Updated 11-13-08

ARIZONA STATE UNIVERSITY
PROPOSAL TO ESTABLISH A NEW UNDERGRADUATE DEGREE

This template is to be used only by programs that have received specific written approval from the Provost's office to proceed with internal proposal development and review. A separate proposal must be submitted for each individual new degree program.

DEGREE PROGRAM INFORMATION

College/School(s) offering this degree: Ira A. Fulton Schools of Engineering

Unit(s) within college/school responsible for program: School of Sustainable Engineering and the Built Environment

If this is for an official joint degree program, list all units and colleges/schools that will be involved in offering the degree program and providing the necessary resources: N/A

Proposed Degree Name: BSE in Construction Engineering

Undergraduate Degree Type: Bachelor of Science in Engineering

If Degree Type is Other, provide proposed degree type: N/A

and proposed abbreviation:

Proposed title of major: Construction Engineering

Is a program fee required? Yes ☒ **No** ☐

Requested effective term: Select term and year: Fall 2010
(The first semester and year for which students may begin applying to the program.)

PROPOSAL CONTACT INFORMATION
(Person to contact regarding this proposal)

Name: G. Edward Gibson, Jr.

Title: Professor and Program Chairman, Del E. Webb School of Construction

Phone: 480-965-7972

email: edd.gibson@asu.edu

DEAN APPROVAL

This proposal has been approved by all necessary unit and College/School levels of review, and the College/School(s) has the resources to offer this degree program. I recommend implementation of the proposed degree program. (*Note: An electronic signature, an email from the dean or dean's designee, or a PDF of the signed signature page is acceptable.*)

College Dean name: Deirdre R. Meldrum, Dean

College Dean signature ______________________ **Date:** __4/16/10__

Paul C. Johnson, Executive Dean

College Dean name:
(if more than one college involved)

College Dean signature ______________________ **Date:** __________

ARIZONA STATE UNIVERSITY
PROPOSAL TO ESTABLISH A NEW UNDERGRADUATE DEGREE

This proposal template should be completed in full and submitted to the University Provost's Academic Council [mailto:curriculum@asu.edu]. It must undergo all internal university review and approval steps including those at the unit, college, and university levels. A program **may not** be implemented until the Provost's Office notifies the academic unit that the program may be offered.

DEGREE PROGRAM INFORMATION

Undergraduate: Bachelor of Science in Engineering

If Degree Type is Other, provide proposed degree type: N/A
and proposed abbreviation:

Proposed title of major: Construction Engineering

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1. PURPOSE AND NATURE OF PROGRAM

A. Brief program description (This is a catalog type description. Include the distinctive features of the program that make it unique. Do not include program or admission requirements.)

The construction engineering degree will fill a gap in the School of Sustainable Engineering and the Built Environment (SSEBE). It will be focused on a combination of engineering and construction management topics and be desirable to those students who are interested in a career in engineering, with an emphasis on construction. This degree is being added to programs across the country (about 15 programs now up from 7 eight years ago) and will be the second in the southwestern part of the US; it will be attractive to students in both Civil Engineering (where 25% are in the construction concentration area), as well as CM students and others across campus. The degree makeup will come from classes that are mostly already offered with a focus on sustainability and building information modeling topics.

2. STUDENT LEARNING OUTCOMES AND ASSESMENT

A. List the knowledge, competencies, and skills students should have when they graduate from the proposed degree program.

Technical Outcomes.
Upon completion of the program, graduates of The Arizona State University Bachelor of Science in Engineering Construction Engineering program will be able to:

Outcome T1: **Solve** problems in mathematics through differential equations, probability and statistics, calculus-based physics, and general chemistry, and one additional area of science. *(Level 3)*

Outcome T2: **Select** and **conduct** engineering experiments to meet a need, and **analyze** and **evaluate** the resulting data. *(Level 4)*

Outcome T3: **Apply** relevant knowledge, techniques, skills, and modern engineering tools to identify, formulate, and solve engineering problems, including problems in construction processes, communications, methods, materials, systems, equipment, planning, scheduling, safety, economics, accounting, cost analysis and control, decision analysis, and optimization. *(Level 3)*

