-term 2 (1.5 hours)	20%
Final Exam (1.5 hours)	20%
Homework	15%
Quiz	15%
Project	10%

Grading Scale

A	90% 100
B	80% 89%
C	70% 79%
D	60% 69%
F	0% - 59%

Tobacco-free/ Smoke-free campus

UOG is a tobacco-free campus. Thank you for not using tobacco products on campus, and for helping make UOG a healthy learning and living environment.

Special Accommodations

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SLO 4	CE PLO a, c, e, j, k	ILO 2, 3, 5, 7	Homework, Presentation, Quiz, Test
SLO 5	CE PLO a, c, e, j, k	ILO 2, 3, 5, 7	Homework, Presentation, Quiz, Test
SLO 6	CE PLO a, c, d, e, g, j, k	ILO 1, 2, 3, 5, 7	Project, Presentation

Course SLOs

When you complete this class you should be able to:
SLO 1: Understand basic material properties of reinforced concrete and the behavior of reinforced concrete members.
SLO 2: Identify and calculate the design loads and distribution.
SLO 3: Understand the ultimate strength method used in reinforced concrete design.
SLO 4: Analyze and design typical reinforced concrete beams, columns, and footings using the American Concrete Institute 318 Building Code.
SLO 5: Apply relevant ACI Code provisions to ensure safety and serviceability of structural elements. and
SLO 6: Develop an appreciation of issues involved in reinforced concrete construction.

Civil Engineering PLOs

PLO a: an ability to apply knowledge of mathematics, science, and engineering
PLO b: an ability to design and conduct experiments, as well as to analyze and interpret data
PLO 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
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Class Schedule (tentative)

Week	Date	Chapter	Topics
1		1	Introduction, Different methods of design of reinforced concrete structures
2		2	Flexural Analysis of Beams.
3		3	Strength Analysis of Beams.
4		4	Design of Rectangular Beams.
5		4	Design of One-way Slab.
6		5	Analysis and Design of T-Beams and Doubly RC Beams
7		1-5	Review Bending Behavior, Analysis, Design.
8			Midterm Exam
9		6	Bond, Anchorage, and Development Length.
9		7	Limit State of Serviceability.
10		8	Shear & Diagonal Tension
11		8	Design for Shear
12		10	Design of Compression Members: Short Columns
12		11	Design of Compression Members: Slender Columns
13		12	Design of Footings & Foundations
14		14	Continuous RC Structures
		Class Note	

University of Guam: School of Engineering
Department of Civil and Environmental Engineering

CEE 307: Introduction to Environmental Engineering (3 credit hours)
Course Syllabus: Fall Semester

Course/Catalog Description:

This course lays a foundation for further coursework in the environmental and civil-sanitary engineering disciplines. Information about the nature and scope of environmental problems will be presented along with an overview of current engineering practices involved in their correction. Methodologies for solving these problems will be introduced along with the underlying principles of environment chemistry and microbiology that they employ. Topics of study will include water and wastewater treatment, air pollution control, solid-waste management, and *in situ* environmental remediation.

Prerequisites: < CH 103, MA 203 >

Class location and time: TBD

Instructor: Dr. Joseph D. Rouse, P.E. (or TBD)
Office: WERI 112, Phone: 735-2691 (rousej@triton.uog.edu)
Office hours: TBA

Required textbook: Basic Environmental Technology: Water Supply, Waste Management and Pollution Control (6th Edition), 2014, Nathanson and Schneider.

Useful references: TBD

Grading:	Quizzes/Homework	40%
	Midterm Exams	40%
	Final:	20%

Attendance and participation are mandatory:

- Attendance will be kept and counted towards participation,
- Homework must be submitted on time. Late submissions may incur penalties.
- Timing, method, and format for submissions will be outlined in class.
- Some assignments will require the use of engineering paper, which the student will be responsible for obtaining.
- If you miss a submission deadline, quiz, or exam, if possible notify the instructor in advance, otherwise in a timely manner as soon as possible thereafter.

Final exam schedule: TBA

Student learning outcomes (SLOs): Students who successfully complete this course will demonstrate the ability to:

1. understand and discuss environmental issues in our global society intelligibly
2. describe various sources and impacts of pollutants in the environment
3. explain various solutions and methodologies for abating air and water pollution
4. determine and explain simple stoichiometric reactions and chemical mass balances
5. understand and explain basic principles of chemical and biological treatment processes
6. understand and communicate the importance of professional responsibilities.

Program learning outcomes (PLOs): Students who successfully meet the requirements of the Civil Engineering program/department of the School of Engineering (SENG) will demonstrate the ability to:

1. apply knowledge of mathematics, science, and engineering to civil engineering disciplines
2. design and conduct civil engineering experiments, as well as to analyze and interpret the resulting data
3. design a system, component, or process to meet desired needs within realistic constraints
4. function on multidisciplinary teams
5. identify, formulate, and solve civil engineering problems
6. understand professional ethical responsibility, including the importance of professional licensure
7. communicate effectively by written, verbal, and visual means
8. appreciate the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
9. recognize the need for, and an ability to engage in lifelong learning
10. understand contemporary issues in local, regional, and global settings
11. use the techniques, skills, and modern engineering tools necessary for engineering practice recognizing the integral roles of computers and internet resources
12. conduct work activities in an ethical manner giving due consideration to economic, environmental, social, political, health and safety, and sustainability issues.

Institutional student learning outcomes (ILOs): Students who successfully graduate from the University of Guam (UOG) will demonstrate:

1. mastery of critical thinking and problem solving
2. mastery of quantitative analysis
3. effective oral and written communication
4. understanding and appreciation of culturally diverse people, ideas and values in a democratic context

5. responsible use of knowledge, natural resources, and technology
6. an appreciation of the arts and sciences
7. an interest in personal development and lifelong learning.

Alignment matrix of SLOs to PLOs and ILOs:

SLOs – will demonstrate the ability to:	PLOs	ILOs
1: understand and discuss environmental issues in our global society intelligibly	1, 7, 8, 9, 10,	1, 3, 4, 5, 6, 7
2: describe various sources and impacts of pollutants in the environment	7, 8, 10,	1, 2,
3: explain various solutions and methodologies for abating air and water pollution	7, 8, 10,	3, 5
4: determine and explain simple stoichiometric reactions and chemical mass balances	1, 7,	2, 3, 6,
5: understand and explain basic principles of chemical and biological treatment processes	1, 3, 7,	3, 6,
6: understand and communicate the importance of professional responsibilities	6, 7, 9, 12	4, 5, 7,

Course schedule for CE307 (Tentative: for 16 weeks): TBD

Week	Dates	Topics	
1		Introduction: The environment, population growth, technology	
2		Mass/energy balances, stoichiometry, water cycle	
3		Chemistry: equilibrium, pH, solubility, carbonates	
4		Environmental cycles: nitrogen, carbon, energy, etc.	
5		Environmental chemistry – continued.	QUIZ 1
6		Ecological/ biological concepts.	Field Trip
7		Environmental microbiology, biodegradation	
8		Biochemical parameters: TOC, BOD, COD	
9		Pollution control and remediation.	
10		Wastewater treatment unit processes.	QIIZ 2
11		Wastewater treatment - cont.	Field Trip
12		Water resources and potable water treatment.	
13		Solid and hazardous wastes management/treatment	
14		Groundwater: contaminant transport and remediation	
15		Air pollution control and treatment	
16		Ethics, community involvement, summary and review.	
	TBA	Final Exam	

Course Syllabus
CEE 308: INTRODUCTION TO SURVEYING

Email: faculty@triton.uog.edu

Class Schedule: Tue & Th 9:00 – 11:00 AM

Office Hours: Tue & Th 11-1 pm (Office: EA # xx)

Catalog Description

This is an introductory course to surveying techniques and includes theory as well as lab sessions. Principles of plane surveying. Measurement of horizontal distance, difference in elevation, and angles. Traverse surveys and computations. Horizontal and vertical curves. Principles of stadia. Topographic surveys. Cross-sectioning & Earthwork.

Prerequisites

PH251, MA203, EN111.

Reference Textbook

Ghilani, C. D. and P. R. Wolf. Elementary surveying – An introduction to geomatics. 14th ed. Upper Saddle River: Pearson Education, 2014. ISBN-13: 978-0-13-375888-7

Course Objective

To provide students with a fundamental understanding of the theory (in-class sessions) and field techniques (via lab sessions) used in horizontal and vertical measurements using tape, automatic level and total station, make students familiar with the mapping capabilities of CAD in support of civil engineering design, and ethical responsibilities involved in modern practice.

Major Assignments and Examinations:

A series of lab reports, two midterm exams, and one comprehensive final exam. All lab reports must be turned in at the start of the class period in which they are due. Failure to do so will constitute a grade of zero for the lab assignment in question. One week of advanced notice will be provided in scheduling each midterm exam. Unexcused failure to appear for an exam at the scheduled time will constitute a grade of zero in that exam.

Grading Policy

Arithmetic average of all lab reports (25%), Midterm exams (20% each), and Final exam (35%).
Final Grading Scale: A: 90-100, B: 80-89,
C: 70-79, D: 60-69, F: 59 or less.

Attendance Policy

Class attendance and punctuality are expected. (No special accommodations will be made for incomplete or missed assignments and/or exams due to unexcused absences.)

Make-Up Exam Policy

Course Syllabus
CEE 308: INTRODUCTION TO SURVEYING

Email: faculty@triton.uog.edu

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Classroom Policies

All the students are responsible for reading the appropriate portions of the text before the classroom session in which it is discussed. This will enable class sessions to be interactive, with lots of student involvement. While classroom discussions may not always cover every item in the text, they will be designed so that students can achieve understanding of the material. Professional conduct will be expected at ALL TIMES and disruptive talking or behavior will NOT be allowed because a high level of concentration is essential for the successful progress in this highly calculation-intensive course. Thus, no food is allowed in the classroom, but a drink is. You are going to be asked to leave the classroom for the other students' classroom achievements if you violate this class policy once. When you violate this rule for the second time during the semester you will get an administrative F for the semester.

Emergency Exit Procedures

Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit (stairwells), which is located next to the elevators. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

Curriculum Mapping:

Course SLOs	Program PLOs	UOG ILOs	Method of Assessment
SLO 1	CE PLO (a, c, & e)	ILO 1, 2, 3	Homework, and Midterm 2
SLO 2	CE PLO (a, c, & e)	ILO 1, 2, 3	Homework, Midterm 2
SLO 3	CE PLO (a, c, e, & k)	ILO 1, 2, 3, 5, 7	Homework, Midterm 2
SLO 4	CE PLO (a, c, e, f & k)	ILO 2, 3, 5, 7	Homework, Midterm 2
SLO 5	CE PLO (a, c, e, f & k)	ILO 1, 2, 3, 5, 7	Homework, Midterm 2

Course SLOs

SLO 1: Identify, formulate and solve problems encountered in surveying as an integral part of the design process in engineering practice.

SLO 2: Understand the fundamentals of surveying and its applications to different engineering operations.

SLO 3: Apply classical and contemporary methods of surveying in engineering practice.

SLO 4: Master the principles of surveying before taking an upper level design course.

SLO 5: Evaluate solutions generated by CAD & GPS software's and compare to solutions produced by hand

Civil Engineering PLOs/ABET Student Learning Outcomes:

PLO a: an ability to apply knowledge of mathematics, science, and engineering

PLO b: an ability to design and conduct experiments, as well as to analyze and interpret data

PLO 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

PLO d: an ability to function on multidisciplinary teams

PLO e: an ability to identify, formulate, and solve engineering problems

PLO f: an understanding of professional and ethical responsibility

PLO g: an ability to communicate effectively

PLO h: the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

PLO i: a recognition of the need for, and an ability to engage in life-long learning

PLO j: a knowledge of contemporary issues

PLO k: an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

UOG ILOs

ILO 1: Mastery of critical thinking & problem solving

ILO 2: Mastery of quantitative analysis

ILO 3: Effective oral and written communication

ILO 4: Understanding & appreciation of culturally diverse people, ideas & value in a democratic context

ILO 5: Responsible use of knowledge, natural resources, and technology

ILO 6: An appreciation of the arts & sciences

ILO 7: An interest in personal development & lifelong learning

TENTATIVE CLASS SCHEDULE (TOTAL ~25 CLASS SESSIONS)

Lecture No.	Contents
1	Course introduction. Written field notes.
2	Units and significant figures.
3	Theory of errors in observations.
4	Intro to Leveling.
5	Leveling procedures and computations.
6	Distance measurement – taping. Taping corrections.
7	Electronic distance measurement.
8	Angles, Azimuths, and Bearings.
9	Compass readings. Total Stations.
10	Horizontal and vertical angle measurement. Traversing
11	Traverse adjustment, Area: coordinate and DMD methods.
12	**MidTerm I**
13	The Global Positioning System (GPS) Intro and Principles, GPS operations.
14-15	Data collectors, Mapping surveys.
16	Interpreting and drawing contours.
17	Mapping and AutoCAD intro.
18	Control surveys and Geodetic datums.
19	State plane coordinates.
20	**MidTerm II**
21	Boundary surveys.
22	United States Public Land Survey System.
23	Horizontal curves.
24	Review and example problems
25	Review and example problems

Lab sessions:

Almost every class will have a theory class followed by a lab session in field. The following 10-12 lab (tentative) sessions will be attempted to cover during the semester (not necessarily in the same order). In the case of change in order, students will be informed at least a week earlier.

I. ***Introduction and station descriptions***

II. ***Leveling (Field work grade)***

III. ***Distances – taping and pacing (Field work grade)***

IV. ***Distances – EDM (Total station) (Field work grade)***

V. ***Angle measurement (Field work grade)***

VI. ***Finish angle measurement***

VII. ***Traverse adjustment***

VIII. ***GPS exercise***

IX. ***CAD exercise***

X. ***Planimetric mapping (Field work grade)***

XI. ***Contour mapping (Field work grade)***

XII. ***Map drafting***

Note: The course outline presented above is tentative. It is your responsibility to attend classes and note any deviations. The Assignments & exams will be designed based on what is covered and discussed in the class and not necessarily based on what is presented above. As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course – Instructor

Syllabus

CEE 401: Steel Structures Design

Professor:	Pyo-Yoon Hong, PhD, PE
Email:	hongp@triton.uog.edu
Class Schedule:	Tue, Thurs 11 am – 1:00 pm
Office Hours:	Tue, Thurs 1 pm – 2 pm &
(Office: 102 ELI)	Wed 11 am – 2 pm

Catalog Description

Introduction to the design of structural elements found in steel buildings with emphasis on theories necessary for a thorough understanding of the design procedure. In particular, steel tension members, beams, columns, beam columns, and connections are considered. Emphasizes the AISC-LRFD Specifications for steel design, though reference is made to the ASD specification with comparisons made where appropriate.

Prerequisites: CEE 301

Required Textbook

W.T. Segui, "Steel Design", Cengage Learning, 6th Edition (ISBN-10: 1337094749)

Course Objectives:

The goal of CE 401 is to introduce the student to the behavior and design of steel structures, encountered in the practice of Civil Engineering.

Required Materials & Tools

1. **Laptop computer** with Windows 7 or newer operating system
2. Download and install ***SUTStrutor***.
3. **Engineering Calculator** with Simultaneous Equation Solver
4. 2 inch 3-Hole Binder
5. 5 color pencils and ruler.

Homework and Class Work

Homework will be assigned each time new material is introduced (literally every day). Also, there will be daily classroom worksheets, sometimes more than one. **There are no make-ups on classroom worksheets** because class attendance and participation are mandatory and extremely important. Homework assignments are graded for completion and are **not** returned.

Quiz, Tests and Exams

There will be a 5 min. quiz every day on the contents covered in the previous class. Also, there are two mid-term exams, based on the material covered since the previous test. The final exam will be comprehensive, and based on all material of the semester. The tests and the final will take place in the regular meeting room. **No makeup tests will be considered** for any circumstances. You must contact your instructor immediately if you have a legitimate excusable reason for missing class and wish to be considered for a make-up test or exam.

Classroom Policies

1. All work in the exams, tests, quiz, homework and class work must be done **neatly** using **pencils** (not pens). Do the work as neatly as possible. Being neat generally stimulates clear and orderly thinking, and vice versa. Only **legible** and **orderly** writing will be graded.
2. All work must be **stapled** and **dated** with the **class ID** (Look at the class attendance sheet). The students are responsible for any materials submitted without being stapled, dated or a class ID.

3. All students are responsible for **reading** the appropriate portions of the text **before** the class session in which it is discussed. This will enable class sessions to be interactive, with lots of student involvement. While classroom discussions may not always cover every item in the text, they will be designed so that students can achieve understanding of the material.
4. **Professional conduct** will be expected at ALL TIMES and disruptive talking or behavior will NOT be allowed because a high level of concentration is essential for the successful progress in this highly calculation-intensive course. Thus, no food is allowed in the classroom but a drink is. You are going to be asked to leave the classroom for the other students' classroom achievements if you violate this class policy once. When you violate this rule for the second time during the semester you will get an administrative **F** for the semester.
5. **No laptop, tablet or cell phone** is allowed in the classroom. This will be regarded as an unprofessional conduct and subjected to the punishments explained in the item #4.

Grade Calculation:

Mid-term 1 (1.5 hours)	20%
Mid-term 2 (1.5 hours)	20%
Final Exam (1.5 hours)	20%
Homework	15%
Quiz	15%
Project	10%

Grading Scale

A	90% 100
B	80% 89%
C	70% 79%
D	60% 69%
F	0% - 59%

Tobacco-free/ Smoke-free campus

UOG is a tobacco-free campus. Thank you for not using tobacco products on campus, and for helping make UOG a healthy learning and living environment.

Special Accommodations

If you are a student with a disability who will require an accommodation(s) to participate in this course, please contact me or the Institutional Compliance Officer privately to discuss your specific needs. You will need to provide me with documentation concerning your need for accommodation(s) from the EEO/ADA & TITLE IX Office. If you have not registered with the EEO/A DA & TITLE IX Office, you should do so immediately at 735-2244, (TTY) 735-2243 to coordinat your accommodation request.

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Curriculum Mapping:

Course SLOs	Program PLOs	UOG ILOs	Method of Assessment
SLO 1	CE PLO a, c, e, j, k	ILO 1, 2, 5, 6	Homework, Presentation, Quiz, Test
SLO 2	CE PLO a, c, e, j, k	ILO 1, 2, 5, 6	Homework, Presentation, Quiz, Test
SLO 3	CE PLO a, c, e, j, k	ILO 1, 2, 5, 6	Homework, Presentation, Quiz, Test
SLO 4	CE PLO a, c, e, j, k	ILO 1, 2, 5, 6	Homework, Presentation, Quiz, Test
SLO 5	CE PLO a, c, e, j, k	ILO 1, 2, 5, 6	Homework, Presentation, Quiz, Test
SLO 6	CE PLO a, c, e, j, k	ILO 1, 2, 5, 6	Homework, Presentation, Quiz, Test
SLO 7	CE PLO a, c, d, e, g, j, k	ILO 1, 2, 3, 5, 6	Project, Presentation

Course SLOs

When you complete this class you should be able to:

SLO 1: Describe load and resistance factor design (LRFD) and allowable stress design (ASD) and apply LRFD to design safe structures.
SLO 2: Design and analyze tension members considering yield and rupture failure modes.
SLO 3: Design and analyze simple bolted and welded connections.
SLO 4: Design and analyze steel compression members.
SLO 5: Design and analyze steel beams for flexure, shear, and deflection.
SLO 6: Design and analyze steel members subjected to combined flexure and axial loads.
SLO 7: Use LRFD to design low-rise steel building for specified loads in a team setting.