Outcome T4: **Design** a system or process in more than one construction engineering specialty field (structural, geotechnical, transportation, mechanical, energy) to meet desired needs, within realistic constraints such as economic, environmental, social, political, ethical, health and safety, constructability, and sustainability. *(Level 5)*

Outcome T5: **Predict** possible global, economic, environmental, and societal impacts of a specific, relatively constrained engineering solution. *(Level 3)*

Outcome T6: **Function** effectively as a member of a multidisciplinary engineering analysis and design team. *(Level 3)*

Outcome T7: **Explain** key aspects of at least one traditional or emerging area of advanced specialization appropriate to construction engineering. *(Level 2)*

Professional Practice Outcomes.

Upon completion of the program, graduates of The Arizona State University Bachelor of Science in Engineering Construction Engineering program will be able to:

Outcome P1: **Analyze** a situation involving multiple conflicting professional, legal, and ethical interests to determine an appropriate course of action. *(Level 4)*

Outcome P2: **Organize** and **deliver** effective written, verbal, graphical and virtual communications. *(Level 4)*

Outcome P3: **Demonstrate** the ability to learn through independent study, without the aid of formal instruction. *(Level 3)*

Outcome P4: **Demonstrate** the ability to incorporate contemporary issues into the identification, formulation, and solution of an engineering problem. *(Level 3)*

Outcome P5: **Explain** the importance of licensure, and basic concepts in construction engineering, business, public policy, and leadership. *(Level 2)*

B. Describe the plan and methods to assess whether students have achieved the knowledge, competencies and skills identified in the Learning Outcomes. (You can find examples of assessment methods at (http://www.asu.edu/oue/assessment.html)

The intent will be to seek Accreditation Board for Engineering and Technology (ABET) accreditation once the program is established and students begin to graduate (ABET requires at least one student to have graduated before accreditation can be considered). Accordingly, ABET processes will be employed for defining and assessing the program objectives and learning outcomes. Two to three metrics will be defined from the curriculum for each learning outcome. Metrics will be specific exam questions, project components or student presentations that directly relate to the outcome. Each metric will state the minimum acceptable proportion of students that must achieve a minimally acceptable score on the metric as defined by an accompanying rubric. With input from the program stakeholders, the program chair will be responsible for formalizing the metrics. Course instructors will evaluate the metrics each semester and forward the results to the Program Chair. The curriculum committee will evaluate performance on the metrics each Spring and propose recommended curricular changes if necessary.

3. CURRICULUM OF THE PROPOSED PROGRAM

Total credit hours must be 120 to include: first year composition, general studies, core/required courses, program specific electives, and any additional requirements.

A. Major Map. Please prepare and attach a Major Map. If there are concentrations in this degree program, prepare a separate Major Map for each one. (Examples of Major Maps can be found at http://provost.asu.edu/curriculum) Found in **Appendix B.**

B. Total credit hours required for this program: 120

English Composition	6	credits
Math & Science Core	26	credits
General Studies Core	15	credits
Supporting Core Foundations	3	credits

Construction Engineering Courses	24	credits
Construction Management	29	credits
Structural Design Electives	6	credits
Basic Science Elective	3	credits
Technical Electives	3	credits
Managerial Internship	1	credit
Capstone	4	credits
	120	**credits**

C. Core/Required Courses.

i. Total required and/or core course credit hours: 97

ii. List the name, prefix, and credit hours for each required/core class for this program.