Civil Engineering PLOs

PLO a: an ability to apply knowledge of mathematics, science, and engineering
PLO b: an ability to design and conduct experiments, as well as to analyze and interpret data
PLO 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
PLO d: an ability to function on multidisciplinary teams
PLO e: an ability to identify, formulate, and solve engineering problems
PLO f: an understanding of professional and ethical responsibility
PLO g: an ability to communicate effectively
PLO h: the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
PLO i: a recognition of the need for, and an ability to engage in life-long learning
PLO j: a knowledge of contemporary issues
PLO k: an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

UOG ILOs

ILO 1: Mastery of critical thinking & problem solving
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ILO 3: Effective oral and written communication
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ILO 5: Responsible use of knowledge, natural resources, and technology
ILO 6: An appreciation of the arts & sciences
ILO 7: An interest in personal development & lifelong learning

Class Schedule (tentative)

Week	Date	Chapter	Topics
1		1	Introduction to Steel Structures: Steel material properties, advantages and disadvantages
2		2	Load and Resistance Factor Design (LRFD). Loadings and load combinations.
3		3	Tension Members: Tensile strength of steel. Limit states in tension.
4		7	Bolts/Welds Patterns of failure modes of bolted and welded connections.
5		4	Compression Members: Columns Euler buckling. Local buckling, LRFD buckling curves. Effective length concept.
6		4	Compression Members: Columns (cont'd)
7		5	Beams: Laterally Supported Bi-axial bending. Shear strength. Deflection.
8		5	Beams: Laterally Supported (cont'd)
9		Class Note	Torsion: Torsional strength. Torsional buckling.
10		Class Note	Beams: Laterally Not Supported
11		6	Beam-Columns: Axial load-moment interaction curve. 2nd Order Effects
12		6	Beam-Columns (cont'd): Braced and unbraced members.
13		8	Connections: Shear connections, Moment connections.
14		9	Composite Steel-Concrete Construction: Neutral axis in composite structures. Effective flange width.
15		Class Note	Structural Steel Applications from Practice

Syllabus

CEE 402: FOUNDATION ENGINEERING

Professor: Ujwalkumar D. Patil
Email: patilu@triton.uog.edu
Class Schedule: Mon, Tue & Wed 10:00 – 11:00 AM
Office Hours: Mon & Wed 11-1 pm (Office: 202 ELI)

Catalog Description:

Effect of geotechnical conditions on the behavior, proportioning, and choice of foundation type, bearing capacity theories, consolidation, shrink-swell, and settlement, shallow and deep foundations, subsurface exploration methods, study of foundation case histories.

Prerequisites:

CEE303: Geotechnical Engineering.

Reference Textbook:

Das, B. M. (2014). Principles of Foundation Engineering, 8th Edition, CENGAGE Learning
Lecture Handouts and Papers, Power Point Presentations

Additional References:

Coduto, D. P. (2001). Foundation Design-Principles and Practices, 2nd Edition, Prentice Hall

Bowles, J. E. (1996). Foundation Analysis and Design, 5th Edition, McGraw Hill

Holtz, R. D., Kovacs, W. D. and Sheahan, T. C. (2011). An Introduction to Geotechnical Engineering, 2nd Edition, Pearson

Paulos, H. G. and Davis, E. H. (1980). Pile Foundation Analysis and Design, John Wiley and Sons.

Foundations and Earth Retaining Structures, M. Budhu, Wiley.

Course Objectives:

Provide students with aspects of design and construction considerations for all types of foundation systems in most soil/rock support conditions, Review of geotechnical principles; Bearing capacity theories; Shallow foundation design: Mat foundations; Deep foundations; Lateral earth pressures and Retaining wall design (Introduction only).

Major Assignments and Examinations:

A series of homework assignments, two midterm exams, and one comprehensive final exam. All homework assignments must be turned in at the start of the class period in which they are due. Failure to do so will constitute a grade of zero for the homework assignment in question. One week of advanced notice will be provided in scheduling each midterm exam. Unexcused failure to appear for an exam at the scheduled time will constitute a grade of zero in that exam.

Grading Policy

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Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit (stairwells), which is located next to the elevators. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

Tested Explicitly (TE) Component:

The Civil Engineering Department ABET accreditation procedure includes assessing the achievement of various departmental student learning outcomes. The procedure includes explicit testing (TE) of the achievement of the departmental student learning outcomes. ES402 Foundation Engineering is designated as a TE course and will involve explicit testing of ABET outcome "CE PLO (e)". This will be achieved through specific problems given to test student knowledge of the outcome, which is reproduced below:
CE Department Outcome "CE PLO (e)" – An ability to identify, formulate, and solve engineering problems.

The second midterm exam will be designated as the explicit assessment tool for student achievement of outcome "e" in this course. The total grade of this exam will be 100. A minimum grade of 70 will be deemed to signify that a student has satisfactorily achieved the outcome. The TE exam will also be counted towards the final grade for this course. (More details will be discussed later in the course.)

Curriculum Mapping:

Course SLOs	Program PLOs	UOG ILOs	Method of Assessment
SLO 1	CE PLO (a, c, e & f)	ILO 1, 2, 3	Homework, and Midterm 2
SLO 2	CE PLO (a, c, e & f)	ILO 1, 2, 3	Homework, Midterm 2, Quiz
SLO 3	CE PLO (a, c, e, f & k)	ILO 1, 2, 3, 5, 7	Homework, Midterm 2, Quiz
SLO 4	CE PLO (a, c, e, f & k)	ILO 2, 3, 5, 7	Homework, Midterm 2, Quiz
SLO 5	CE PLO (a, c, e, f & k)	ILO 1, 2, 3, 5, 7	Homework, Midterm 2, Quiz

Course SLOs

Upon completion of this class, students should be able to:

SLO 1: Identify, formulate and solve problems encountered in Foundation engineering as an integral part of the design process in engineering practice.

SLO 2: Understand the role of foundation in buildings/structures under various loading conditions, and in different types of soils.

SLO 3: Apply classical and contemporary methods of soil mechanics and foundation engineering in engineering practice.

SLO 4: Master the principles of foundation engineering before taking an upper level design course.

SLO 5: Evaluate solutions generated by geotechnical/foundation analysis software and compare to solutions produced by hand.

Civil Engineering PLOs/ABET Student Learning Outcomes:

PLO a: an ability to apply knowledge of mathematics, science, and engineering

PLO b: an ability to design and conduct experiments, as well as to analyze and interpret data

PLO 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

PLO d: an ability to function on multidisciplinary teams

PLO e: an ability to identify, formulate, and solve engineering problems

PLO f: an understanding of professional and ethical responsibility

PLO g: an ability to communicate effectively

PLO h: the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

PLO i: a recognition of the need for, and an ability to engage in life-long learning

PLO j: a knowledge of contemporary issues

PLO k: an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

UOG ILOs

ILO 1: Mastery of critical thinking & problem solving

ILO 2: Mastery of quantitative analysis

ILO 3: Effective oral and written communication

ILO 4: Understanding & appreciation of culturally diverse people, ideas & value in a democratic context

ILO 5: Responsible use of knowledge, natural resources, and technology

ILO 6: An appreciation of the arts & sciences

ILO 7: An interest in personal development & lifelong learning

TENTATIVE CLASS SCHEDULE (TOTAL ~36 CLASS SESSIONS)

Lecture No.	Date	Content
1		Introduction
2		Soil Mechanics Review
3		Soil Mechanics Review
4-6		subsurface investigations
7-12		Bearing Capacity
13-14		Bearing Capacity – Special Cases
15		Settlement – Schmertmann's method
16		Settlement – Consolidation
17		Mat Foundation
18		**Midterm1**
19		Mat Foundation
20-23		Pile Foundation
24		Drilled Shafts
25		Drilled Shafts
26		**Midterm2**
27-28		Drilled Shafts (3rd Project)
29		Earth Pressure/Retaining Wall
30-31		Retaining Wall
32-33		review week
34-35		review week
36		**Final Exam**

Note: The course outline presented above is tentative. It is your responsibility to attend classes and note any deviations. The quizzes and exams will be designed based on what is covered and discussed in the class and not necessarily based on what is presented above. As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course – Patil U.D.

Syllabus
CEE 404/405 Civil Engineering Project 1 & 2

Professor:	Pyo-Yoon Hong, PhD, PE
Email:	hongp@triton.uog.edu
Class Schedule:	Tue, Thurs 1 pm – 3:00 pm
Office Hours:	Tue, Thurs 1 pm – 2 pm &
(Office: 102 ELI)	Wed 11 am – 2 pm

Catalog Description

This course is a one-year independent study under the supervision of a faculty member, which includes analytical, experimental, computational, or case-study type work. A final report must be submitted near the end of the second semester accompanied with an A3 size poster. The project will be assessed through both report writing and oral presentation. The mark will be given as a single unit for both the courses "CEE 404 Civil Engineering Project 1" and " CEE 404 Civil Engineering Project 2 ", with a total of 4 credits.

Prerequisites: Completion of all 300-level engineering courses for the civil engineering major all with a grade of "C" or better and consent of department undergraduate advisor.

Project Topic Offered

Project topics will usually be offered in the following areas depending on the availability of resource:

1. Structural engineering
2. Geotechnical engineering
3. Hydraulics and environmental engineering
4. Transportation and construction management

Student should choose the direction of his/her final year project in one of the areas or any other direction related to the civil engineering.

Course Objectives:

- To allow students to complete a research and/or development project via an individual work or team work.
- To provide students with an opportunity of in-depth exploration of a particular topic in the civil engineering, and to allow them to illustrate their expertise in a chosen area.
- To further develop students' creativity and overall skills of problem formulation, development of appropriate solution methods, design and implementation of a final chosen solution.
- To develop students with the ability to write scientific report and present their research results Make measurements of behavior of various materials used in Civil Engineering.

Student Assessment

The progress report, the final report and oral presentation will be assessed individually and will contribute towards the final mark. The assessment scheme is shown below:

Part 1. Work & Report (70 marks)

Supervisor 50 (work: 25, progress report: 5, final report: 20)
Examiner 20

From Supervisor (25% continuous work)

	Item	Percentage
1	Motivation of Independent Work or Idea	3.75%
2	Ability of searching related literatures and organizing related materials	3.75%
3	Ability of problem solving (e.g. analytical or numerical problem solving, design and perform of experiments)	7.5%
4	Ability of finishing assigned task on time	7.5%
5	Continuous reporting of progress of project	2.5%
	Total	**25%**

From Supervisor (5% Progress report)

	Item	Percentage
1	Whether the progress report was submitted on time; Whether the progress shown in the report is satisfactory.	5%
	Total	**5%**

From Supervisor (20% Report)

	Item	Percentage
1	Abstract, introduction and description of project	2.0%
2	Amount and quality of background research and use of literatures	3.0%
3	Description of methodology, technical content or empirical work	5.0%
4	Critical analysis and evaluation	5.0%
5	Conclusion, summary of achievements and list of references	3.0%
6	Report writing skill (i.e. format, grammar, figures etc.)	2.0%
	Total	**20%**

From Examiner (20% Report)

	Item	Percentage
1	Abstract, introduction and description of project	2.0%
2	Amount and quality of background research and use of literatures	3.0%
3	Description of methodology, technical content or empirical work	5.0%
4	Critical analysis and evaluation	5.0%
5	Conclusion, summary of achievements and list of references	3.0%
6	Report writing skill (i.e. format, grammar, figures etc.)	2.0%
	Total	**20%**

Part 2. Presentation & Poster (30 marks)

For students who obtain ≥ 58 or ≤ 29 in part 1, the final year project committee will determine the score of this part. For other students, the supervisor and the examiner will determine the score of this part.

From Supervisor (15% Presentation & Poster Design)

	Item	Percentage
1	Power point	2.25%
2	English language skill	3.0%
3	Presentation skill and Q&A performance	6.0%
4	Time Control e	1.5%
5	Poster Design	2.25%
	Total	**15%**

From Examiner (15% Presentation & Poster Design)

	Item	Percentage
1	Power point	2.25%
2	English language skill	3.0%
3	Presentation skill and Q&A performance	6.0%
4	Time Control e	1.5%
5	Poster Design	2.25%
	Total	**15%**

Grading Scale

A	90% 100
B	80% 89%
C	70% 79%
D	60% 69%
F	0% - 59%

Special Accommodations

If you are a student with a disability who will require an accommodation(s) to participate in this course, please contact me or the Institutional Compliance Officer privately to discuss your specific needs. You will need to provide me with documentation concerning your need for accommodation(s) from the EEO/ADA & TITLE IX Office. If you have not registered with the EEO/A DA & TITLE IX Office, you should do so immediately at 735-2244, (TTY) 735-2243 to coordinate your accommodation request.

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Curriculum Mapping:

Course SLOs	Program PLOs	UOG ILOs	Method of Assessment
SLO 1	CE PLO a, e	ILO 1, 2, 3	Homework, Presentation, Quiz, Test
SLO 2	CE PLO a, e	ILO 1, 2, 3	Homework, Presentation, Quiz, Test
SLO 3	CE PLO a, c, e	ILO 1, 2, 3, 5, 7	Homework, Presentation, Quiz, Test

SLO 4	CE PLO a, c, e, j, k	ILO 2, 3, 5, 7	Homework, Presentation, Quiz, Test
SLO 5	CE PLO a, b, e, g, i, j, l	ILO 2, 3, 5, 7	Homework, Presentation, Quiz, Test

Course SLOs

Upon completion of this course, students should be able to:

SLO 1. demonstrate their initiative and intellectual achievement, their comprehension of the chosen subject matter, and their capacity of employing the theoretical principles in practical situations;

SLO 2. search for technical information from various resources, such as the library, research and technical literature, electronic database and the World Wide Web;

SLO 3. be able to formulate engineering problems and develop appropriate solution methods to meet desired needs;

SLO 4. understand the professional practices in the civil engineering and the impact of engineering solutions to the society;

SLO 5. write scientific report and present their research work in a precise and coherent manner. You should learn about:

Civil Engineering PLOs

PLO a: an ability to apply knowledge of mathematics, science, and engineering

PLO b: an ability to design and conduct experiments, as well as to analyze and interpret data

PLO 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

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Professor:	Pyo-Yoon Hong, PhD, PE
Email:	hongp@triton.uog.edu
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Prerequisites: Completion of all 300-level engineering courses for the civil engineering major all with a grade of "C" or better and consent of department undergraduate advisor.

Project Topic Offered

Project topics will usually be offered in the following areas depending on the availability of resource:

1. Structural engineering
2. Geotechnical engineering
3. Hydraulics and environmental engineering.
4. Transportation and construction management

Student should choose the direction of his/her final year project in one of the areas or any other direction related to the civil engineering.

Course Objectives:

- To allow students to complete a research and/or development project via an individual work or team work.
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	Item	Percentage
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2	Amount and quality of background research and use of literatures	3.0%
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4	Critical analysis and evaluation	5.0%
5	Conclusion, summary of achievements and list of references	3.0%
6	Report writing skill (i.e. format, grammar, figures etc.)	2.0%
	Total	**20%**

Part 2. Presentation & Poster (30 marks)

For students who obtain ≥ 58 or ≤ 29 in part 1, the final year project committee will determine the score of this part. For other students, the supervisor and the examiner will determine the score of this part.

From Supervisor (15% Presentation & Poster Design)

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Curriculum Mapping:

Course SLOs	Program PLOs	UOG ILOs	Method of Assessment
SLO 1	CE PLO a, e	ILO 1, 2, 3	Homework, Presentation, Quiz, Test
SLO 2	CE PLO a, e	ILO 1, 2, 3	Homework, Presentation, Quiz, Test
SLO 3	CE PLO a, c, e	ILO 1, 2, 3, 5, 7	Homework, Presentation, Quiz, Test

SLO 4	CE PLO a, c, e, j, k	ILO 2, 3, 5, 7	Homework, Presentation, Quiz, Test
SLO 5	CE PLO a, b, e, g, i, j, l	ILO 2, 3, 5, 7	Homework, Presentation, Quiz, Test

Course SLOs

Upon completion of this course, students should be able to:

SLO 1. demonstrate their initiative and intellectual achievement, their comprehension of the chosen subject matter, and their capacity of employing the theoretical principles in practical situations;

SLO 2. search for technical information from various resources, such as the library, research and technical literature, electronic database and the World Wide Web;

SLO 3. be able to formulate engineering problems and develop appropriate solution methods to meet desired needs;

SLO 4. understand the professional practices in the civil engineering and the impact of engineering solutions to the society;

SLO 5. write scientific report and present their research work in a precise and coherent manner. You should learn about:

Civil Engineering PLOs

PLO a: an ability to apply knowledge of mathematics, science, and engineering

PLO b: an ability to design and conduct experiments, as well as to analyze and interpret data

PLO 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

PLO d: an ability to function on multidisciplinary teams

PLO e: an ability to identify, formulate, and solve engineering problems

PLO f: an understanding of professional and ethical responsibility

PLO g: an ability to communicate effectively

PLO h: the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

PLO i: a recognition of the need for, and an ability to engage in life-long learning

PLO j: a knowledge of contemporary issues

PLO k: an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

UOG ILOs

ILO 1: Mastery of critical thinking & problem solving

ILO 2: Mastery of quantitative analysis

ILO 3: Effective oral and written communication

ILO 4: Understanding & appreciation of culturally diverse people, ideas & value in a democratic context

ILO 5: Responsible use of knowledge, natural resources, and technology

ILO 6: An appreciation of the arts & sciences

ILO 7: An interest in personal development & lifelong learning

Course Syllabus
CEE 406: FUNDAMENTALS OF TRANSPORATION ENGINEERING
Email: patilu@triton.uog.edu
Class Schedule: MW 02:00 – 03:15 PM
Office Hours: MW 03:30-4:45 pm (Office: XXX)

Catalog Description

History of transportation modes, multi-modal transportation systems, new transport technologies, traffic operations and control, economic evaluation of transport alternatives, introduction to transportation planning, design, and operation of transportation systems with an emphasis on highway design, horizontal and vertical alignment, cross-sections, earthwork, drainage, pavement materials for highways, pavement foundation design, and traffic surveys.

Prerequisites

CEE301, CE303 and CEE306 or concurrent enrollment in CEE306.

Reference Textbook

Garber, N.J. and L.A. Hoel, Traffic and Highway Engineering, 5thEdition, Cengage Learning, 2014.
Pavement analysis and Design by Yang H. Huang, Second Edition, Pearson Prentice Hall, 2004. (ISBN 0-13-142473-4)

Course Objective

This course will provide an introduction to planning, design, and operation of transportation systems with an emphasis on highways and streets. Focus will be on first principles and basic, practical tools as a foundation for further coursework and practice in transportation engineering.

Student Learning Outcome

Upon successful completion of this course, students will be able to:

1. To develop an appreciation of the role of engineers in planning, designing and managing the transport system and infrastructure;
2. Learn the various aspects of the transport system such as planning and design;
3. Describe the basic components of transport system and infrastructure, their role, importance and characteristics;
4. Design and conduct traffic surveys to collect traffic data;
5. Apply engineering principles to identify and investigate traffic problems and to devise and evaluate sustainable solutions.
6. Design transport system components, in particular geometric design of roads and intersections.
7. Appreciate the role of pavement materials and testing methods in highway design.