In order to meet the clearly defined learning outcomes for the Construction Engineering program, specific clusters of core courses have been defined. These are:

- Math and Science Core: (26 hours total)
  - CHM 114 — 4 — Gen.I Chem. for Engr. (SQ) OR CHM 116 Gen. Chem. II (SQ) (4)
  - MAT 265 — 3 — Calculus for Engineers I (MA)
  - MAT 266 — 3 — Calculus for Engineers II
  - MAT 267 — 3 — Calculus for Engineers III
  - MAT 242 — 2 — Elementary Linear Algebra
  - MAT 275 — 3 — Modern Differential Equations
  - PHY 121 — 3 — University Physics I (SQ)
  - PHY 122 — 1 — University Physics I Laboratory (SQ)
  - PHY 131 — 3 — Univ Physics II: Elctrc/Magnet
  - PHY 132 — 1 — University Physics Lab II

- General Studies Core Requirements: (15 hours total)
  - CEE 400 — 3 — Earth Systems Engineering & Management (HU)
  - CON 101 — 3 — Const/Culture: A Built Environment (HU,G, H)
  - ECN 201/211/212 — 3 — Economic Issues/Macro/Microeconomics (SB)
  - HU or SB, & C — 6

- Supporting Core Foundations: (3 hours total)
  - ASU 101 — 1 — The ASU Experience
  - CEE 100 — 2 — Intro to Civil & Environmental Engineering

- Construction Engineering Courses (24 hours total)
  - CEE 210 — 3 — Engineering Mechanics: Statics
  - CEE 212 — 3 — Engineering Mechanics: Dynamics
  - CEE 213 — 3 — Introduction to Deformable Solids
  - CEE 321 — 4 — Structural Analysis and Design
  - CEE 351 — 4 — Geotechnical Engineering
  - CEE 353 — 3 — Civil Engineering Materials
  - EEE 202 — 4 — Circuits I, OR MAE 240 Thermofluids I (4)

- Construction Management (29 hours total)
  - CON 241 — 3 — Surveying
  - CON 243 — 3 — Heavy Construction Equip, Methods, Materials
  - CON 271 — 3 — Construction Safety
  - CON 383 — 4 — Construction Estimating
  - CON 389 — 3 — Construction Cost Accounting and Control (CS)
  - CON 453 — 4 — Construction Project Management 1
  - CON 495 — 3 — Construction Planning and Scheduling
  - CON 496 — 3 — Construction Contract Administration (L)
  - IEE 380 — 3 — Probability & Statistics for Engr Problem Solving

D. Program Specific Electives.

i. Total required program elective credit hours: 12

ii. List the name, prefix, and credit hours for any program specific electives for this program:

Three categories of Program Electives have been designed.

- Structural Design (two of the following three classes) 6
  - CEE 420 3 Steel Structures
  - CEE 421 3 Concrete Structures
  - CEE 452 3 Foundations
- Basic Science Elective 3
  - GLG 101 3 Geology, or approved courses related to construction engineering in: life sciences, earth sciences, advanced chemistry and advanced physics.
- Technical Electives (one of the following) 3
  - CEE 341 3 Fluid Mech. for Civil Engrg
  - CEE 372 3 Transportation Engineering
  - CEE 412 3 Pavement Design
  - CEE 483 3 Highway Materials and Construction
  - Other program approved topics

E. Additional Program Requirements, if any.

i. Total required additional program requirements: 0

ii. List and describe any capstone experiences, milestone, and/or additional requirements for this degree program:

The student must complete a field internship working for a construction or construction engineering organizations.

- Internship Event
  - CON 484 1 Managerial Internship

The student must complete a capstone experience in their final semester. The capstone will consist of an industry-based project. This will be a team project where the Construction Engineering major fulfills the role of project manager for a multidisciplinary team project. The project responsibilities of the student must be approved by the ASU course instructor.

- Capstone Events
  - CON 486 4 Integrated Civil Engineering Design (L)

F. Are any concentrations to be established under this degree program? ☐ Yes ☒ No

i. If "Yes", please check one:

☐ Students must select a concentration as part of this degree program

☐ Concentrations are optional

ii. List courses & additional requirements for the proposed concentration (s):

4. NEW COURSE DEVELOPMENT

A. Will a new course prefix(es) be required for this degree program? Yes ☐ No ☒

If yes, complete the request for establishment of a new prefix for each prefix and submit with this proposal.

B. New Courses Required for Proposed Degree Program. List all new courses required for this program, including course prefix, number and course description.