Major Assignments and Examinations:

A series of homework assignments, two midterm exams, and one comprehensive final exam. All homework assignments must be turned in at the start of the class period in which they are due. Failure to do so will constitute a grade of zero for the homework assignment in question. One week of advanced notice will be provided in scheduling each midterm exam. Unexcused failure to appear for an exam at the scheduled time will constitute a grade of zero in that exam.

Grading Policy

Arithmetic average of all assigned homework's (15%), Midterm exams (25% each), and Final exam (35%). Final Grading Scale: A: 90-100, B: 80-89, C: 70-79, D: 60-69, F: 59 or less.

Our **last test** will be during Exam Week. More details will be disclosed on first day of classes. DO NOT SCHEDULE ANY OTHER EVENT DURING THIS TIME PERIOD. Every class has its own exam period and there is no reason another instructor's project or presentation need infringe upon the exam for this class.

Attendance Policy

Class attendance and punctuality are expected. (No special accommodations will be made for incomplete or missed assignments and/or exams due to unexcused absences.)

Make-Up Exam Policy

No make-up exams will be given except for medical or other similar hardships where advanced arrangements are made with the instructor: or in case of non-selective medical emergencies with appropriate physician's note or documentation. Other than circumstances described above, failure to take the exam at the scheduled time will constitute a grade of zero in the exam.

Tobacco-free/ Smoke-free Campus
UOG is a tobacco-free campus. Thank you for not using tobacco products on campus, and for helping make UOG a healthy learning and living environment.

Special Accommodations
If you are a student with a disability who will require an accommodation(s) to participate in this course, please contact me or the Institutional Compliance Officer privately to discuss your specific needs. You will need to provide me with documentation concerning your need for accommodation(s) from the EEO/ADA & TITLE IX Office. If you have not registered with the EEO/A DA & TITLE IX Office, you should do so immediately at 735-2244, (TTY) 735-2243 to coordinate your accommodation request.

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The Family Educational Rights and Privacy Act (FERPA) afford students certain rights with respect to their education record. The right for students, parent and school officials can be viewed at http://www2.ed.gov/policy/gen/guid/fpco/ferpa/index.html.

Classroom Policies

All the students are responsible for reading the appropriate portions of the text before the classroom session in which it is discussed. This will enable class sessions to be interactive, with

lots of student involvement. While classroom discussions may not always cover every item in the text, they will be designed so that students can achieve understanding of the material.

Professional conduct will be expected at ALL TIMES and disruptive talking or behavior will NOT be allowed because a high level of concentration is essential for the successful progress in this highly calculation-intensive course. Thus, no food is allowed in the classroom, but a drink is. You are going to be asked to leave the classroom for the other students' classroom achievements if you violate this class policy once. When you violate this rule for the second time during the semester you will get an administrative F for the semester.

Emergency Exit Procedures

Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit (stairwells), which is located next to the elevators. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

Curriculum Mapping:

Course SLOs	Program PLOs	UOG ILOs	Method of Assessment
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SLO 3	CE PLO (a, c, e, f & k)	ILO 1, 2, 3, 5, 7	Homework, Midterm 2, Quiz
SLO 4	CE PLO (a, c, e, f & k)	ILO 2, 3, 5, 7	Homework, Midterm 2, Quiz
SLO 5	CE PLO (a, c, e, f & k)	ILO 1, 2, 3, 5, 7	Homework, Midterm 2, Quiz

Course SLOs

SLO 1: Identify, formulate and solve problems encountered in transportation engineering as an integral part of the design process in engineering practice.

SLO 2: Understand the behavior of pavement materials in highways under different vehicle loadings.

SLO 3: Apply classical and contemporary methods of transportation in engineering practice.

SLO 4: Master the principles of transportation engineering before taking an upper level design course.

SLO 5: Evaluate solutions generated by pavement analysis software and compare to solutions produced by hand

Civil Engineering PLOs/ABET Student Learning Outcomes:

CE PLO (a): An ability to apply knowledge of mathematics, science, and engineering	a
CE PLO (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	c
CE PLO (e): An ability to identify, formulate and solve engineering problems	e
CE PLO (f): An understanding of professional and ethical responsibility	f
CE PLO (g): An ability to communicate effectively	g
CE PLO (h): The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context	h
CE PLO (i): A recognition of the need for, and an ability to engage in life-long learning	i
CE PLO (j): A knowledge of contemporary issues	j
CE PLO (k): An ability to use the techniques, skills and modern engineering tools necessary for engineering practice	k

UOG ILOs

ILO 1: Mastery of critical thinking & problem solving

ILO 2: Mastery of quantitative analysis

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ILO 6: An appreciation of the arts & sciences

ILO 7: An interest in personal development & lifelong learning

TENTATIVE CLASS SCHEDULE (TOTAL ~ 34 CLASS SESSIONS)

Weeks.	Content
1-4	Introduction, history, new transportation technologies
	Traffic operations and control
5-7	Economic evaluation of transport alternatives
	Transportation planning & design
	Mid-Term Exam 1
8-12	Highway design
	Horizontal & vertical alignments
	Cross-section, earthwork, drainage
13-16	Pavement materials
	Pavement foundation design
	Traffic surveys
	Mid-Term Exam 2
17	**Final Exam**

Note: The course outline presented above is tentative. It is your responsibility to attend classes and note any deviations. The quizzes and exams will be designed based on what is covered and discussed in the class and not necessarily based on what is presented above. As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course.

Appendix 5
New Course Outline Forms

Bachelor of Science in Civil Engineering

School of Engineering

Department of Civil & Environmental Engineering

NEW COURSE OUTLINE FORM

College: **School of Engineering** Course Number: **CEE 204**

Course Title: **Mechanics of Fluids** Credit Hours: **3**

Date of Final Approval: _____ Semester Offered: **Fall 2019**

Course counts as:

_____ general education requirement
X part of **BS in Civil Engineering** major program
_____ elective

1. Catalog Description:
   Physical properties of fluids, fluid statics, mass momentum and energy conversation, Bernoulli equation, dimensional analysis, friction and head loss, flow in closed conduits, forces over immersed bodies.

2. Course Content:
   Topics that will be covered includes fluid properties, fluid statics and buoyancy, Bernoulli's equation and its use/limitations, linear momentum, dimensional analysis, laminar and turbulent flow, flow in pipes and pipe networks including pressure drop calculations, boundary layer in external flow, drag or immersed bodies, turbines, fans and pumps and analysis of turbo-machines.

3. Rationale for the Course:
   This is the first basic course of fluid mechanics. The main objective of this course is to understand the fundamentals of the fluid mechanics such as fluid and flow properties, fluid behavior at rest and in motion and fundamental equations like mass, energy and momentum conservation of the fluid flow.

4. Skills and Background Required or Expected:
   The course requires materials in MA204 including differential, and integration.

5. Teaching Methodologies and Anticipated class size:
   The course consists of 3 hours a week of traditional lectures. Lectures will be designed to cover the terminology and core concepts and theories in fluid mechanics. They do not simply reiterate the texts, but build on the lecture topics using practical examples to show how the theory is applied in real engineering problems and the details of when, where and how it should be applied. The anticipated class size is 10 to 20.

6. Learning Objectives for Students (SLO):

After course completion, the students will be able to:

- Understand the fundamentals of fluid mechanics, including concepts of mass and momentum conservation.
- Use fluid properties correctly to solve the problems.
- Apply the Bernoulli equation to solve problems in fluid mechanics.
- Apply control volume analysis to problems in fluid mechanics.
- Perform dimensional analysis for problems in fluid mechanics.
- Understand the laminar and turbulent boundary layer fundamentals.
- Determine pressure drops for pipe systems and choose appropriate pumps and turbine depending on the application.
- An ability to apply the concepts developed for fluid flow analysis to issues such as environment, structure, and hydrology areas.

7. Methods of Evaluation:

Quizzes, homework assignments, mid-term and final exam will be the evaluation tools for this course. There will be a total of 6 assignments, and each assignment will cover the topics that were taught in the prior weeks. The number of the quizzes will be the instructor choice. The home works (assignments) and quiz 40%, mid-term 40%, and final each 20% of the total grade.

8. Methods for Student Learning Outcomes Assessment:

Asking to solve exercise/tutorial problems on each topic for applications by asking sequential questions.
Asking the students to explain the steps adopted in the problem and ensures that they understand the problem.
Asking the students to suggest a solution before giving them the correct answer.

9. Required and Recommended Texts or Study Guides:

Fundamentals of Fluid Mechanics – 8th edition, by Philip Gerhard, Andrew Gerhard and John Hochstein, John Wiley and Sons, 2016. ISBN 10: 0201114100 / ISBN 13: 9780201114102.

10. Subsequent Courses:

Engineering Hydraulics CEE302

11. Additional Course Descriptors, if any:

The Calendar of Assignments, Assessment Project, a Statement Concerning the "Americans with Disabilities Act" (ADA) Accommodations for Students, Attendance and Grading Policies are to be included in the course syllabus.

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NEW COURSE OUTLINE FORM

College: **School of Engineering** Course Number: **CEE 302**

Course Title: **Engineering Hydraulics** Credit Hours: **3**

Date of Final Approval: _____ Semester Offered: **Fall 2019**

Course counts as:

_____	general education requirement
_____X_____	part of **BS in Civil Engineering** major program
_____	elective

1. Catalog Description:
   Hydraulics of closed conduits and open channel flow with the emphasis on engineering applications. Pump hydraulics, urban drainages, and flood plain management. Prerequisite: CEE204, and concurrent enrollment in CEE302L

2. Course Content:
   The course covers the fundamentals of hydraulics, including properties of water, hydrostatic forces / pressures, fluid statics / dynamics, head losses, and related phenomena in closed conduit flow. Additional topics to be covered include: hydraulic machinery (pumps), open channel flow, statistical methods, and the design of hydraulic structures.

3. Rationale for the Course:
   Civil engineers are often involved in designing hydraulic structures such as dams, water distribution system, sewer system, flood control, and pump design. The principle of hydraulics forms the basis for the design and construction of all these systems.

4. Skills and Background Required or Expected:
   Students must have knowledge on Mechanics of Fluid (CEE204) for this course.

5. Teaching Methodologies and Anticipated class size:
   The course consists of 3 hours a week of traditional lectures in the classroom where the teacher presents the concepts and basics of the course. The lectures will not simply reiterate the texts, but build on the lecture topics using practical examples to show how the theory is applied in real engineering problems and the details of when, where and how it should be applied. The anticipated class size is 10 to 15.

6. Learning Objectives for Students:
   - Understand and be able to use the energy and momentum equations.
   - Analyze flow in closed pipes, and design and selection of pipes including sizes. (a, c, e)
   - Understand pumps classification and be able to develop a system curve used in pump selection. [a, c, e] Design and select pumps (single or multiple) for different hydraulic applications. [a, c, e] Department
   - Determine water surface profiles for gradually varied flow in open channels. (a, e)
   - Become familiar with open channel cross sections, hydrostatic pressure distribution and Manning's law
   - Familiar with drainage systems and wastewater sources and flow rates. (a)
   - Analyze and design a sanitary sewer system using modern engineering (k)

7. Methods of Evaluation
   Questions in Quiz, Midterm and Final exams which will force the student to think and apply concepts and principles learned.

8. Methods for Student Learning Outcomes Assessment:
   Asking to solve exercise/tutorial problems on each topic for applications by asking sequential questions.
   Asking the students to explain the steps adopted in the problem and ensures that they understand the problem.
   Asking the students to suggest a solution before giving them the correct answer.

9. Required and Recommended Texts or Study Guides:
   Larry Mays, Water Resources Engineering, John Wiley Publishing Company, Current Edition.
   Open Channel Hydraulics by Ven Te Chow, Published by McGraw-Hill, Inc., U.S.A., 1959.

10. Subsequent Courses:
    Structural design

11. Additional Course Descriptors, if any:

The Calendar of Assignments, Assessment Project, a Statement Concerning the "Americans with Disabilities Act" (ADA) Accommodations for Students, Attendance and Grading Policies are to be included in the course syllabus.

Approved _____ Disapproved _____

Senior Vice President, Academic & Student Affairs

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NEW COURSE OUTLINE FORM

College: SCHOOL OF ENGINEERING

Course Number: CEE302L

Course Title: Engineering Hydraulics Laboratory CE

Credit Hours: 1

Date of Final Approval: _____

Semester Offered: Fall 2019 / Spring 2020 CE

Course counts as:
_____ general education requirement
__X__ part of Civil Engineering major program
_____ elective

1. Catalog Description:
This course involves conducting a number of lab experiments to support and verify the principles taught in Fluid Mechanics and Hydraulics courses. Prerequisite: Concurrent Enrollment ES302.

2. Course Content:
Laboratory testing of energy losses in pipes, energy losses in bends, Laminar flow visualization, and Centrifugal pumps characteristics.

3. Rationale for the Course:
The main objective of this course is to understand the theories and applications of Fluid & Hydraulics as it applies to pipes, pumps, water distribution networks and open channels. The lab session is designed to give the students hands-on experience with the equipment, methods, and procedures to be followed in Hydraulic engineering lab.

4. Skills and Background Required or Expected:
The student should have already taken course of Mechanics of Fluids and concurrent enrollment in ES302. They will solve a range of hydraulic problems, from sizing pipes, selecting pumps, measuring flow in the field, and calculating open channel hydraulic profiles b) Think more intuitively (through laboratory experience) about hydraulic phenomena Students must have knowledge of University Physics and Calculus to take this course.

5. Teaching Methodologies and Anticipated class size:
This course consisting of 3 hours per week of laboratory session where the instructor presents the concepts and basic required to conduct the experiments and how to analyze and interpret the data obtained from the test. Encourage students for submitting their assignment. The anticipated class size is 7 to 15 students.

6. Learning Objectives for Students:

Understand and follow procedures, through practical handouts. Work in teams, as• practicals are conducted in groups. Prepare a technical report,• as the findings of practicals have to be reported in well structured format. Critically evaluate their• results, by bench marking them with related published information. Appreciate how the• theoretical concepts are applied in practice. Understand how results of• a practical are influenced by the status of the apparatus. CONSULTANCY SERVICES

- Identify the various types of surveys in common use and explain purpose of each and Know how to setup a tripod over a monument (ABET a).
- Know how to measure distances using a steel tape/chain, pacing, total station and GPS (ABET a)
- Know how to measure/derive elevations/heights using an automatic level, total station and GPS. Perform level loop/circuit analysis (ABET a & k).
- Know how to measure horizontal and vertical angles using a total station (ABET a).
- Perform closure adjustments to closed traverses using the Compass (Bowditch) Rule/Method.
- Create CAD drawings using field measurement data showing angles (ABET g & k), bearings and distances, area, existing and proposed TIN surface, and coordinates. Also create topographic maps showing elevation contours (ABET j & k).
- Earthwork calculations, determine the volume between the existing and proposed surface (ABET a, b & c).
- Learn ethical responsibilities involved in modern practice (ABET f).

7. Methods of Evaluation

Questions in HomeWorks, Midterm and Final exams which will force the student to think and apply concepts and principles learnt. Emphasis is on understanding concepts and illustrating applications to problems.

8. Methods for Student Learning Outcomes Assessment:

Asking to solve exercise/tutorial problems on each topic for applications by asking sequential questions. Asking the students to explain the steps adopted in the problem and ensures that they understand the problem. Asking the students to suggest a solution before giving them the correct answer.

9. Required and Recommended Texts or Study Guides:

(1) Schaum's Outline of Fluid Mechanics and Hydraulics (3rd Edition) by R.V. Giles, J.B. Evett, and C.Liu (1994). McGraw-Hill, New York.

(2) Laboratory Work in Hydraulic Engineering, by G.L. Asawa (2006). New Age International Publishers, New Delhi.

(3) Practical Hydraulics, A.L. Simon (1976). John Wiley & Sons, New York. d. Open Channel Flow, by F.M. Henderson, (1966). MacMillan, New York. e. Open-Channel Flow, by Subhash C. Jain, (2001), John Wiley & Sons, New York.

10. Subsequent Courses:

11. Additional Course Descriptors, if any:

(✓) Approved ( ) Disapproved

DEC 18 2018

Senior Vice President Academic and Student Affairs — Date

The Calendar of Assignments, Assessment Project, a Statement Concerning the "Americans with Disabilities Act" (ADA) Accommodations for Students, Attendance and Grading Policies are to be included in the course syllabus.

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NEW COURSE OUTLINE FORM

College: **School of Engineering** Course Number: **CEE 304/L**

Course Title: **Civil Engineering Materials** Credit Hours: 4

Date of Final Approval: _____ Semester Offered: **Fall Semester** 2019 or

Course counts as:

_____	general education requirement
____X____	part of **BS in Civil Engineering** major program
_____	elective

1. Catalog Description:
   A study of the principal materials used for engineering purposes with special attention to mechanical properties and their importance to the engineer. Hands-on experience in testing of civil engineering materials.

2. Course Content:
   Topics include introduction to mechanical behavior of materials, characteristics of metals, characteristics of wood, evaluation of aggregates, design of Portland cement concrete and asphalt concrete, and hands-on experience in testing of civil engineering materials.

3. Rationale for the Course:
   Civil engineering personnel work with a range of materials. Some of these materials occur naturally, such as timber, soil and water, and may be used in their natural state. Others occur naturally but must be physically altered by man to produce useful commodities, and examples of these are rubber, aggregate and bitumen. Still others, such as cement and fiber composite material, are produced by chemical and industrial processes and are such that their parent constituents are unrecognizable. It is necessary for the civil engineer to have a detailed understanding of the range of materials available, how materials may be characterized in a way that provides quantifiable material properties that are used in engineering design and construction, how materials are tested to establish their characteristics, and the limitations of these tests. It is also necessary for the civil engineer to be able to present test data in a way that is understood by other professionals, and to be able to interpret test data. In this course, students gain hands-on experience with traditional, as well as advanced, construction materials used by modern civil engineers

4. Skills and Background Required or Expected:
   Students must have knowledge on Mechanics of Materials.

5. Teaching Methodologies and Anticipated class size:

This course is laboratory oriented. A significant portion of the learning is expected to occur in the laboratory and during lab reports with lectures complementing some theoretical aspects. The course consists of 2 hours and 3 hours of lab per week to complete the assignments. In the traditional lectures in the classroom, the teacher presents the concepts and basics of the course. Visual worksheets designed to enhance qualitative understanding in addition to quantitative understanding are utilized for lectures and homework. Educational structural analysis software will be actively utilized to compare the solutions by hand calculations to the computer analysis results. The anticipated class size is 10 to 20.

6. Learning Objectives for Students:

When you complete this class you should be able to:

SLO 1: Understand the mechanical, physical, chemical and electrochemical properties of civil engineering materials, including: concrete, masonry, metal and alloys, timber, polymeric materials, plastics, fiber-reinforced composites, and asphalt.

SLO 2: Recommend materials to use in civil engineering projects based on the mechanical and physical characteristics.

SLO 3: Understand the standard tests and/or interpret test results related to aggregates, Portland cement concrete and bituminous mixes.

SLO 4: Explain the fundamental (engineering related) issues surrounding the use of the civil engineering materials.

SLO 5: Identify the causes of failure of the civil engineering materials like concrete, steel, timber, and bituminous mixes.

SLO 6: Communicate their learned knowledge of these materials.

7. Methods of Evaluation

Minor and major reports, Midterm and Final exams which will force the student to think and apply concepts and principles learnt. Emphasis is on understanding concepts and illustrating applications to problems. The students work in a small group to apply the knowledge gained to term projects.