- None at this point

5. PROGRAM NEED. Explain why the university needs to offer this program (include target audience and market).

Students who want a combination of Civil Engineering and Construction Management with aspirations of moving from technical to managerial positions as their careers mature will be attracted to this program.

- We have identified a large number of existing civil engineering and construction management students seeking to focus on the construction industry and project management.
- The large need for construction and engineering talent to support the built environment in the future should drive a strong interest in the program.
- Recently (April 2008), engineers began to have the opportunity to become licensed in construction engineering. Since then, about 25% of all individuals taking the Professional Practice exam to gain their professional engineering license have taken the construction engineering option.

6. **IMPACT ON OTHER PROGRAMS.** List other academic units that might be impacted by the proposed program and describe the potential impact (e.g., how the implementation of this program might affect student headcount/enrollment, student recruitment, faculty participation, course content, etc. in other programs). Attach letters of collaboration/support from impacted programs.

With the projected enrollment in the Construction Engineering program, impact on other programs is not foreseen. The impact should be negligible.

Letters of support from the following departments can be found in **Appendix C**. These include letters from:

- Paul Westerhoff, Director of School of Sustainable Engineering and the Built Environment
- Edd Gibson, Program Chairman of Del E. Webb School of Construction
- Mike Mamlouk, Program Chairman of Civil, Environmental and Sustainable Engineering program
- Katherine Spielmann, Associate Director, School of Sustainability

7. **PROJECTED ENROLLMENT** How many new students do you anticipate enrolling in this program each year for the next five years? Please utilize the following tabular format.

5-YEAR PROJECTED ANNUAL ENROLLMENT					
	1st Year	**2nd Year** (Yr 1 continuing + new entering)	**3rd Year** (Yr 1 & 2 continuing + new entering)	**4th Year** (Yrs 1, 2, 3 continuing + new entering)	**5th Year** (Yrs 1, 2, 3, 4 continuing + new entering)
Number of Students Majoring (Headcount)	20	40	70	100	120

8. **ACCREDITATION OR LICENSING REQUIREMENTS (if applicable).** Provide the names of the external agencies for accreditation, professional licensing, etc. that guide your curriculum for this program, if any. Describe any requirements for accreditation or licensing. ABET (Accreditation Board for Engineering and Technology). Accreditation requirements are available at: http://www.abet.org/forms.shtml#For_Engineering_Programs_Only. In addition to the requirements for all engineering programs, Specific Criteria for Construction Engineering are

1. Curriculum
The program must demonstrate the graduates can apply knowledge of mathematics through differential and integral calculus, probability and statistics, general chemistry, and calculus-based physics; can analyze and design construction processes and systems in a construction engineering specialty field applying knowledge of methods, materials, equipment, planning, scheduling, safety, and cost analysis; can explain basic legal and ethical concepts and the importance of professional engineering licensure in the construction industry; and can explain basic concepts of management topics such as economics, business, accounting, communications, leadership, decision and optimization methods, engineering economics, engineering management, and cost control.

2. Faculty
The program must demonstrate that the majority of faculty teaching courses that are primarily design in content are qualified to teach the subject matter by virtue of professional licensure, or by education and design experience. The faculty must include at least one member who has had full-time experience and decision-making responsibilities in the construction industry.

Note: These are newly proposed criteria and should receive final approval in summer 2010 by ABET.

9. FACULTY and STAFF

a. **Current Faculty**. List the name, rank, highest degree, area of specialization/expertise and estimate of the level of involvement of all current faculty who will teach in the program.

Construction Engineering faculty involved in this program include the following. Many teach in the undergraduate program and will have involvement in the Construction Engineering program through the courses they already teach.

Faculty	Rank	Degree	Area
Morteza Abbaszadegan	Professor	Ph.D.	Water
Samuel T Ariaratnam	Professor	Ph.D.	Trenchless Construction
Soyoung Ahn	Assistant Professor	Ph.D.	Transportation
Braden Allenby	Professor	Ph.D.	Earth Systems Engineering
Absar Alum	Asst. Prof. Research	Ph.D.	Water
William Badger	Professor	Ph.D.	Leadership and construction production
Howard H Bashford	Associate Professor	Ph.D.	residential construction issues
Allan D. Chasey,	Associate Professor	Ph.D.	Controlled Environment Construction
Paul R. Dahlen	Asst. Prof. Research	Ph.D.	Groundwater
Hugo Destaillats	Asst. Prof. Research	Ph.D.	Environmental chemistry
Mohamed El-Basyouny	Asst. Prof. Research	Ph.D.	Pavement Materials
James J. Ernzen	Associate Professor	Ph.D.	Concrete Design
Apostolos Fafitis	Associate Professor	Ph.D.	Structures
Peter Fox	Professor	Ph.D.	Water
G. Edward Gibson	Professor	Ph.D.	Planning, Risk Management
Rolf Halden	Associate Professor	Ph.D.	Sustainability,
Sandra L Houston	Professor	Ph.D.	Geotechnical Engineering
Paul Johnson	Executive Dean, Professor	Ph.D.	Water
Kamil Kaloush	Associate Professor	Ph.D.	Pavement Materials
Dean T. Kashiwagi	Professor	Ph.D.	Information Measurement Theory
Edward Kavazanjian	Associate Professor	Ph.D.	Geotechnical Engineering
Kraig Knutson	Lecturer, Sr.	Ph.D.	Electrical construction
Rosa Krajmalnik-Brown	Assistant Professor	Ph.D.	environmental contaminants
Christopher Lawrence	Lecturer	Ph.D.	Structures
Jason S. Lueke	Assistant Professor	Ph.D.	Trenchless Construction
Michael Mamlouk	Professor	Ph.D.	Pavement analysis and design
Brooke Mayer	Lecturer	Ph.D.	Drinking water treatment
Larry Mays	Professor	Ph.D.	Hydrosystems
Panagiotis Mitropoulos	Assistant Professor	Ph.D.	Safety
Barzin Mobasher	Professor	Ph.D.	Mechanics of Composite Materials
Ram M. Pendyala	Professor	Ph.D.	Transportation
Subramaniam D. Rajan	Professor	Ph.D.	Constitutive Material Modeling
Bruce E. Rittmann	Regents' Professor	Ph.D.	Environmental Biotechnology
Hodon Ryu	Asst. Prof. Research	Ph.D.	Water treatment)
Kenneth T. Sullivan	Assistant Professor	Ph.D.	Facility Management
Enrique Vivoni	Associate Professor	Ph.D.	Surface Hydrology
Edwin C Weaver	Lecturer, Sr.	M.C.E.	Concrete construction
Paul Westerhoff	Professor	Ph.D.	Drinking water treatment
Avi Wiezel	Associate Professor	Ph.D.	Information technology in construction
Eric D Williams	Assistant Professor	Ph.D.	Industrial ecology
Matthew Witczak	Professor	Ph.D.	Highway and airfield pavements
Claudia E. Zapata	Assistant Professor	Ph.D.	Geotechnical Engineering

b. **New Faculty.** Describe the new faculty hiring needed during the next three years to sustain the program. List the anticipated hiring schedule and financial sources for supporting the addition of these faculty.

Program Chair. At this time, the Chair of the program can come from within SSEBE. In the future, a faculty member may need to be hired with this position in mind.

Additional Faculty Members: No new faculty members are needed to get the program going, but as the number of students grow and courses evolve, it would be advantageous to hire four or five faculty members at some point in the future with a clear construction engineering focus. This can perhaps be done by selective hiring of faculty to replace retirees.

c. **Administration of the program.** Explain how the program will be administered for the purposes of admissions, advising, course offerings, etc. Discuss the available staff support.

The program will be administered by the School of Sustainable Engineering and the Built Environment (SSEBE). The Faculty of SSEBE will assume responsibility for the curriculum. Advising will be performed by the academic success specialists within SSEBE.

10. RESOURCES (necessary to launch and sustain the program)

a. Describe any new resources required for this program's success, such as new support staff, new facilities, new library resources, new technology resources, etc.

None at this point.

b. Explain where you will get the resources to support this program.