8. Methods for Student Learning Outcomes Assessment:

Asking to solve exercise/tutorial problems on each topic for applications by asking sequential questions.
Asking the students to explain the steps adopted in the problem and ensures that they understand the problem.
Asking the students to suggest a solution before giving them the correct answer.

9. Required and Recommended Texts or Study Guides:

Materials for Civil and Construction Engineers, 4th edition, Mamlouk and Zaniewski, Prentice Hall. ISBN: 0134320530.

10. Subsequent Courses:

CEE 404 Civil Engineering Project

11. Additional Course Descriptors, if any:

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✓ Approved _____ Disapproved

Senior Vice President, Academic & Student Affairs

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NEW COURSE OUTLINE FORM

College: School of Engineering Course Number: CEE 306

Course Title: **Reinforced Concrete Structures Design** Credit Hours: 3

Date of Final Approval: _____ Semester Offered: ~~Spring Semester~~ 2020 or

Course counts as:
_____ general education requirement
__X__ part of **BS in Civil Engineering** major program
_____ elective

1. Catalog Description:
Flexural analysis and design of reinforced concrete beams including singly and doubly reinforced rectangular beams and T-beams, shear and diagonal tension, serviceability, bond, anchorage and development length, short and slender columns, slabs, footings, and retaining walls, including computer applications.

2. Course Content:
Topics include strength and serviceability requirements, design of one way slabs, rectangular beams, flanged sections and columns, for strength, shear, bond, bearing, and serviceability. Building codes, American Concrete Institute (ACI) specifications, material specifications, test methods, and recommended practice documents are involved.

3. Rationale for the Course:
Most of the civil Engineering structures are normally made up of either Steel Sections or of Reinforced Cement Concrete. In this course, Reinforced Concrete Structures Design is taught and in the subsequent semester, Design of Steel Structure will be covered. Most of the residential buildings, Commercial and Public Buildings are designed using R. C. due to their long durability and flexibility in size and shape of structures and its members. So, Design of R.C. components like slab, beam, column and footing using Limit State Method is required to be understood. Hence this course will provide a detailed knowledge of reinforcement as per American Concrete Institute (ACI-318) code.

4. Skills and Background Required or Expected:
Students must have knowledge on Mechanics of Materials and Structural Analysis to take this course.

5. Teaching Methodologies and Anticipated class size:
The course consists of 3 hours a week of traditional lectures in the classroom where the teacher presents the concepts and basics of the course. Visual worksheets designed to enhance qualitative understanding in

addition to quantitative understanding are utilized for lectures and homework. Educational structural analysis software will be actively utilized to compare the solutions by hand calculations to the computer analysis results. The anticipated class size is 10 to 20.

6. Learning Objectives for Students:

When you complete this class you should be able to:

SLO 1: Understand basic material properties of reinforced concrete and the behavior of reinforced concrete members.

SLO 2: Identify and calculate the design loads and distribution.

SLO 3: Understand the ultimate strength method used in reinforced concrete design.

SLO 4: Analyze and design typical reinforced concrete beams, columns, and footings using the American Concrete Institute 318 Building Code.

SLO 5: Apply relevant ACI Code provisions to ensure safety and serviceability of structural elements. and

SLO 6: Develop an appreciation of issues involved in reinforced concrete construction.

7. Methods of Evaluation

Questions in Quiz, Midterm and Final exams which will force the student to think and apply concepts and principles learnt.

Emphasis is on understanding concepts and illustrating applications to problems.

The students work in a small group to apply the knowledge gained to term projects.

8. Methods for Student Learning Outcomes Assessment:

Asking to solve exercise/tutorial problems on each topic for applications by asking sequential questions.

Asking the students to explain the steps adopted in the problem and ensures that they understand the problem.

Asking the students to suggest a solution before giving them the correct answer.

9. Required and Recommended Texts or Study Guides:

Design of Reinforced Concrete" 10th Ed. by McCormac, (2015), Wiley (ISBN: 1118879104)

ACI 318-08 "Building Code Requirements for Structural Concrete"

10. Subsequent Courses:

CEE 404 Civil Engineering Project

11. Additional Course Descriptors, if any:

The Calendar of Assignments, Assessment Project, a Statement Concerning the "Americans with Disabilities Act" (ADA) Accommodations for Students, Attendance and Grading Policies are to be included in the course syllabus.

✓ Approved _____ Disapproved

Senior Vice President, Academic & Student Affairs

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NEW COURSE OUTLINE FORM

College: SCHOOL OF ENGINEERING Course Number: CEE307

Course Title: INTRODUCTION TO ENVIRONMENTAL ENGINEERING Credit Hours: 3

Date of Final Approval: _____ Semester Offered: SPRING 2019

Course counts as:
_____ general education requirement
__X__ part of BS in Civil Engineering major program
_____ elective

1. Catalog Description:
This course lays a foundation for further coursework in the environmental and civil-sanitary engineering disciplines. Information about the nature and scope of environmental problems will be presented along with an overview of current engineering practices involved in their correction. Methodologies for solving these problems will be introduced along with the underlying principles of environment chemistry and microbiology that they employ. Topics of study will include water and wastewater treatment, air pollution control, solid-waste management, and *in situ* environmental remediation.

2. Course Content:
< As Catalog Description, above. >

3. Rationale for the Course:
This is a required course for all students in the Civil and Environmental Engineering Program and will serve as a prerequisite for all further technical electives in the environmental engineering and civil-sanitary engineering disciplines.

4. Skills and Background Required or Expected:
Students must have knowledge of college level chemistry and math to take this course. CH103 (General Chemistry) and MA203 (Calculus I) are prerequisites.

5. Teaching Methodologies and Anticipated class size:
The course consists of 3 hours of lecture per week in the classroom where the teacher presents the concepts and basics of the course. The anticipated class size is 7 to 15 students.

6. Learning Outcomes for Students: **Students who successfully complete this course will demonstrate the ability to:**

1. **understand and discuss environmental issues in our global society intelligibly**
2. **describe various sources and impacts of pollutants in the environment**
3. **explain various solutions and methodologies for abating air and water pollution**
4. **determine and explain simple stoichiometric reactions and chemical mass balances**
5. **understand and explain basic principles of chemical and biological treatment processes**
6. **understand and communicate the importance of professional responsibilities.**

See Course Syllabus for mapping of outcomes (to PLOs and ILOs).

7. Methods of Evaluation

Quizzes, homework assignments, midterm and final exams which will force the student to think and apply concepts and principles learnt. Emphasis is on understanding concepts and illustrating applications to problems.

8. Methods for Student Learning Outcomes Assessment:

Asking students to solve problems on topics for applications.
Asking the students to explain their work to ensure they understand the problem.
Asking the students to suggest a solution before giving them the correct answer.

9. Required and Recommended Texts or Study Guides:

Basic Environmental Technology: Water Supply, Waste Management and Pollution Control (6th Edition), 2014, Nathanson and Schneider.

Additional Key References:

TBD

10. Subsequent Courses:

Technical electives to be developed in fields of Environmental and Sanitary Engineering.

11. Additional Course Descriptors, if any:

The Calendar of Assignments, Assessment Project, a Statement Concerning the "Americans with Disabilities Act" (ADA) Accommodations for Students, Attendance and Grading Policies are to be included in the course syllabus.

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Senior Vice President, Academic & Student Affairs

DEC 18 2018

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NEW COURSE OUTLINE FORM

College: **SCHOOL OF ENGINEERING** Course Number: **CEE308**

Course Title: **INTRODUCTION TO SURVEYING** Credit Hours: **2**

Date of Final Approval: _____ Semester Offered: **SPRING 2019**

Course counts as:
_____ general education requirement
X part of **BS in Civil Engineering** major program
_____ elective

1. Catalog Description:
This is an introductory course to surveying techniques and includes theory as well as lab sessions. Principles of plane surveying. Measurement of horizontal distance, difference in elevation, and angles. Traverse surveys and computations. Horizontal and vertical curves. Principles of stadia. Topographic surveys. Cross-sectioning & Earthwork. Prerequisite: PH251, MA203, EN111.

2. Course Content:

General surveying principles and theories/fundamentals of physical measurements of spatial quantities, the use of surveying instruments: tape measurements, leveling, electronic distance measurement, total stations, traverse surveys, satellite positioning, introduction to geomatics, horizontal control surveys; construction applications: grade, highway curves, street construction surveys.

3. Rationale for the Course:
Surveying is required in almost every type of construction including roads, railways, buildings etc. to ensure that each element of construction is on the right alignment. Its application avoids dispute/conflict in property lines, avoids misaligned column, and makes sure that elevations are accurate. Surveying knowledge helps construction engineers in setting out the plan on the earth surface. Thus, we need surveying knowledge and every architect and engineer should know how to use the surveying equipment. Surveying is a preliminary activity that is necessary before commencement of construction. Survey reports also aids in preparing preliminary estimate required for preparing budgets.

4. Skills and Background Required or Expected:
Students must have knowledge of University Physics and Calculus to take this course.

5. Teaching Methodologies and Anticipated class size:

The course consists of 2 classes (each 2 hours) per week. Some of these classes will be approximately 1-hour theory class where the teacher presents the concepts and basics of the course followed by approximately 1 hour of lab session where students will get hands-on experience on surveying equipment. The anticipated class size is 10 to 20.

6. Learning Objectives for Students:

- Identify the various types of surveys in common use and explain purpose of each and Know how to setup a tripod over a monument (ABET a).
- Know how to measure distances using a steel tape/chain, pacing, total station and GPS (ABET a)
- Know how to measure/derive elevations/heights using an automatic level, total station and GPS. Perform level loop/circuit analysis (ABET a & k).
- Know how to measure horizontal and vertical angles using a total station (ABET a).
- Perform closure adjustments to closed traverses using the Compass (Bowditch) Rule/Method.
- Create CAD drawings using field measurement data showing angles (ABET g & k), bearings and distances, area, existing and proposed TIN surface, and coordinates. Also create topographic maps showing elevation contours (ABET j & k).
- Earthwork calculations, determine the volume between the existing and proposed surface (ABET a, b & c).
- Learn ethical responsibilities involved in modern practice (ABET f).

7. Methods of Evaluation

Questions in HomeWorks, Midterm and Final exams which will force the student to think and apply concepts and principles learnt. Emphasis is on understanding concepts and illustrating applications to problems.

8. Methods for Student Learning Outcomes Assessment:

Asking to solve exercise/tutorial problems on each topic for applications by asking sequential questions. Asking the students to explain the steps adopted in the problem and ensures that they understand the problem. Asking the students to suggest a solution before giving them the correct answer.

9. Required and Recommended Texts or Study Guides:

Ghilani, C. D. and P. R. Wolf. Elementary surveying – An introduction to geomatics. 14th ed. Upper Saddle River: Pearson Education, 2014. ISBN-13: 978-0-13-375888-7

10. Subsequent Courses: Third year civil engineering courses such as below:

Geotechnical Engineering
Structural Analyses

11. Additional Course Descriptors, if any:

The Calendar of Assignments, Assessment Project, a Statement Concerning the "Americans with Disabilities Act" (ADA) Accommodations for Students, Attendance and Grading Policies are to be included in the course syllabus.

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NEW COURSE OUTLINE FORM

College: School of Engineering — Course Number: CEE 401

Course Title: **Steel Structures Design** Credit Hours: **3**

Date of Final Approval: _____ Semester Offered: ~~Spring Semester~~ Fall 2020

Course counts as:
_____ general education requirement
__X__ part of **BS in Civil Engineering** major program
_____ elective

1. Catalog Description:
Introduction to the design of structural elements found in steel buildings with emphasis on theories necessary for a thorough understanding of the design procedure. In particular, steel tension members, beams, columns, beam columns, and connections are considered. Emphasizes the AISC-LRFD Specifications for steel design, though reference is made to the ASD specification with comparisons made where appropriate.

2. Course Content:
Topics include tension members, compression members, flexural members and simple connections. Building codes, American Institute of Steel Construction (AISC) specs, material specs, test methods, and recommended practice documents.

3. Rationale for the Course:
Most of the civil Engineering structures are normally made up of either Steel Sections or of Reinforced Cement Concrete. In the sixth semester, Reinforced Concrete Structures Design was taught and, in this semester,, Design of Steel Structure is covered. Many of the Commercial and Public Buildings are designed using Steel due to their short construction time and flexibility in size and shape of structures and its members. So, Design of Steel components like beam, column and braces using Load Resistance Factors Design (LRFD) is required to be understood. Hence this course will provide a detailed knowledge of design of steel structures as per American Institute of Steel Construction (AISC) Design Specifications.

4. Skills and Background Required or Expected:
Students must have knowledge on Mechanics of Materials and Structural Analysis to take this course.

5. Teaching Methodologies and Anticipated class size:
The course consists of 3 hours a week of traditional lectures in the classroom where the teacher presents the concepts and basics of the course. Visual worksheets designed to enhance qualitative understanding in

addition to quantitative understanding are utilized for lectures and homework. Educational structural analysis software will be actively utilized to compare the solutions by hand calculations to the computer analysis results. The anticipated class size is 10 to 20.

6. Learning Objectives for Students:

When you complete this class you should be able to:

SLO 1: Understand basic material properties of reinforced concrete and the behavior of reinforced concrete members.

SLO 2: Identify and calculate the design loads and distribution.

SLO 3: Understand the ultimate strength method used in reinforced concrete design.

SLO 4: Analyze and design typical reinforced concrete beams, columns, and footings using the American Concrete Institute 318 Building Code.

SLO 5: Apply relevant ACI Code provisions to ensure safety and serviceability of structural elements. and

SLO 6: Develop an appreciation of issues involved in reinforced concrete construction.

7. Methods of Evaluation

Questions in Quiz, Midterm and Final exams which will force the student to think and apply concepts and principles learnt.

Emphasis is on understanding concepts and illustrating applications to problems.

The students work in a small group to apply the knowledge gained to term projects.

8. Methods for Student Learning Outcomes Assessment:

Asking to solve exercise/tutorial problems on each topic for applications by asking sequential questions.

Asking the students to explain the steps adopted in the problem and ensures that they understand the problem.

Asking the students to suggest a solution before giving them the correct answer.

9. Required and Recommended Texts or Study Guides:

W.T. Segui, "Steel Design", Cengage Learning, 6th Edition (ISBN-10: 1337094749)

10. Subsequent Courses:

CEE 404 Civil Engineering Project

11. Additional Course Descriptors, if any:

The Calendar of Assignments, Assessment Project, a Statement Concerning the "Americans with Disabilities Act" (ADA) Accommodations for Students, Attendance and Grading Policies are to be included in the course syllabus.

____Approved _____Disapproved

Senior Vice President, Academic & Student Affairs

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NEW COURSE OUTLINE FORM

College: SCHOOL OF ENGINEERING Course Number: CEE 402

Course Title: FOUNDATION ENGINEERING Credit Hours: 3

Date of Final Approval: _____ Semester Offered: FALL 2019

Course counts as:
_____ general education requirement
__X__ part of **BS in Civil Engineering** major program
_____ elective

1. Catalog Description:
   Effect of geotechnical conditions on the behavior, proportioning, and choice of foundation type; bearing capacity theories, consolidation, shrink-swell, and settlement, shallow and deep foundations, subsurface exploration methods, study of foundation case histories. Prerequisite: CEE303.

2. Course Content:
   Application of soil mechanics to analysis of structural foundations. Site and soil exploration; bearing capacity and settlements of shallow and deep foundations; Case studies.

3. Rationale for the Course:
   Almost all civil engineering structures rest on soil/rock and as such it is important to understand the bearing capacity of foundation soil and the settlement that will be experienced by the foundation structure. This course uses the basic principles of soil mechanics to design various foundation systems. In addition, the numerical analyses of design are applied to most of the practical situations encountered in real practice.

4. Skills and Background Required or Expected:
   Students must have completed Geotechnical engineering (CEE303) course to take this course.

5. Teaching Methodologies and Anticipated class size:
   The course consists of 3 hours a week of traditional lectures in the classroom where the teacher presents the concepts and basics of the course. The anticipated class size is 10 to 20.

6. Learning Objectives for Students:
   - To apply the principles of statics and mechanics to form the necessary tools to solve geotechnical engineering problems concerning foundation design (ABET a).
   - Assess and select appropriate foundation design parameters;
   - Appraise foundation design concepts in the choice of appropriate foundation (ABET c).

- To learn about types and purposes of different foundation systems and structures (ABET d).
- To provide students with exposure to the systematic methods for designing foundations (ABET e).
- To discuss and evaluate the feasibility of foundation solutions to different types of soil conditions considering the time effect on soil behavior (ABET d & e).
- To build the necessary theoretical background for design and construction of foundation systems (ABET I & j).

7. Methods of Evaluation

The problem-solving assignments are used to assess students' ability to solve geotechnical and foundation engineering problems with good numerical accuracy based on the theories and concepts studied in lectures. The mid-term test and the final examination are used to assess students' understanding of the geotechnical and foundation engineering theories and concepts learned in the lectures and ability to solve geotechnical and foundation engineering problems with good numerical accuracy. Questions in Quiz, Midterm and Final exams which will force the student to think and apply concepts and principles learnt. Emphasis is on understanding concepts and illustrating applications to problems. The students work in a small group to apply the knowledge gained to term projects/assignments.

8. Methods for Student Learning Outcomes Assessment:

Asking to solve exercise/tutorial problems on each topic for applications by asking sequential questions.
Asking the students to explain the steps adopted in the problem and ensures that they understand the problem.
Asking the students to suggest a solution before giving them the correct answer.

9. Required and Recommended Texts or Study Guides:

Das, B. M. (2014). Principles of Foundation Engineering, 8th Edition, CENGAGE Learning
Lecture Handouts and Papers, Power Point Presentations

Additional References:

Coduto, D. P. (2001). Foundation Design-Principles and Practices, 2nd Edition, Prentice Hall
Bowles, J. E. (1996). Foundation Analysis and Design, 5th Edition, McGraw Hill
Holtz, R. D., Kovacs, W. D. and Sheahan, T. C. (2011). An Introduction to Geotechnical Engineering, 2nd Edition, Pearson
Paulos, H. G. and Davis, E. H. (1980). Pile Foundation Analysis and Design, John Wiley and Sons

10. Subsequent Courses:

Senior Year Capstone Project

11. Additional Course Descriptors, if any:

The Calendar of Assignments, Assessment Project, a Statement Concerning the "Americans with Disabilities Act" (ADA) Accommodations for Students, Attendance and Grading Policies are to be included in the course syllabus.

✓ Approved _____ Disapproved

Senior Vice President, Academic & Student Affairs

DEC 18 2018

Date

UNIVERSITY
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Office of Academic and Student

NEW COURSE OUTLINE FORM

College: School of Engineering Course Number: CEE 404

Course Title: **Civil Engineering Design 1** Credit Hours: 2

Date of Final Approval: _____ Semester Offered: **Fall ~~& Spring~~** 2021 CE

Course counts as:
_____ general education requirement
__X__ part of **BS in Civil Engineering** major program
_____ elective

1. Catalog Description:

This course is a one-year independent study under the supervision of a faculty member, which includes analytical, experimental, computational, or case-study type work. A final report must be submitted near the end of the second semester accompanied with an A3 size poster. The project will be assessed through both report writing and oral presentation. The mark will be given as a single unit for both the courses "CEE 404 Civil Engineering Project 1" and "CEE 404 Civil Engineering Project 2", with a total of 4 credits.