N/A

APPENDIX A
OPERATIONAL INFORMATION FOR UNDERGRADUATE PROGRAMS

(This information is used to populate the Degree Search /catalog website.)

1. Contact and Support Information

Office Location (Building & Room): SSEBE Student Advising Center, ECG 251

Campus Telephone Number: 480-965-0595

Program email address: sebe.advising@asu.edu

Mail Code: 5306

Program website address: http://engineering.asu.edu/ssebe (under development)

2. Additional Program Description Information

A. Additional program fee required for this program? Yes ☐ No ☒
(Students will be charged the differential tuition assessed for undergraduate engineering students ~ no additional program specific fee is anticipated.)

B. Does this program have a second language requirement? Yes ☐ No ☒

3. Career Opportunities & Concentrations

Career Opportunities & Concentrations Provide a brief description of career opportunities available for this degree program. If program will have concentrations, provide a brief description for each concentration.

The Construction Engineering graduate will be prepared to begin as a field engineer, project engineer, or project designer working for facility owners, design firms, construction companies, specialty subcontractors, or material suppliers. The graduate will have unique skills which will allow he or she to take on the role of integrator in the delivery of design build projects or development activities. As the graduate's career progresses, each should be able to take on leadership roles in the delivery of sustainable facilities in the built environment and then progress through successively higher levels of management responsibility. The graduate should be particularly attuned to design and construction of heavy civil and industrial facilities meeting the infrastructure needs of society.

4. Additional Admission Requirements If applicable list any admission requirements (freshman and/or transfer) that are higher than and/or in addition to the university minimum undergraduate admission requirements.)

Admission requirements will be the same as the current admission requirements for the Ira A. Fulton Schools of Engineering.

- Freshman Admission Requirements:

1. Minimum 1140 SAT combined math and verbal or minimum 24 ACT combined score; **or** 3.00 minimum ABOR GPA; **or** class ranking in top 25 percent of high school class.
2. No high school math or science competency deficiencies,

- Transfer students with fewer than 24 transferable college credit hours:

1. Minimum transfer GPA of 3.00 for less than 24 transfer hours.
2. Minimum 1140 SAT combined math and verbal or minimum 24 ACT combined score, **or** 3.00 minimum ABOR GPA, **or** class ranking in top 25 percent of high school class.
3. No high school math or science competency deficiencies.

- Transfer students with 24 or more transferable college credit hours:

1. Minimum transfer GPA of 3.00 for 24 or more transfer hours.
2. No high school math or science competency deficiencies (if Undergraduate Admission requires submission of a high school transcript).

5. Keywords List all keywords used to search for this program. Keywords should be specific to the proposed program.

Construction Engineering, Project Management, Leadership, Project Integration, Risk Management

6. Area(s) of Interest

A. Select one (1) primary Area of Interest from the list below that applies to this program.

☐	Architecture, Construction & Design	☒	Engineering & Technology
☐	Artistic Expression & Performance	☐	Environmental Issues & Physical Sci
☐	Biological Sciences, Health & Wellness	☐	Interdisciplinary Studies
☐	Business, Management & Economics	☐	Languages & Cultures
☐	Communication & Media	☐	Law & Justice
☐	Computing & Mathematics	☐	Social Science, Policies & Issues
☐	Education & Teaching		

B. Select any additional Areas of Interest that apply to this program from the list below.

☒	Architecture, Construction & Design	☐	Environmental Issues & Physical Sci
☐	Artistic Expression & Performance	☐	Engineering & Technology
☐	Biological Sciences, Health & Wellness	☐	Interdisciplinary Studies
☒	Business, Management & Economics	☐	Languages & Cultures
☐	Communication & Media	☐	Law & Justice
☐	Computing & Mathematics	☐	Social Science, Policies & Issues
☐	Education & Teaching		