2. Course Content:

Project topics will usually be offered in the following areas depending on the availability of resource:

- Structural engineering
- Geotechnical engineering
- Hydraulics and environmental engineering
- Transportation and construction management

Student should choose the direction of his/her final year project in one of the areas or any other direction related to the civil engineering.

3. Rationale for the Course:

The Accreditation Board of Engineering and Technology (ABET) of the Civil Engineering program requires that accredited programs implement a capstone course that is taken by all seniors majoring in the program. The preparation of an individual project enables students to use a range of skills that have been developed throughout their program: for example, the skills of enterprise, initiative, design and analysis required for thorough investigation and research into a particular civil engineering topic; the motivation and time management skills necessary to produce a substantive and organized piece of reported work and the ability to synthesize and integrate complex information.

4. Skills and Background Required or Expected:

In order to take this course, students must complete all 300-level engineering courses for the civil engineering major all with a grade of "C" or better and obtain consent of department undergraduate advisor..

5. Teaching Methodologies and Anticipated class size:

The capstone course is taught by a full-time faculty member who is a licensed Professional Engineer. The current instructor have seven years of design experience before beginning his career in academia, so he is able to share lessons from his firsthand practical experience and emphasize the importance of non-technical, professional issues. Students also receive help from other faculty .members whenever needed; 4 out of 4 of our civil engineering faculty are licensed Professional Engineers. Projects are sponsored or "donated" by professionals, or the faculty member creates the project based on a need in the community. Project scopes are tailored toward the students' area interests, and are multi-disciplinary in nature. The number of student design teams in one course ranges from six to twelve, with an average of four students per team.

6. Learning Objectives for Students:

When you complete this class you should be able to:

SLO 1: Understand the mechanical, physical, chemical and electrochemical properties of civil engineering materials, including: concrete, masonry, metal and alloys, timber, polymeric materials, plastics, fiber-reinforced composites, and asphalt.

SLO 2: Recommend materials to use in civil engineering projects based on the mechanical and physical characteristics.

SLO 3: Understand the standard tests and/or interpret test results related to aggregates, Portland cement concrete and bituminous mixes.

SLO 4: Explain the fundamental (engineering related) issues surrounding the use of the civil engineering materials.

SLO 5: Identify the causes of failure of the civil engineering materials like concrete, steel, timber, and bituminous mixes.

SLO 6: Communicate their learned knowledge of these materials.

7. Methods of Evaluation

The progress report, the final report and oral presentation will be assessed individually and will contribute towards the final mark. The assessment scheme is shown in the attached course syllabus:

8. Methods for Student Learning Outcomes Assessment:

Asking to solve exercise/tutorial problems on each topic for applications by asking sequential questions.
Asking the students to explain the steps adopted in the problem and ensures that they understand the problem.
Asking the students to suggest a solution before giving them the correct answer.

9. Required and Recommended Texts or Study Guides:

Materials for Civil and Construction Engineers, 4th edition, Mamlouk and Zaniewski, Prentice Hall. ISBN: 0134320530.

10. Subsequent Courses:

None.

11. Additional Course Descriptors, if any:

The Calendar of Assignments, Assessment Project, a Statement Concerning the "Americans with Disabilities Act" (ADA) Accommodations for Students, Attendance and Grading Policies are to be included in the course syllabus.

✓ Approved ____ Disapproved	Senior Vice President, Academic & Student Affairs	DEC 18 2018 Date

UNIVERSITY
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Office of Academic and Student

NEW COURSE OUTLINE FORM

College: **School of Engineering** Course Number: **CEE 405**

Course Title: **Civil Engineering Design 2** Credit Hours: **2**

Date of Final Approval: _____ Semester Offered: **Spring ~~& Fall~~** 2022 or

Course counts as:

_____	general education requirement
_____X_____	part of **BS in Civil Engineering** major program
_____	elective

1. Catalog Description:

This course is a one-year independent study under the supervision of a faculty member, which includes analytical, experimental, computational, or case-study type work. A final report must be submitted near the end of the second semester accompanied with an A3 size poster. The project will be assessed through both report writing and oral presentation. The mark will be given as a single unit for both the courses "CEE 404 Civil Engineering Project 1" and "CEE 404 Civil Engineering Project 2", with a total of 4 credits.

2. Course Content:

Project topics will usually be offered in the following areas depending on the availability of resource:

- Structural engineering
- Geotechnical engineering
- Hydraulics and environmental engineering
- Transportation and construction management

Student should choose the direction of his/her final year project in one of the areas or any other direction related to the civil engineering.

3. Rationale for the Course:

The Accreditation Board of Engineering and Technology (ABET) of the Civil Engineering program requires that accredited programs implement a capstone course that is taken by all seniors majoring in the program. The preparation of an individual project enables students to use a range of skills that have been developed throughout their program: for example, the skills of enterprise, initiative, design and analysis required for thorough investigation and research into a particular civil engineering topic; the motivation and time management skills necessary to produce a substantive and organized piece of reported work and the ability to synthesize and integrate complex information.

4. Skills and Background Required or Expected:

In order to take this course, students must complete all 300-level engineering courses for the civil engineering major all with a grade of "C" or better and obtain consent of department undergraduate advisor..

5. Teaching Methodologies and Anticipated class size:

The capstone course is taught by a full-time faculty member who is a licensed Professional Engineer. The current instructor have seven years of design experience before beginning his career in academia, so he is able to share lessons from his firsthand practical experience and emphasize the importance of non-technical, professional issues. Students also receive help from other faculty .members whenever needed; 4 out of 4 of our civil engineering faculty are licensed Professional Engineers. Projects are sponsored or "donated" by professionals, or the faculty member creates the project based on a need in the community. Project scopes are tailored toward the students' area interests, and are multi-disciplinary in nature. The number of student design teams in one course ranges from six to twelve, with an average of four students per team.

6. Learning Objectives for Students:

When you complete this class you should be able to:

SLO 1: Understand the mechanical, physical, chemical and electrochemical properties of civil engineering materials, including: concrete, masonry, metal and alloys, timber, polymeric materials, plastics, fiber-reinforced composites, and asphalt.

SLO 2: Recommend materials to use in civil engineering projects based on the mechanical and physical characteristics.

SLO 3: Understand the standard tests and/or interpret test results related to aggregates, Portland cement concrete and bituminous mixes.

SLO 4: Explain the fundamental (engineering related) issues surrounding the use of the civil engineering materials.

SLO 5: Identify the causes of failure of the civil engineering materials like concrete, steel, timber, and bituminous mixes.

SLO 6: Communicate their learned knowledge of these materials.

7. Methods of Evaluation

The progress report, the final report and oral presentation will be assessed individually and will contribute towards the final mark. The assessment scheme is shown in the attached course syllabus:

8. Methods for Student Learning Outcomes Assessment:

Asking to solve exercise/tutorial problems on each topic for applications by asking sequential questions.
Asking the students to explain the steps adopted in the problem and ensures that they understand the problem.
Asking the students to suggest a solution before giving them the correct answer.

9. Required and Recommended Texts or Study Guides:

Materials for Civil and Construction Engineers, 4th edition, Mamlouk and Zaniewski, Prentice Hall. ISBN: 0134320530.

10. Subsequent Courses:

None.

11. Additional Course Descriptors, if any:

The Calendar of Assignments, Assessment Project, a Statement Concerning the "Americans with Disabilities Act" (ADA) Accommodations for Students, Attendance and Grading Policies are to be included in the course syllabus.

✓ Approved ____ Disapproved	Senior Vice President, Academic & Student Affairs	DEC 18 2018 Date

UNIVERSITY
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Office of Academic and Student Affairs

NEW COURSE OUTLINE FORM

College: SCHOOL OF ENGINEERING Course Number: CEE 406

Course Title: FUNDAMENTALS OF TRANSPORTATION ENGINEERING Credit Hours: 3

Date of Final Approval: _____ Semester Offered: FALL/SPRING 2018 &

Course counts as:
_____ general education requirement
__X__ part of Civil Engineering major program
_____ elective

1. Catalog Description:
History of transportation modes, multi-modal transportation systems, new transport technologies, traffic operations and control, economic evaluation of transport alternatives, introduction to transportation planning, design, and operation of transportation systems with an emphasis on highway design, horizontal and vertical alignment, cross-sections, earthwork, drainage, pavement materials for highways, pavement foundation design, and traffic surveys.

2. Course Content:
Course topics include fundamentals and principles of transportation engineering, multimodal transportation, theory on various elements of the transport system, highway design, analyses of pavement loadings, pavement foundation design, pavement materials, economic analyses related with highways.

3. Rationale for the Course:
Everything that we wear, eat, or use must be transported from one place to other. As such world would come to standstill if there was no appropriate means of transportation available. We need transportation engineers to plan and design different modes of transportation via air, land and sea such that trade can be done economically. Thus, it is obvious that world needs skilled transportation engineers to plan, design, construct and operate different modes of transportation. This course provides a basic introduction to fundamentals and principles of transportation engineering with emphasis on highways for students in the Bachelor of Civil and Environmental Engineering programs. This course will also serve as a solid foundation for students interested in studying higher level courses in transportation engineering.

4. Skills and Background Required or Expected:
Students must have knowledge about different construction materials such as soil, concrete and steel that may be used in pavement design. The student should also have some knowledge of engineering analyses. Students are expected to have taken CEE 301, CEE303 and must have at least concurrent enrollment in CE 306 to satisfy this pre-requisite requirement.

5. Teaching Methodologies and Anticipated class size:

The course consists of 3 hours per week of traditional lectures in the classroom where the teacher presents the concepts and basics of the course. The anticipated class size is 10 to 20.

6. Learning Objectives for Students:

- To develop an appreciation of the role of engineers in planning, designing and managing the transport system and infrastructure;
- Learn the various aspects of the transport system such as planning and design;
- Describe the basic components of transport system and infrastructure, their role, importance and characteristics.
- Design and conduct traffic surveys to collect traffic data;
- Apply engineering principles to identify and investigate traffic problems and to devise and evaluate sustainable solutions;
- Design transport system components, in particular geometric design of roads and intersections;
- Appreciate the role of pavement materials and testing methods in highway design.

7. Methods of Evaluation

Questions in Quiz, Midterm and Final exams which will force the student to think and apply concepts and principles learnt. Emphasis is on understanding concepts and illustrating applications to problems.

8. Methods for Student Learning Outcomes Assessment:

Asking to solve exercise/tutorial problems on each topic for applications by asking sequential questions.
Asking the students to explain the steps adopted in the problem and ensures that they understand the problem.
Asking the students to suggest a solution before giving them the correct answer.

9. Required and Recommended Texts or Study Guides:

Garber, N.J. and L.A. Hoel, Traffic and Highway Engineering, 5thEdition, Cengage Learning, 2014.
Pavement analysis and Design by Yang H. Huang, Second Edition, Pearson Prentice Hall, 2004.

10. Subsequent Courses:

Civil Engineering Design I & II

11. Additional Course Descriptors, if any:

The Calendar of Assignments, Assessment Project, a Statement Concerning the "Americans with Disabilities Act" (ADA) Accommodations for Students, Attendance and Grading Policies are to be included in the course syllabus.

____Approved _____Disapproved

Senior Vice President, Academic & Student Affairs

DEC 18 2018

Date

Appendix 6
Approved Courses

Bachelor of Science in Civil Engineering

School of Engineering

Department of Civil & Environmental Engineering

UNIVERSITY OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR COURSE REVISION

1. Type of Change:

   A. [ ] GRADUATE
   [X] UNDERGRADUATE (/G)

   B. [ ] SUBSTANTIVE
   [X] NONSUBSTANTIVE

2. Original Course Number and Title: ES 100 Engineering Orientation

3. Page in current catalog where course is listed: P. 189 (2017-18)

4. Full Description of Requested Change(s):

   A. From:
   ES100 (1)
   ENGINEERING ORIENTATION F/SP
   This course is designed to give freshmen students an insight into the nature of technology and the engineer's role in society. Members of the faculty and guest speakers present lectures dealing with the various engineering disciplines and related areas.

   B. To:
   CEE100 (1)
   ENGINEERING ORIENTATION F/ SP
   This course is designed to give freshmen students an insight into the nature of technology and the engineer's role in society. Members of the faculty and guest speakers present lectures dealing with the various engineering disciplines and related areas.

5. Effective Date (Catalog Year):

   2018-2019 Undergraduate Catalog (Year) _____ Graduate Bulletin (If /G course) (Year)

6. Reason(s) for Proposed Change(s): For the new 4 year BS in Civil Engineering program, new course numbering is required for consistency.

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2018
Division Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	

APPROVED:

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

9/28/18
DATE

Faculty Senate Office
University of Guam

um
Received By:
9/25/18 4:45pm
Date & Time

UNIVERSITY OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR COURSE REVISION

1. Type of Change:

   A. [ ] GRADUATE
   [X] UNDERGRADUATE (/G)

   B. [ ] SUBSTANTIVE
   [X] NONSUBSTANTIVE

2. Original Course Number and Title: ES 101 Engineering Graphics

3. Page in current catalog where course is listed: P. 189 (2017-18)

4. Full Description of Requested Change(s):

   A. From:
   ES101 ~~(4)~~ 3 SL
   ENGINEERING GRAPHICS F / SP
   Concepts and methods of communications by graphical means; freehand and instrument drawing, orthogonal projections, and descriptive geometry are covered in this course.

   B. To:
   CEE101 ~~(4)~~ 3 SL
   ENGINEERING GRAPHICS F / SP
   Concepts and methods of communications by graphical means; freehand and instrument drawing, orthogonal projections, and descriptive geometry are covered in this course.

5. Effective Date (Catalog Year):

   2018-2019 Undergraduate Catalog Year
   _____ Graduate Bulletin (If /G course) Year

6. Reason(s) for Proposed Change(s): For the new 4 year BS in Civil Engineering program, new course numbering is required for consistency.

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2018
Division Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	

APPROVED:

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

9/28/18
DATE

UNIVERSITY OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR COURSE REVISION

1. Type of Change:

   A. [ ] GRADUATE B. [ ] SUBSTANTIVE
   [X] UNDERGRADUATE (/G) [X] NONSUBSTANTIVE

2. Original Course Number and Title: ES 201 Engineering Statics

3. Page in current catalog where course is listed: P. 189 (2017-18)

4. Full Description of Requested Change(s):

   A. From:
   ES201 (3)
   ENGINEERING STATICS F
   This course covers vector algebra and elementary vector calculus; statics of particles and rigid bodies; statics of structures; frictional effects; centers of gravity, centroids, and moments of inertia. Prerequisites: PH251, MA203, EN111.

   B. To:
   CEE201 (3)
   ENGINEERING STATICS F/SP
   This course covers vector algebra and elementary vector calculus; statics of particles and rigid bodies; statics of structures; frictional effects; centers of gravity, centroids, and moments of inertia. Prerequisites: PH251, MA203, EN111 or concurrent enrollment (for all three).

5. Effective Date (Catalog Year):

   2018-2019 Undergraduate Catalog Year _____ Graduate Bulletin (If /G course) Year

6. Reason(s) for Proposed Change(s): To accommodate students scheduling SENG classes without having to wait for two semesters. For the new 4 year BS in Civil Engineering program, new course numbering is required for consistency.

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2018
Division Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	

APPROVED:

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

DATE 9/28/18

UNIVERSITY
OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR COURSE REVISION

1. Type of Change:

   A. [ ] GRADUATE B. [ ] SUBSTANTIVE
   [X] UNDERGRADUATE (/G) [X] NONSUBSTANTIVE

2. Original Course Number and Title: ES 202 Engineering Dynamics

3. Page in current catalog where course is listed: P. 189 (2017-18)

4. Full Description of Requested Change(s):

   A. From:
   ES202 (3)
   ENGINEERING DYNAMICS SP
   This course covers kinematics and kinetics of translation, rotation, and plane motion; work, energy, and power; impulse, momentum, and impact; kinetics of variable mass; introduction to vibration. Prerequisites: Three hours of lecture and two contact hours of problem-solving workshops are held weekly. ES201 and MA204 or concurrent enrollment.

   B. To:
   CEE202 (3)
   ENGINEERING DYNAMICS F/SP
   This course covers kinematics and kinetics of translation, rotation, and plane motion; work, energy, and power; impulse, momentum, and impact; kinetics of variable mass; introduction to vibration. Prerequisites: Three hours of lecture and two contact hours of problem-solving workshops are held weekly. CEE201 and MA204 or concurrent enrollment.

5. Effective Date (Catalog Year):

   2018-2019 Undergraduate Catalog Year _____ Graduate Bulletin (If /G course) Year

6. Reason(s) for Proposed Change(s): To accommodate students scheduling SENG classes without having to wait for two semesters. For the new 4 year BS in Civil Engineering program, new course numbering is required for consistency.

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program	[signature]	9-21-2018
Division Chair	[signature]	9-21-2018
Chair, College AAC/GC	[signature]	9-21-2018
Dean of College	[signature]	9/21/2018
UCRC/GCRC		
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	

APPROVED:

[signature]
SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

DEC 18 2018
DATE

UNIVERSITY
OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR COURSE REVISION

1. Type of Change:

   A. [ ] GRADUATE
   [X] UNDERGRADUATE (/G)

   B. [ ] SUBSTANTIVE
   [X] NONSUBSTANTIVE

2. Original Course Number and Title: ES 203 Mechanics of Materials

3. Page in current catalog where course is listed: P. 189 (2017-18)

4. Full Description of Requested Change(s):

   A. From:
   ES203 (3)
   MECHANICS OF MATERIALS SP
   This course emphasizes the fundamental concepts and application of strength of materials while developing student's analytical problem solving skills. The course covers the response of structures due to axial load, bending, shear and torsion; concept of stress and strain; and beam and column deflection. Three hours of lecture and two contact hours of problem-solving workshop are held weekly. Prerequisites: ES201.

   B. To:
   CEE203 (3)
   MECHANICS OF MATERIALS SP
   This course emphasizes the fundamental concepts and application of strength of materials while developing student's analytical problem solving skills. The course covers the response of structures due to axial load, bending, shear and torsion; concept of stress and strain; and beam and column deflection. Three hours of lecture and two contact hours of problem-solving workshop are held weekly. Prerequisites: CEE201.

5. Effective Date (Catalog Year):

   2018-2019 Undergraduate Catalog (Year) _____ Graduate Bulletin (If /G course) (Year)

6. Reason(s) for Proposed Change(s): For the new 4 year BS in Civil Engineering program, new course numbering is required for consistency.

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2018
Division Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	

APPROVED:

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

9/28/18
DATE

Faculty Senate Office
University of Guam

um
Received By:

9/25/18 4:45 pm
Date & Time

UNIVERSITY
OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR COURSE REVISION

1. Type of Change:

   A. [ ] GRADUATE
   [X] UNDERGRADUATE (/G)

   B. [ ] SUBSTANTIVE
   [X] NONSUBSTANTIVE

2. Original Course Number and Title: ES 301 Structural Analysis

3. Page in current catalog where course is listed: SVP endorsed to be listed in 2018-2019 Undergraduate Catalog

4. Full Description of Requested Change(s):

   A. From:
   ES301 (3)
   STRUCTURAL ANALYSIS F
   The course includes an introduction to structural systems and basic analysis methods for beams, frames, and trusses. Prerequisites: ES203.