Updated 11-13-08

APPENDIX B - MAJOR MAP for CONSTRUCTION ENGINEERING PROGRAM

Course Subject and Title *(courses in bold/shading are critical)*	Hrs.	Upper Division	Transfer Course/Grade	Minimum Grade if Required	Additional Critical Requirement Notes
			Completed ATP: ☐ *Yes* ☐ *No*		*Completed AGEC:* ☐ *Yes* ☐ *No*
TERM ONE: 0-15 CREDIT HOURS					
ASU 101-FSE: The ASU Experience	1	☐			• ASU 101-FSE should be completed first semester. • An SAT, ACT, Accuplacer, or TOEFL score determines placement into first-year composition courses • ASU Math Placement Exam score determines placement in Mathematics course ** If ENG 105 a 3 hr applicable elective must also be taken prior to graduation. See Advisor.
CEE 100: Intro to Civil and Environmental Engineering	2	☐		Grade of C	
CHM 114: General Chemistry for Engineers (SQ) OR CHM 116: General Chemistry II* (SQ)	4	☐			
MAT 265: Calculus for Engineers I	3	☐		Grade of C	
ENG 101 or 102: First-Year Composition OR ENG 105: Advanced First-Year Composition** OR ENG 107 or 108: English for Foreign Students	3	☐		Grade of C	
CON 101: Construction & Culture: A Built Environment (HU, G, H)	3	☐			
TERM TWO: 16-30 CREDIT HOURS					
ECN 211/212 (SB): Macroeconomic Principles/Microeconomic Principles or ECN 201: Economic Issues & Analysis (SB)	3	☐			
MAT 242: Elementary Linear Algebra	2	☐		Grade of C	
MAT 266: Calculus for Engineers II	3	☐		Grade of C	
PHY 121/122: University Physics I/ Laboratory I (SQ)	3/1	☐		Grade of C	
ENG 101 or 102: First-Year Composition OR ENG 105: Advanced First-Year Composition** OR ENG 107 or 108: English for Foreign Students	3	☐		Grade of C	
TERM THREE: 31-45 CREDIT HOURS					
CEE 210: Engineering Mechanics: Statics	3	☐		Grade of C	• **Complete all 10 critical courses.** • Complete First-Year Composition requirement: ENG 101 & 102 or ENG 107 & 108 or ENG 105
MAT 267: Calculus for Engineers III	3	☐		Grade of C	
MAT 275: Modern Differential Equations (MA)	3	☐		Grade of C	
PHY 131/132: University Physics II: Electricity and Magnetism/Laboratory II (SQ)	3/1	☐		Grade of C	
TERM FOUR: 46-60 CREDIT HOURS					
CEE 212: Engineering Mechanics: Dynamics	3	☐		Grade of C	
CEE 213: Introduction to Deformable Solids	3	☐		Grade of C	
CON 243: Heavy Construction Equipment, Methods, Materials	3	☐		Grade of C	
EEE 202: Circuits I OR MAE 240: Thermofluids I	4	☐			
Social & Behavioral Science (SB)	3	☐			
TERM FIVE: 61-75 CREDIT HOURS					
# CEE 321: Structural Analysis and Design	4	☒		Grade of C	• See advisor for approved science electives. # Designates Major Course: A minimum cumulative GPA of 2.30 required in all CEE & CON 3XX courses. A minimum cumulative GPA of 2.30 required in all CEE & CON 4XX courses. NOTE: A maximum of two "D" grades are allowed in all 3XX and 4XX courses combined.
# CEE 353: Civil Engineering Materials	3	☒		Grade of C	
# CON 389: Construction Cost Accounting and Control (CS)	3	☒		Grade of C	
IEE 380: Probability and Statistics for Engineering Problem Solving	3	☒			
Basic Science Elective	3	☐			
TERM SIX: 76-90 CREDIT HOURS					
# CEE 351: Geotechnical Engineering	4	☒		Grade of C	# Designates Major Course: A minimum cumulative GPA of 2.30 required in all CEE & CON 3XX courses. A minimum cumulative GPA of 2.30 required in all CEE & CON 4XX courses. NOTE: A maximum of two "D" grades are allowed in all 3XX and 4XX courses combined.
CON 241: Surveying	3	☐		Grade of C	
CON 271: Construction Safety	3	☐		Grade of C	
# CON 383: Construction Estimating	4	☒		Grade of C	
TERM SUMMER 3rd Year: 1 CREDIT HOUR					
# CON 484: Managerial Internship	1	☒			# Designates Major Course:
TERM SEVEN: 91-105 CREDIT HOURS					
# CON 453: Construction Project Management I	4	☒		Grade of C	• See advisor for approved technical electives. # Designates Major Course: A minimum cumulative GPA of 2.30 required in all CEE & CON 3XX courses. A minimum cumulative GPA of 2.30 required in all CEE & CON 4XX courses. NOTE: A maximum of two "D" grades are allowed in all 3XX and 4XX courses combined.
# CON 495: Construction Planning and Scheduling (CS)	3	☒		Grade of C	
Structures Elective: - Select 2 of: # CEE 420 Steel Structures (3) # CEE 421 Concrete Structures (3) # CEE 452 Foundations (3)	6	☒		Grade of C	
# Technical Elective	3	☒		Grade of C	
TERM EIGHT: 106-120 CREDIT HOURS					
# CEE 400: Earth Systems Engineering and Management (HU, H)	3	☒		Grade of C	# Designates Major Course: A minimum cumulative GPA of 2.30 required in all CEE & CON 3XX courses. A minimum cumulative GPA of 2.30 required in all CEE & CON 4XX courses. NOTE: A maximum of two "D" grades are allowed in all 3XX and 4XX courses combined.
# CEE 486: Integrated Civil Engineering Design (L)	4	☒		Grade of C	
# CON 496: Construction Contract Administration (L)	3	☒		Grade of C	
Humanities, Fine Arts & Design (HU) OR Social & Behavioral Science (SB) AND Cultural Diversity in the US (C),	3	☐			