   B. To:
   CEE301 (3)
   STRUCTURAL ANALYSIS F
   The course includes an introduction to structural systems and basic analysis methods for beams, frames, and trusses. Prerequisites: CEE203.

5. Effective Date (Catalog Year):

   2018-2019 Undergraduate Catalog
   Year

   _____ Graduate Bulletin (If /G course)
   Year

6. Reason(s) for Proposed Change(s): For the new 4 year BS in Civil Engineering program, new course numbering is required for consistency.

APPROVAL RECOMMENDED BY:

_____

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2018
Division Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	

APPROVED:

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

9/28/18
DATE

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Office of Academic and Student Affairs

REQUEST FOR COURSE REVISION

1. Type of Change:

   A. [ ] GRADUATE B. [ ] SUBSTANTIVE

   [X] UNDERGRADUATE (/G) [X] NONSUBSTANTIVE

2. Original Course Number and Title: ES 303 Geotechnical Engineering

3. Page in current catalog where course is listed: SVP endorsed to be listed in 2018-2019 Undergraduate Catalog

4. Full Description of Requested Change(s):

   A. From:
   ES303 (3)
   GEOTECHNICAL ENGINEERING F
   Introduction to soil mechanics including classification and index properties of soils, soil permeability and flow in soil, stresses in soils, compressibility, consolidation, shear strength, soil improvement, substantial emphasis on writing lab reports. Lecture, three hours; laboratory, three hours per week. Prerequisite: ES203 and concurrent enrollment in ES303L

   B. To:
   CEE303 (3)
   GEOTECHNICAL ENGINEERING F/SP
   Introduction to soil mechanics including classification and index properties of soils, soil permeability and flow in soil, stresses in soils, compressibility, consolidation, shear strength, soil improvement, substantial emphasis on writing lab reports. Lecture, three hours; laboratory, three hours per week. Prerequisite: CEE203 and concurrent enrollment in CEE303L

5. Effective Date (Catalog Year):

   2018-2019 Undergraduate Catalog Year _____ Graduate Bulletin (If /G course) Year

6. Reason(s) for Proposed Change(s): For the new 4 year BS in Civil Engineering program, new course numbering is required for consistency.

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		12-11-2018
Division Chair		12-11-2018
Chair, College AAC/CC		12-11-2018
Dean, of College		12/11/2018
UCRC/GCRC		
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	

APPROVED:

DEC 18 2018

SENIOR VICE PRESIDENT
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OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR COURSE REVISION

1. Type of Change:

   A. [ ] GRADUATE B. [ ] SUBSTANTIVE

   [X] UNDERGRADUATE (/G) [X] NONSUBSTANTIVE

2. Original Course Number and Title: ES 303L Geotechnical Engineering Lab

3. Page in current catalog where course is listed: SVP endorsed to be listed in 2018-2019 Undergraduate Catalog

4. Full Description of Requested Change(s):

   A. From:
   ES303L (1)
   GEOTECHNICAL ENGINEERING LAB F/SP
   Introduction to soil mechanics including classification and index properties of soils, soil permeability and flow in soil, stresses in soils, compressibility, consolidation, shear strength, soil improvement, substantial emphasis on writing lab reports. Lecture, three hours; laboratory, three hours per week. Prerequisite: ES203 and concurrent enrollment in ES303L

   B. To:
   CEE303L (1)
   GEOTECHNICAL ENGINEERING LAB F/SP
   Introduction to soil mechanics including classification and index properties of soils, soil permeability and flow in soil, stresses in soils, compressibility, consolidation, shear strength, soil improvement, substantial emphasis on writing lab reports. Lecture, three hours; laboratory, three hours per week. Prerequisite: CEE203 and concurrent enrollment in CEE303L

5. Effective Date (Catalog Year):

   2018-2019 Undergraduate Catalog (Year) _____ Graduate Bulletin (If /G course) (Year)

6. Reason(s) for Proposed Change(s): For the new 4 year BS in Civil Engineering program, new course numbering is required for consistency.

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		12-11-2018
Division Chair		12-11-2018
Chair, College AAC/CC		12-11-2018
Dean, of College		12/11/2018
UCRC/GCRC		
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	

APPROVED:

WTS

DEC 18 2018

SENIOR VICE PRESIDENT
ACADEMIC & STUDENT AFFAIRS

DATE

Faculty Senate Office
University of Guam

Received By:

9/25/18 4:45 pm
Date & Time

UNIVERSITY OF GUAM
Unibetsedåt GUAHAN

Office of Academic and Student Affairs

REQUEST FOR COURSE REVISION

1. Type of Change

   A. [ ] GRADUATE B. [ ] SUBSTANTIVE

   [X] UNDERGRADUATE (/G) [X] NONSUBSTANTIVE

2. Original Course Number and Title: ES 305 Earth Structures Design

3. Page in current catalog where course is listed: SVP endorsed to be listed in 2018-2019 Undergraduate Catalog

4. Full Description of Requested Change(s):

   A. From

   ES305 (3)
   EARTH STRUCTURES DESIGN F/SP
   Earth pressure theories, design of earth retaining structures, including reinforced cantilever walls, sheet pile walls, mechanically stabilized earth walls, engineered earth slopes and stability, use of geosynthetics. Lecture, three hours per week. Prerequisite: ES303

   B. To

   CEE305 (3)
   EARTH STRUCTURES DESIGN F/SP
   Earth pressure theories, design of earth retaining structures, including reinforced cantilever walls, sheet pile walls, mechanically stabilized earth walls, engineered earth slopes and stability, use of geosynthetics. Lecture, three hours per week. Prerequisite: CEE303

5. Effective Date (Catalog Year):

   2018-2019 Undergraduate Catalog — Year
   _____ Graduate Bulletin (If /G course) — Year

6. Reason(s) for Proposed Change(s): For the new 4 year BS in Civil Engineering program, new course numbering is required for consistency.

APPROVAL RECOMMENDED BY:

UNIT	SIGNATURE (use BLUE pen please)	DATE
For Program		9-21-2018
Division Chair		9-21-2018
Chair, College AAC/CC		9-21-2018
Dean, of College		9/21/2018
UCRC/GCRC		
President, Faculty Senate (if substantive)	(Endorsement of UCRC/GCRC Recommendation)	

APPROVED:

SENIOR VICE PRESIDENT ACADEMIC & STUDENT AFFAIRS — DATE 9/27/18

Appendix 7
School of Engineering
Advisory Council Bylaws

Bachelor of Science in Civil Engineering

School of Engineering

Department of Civil & Environmental Engineering

Bylaws of the University of Guam School of Engineering Advisory Council

ARTICLE I – NAME

The name of this organization is the University of Guam (UOG) School of Engineering (SENG) Advisory Council.

ARTICLE II – MISSION

The SENG Advisory Council's mission is to assist and advise the school by:

- Providing external perspective and review as well as advocacy and support for the school's strategic direction and overall objectives and as mutually agreed, specific programs and new initiatives;
- Advising and consulting with school leadership regarding issues of mutual concern related to the education, accreditation and service program;
- Supporting and guiding the school in the outreach and fostering relationships with industry, engineering and business communities, local and federal governments, and current and former students; and
- Assisting in developing and identifying resources to support the needs and programs of the school.

ARTICLE III – MEMBERSHIP

SECTION 1 MEMBERSHIP

Membership of the Council will consist of at least eleven (11) members at any given time. They will include the senior officials or chief executive of the agency, or organization, or someone designated by the senior officials or chief executive and given authority to act on behalf of the agency or organization as is relates to the engineering field, including but not limited to the following:

- Federal and Public Agencies
  - Guam Department of Public Works
  - Guam Power Authority
  - Guam Professional Engineering Architects and Land Surveyors Board
  - Guam Waterworks Authority
  - Naval Facilities Engineering Command Marianas
  - Officer-in-Charge of Construction Marine Corps Marianas

- Private Sector
  - President of the Guam Society of Professional Engineers
  - President of the Guam Contractors Association
  - President of the Society of American Military Engineers Guam Post
  - Engineering and/or Environmental consulting firms (minimum five representatives)

- Engineering School Alumni

Members are invited by the Dean of the School of Engineering, in consultation with the Chair of the Council. Appointment shall be effective immediately upon acceptance of the invitation and ratification by a majority vote of the Council members in attendance at any regular meeting.

The Council shall endeavor to have as wide a representation of the various types of local and regional engineering, related industries and agencies as practicable, alumni of the engineering program.

SECTION 2 TERMS OF OFFICE

Members serve on a term of two years and may be reappointed to serve additional terms. There will be no limitation to the number of terms each member may serve. Members of the council can be removed for cause by a majority vote of the Council.

ARTICLE IV – OFFICERS, ELECTIONS, AND APPOINTMENTS

The officers of the Council are the Chair, Vice-Chair and Secretary positions and are as follows:

SECTION 1 COUNCIL CHAIR

The Council Chair shall:

a. serve as presiding officer at Council meetings
b. prepare the agenda for Councils meetings, in consultation with the SENG Dean, and ensure that the agenda is made available to the members at least three (3) days prior to the meeting
c. meet as appropriate with the SENG Dean and other college and university officials
d. serve as signature authority for the Council
e. represent the Council at academic ceremonies and social events

SECTION 2 COUNCIL VICE-CHAIR

The Council Vice-Chair shall:

a. serve as presiding officer at Council meetings in the absence of the Chair
b. serve as acting Chair when the Chair is off-island

c. assume the position of Chair until a new chair can be elected at the next scheduled meeting should the extant Chair vacate the office or otherwise be unable to continue service as chair

SECTION 3 COUNCIL SECRETARY

The Council Secretary shall:

a. be responsible for taking minutes of all meetings and keeping records of the activities and accomplishments of the council
b. distribute the draft minutes of meetings to the members prior to the next scheduled meeting
c. coordinate with the office of the Dean, School of Engineering, for administrative support of the Council, and preparation of annual reports.

SECTION 4 ELECTIONS

The election of the officers will be held on the last scheduled meeting during the month of May every year. The newly elected officers will begin their terms immediately following the election and will serve as a minimum for one nominal year.

SECTION 5 APPOINTMENT OF COMMITTEES

The Chairperson and the SENG Dean will ask members to chair committees or oversee tasks to facilitate the work of the Council. The Chairperson is an ex-officio member of any committees organized to handle special projects or issues. The Council Chair with the approval of the SENG Dean may also disband such special committees at any time.

ARTICLE V – STANDING COMMITTEES AND THEIR FUNCTIONS

SECTION 1 EXECUTIVE COMMITTEE

The officers and standing committee chairs shall constitute the Executive Committee, which shall have general supervision of the affairs of the Council between its scheduled meetings, make recommendations to the Council, and perform other appropriate functions, including:

a. Fix the hour and place of Council meetings
b. Coordinate Council business and follow up as necessary
c. Maintain the *Bylaws* and see that they are observed

SECTION 2 PROGRAM COMMITTEE

This committee is composed of no more than three members. The committee shall:

a. conduct a review of the curriculum and make recommendations to the SENG Dean regarding content and quality, to include the composition of the core and the addition or deletion of elective courses

b. review the portions of the *Undergraduate Catalog* and SENG Webpage pertaining to program and curriculum and recommend measures and strategies for maximum effectiveness
c. perform other necessary functions relative to its areas of responsibility.

SECTION 3 ACCREDITATION COMMITTEE

This committee is composed of no more than three members. It is expected that the committee to be familiar with the ABET general criteria for accrediting engineering programs. Additional assistant will be provided by the Dean of the SENG.
The committee shall:

a. support the SENG Dean to develop measures and strategies to prepare for accreditation from within and outside of the University
b. assist the dean and faculty in preparing the progress reports to ABET at time of the accreditation team visit
c. Make recommendations relative to accreditation standards.
d. Perform other necessary functions relative to its areas of responsibility.

ARTICLE VI – MEETINGS

SECTION 1 MEETING TIMES

The Council meets at least quarterly or as otherwise determined by the Executive Committee, during the academic year at an agreed-upon time and location. Special meetings may be called at the discretion of the Council Chair.

SECTION 2 QUORUM

For all scheduled Council meetings, both regular and special, a majority of current members shall constitute a quorum for conducting business.

ARTICLE VII - PARLIAMENTARY AUTHORITY

The rules contained in the current edition of *Robert's Rules of Order* shall govern the meetings of the Council and it committee, in all cases in which they are not inconsistent with these *Bylaws* and any special rules of order the Council may adopt.

Article VIII – Amendment of the *Bylaws*

Amendments of these *Bylaws* may be made at any regular meeting of the Council by a vote of two-thirds of the Members present, provided that the amendments have been submitted in writing at the Council's previous regular meeting. Unless otherwise noted in the amendment, an amendment shall become effective after the Chair announces the vote.

UNIVERSITY OF GUAM

SCHOOL OF ENGINEERING (SENG)

ADVISORY COUNCIL MEMBERS

	NAME	TITLE AGENCY/ORGANIZATION	CONTACT NO.	EMAIL ADDRESS
1.	**MR. KEN REKDAHL, P.E.** *COUNCIL CHAIR; and* *EXECUTIVE COMMITTEE CHAIR*	***DIVISION MANAGER*** DUENAS CAMACHO AND ASSOCIATES	477-7991	kmrekdahl@dcaguam.com
2.	**MR. AGAPITO "PETE" DIAZ, P.E.** *COUNCIL VICE-CHAIR*	***PROJECT MANAGER***/AECOM ***PRESIDENT***/SAME GUAM POST	788-6710	Pete.diaz@aecom.com
3.	**MS. EILEEN FLANAGAN** *COUNCIL SECRETARY*	***QUALITY CONTROL MANAGER*** CONTRACK WATTS	671-685-8127	eileen.flanagan@watts-con.com
4.	**MR. JOHN RIEGEL, P.E.** *PROGRAM COMMITTEE CHAIR*	***SENIOR MANAGER*** BROWN AND CALDWELL	671-747-6094	jriegel@brwncald.com
5.	**MR. GABRIEL JUGO, P.E., SE** *ACCREDITION COMMITTEE CHAIR*	***SENIOR DIRECTOR*** TG ENGINEERS AND BOARD CHAIRMAN, PEALS	671-647-0808	gabrielj@tg-engr.com
6.	**MR. PAUL BARON** *MEMBER*	***CCM*** GHD		Paul.Baron@ghd.com
7.	**MR. MAX MANZANO, P.E.** *MEMBER*	***CHIEF ENGINEER*** DPW	988-6273	max.manzano@dpw.guam.gov
8.	**MR. JOVEN ACOSTA, P.E.** *MEMBER*	***CHIEF ENGINEER*** GPA	648-3214	jacosta@gpagwa.com
9.	**MR. THOMAS CRUZ, P.E.** *MEMBER*	***CHIEF ENGINEER*** GWA	300-6036	thomas@guamwaterworks.org
10.	**MS. ARLENE AROMIN, P.E.** *MEMBER*	***CHIEF ENGINEER*** NAVFAC MARIANAS	671-349-1073	arlene.aromin@fe.navy.mil
11.	**MR. JOHN PAUL DIERKING, CPE, LEED AP** *MEMBER*	***ADVISOR*** SAME STUDENT CHAPTER	671-355-8029	Johnpaul.dierking@fe.navy.mil
12.	**MR. AARON SUTTON, P.E., ENV SP** *MEMBER*	***CHIEF ENGINEER*** GHD	472-6792	aaron.sutton@ghd.com
13.	**CAPT DANIEL TURNER, CEC, USN** *MEMBER*	***COMMANDING OFFICER***	671-898-9066	Daniel.turner@fe.navy.mil

		OICC MCM; and NAVFACMARIANAS		
14.	**MR. JAMES MARTINEZ** *MEMBER* **ALTERNATE:** **MS. DESIREE LIZAMA**	***PRESIDENT*** GUAM CONTRACTORS ASSOCIATION (GCA) OFFICE MANAGER	647-4840	gca@teleguam.net desiree.lizama@guamcontractors.org
15.	**MR. ERIC MARBLE, P.E.** *MEMBER*	***PROJECT MANAGER*** BROWN AND CALDWELL	671-685-4747	ericksonmarble@gmail.com
16.	**MR. NOEL ENRIQUEZ** *MEMBER*	***OPERATIONS MANAGER ASIA PACIFIC*** STANLEY CONSULTANTS	671-646-3466	Enrigueznoel@stanleygroup.com
17.	**MR. BOB SHAMBACH** *MEMBER*	***GUAM OFFICER MANAGER*** EA ENGINEERING	671-646-5231	bshambach@eaest.com
18.	**Mr. THOMAS P. CAMACHO, P.E., SE** *MEMBER*	***PRESIDENT*** GUAM SOCIETY OF PROFESSIONALS ENGINEERS (GSPE)	727-1611	tpcamacho@dcaguam.com
19.	**MR. JAMES KIRK** *MEMBER*	***PROJECT MANAGER*** CONTRACK WATTS	888-1488	James.kirk@watts-con.com
	STANDING COMMITTEES:			
	EXECUTIVE COMMITTEE:			
	MR. KEN REKDAHL, P.E. *COUNCIL CHAIR; and* *EXECUTIVE COMMITTEE CHAIR*	***DIVISION MANAGER*** DUENAS CAMACHO AND ASSOCIATES	477-7991	kmrekdahl@dcaguam.com
	MR. AGAPITO "PETE" DIAZ, P.E. *COUNCIL VICE-CHAIR*	***PROJECT MANAGER***/AECOM ***PRESIDENT***/SAME GUAM POST	788-6710	Pete.diaz@aecom.com
	MS. EILEEN FLANAGAN *COUNCIL SECRETARY*	***QUALITY CONTROL MANAGER*** CONTRACK WATTS	671-685-8127	eileen.flanagan@watts-con.com
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	MR. GABRIEL JUGO, P.E., SE *ACCREDITION COMMITTEE CHAIR*	***SENIOR DIRECTOR*** TG ENGINEERS AND BOARD CHAIRMAN, PEALS	671-647-0808	gabrielj@tg-engr.com
	MR. NOEL ENRIQUEZ *MEMBER*	***OPERATIONS MANAGER ASIA***	671-646-3466	Enrigueznoel@stanleygroup.com

		PACIFIC STANLEY CONSULTANTS		
	CAPT DANIEL TURNER, CEC, USN *MEMBER*	***COMMANDING OFFICER*** OICC MCM; and NAVFACMARIANAS	671-898-9066	Daniel.turner@fe.navy.mil
	PROGRAM COMMITTEE:			
	MR. JOHN RIEGEL, P.E. *PROGRAM COMMITTEE CHAIR*	***SENIOR MANAGER*** BROWN AND CALDWELL	671-747-6094	jriegel@brwncald.com
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	MR. ERIC MARBLE, P.E. *MEMBER*	***PROJECT MANAGER*** BROWN AND CALDWELL	671-685-4747	ericksonmarble@gmail.com
	Mr. THOMAS P. CAMACHO, P.E., SE *MEMBER*	***PRESIDENT*** GUAM SOCIETY OF PROFESSIONALS ENGINEERS (GSPE)	727-1611	tpcamacho@dcaguam.com
	ACCREDITATION COMMITTEE:			
	MR. GABRIEL JUGO, P.E., SE *ACCREDITION COMMITTEE CHAIR*	***SENIOR DIRECTOR*** TG ENGINEERS AND BOARD CHAIRMAN, PEALS	671-647-0808	gabrielj@tg-engr.com
	DR. JOSEPH ROUSE *MEMBER*	***FACULTY*** SENG/WERI (UOG)	735-2691	rousej@triton.uog.edu
	MR. PAUL BARON *MEMBER*	***CCM*** GHD		Paul.Baron@ghd.com
	DR. JOHN JENSON *MEMBER*	***DIRECTOR*** WERI (UOG)	735-2689	jjenson@triton.uog.edu
	SCHOOL OF ENGINEERING (SENG)			
	DR. SHAHRAM KHOSROWPANAH, P.E.	***DEAN*** SENG (UOG)	735-2694	khosrow@triton.uog.edu
	DR. PYOYOON HONG	***FACULTY***	735-2318	hongp@triton.uog.edu
	DR. UJWALKUMAR PATIL	***FACULTY***	735-2761	patilu@triton.uog.edu

Appendix 8
Result of Student Survey

Bachelor of Science in Civil Engineering

School of Engineering
Department of Civil & Environmental Engineering

UNIVERSITY OF GUAM
UNIBETSEDÅT GUAHAN

SCHOOL OF ENGINEERING (SENG)
Office of the Dean

Survey Questionnaire of the University of Guam's School of Engineering (SENG)

Need for Having Engineering School in Guam:
Survey of the student's serious interest in enrolling the UOG-SENG

Please complete the following questionnaire with specific regard to the above enquiry, by placing a CROSS in the appropriate box.

1. Please choose which item describes your student status:
   - [x] Student attending a public high school on Guam
   - [ ] Student attending a private high school on Guam
   - [ ] Student attending a regional college (e.g., GCC, COM-FSM, PCC, CMI, NMC)
   - [ ] Student attending UOG
   - [ ] Not a student
   - [ ] Other

Questions	Yes	No	Don't Know/Not Sure
2. Are you familiar with the engineering fields and what they do?	☒	☐	☐
3. Are you interested in studying engineering?	☒	☐	☐
4. Have you heard about the UOG-School of Engineering (SENG)?	☒	☐	☐
5. Are you interested to hear more about the UOG-School of Engineering?	☒	☐	☐

If you answered yes, please provide your name and email address here:

Francis Borja

Mom's email: sgborja08@yahoo.com

T: +1 671.735.2694 F: +1 671.735.8890 W: www.uog.edu
Mailing Address: 303 University Drive UOG Station Mangilao, Guam 96913

6.	Do you agree that having an engineering school on island will help Guam and other neighbouring island communities?	☒	☐	☐
7.	Do you agree that having engineering school in Guam will help the students stay on Guam?	☒	☐	☐
8.	Are you in Pre-engineering student at UOG?	☐	☒	☐
9.	If you answered yes to the previous question, are you interested in completing your engineering degree (Civil· Environmental Engineer) at SENG?	☐	☐	☐

For more Information Please: University of Guam, School of Engineering. Dr. UJWALKUMAR D. PATIL [patilu@triton.uog.edu]

You have an option, to complete this Survey Questionnaire through the following link:

https://uguam.qualtrics.com/jfe/form/SV_1HYLINXBpTO7Tgx

UNIVERSITY OF GUAM
UNIBETSEDÅT GUAHAN

SCHOOL OF ENGINEERING (SENG)
Office of the Dean

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1. Please choose which item describes your student status:
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   - ● Student attending a private high school on Guam
   - ○ Student attending a regional college (e.g., GCC, COM-FSM, PCC, CMI, NMC)
   - ○ Student attending UOG
   - ○ Not a student
   - ○ Other

Questions	Yes	No	Don't Know/Not Sure
2. Are you familiar with the engineering fields and what they do?	☐	☐	☑
3. Are you interested in studying engineering?	☐	☐	☑
4. Have you heard about the UOG-School of Engineering (SENG)?	☐	☑	☑
5. Are you interested to hear more about the UOG-School of Engineering?	☑	☐	☐

If you answered yes, please provide your name and email address here:

reddyn ordonez@gmail.com

T: +1 671.735.2694 F: +1 671.735.8890 W: www.uog.edu
Mailing Address: 303 University Drive UOG Station Mangilao, Guam 96913

6.	Do you agree that having an engineering school on island will help Guam and other neighbouring Island communities?	☑	☐	☐
7.	Do you agree that having engineering school in Guam will help the students stay on Guam?	☑	☐	☐
8.	Are you in Pre-engineering student at UOG?	☐	☑	☐
9.	If you answered yes to the previous question, are you interested in completing your engineering degree (Civil-Environmental Engineer) at SENG?	☐	☐	☐

For more Information Please: University of Guam, School of Engineering, Dr. UJWALKUMAR D. PATIL [patilu@triton.uog.edu]

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   - ○ Not a student
   - ☒ Other

Questions	Yes	No	Don't Know/Not Sure
2. Are you familiar with the engineering fields and what they do?	☐	☒	☐
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5. Are you interested to hear more about the UOG-School of Engineering?	☐	☒	☐

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Mailing Address: 303 University Drive UOG Station Mangilao, Guam 96913

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9.	If you answered yes to the previous question, are you interested in completing your engineering degree (Civil-Environmental Engineer) at SENG?	☐	☐	☐

For more Information Please: University of Guam, School of Engineering. Dr. UJWALKUMAR D. PATIL [patilu@triton.uog.edu]

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UNIBETSEDÅT GUAHAN

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   - ○ Other

Questions	Yes	No	Don't Know/Not Sure
2. Are you familiar with the engineering fields and what they do?	☑	☐	☐
3. Are you interested in studying engineering?	☑	☐	☐
4. Have you heard about the UOG-School of Engineering (SENG)?	☑	☐	☐
5. Are you interested to hear more about the UOG-School of Engineering?	☑	☐	☐

If you answered yes, please provide your name and email address here:

T: +1 671.735.2694 F: +1 671.735.8890 W: www.uog.edu
Mailing Address: 303 University Drive UOG Station Mangilao, Guam 96913

6.	Do you agree that having an engineering school on island will help Guam and other neighbouring Island communities?	☑	☐	☐
7.	Do you agree that having engineering school in Guam will help the students stay on Guam?	☑	☐	☐
8.	Are you in Pre-engineering student at UOG?	☑	☐	☐
9.	If you answered yes to the previous question, are you interested in completing your engineering degree (Civil-Environmental Engineer) at SENG?	☑	☐	☐

For more Information Please: University of Guam. School of Engineering, Dr. UJWAL.KUMAR D. PATIL [patilu@triton.uog.edu]

You have an option, to complete this Survey Questionnaire through the following link:

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UNIBETSEDÅT GUAHAN

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   - ☐ Not a student
   - ☐ Other

Questions	Yes	No	Don't Know/Not Sure
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Mailing Address: 303 University Drive UOG Station Mangilao, Guam 96913

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7.	Do you agree that having engineering school in Guam will help the students stay on Guam?	☒	☐	☐
8.	Are you in Pre-engineering student at UOG?	☐	☒	☐
9.	If you answered yes to the previous question, are you interested in completing your engineering degree (Civil· Environmental Engineer) at SENG?	☐	☒	☐

For more Information Please: University of Guam, School of Engineering. Dr. UJWALKUMAR D. PATIL [patilu@triton.uog.edu]

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   - ☐ Not a student
   - ☑ Other

Questions	Yes	No	Don't Know/Not Sure
2. Are you familiar with the engineering fields and what they do?	☐	☐	☑
3. Are you interested in studying engineering?	☑	☐	☐
4. Have you heard about the UOG-School of Engineering (SENG)?	☑	☐	☐
5. Are you interested to hear more about the UOG-School of Engineering?	☑	☐	☐

If you answered yes, please provide your name and email address here:

T: +1 671.735.2694 F: +1 671.735.8890 W: www.uog.edu
Mailing Address: 303 University Drive UOG Station Mangilao, Guam 96913

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melzcamp6@hotmail.com

T: +1 671.735.2694 F: +1 671.735.8890 W: www.uog.edu
Mailing Address: 303 University Drive UOG Station Mangilao, Guam 96913

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If you answered yes, please provide your name and email address here:

Mark A. Manlangit
manlangit_mark@yahoo.com

T: +1 671.735.2694 F: +1 671.735.8890 W: www.uog.edu
Mailing Address: 303 University Drive UOG Station Mangilao, Guam 96913

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3. Are you interested in studying engineering?	☐	☑	☐
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5. Are you interested to hear more about the UOG-School of Engineering?	☑	☐	☐

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   - ○ Not a student
   - ○ Other

Questions	Yes	No	Don't Know/Not Sure
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If you answered yes, please provide your name and email address here: Jesse Chargualaf
jchargualaf@hafm.ll.

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Questions	Yes	No	Don't Know/Not Sure
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3. Are you interested in studying engineering?	☐	☐	☐ ✓
4. Have you heard about the UOG-School of Engineering (SENG)?	☐ ✓	☐	☐
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Appendix 9
External Review

Bachelor of Science in Civil Engineering

School of Engineering

Department of Civil & Environmental Engineering

Shahram Khosrowpanah

From: Ken Rekdahl [kmrekdahl@dcaguam.com]
Sent: Wednesday, June 20, 2018 6:42 PM
To: John Riegel
Cc: Pete Diaz; Shahram Khosrowpanah
Subject: Re: Comments on "Request for New Degree Program Approval"

Thanks John,

I will arrange for a council meeting when both you and I return to Guam Mid July

Ken

On Jun 20, 2018, at 4:42 PM, John Riegel <JRiegel@BrwnCald.com> wrote:

All,
Below is a compilation of comments provided on the subject document that the Program Committee was tasked with reviewing. If there are further comments, please forward them.

1. Section 1.5 - Add the following to program goals: Wastewater Treatment and Collection
   Contracting/Specifications
   Project Management
   Materials
2. Section 1.5.a - Add the following as subject matter covered: Water Resources
   Project Management
   Contracts & Specifications
   Highways & Transportation
3. Section 1.5.c - Add to recognize and understand problems, and solution approaches and alternatives
4. Section 1.7 - Fewer humanities credit requirements and more engineering course electives. Transportation engineering should be core not elective credit.
5. Section 1.9 is blank
6. Section 2.1 - Suggest revising the first sentence from "...developing a society and country" to "...developing a society and civilization"
7. Section 3.4 - What does Spring 70 mean?
8. Section 1.6 - Will Differential Equations be an included course?
9. Section 4.6 - Add references such as AWWA, WEF, and ASCE journals

The council chair, Mr. Ken Rekdahl, was going to share this information with the council body, I believe.

John Riegel
Program Management, Sr. Manager
Brown and Caldwell
JRiegel@browncald.com
Direct: 671.300.4230

<image001.jpg>

Kenneth M. Rekdahl, PE

Chief of Special Projects
Duenas, Camacho & Associates, Inc.
671-477-7991

Shahram Khosrowpanah

From: Troy McVey [tmcvey@triton.uog.edu]
Sent: Saturday, August 18, 2018 8:47 AM
To: khosrow@triton.uog.edu
Subject: RE: My Friend: Drat-SENG Degree Program for review

Hafa Adai Dr. K,

I'm sorry that it took me so long to respond. Lots of great work here!

In your final draft of the BSCE program, I only have two minor comments.

(1) On your table on pages 6-7, when referring to the Gen Ed Tier II categories, kindly remove the word "electives". I understand that these courses are elective in that students choose them, but they are requirements. The same comment for your appendix on page 18. Gen Ed (Humanities) would work well for your format.

(2) On pages 13 and 14, you have the same description of FTE needs for the program. This sentence confused me both times.

> Four faculty members are required to fully implement the complete civil engineering program with an expected growth to 3.5 FTE.

I assume some of your load and Joe's load are dedicated somewhere else, or that current FTE is only 2.5 or something, but I was struck by this. Another sentence is needed for clarification.

Your draft Appendix looks quite complete.

Hope this helps.

Troy

From: Shahram Khosrowpanah [mailto:khosrow@triton.uog.edu]
Sent: Wednesday, August 01, 2018 3:06 PM
To: 'Troy McVey' <tmcvey@triton.uog.edu>
Cc: 'Shahram Khosrowpanah' <khosrow@triton.uog.edu>
Subject: My Friend: Drat-SENG Degree Program for review

Hi Troy,

Attached is the draft copy for School of Engineering degree program for your review and comments. Really appreciate. Thanks

Shahram Khosrowpanah, Ph.D., P.E.
Dean, School of Engineering (SENG)
University of Guam
Mangilao, GU 96923
Ph. (671) 735-2694/2761
Email: khosrow@triton.uog.edu

Shahram Khosrowpanah

From: Deborah [deborah@triton.uog.edu]
Sent: Monday, July 30, 2018 12:58 PM
To: khosrow@triton.uog.edu
Cc: 'UJWALKUMAR D. PATIL'
Subject: RE: Review the SENG degree program
Attachments: 01 Final Draft - New BS CE program-July16 2018 dlg feedback.docx

Buenas Dr. K.,

Please see attached markup of the SENG degree program proposal with my minor suggested revisions or questions. You may want to have Dr. Troy McVey review the proposal as well.

Hth,

dee

Deborah D. Leon Guerrero
Office of Institutional Effectiveness
University of Guam
Unibetsedåt Guahan
671-735-2585

From: Shahram Khosrowpanah [mailto:khosrow@triton.uog.edu]
Sent: Monday, July 16, 2018 6:09 PM
To: 'Deborah'
Cc: 'UJWALKUMAR D. PATIL'; 'Shahram Khosrowpanah'
Subject: Reviw the SENG degree program

Hafa Adai, Dee,

I would like to ask you a favor, Attached is a draft copy "Request for approval of a new degree program, BS in civil engineering" that needs to be review. I would appreciated, if you do a review it and send (email) me your comments. I will be off-island from July 17 to 30.

Shahram Khosrowpanah, Ph.D., P.E.
Dean, School of Engineering (SENG)
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REQUEST FOR APPROVAL OF A NEW DEGREE PROGRAM
UNIVERSITY OF GUAM
SCHOOL OF ENGINEERING
BACHELOR OF SCIENCEE IN CIVIL ENGINEERING

Table of Contents

2.9 Assurance that courses and programs are planned both for optima learning and accessible scheduling

Table of Contents (continued)

Bachelor of Science in Civil Engineering
Proposal

1. Definition of the proposed program.

1.1 Full and exact designation for the proposed program.

Bachelor of Science in Civil Engineering

1.2 Name of college submitting the request.

School of Engineering (SENG)

1.3 Name of the department, department's division, or other unit of the college which would offer the proposed program.

Department of Civil and Environmental Engineering

1.4 Name, title and rank of the individuals primarily responsible for drafting the proposed program.

This document was drafted by the School of Engineering (SENG) administrator and faculty:

i. Shahram Khosrowpanah, Ph.D., P.E., Professor and Interim Dean, School of Engineering

ii. Pyo-Yoon Hong, Ph.D., P.E., Associate Professor and Division Chair, School of Engineering

iii. Ujwalkumar D. Patil, Ph.D., P.E., Assistant Professor, School of Engineering

iv. Joseph D Rouse, Ph.D., P.E., Professor, Water and Environmental Research Institute

In addition, the draft ~~copy~~ proposal of the program was reviewed by the: School of Engineering (SENG) Advisory Council members, UOG faculty and administration. The members of the advisory council are senior officials and chief executive from Federal and Public Agencies, Private Sector, and School of Engineering ~~School~~ Pre-Engineering Curriculum Alumni, with the mission:

- Providing external perspective and review as well as advocacy and support for the school's strategic direction and overall objectives and as mutually agreed, specific programs and new initiatives;
- Advising and consulting with school leadership regarding issues of mutual concern related to the education, accreditation and service program;
- Supporting and guiding the school in the outreach and fostering relationships with industry, engineering and business communities, local and federal governments, and current and former students; and

- Assisting in developing and identifying resources to support the needs and programs of the school.

1.5 Goals and Objectives of the proposed program.

The Bachelor of Science in Civil Engineering degree at University of Guam will meet the needs of local students and the work force requirements of Guam, Micronesia and the neighboring regions of the Pacific and Asia. The graduates would be valuable for Guam construction companies, consulting companies, municipalities, Guam Department of Public Works, Guam Environmental Protection agency, and more. The graduates would be primarily involved with the analysis, design and development of structural systems, construction projects, transportation projects, environmental projects and water quality.

The program's educational objectives are specifically defined as expectations of alumni 3-6 years after graduation. The educational objectives of the program in civil engineering, that are consistent with the mission of University of Guam, are the following:

a. Successfully engage in the practice of civil or environmental engineering (private, public, or academic sectors) to solve important engineering and environmental problems, while upholding the code of ethics for engineers.

b. Pursue ongoing professional development opportunities including professional licensure (PE), advanced studies, research, participation in conferences or workshops, and continuing education.

c. Advance the profession by pursuing leadership positions, membership in professional societies, and teaching opportunities.

d. Participate in and contribute to service to society through public, private, or academic organizations addressing important societal issues and needs.

Program learning outcomes are specifically defined statements that describe what students are expected to attain by the time of graduation. Students completing the civil engineering program must demonstrate the:

a. Ability to apply knowledge of mathematics, science, and engineering, including: mathematics through differential equations, calculus based physics, chemistry, biology, and four technical areas appropriate to civil engineering.

b. Ability to design and conduct civil engineering experiments, as well as to analyze and interpret the resulting data.

c. Ability to design a system, component, or process to meet desired needs in more than one civil engineering context and within realistic constraints.

d. Ability to function on multidisciplinary teams.

e. Ability to identify, formulates, and solves engineering problems.

f. Understanding of professional ethical responsibility, including the importance of professional licensure.

g. Ability to communicate effectively by written, verbal, and visual (plans/PowerPoint) means.

h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.

i. Need for, and an ability to engage in life-long learning.

j. Knowledge of contemporary issues as they relate to civil engineering.

k. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice, and

l. Understanding of basic concepts in management, business, public policy, and leadership.

1.5. a Specify the subject matter to be covered.

Engineering Statics
Engineering Dynamics
Mechanics of Materials
Mechanics of Fluids
Surveying
Structural Analysis
Engineering Hydraulics
Geotechnical Engineering
Civil Engineering Materials
Earth Structures Design
Steel Structures Design
Environmental Engineering
Engineering Transportation
Reinforced Concrete Design
Foundation Engineering
Ethics and Sustainability in Civil Engineering
Civil Engineering Design I: Site Planning and Design
Civil Engineering Design II: Structural Analysis

1.5.b Specify the intellectual skills and learning methods to be acquired.

The students will successfully engage in the practice of civil or environmental engineering (private, public, or academic sectors) to solve important engineering and environmental problems, while upholding the code of ethics for engineers. Engineering students are instructed to obtain conceptual understanding of engineering concepts. To build up ability to apply the engineering concepts to real-world situations, students will be asked to solve problems, analyze situations and evaluate alternatives and their consequences. The students will be taught how to design and conduct engineering experiments and analyze and interpret experimental data. The students will also be taught in individual, group and cooperative learning situations.

1.5. c Specify the affective and creative capabilities to be developed.

Affective and creative capabilities to be developed in engineering students are critical in their professions. The affective capabilities to be developed are:

- Identification or clarification of values
- Development of appreciation and empathy
- Motivation of self and others; and acquisition of respect for diversity.

The creative capabilities to be developed are:

- Oral, written, non-verbal and listening communication skills
- Organizational skills
- Ability to define problems and solution and alternatives
- Ability to revise and modify
- Analysis and interpretation
- Mentorships
- The skills to empower creativity in others

Comment [DLG1]: Clarify this bullet item

Comment [DLG2]: Clarify this bullet item

Comment [DLG3]: Clarify this bullet item

1.5. d Specify, if relevant, the specific career-preparation practices to be mastered.

The best way that this program connects students to apply their classroom knowledge to real situations and reinforces concepts taught in classes and pre-employment career preparation opportunities is through our Advisory Council Board. Each summer, our students have internships in local private and public sectors and with that the opportunity to demonstrate their skills and competencies to future employers.

1.6 List of all courses, by catalog number, title and units of credit to be required for a major under the proposed program.

Curriculum

Table 1: Curriculum for the BS in Civil – Environmental Engineering

Mathematics: 14 Credits

- MA 203 Calculus I *5 Credits*
- MA 204 Calculus II *5 Credits*
- MA 205 Calculus III *4 Credits*

Sciences: 21 Credits

- CH 102/L General Chemistry *4 Credits*
- CH 103/L General Chemistry *4 Credits*
- PH 251/L University Physics *5 Credits*
- PH 252/L University Physics *5 Credits*
- GenEd Tier II Direction Building Elective *3 Credits*

General Engineering, Computer Science: 8 Credits

- CEE 100 Introduction to Engineering *1 Credits*
- CEE 101 Engineering Graphics *3 Credits*
- CS 201 Programming I *4 Credits*

Humanities and Social Science: 30 Credits

- EN 110 Freshmen Composition *3 Credits*
- EN 111 Writing for Research *3 Credits*
- CT 101 Critical Thinking *3 Credits*
- CO 210 Fundamentals of Communication *3 Credits*
- GenEd Tier II Humanities and Social Sciences Electives *12 Credits*
- GenEd Tier II Uniquely UOG Electives *6 Credits*

Civil Engineering: 53 Credits

- CEE 201 Engineering Statics *3 Credits*
- CEE 202 Engineering Dynamics *3 Credits*
- CEE 203 Mechanics of Materials *3 Credits*
- CEE 204 Mechanics of Fluids *3 Credits*
- CEE 301 Structural Analysis *3 Credits*
- CEE 302/L Engineering Hydraulics *4 Credits*
- CEE 303/L Geotechnical Engineering *4 Credits*
- CEE 304/L Civil Engineering Materials *4 Credits*
- CEE 305 Earth Structures Design *3 Credits*
- CEE 306 Reinforced Concrete Design *3 Credits*
- CEE 307 Introduction to Environmental Engineering *3 Credits*
- CEE 308 Introduction to Survey *2 Credits*

- CEE 401 Steel Structures Design *3 Credits*
- CEE 402 Foundation Engineering *3 Credits*
- CEE 403 Ethics& Sustainability in Civil Engineering *2 Credits*
- CEE 404 Civil Engineering Design I *2 Credits*
- CEE 405 Civil Engineering Design II *2 Credits*
- CEE xxx Engineering Electives *2 Credits*

Total Credits for Degree: 125

Comment [DLG4]: Per G2G, bachelors programs should not require more than 124 credits

1.7 Clarification of number and types of electives, if any, under the proposed program, including special options.

Students are to choose a minimum of six credits from the following Electives:

- CEE xxx Construction Management Elective *3 Credits*
- CEE xxx Construction Engineering Elective *3 Credits*
- CEE xxx Transportation Engineering Elective *3 Credits*
- CEE xxx Engineering Economy *3 Credits*

1.8 Special Option: Non-Thesis Certificate Program
N/A

1.9 Justification of any unusual characteristics of the proposed program, e.g., in terminology, units of credit required, types of course work, etc.

Comment [DLG5]: Explain why the program cannot be completed within 124 credits

1.10 Prerequisites and criteria for admission of students to the proposed program, and for their continuation in the program.

Prerequisites and criteria for admission of students shall be the same as for admission to the University, as specified in the Undergraduate Catalog. Continuation in the program requires that the student maintain a minimum cumulative grade point average (GPA) of 2.5.

1.11 Evidence that the degree program has a coherent design and is characterized by continuity, sequential progression, and a synthesis of learning.

In order to eventually become licensed as a Professional Engineer, graduating from an ABET-accredited program is critical. The proposed Bachelor of Science in Civil-Environmental Engineering Program has been designed to satisfy the path to licensure proposed in the ASCEE Policy Statement 465 and supported by the NCEEES Model Law. The program structure and content was informed by the ASCEE Body of Knowledge, ABET requirements, recent changes to the Fundamentals of Engineering exam, similar co-terminal programs at others schools, faculty background and

university general education requirements. Continuity, sequential progression and a synthesis of learning is monitored by the Dean, Division Chair, Academic Affair Committee as well as ABET and culminated in Capstone Project by taking skills learned in the classroom and applying them to real-world engineering situations.

1.12 Describe how educational effectiveness of program is to be measured.

The program must regularly use appropriate, documented processes for assessing and evaluating the extent to which the student outcomes are being attained. The results of these evaluations must be systematically utilized as input for the continuous improvement of the program. Other available information may also be used to assist in the continuous improvement of the program. The following criteria and methods will be utilized for the program assessment and evaluation of the engineering program.

a. The quality and performance of the students and graduates are important considerations in the evaluation of the engineering program. Data will be kept on quality of the incoming students and the placement of engineering graduates, which includes statistics on retention, placement, career advancement of students and employer satisfaction.

b. The assessment process will be designed to evaluate the program outcomes important to the mission of the institution and the program educational objectives. Working with ABET and the industrial advisory board, the content of the program will be continuously evaluated and updated to maintain the appropriate scholarly activity. ABET criteria require such measures be taken.

c. The professional component requirements specify subject areas appropriate to the field of engineering and the engineering faculty will ensure the development of the program in a timely manner consistent with the objectives of the institution.

d. The faculty has adequate expertise to cover all of the curricular area of the program, including student advising and counseling, university service activities, professional development and interactions with local industry.

Program quality will be evaluated by the Dean of Engineering and Technology in cooperation with the faculty members, the industrial advisory board and the Engineering Accreditation Commission of ABET. Educational effectiveness of the program will also be measured by an annual survey conducted of recent graduates of the program. Graduates will be asked about the nature of their work and their succession enrolling in higher degree programs, as well as their success in obtaining professional employment and the adequacy of the preparation they received at University of Guam. Employers will be surveyed as well to assess the readiness and effectiveness of our graduates. The results of the survey will provide a valuable feedback for future curriculum adjustment.

2. Context of the Proposed Program

2.1 Examples of colleges offering the proposed program.

Civil engineering is the oldest branch of engineering and plays a major role in developing a society and country. Employment of civil engineers is projected to grow 20 percent

from 2012 to 2022, which is also much faster than the average for all occupations. As infrastructure ages, civil engineers will be needed to manage projects to rebuild bridges, repair roads, and upgrade levees and dams. Due to such a continuous high demands for civil engineers the majority of universities offer civil engineering degree programs.

2.2 Endorsements from university or community elements

The letters contained in Appendix 1 show the community representatives that support the Bachelor of Science in Civil Engineering.

2.3 Differences of the proposed program, if any, from similar programs in other institutions.

Civil engineering is among the most diversified of the traditional engineering disciplines. The proposed BS program is a typical civil engineering undergraduate program administered within a well-established and constrained four-year curriculum.

2.4 Relation of the proposed program to the total educational program of the respective college.

The School of Engineering (SENG) pursues to inspire the advancement of regional knowledge through teaching, research and industry consulting. The program provides a strong foundation in the areas of mathematics, basic and engineering sciences, and the humanities and social sciences while promoting further critical reading and thinking, self-development and life-long intellectual achievement. The program also seeks to build student skills in written and oral communication, and a sense of poise and professionalism. The educational objectives for the civil engineering program clearly supports the mission of University of Guam by providing hands-on practice-oriented education and reflects the importance placed on successful professional practice, the ability to pursue advanced degrees, the assumption of professional and societal leadership roles.

2.5 Relation of the proposed program to the planned curricular development of the respective instructional area (department, department's division).

The new program is the first engineering degree program of its kind in Guam and the Western Pacific. The program, however, will soon to have evolved into a diverse department that encompasses research, undergraduate and graduate education in environmental and water resources, geotechnical, structural, and transportation engineering etc. In this context, the proposed program is to provide students a unique opportunity to acquire the essential knowledge and skills needed for lifelong learning in fields associated with civil engineering.

2.6 List of other programs currently offered which are closely related to the proposed program.

The Two-Plus-Two Engineering Program (2+2) is a joint program offered by School of

Engineering at University of Guam. This program allows students to complete the first two years of an engineering curriculum at UOG, qualify for transfer to Mapua Institute of Technology, Iowa State University, University of Alaska at Fair Banks and University of Hawaii and finish their education in two more years at the university of their own choices. The disadvantage one might find in the 2+2 Program is that it requires a transfer and change of location half-way through the curriculum.

2.7 Explanation of how the needs to be met by the proposed program have previously been satisfied.

The need for qualified professionals in the field of Civil Engineering on Guam has never been satisfied. To fill some of the need, off-island hires, short-term contracts and people with limited training who have had to learn on the job were hired. Well-educated and licensed civil engineers are needed on the island and neighboring regions. The combination of importing technical labor, hiring consultants, and providing a few local engineers who must complete their programs at other institutions, does not meet the current demand, and will certainly not meet the future demand. In the next few years, normal population growth and the military buildup will increase the need and demand for engineering skills many fold. As the President has recognized, the time has come for the university to step up and create the opportunity for local and regional students to become engineers, in a setting that will encourage them to make long-term professional and personal commitments to the prosperity and quality of life for the island of Guam and the rest of the region served by the University of Guam.

Comment [DLG6]: Are there not Guam residents who earned a Civil Engineering degree in the U.S. or other countries and then returned back to Guam to work?

2.8 Applicability of course work taken under the proposed program to other programs currently offered.

None.

Comment [DLG7]: GenEd courses listed in the document could be used to meet other major programs if an Engineering major changed to another major?

2.9 Assurance that courses and programs are planned both for optima/learning and accessible scheduling, and are offered in a manner that ensures students the opportunity to complete the entire program as announced.

The degree program is designed to satisfy the path to licensure proposed in the ASCEE Policy Statement 465 and supported by the NCEEES Model Law. The program structure and content was informed by the ASCEE Body of Knowledge, ABET requirements, recent changes to the Fundamentals of Engineering exam, similar co-terminal programs at others schools, faculty background and university general education requirements. The student performance is closely monitored by the Dean, Division Chair, Academic Affair Committee, Advisory Committee and ABET.

3. Need for the Proposed Program

3.1 Primary reason for requesting the proposed program.

The Bachelor of Science in Civil Engineering degree at University of Guam will meet the needs of local students and the work force requirements of Guam, Micronesia and the neighboring regions of the Pacific and Asia. The graduates would be valuable for Guam construction companies, consulting companies, municipalities, Guam DOT and more. The graduates would be primarily involved with the analysis, design and development of structural systems, construction projects, transportation projects, environmental projects and water quality.

The faculty and academic advisors visited local high schools to obtain feedback from students about their interest in B.S. engineering programs at UOG. The student survey indicates that the majority of students who have an interest in engineering prefer to study the civil, electrical and mechanical engineering disciplines. In addition, feedback from the local industrial advisory committee revealed a strong need for these disciplines to be provided locally to support the industry and local municipalities in Guam and surrounding regions. Local municipalities also have a need for engineers for water, sewage, environmental and infrastructure.

The new engineering program will enhance and contribute positively to the existing natural & applied science programs at UOG. Many students that are not retained in the engineering program may transfer to one of the engineering programs.

3.2 Professional uses of the proposed program.

Our graduates will perform technical and managerial civil engineering tasks:
Structural engineer; Site engineer; Consulting civil engineer; Contracting civil engineer; Design engineer; Building control surveyor; Water engineer; Building services engineer; Construction manager; Engineering geologist; Environmental consultant

3.3 Results of a survey of serious interest in enrolling under the proposed program.

3.4 Enrollment figures during the past two years in specified courses or programs related to the proposed program, which indicate interest in the proposed program.

Pre-Engineering Program
Undergraduate Student Enrollment
(University of Guam, FACT Book-218, 2017, 2016)

Course Title	Academic Year 2018	Academic Year 2017	Academic Year 2016
ES100 Introduction to Engineering	20	32	33
ES101 Engineering Graphics	25	21	35
ES201 Engineering Statics	16	3	9
ES202 Engineering Dynamics	12	7	9
ES203 Mechanics of Materials	8	7	9

Total Academic year 2016-2018	81	70	92
Declared Eng. students	83	80	70
Total Enrollment to Program	164	150	162

3.5 Estimate of the number of students completing the proposed program in the second year and in the fifth year after its approval.

Student Completed & Estimation
University of Guam – Academic and Student Affairs

Academic Year	Total Enrollment	Freshman	Junior	Percentage %
2015	164	74	31	41
2016	162	71	36	50
2017	150	49	31	63
2018	164			
2019 - Estimate	180			
2020 - Estimate	200			

3.6 Total FTE lower division and in the upper division, enrollments in the specified department, department's division, or other units of the college which would offer the proposed program, as the current semester and as projected five years hence, further divided into lecture FTE and laboratory FTE where appropriate.

The program requires 4.0 Full Time Equivalent (FTE) faculties to teach most of the courses that are part of the curriculum. A normal load at UOG for faculty is 9 to12 contact hours per semester. Four faculty members are required to fully implement the complete civil engineering program with an expected growth to 3.5 FTE. Some of the courses are cross listed the total FTE cannot be precisely be calculated. The minimum credentials required for each faulty member are a Ph.D. degree along with several years of experience in the discipline. Additionally, part-time faculty with appropriate expertise will be employed as required to teach selected courses.

3.7 Advantages to the college of offering the proposed program.

The proposed program will help generate revenue as there will be increase in student enrollment as the program will expand from 2-year pre-engineering to a full 4-year civil engineering degree program. In future, this program is believed to attract students from neighboring Islands and countries and the revenue generated will help School of Engineering (SENG) to become self-sufficient to run by itself without much financial support from Government of Guam. The internship programs will help build Industry-University collaboration via internship programs that will help student professional development and help them identify their potential employers and vice-versa. Local and federal agencies as well as private engineering firms such as Guam Power Authority, Guam Water Authority, NAVFAC, Brown and Coldwell etc. will benefit from hiring

local engineers and this will prevent shortage of skilled labors on Island of Guam. In addition, the local talent will be kept on Island as they will be employed in local firms and Government agencies. Research projects acquired by faculties will help give students financial support in the form of research assistantships.

4. Resources for the Proposed Program

4.1 List all present faculty members, with rank, highest degree earned, publications and professional experience, which would teach in the proposed program.

Curriculum vitae for each faculty member are presented in Appendix 4.A listing of present faculty members follows.

i. Shahram Khosrowpanah, Ph.D., P.E., Professor and Dean, School of Engineering

ii. Pyo-Yoon Hong, Ph.D., P.E., Associate Professor and Division Chair, School of Engineering

iii. Ujwal kumar D. Patil, Ph.D., P.E., Assistant Professor, School of Engineering

iv. Joseph D Rouse, Ph.D., P.E., Professor, Water and Environmental Research Institute

4.2 Number and types of additional faculty and other staff positions, if any, needed to initiate the proposed program.

The program requires up to four (4) Full Time Equivalent (FTE) faculty to teach all of the courses that are part of the curriculum. A normal load at UOG for faculty is 9 to12 contact hours per semester. Four faculty members are required to fully implement the complete civil engineering program with an expected growth to 3.5 FTE. The minimum credentials required for each faulty member are a Ph.D. degree along with several years of experience in the discipline. Additionally, part-time faculty with appropriate expertise will be employed as required to teach selected courses.

4.3 Estimate of additional faculty and other staff positions needed specifically for the proposed program one, two, and five years after its approval.

According to ABET criteria the program must have competencies to cover all of the curricular areas of the program. We have determined that there is need to hire two additional faculty members. Currently, the search are on-going for hiring new faculty position (structural and hydrology).

4.4 List of courses now offered, by catalog number, title and units of credit needed in the proposed program.

The courses are listed as they appear in the UOG 2018-2019 Undergraduate Catalog. The recourses include:

Program Core

- CEE 100 Introduction to Engineering *1 Credits*
- CEE 101 Engineering Graphics *3 Credits*
- CEE 201 Engineering Statics *3 Credits*
- CEE 202 Engineering Dynamics *3 Credits*
- CEE 203 Mechanics of Materials *3 Credits*
- CEE 301 Structural Analysis *3 Credits*
- CEE 303 Geotechnical Engineering *3 Credits*
- CEE 303L Geotechnical Engineering Lab *1 Credits*
- CEE 305 Earth Structures Design *3 Credits*

4.5 List of additional courses not now offered, by catalog number, title and units of credit, needed initially and during the first two years after approval of the program, needed to make the program fully operative.

New course request forms and syllabi are in Appendix 5

- CEE 204 Mechanics of Fluids *3 Credits*
- CEE 302 Engineering Hydraulics *3 Credits*
- CEE 302L Engineering Hydraulics Lab *1 Credits*
- CEE 304 Civil Engineering Materials *3 Credits*
- CEE 304L Civil Engineering Materials Lab *1 Credits*
- CEE 306 Reinforced Concrete Structures Design *3 Credits*
- CEE 307 Introduction to Environmental Engineering *3 Credits*
- CEE 308 Introduction to Surveying *4 Credits*
- CEE 401 Steel Structures Design *3 Credits*
- CEE 402 Foundation Engineering *3 Credits*
- CEE 403 Ethics& Sustainability in Civil Engineering *2 Credits*
- CEE 404 Civil Engineering Design I *2 Credits*
- CEE 405 Civil Engineering Design II *2 Credits*

4.6 College library resources, available in direct support of the propose program, specified by subject areas, volume count, periodical holdings, etc.

UOG Library Resources (LRC):
Inter-library loan is available to both students and faculty. Some items can be received at no cost, for others LRC is charged for. Both students and faculty may designate if they are willing to pay for an item. Here are links to the online for various types of materials:

Databases
The RFK library has access to more EBSCO data bases than PREL does but the systems are not interchangeable in that if you store something in a folder on the PREL site you cannot access it from the same data base through the UOG. You can reach

UOG databases from home if you have your library card up-to-date. You can reach them with the university Wi-Fi if you have the computer center install the software on your personal computer. You access these by clicking on the "Electronic Journal s and Databases" link on the library web page. The LRC has MedlinePius and PubMed.

Other databases directly related to this field might be:
There are also Newspaper databases such as News Bank which could be helpful and more general academic data bases such as EBSCO Academic Search Premiere

Because of the multidisciplinary nature of the Master of Science in Sustainable Agriculture, Food and Natural Resources, a wide variety of library subject classes support the proposed program.

4.7 Plans for developing college library resources in support of the proposed program during the first five years of operating the program.

The School of Engineering is in progress of Internet accessibility for students in the teaching classroom and research laboratories. The future computer lab in the new School of Engineering Building is to accommodate students with online courses and bibliographic research.

4.8 Other instructional materials, if any, needed in support of the proposed program, itemized with cost estimates as projected for the first five years of operating the program.

The laboratories in the new School of Engineering building will include a structural laboratory, geotechnical laboratory, hydraulic laboratory and computer lab. These resources will be exclusively used by engineering programs and provide ideal environments for capstone projects in civil engineering fields.

4.9 Special classrooms, laboratories and other capital outlay facilities, if any, needed in support of the proposed program, itemized and arranged by dates for the first five years of operating program.

The structural laboratory, geotechnical laboratory, hydraulic laboratory and computer laboratory are an integral part of construction of new School of Engineering building.