Ira A. Fulton
Schools of Engineering

ARIZONA STATE UNIVERSITY

March 30, 2010

Dr. Paul Westerhoff, Director
School of Sustainable Engineering and the Built Environment
MC 5306

Dear Paul,

Re: Construction Engineering Program

As Program Chair of the Del E. Webb School of Construction with responsibility of overseeing undergraduate and graduate construction programs, I see the new Construction Engineering Program as having a positive impact on our efforts here.

I expect the program will attract new students to SSEBE and although some of our existing students may transfer, it should positively impact SSEBE enrollment. In addition, it will influence interactions between DEWSC and CESE graduate program efforts.

Yours truly,

G. Edward Gibson, Jr., Ph.D., P.E.
Programs Chairman, Del E. Webb School of Construction
Professor and Sunstate Chair of Construction Management and Engineering

School of Sustainable Engineering and the Built Environment
Del E. Webb School of Construction
PO Box 870204 Tempe, AZ 85287-0204
(480) 965-3589 FAX: (480) 965-0557

G. Gibson

To: Michael Mamlouk
Subject: RE: Construction Engineering Program

Thanks Mike,
Best regards
Edd

From: Michael Mamlouk [mailto:mamlouk@asu.edu]
Sent: Tuesday, March 30, 2010 10:51 AM
To: edd.gibson@asu.edu
Subject: Construction Engineering Program

Dear Edd,

As the Undergraduate Program Chair of Civil, Environmental and Sustainable Engineering, I support the development of the new Construction Engineering Program. I see the new Construction Engineering Program as having a positive impact on our efforts here.

I expect the new Construction Engineering Program will attract new students to the School of Sustainable Engineering and the Built Environment. Although some of our existing students may transfer to the new program, it should positively impact the enrollment of SSEBE. In addition, it will improve interactions between DEWSC and CESE graduate program efforts.

Regards.

Mike Mamlouk, Ph.D., P.E., F.ASCE
Professor and Undergraduate Program Chair
Civil, Environmental and Sustainable Engineering
School of Sustainable Engineering & the Built Environment
Arizona State University
Tempe, AZ 85287-5306
Phone: 480-965-2892
Fax: 480-965-0557

SCHOOL of SUSTAINABILITY
ARIZONA STATE UNIVERSITY

April 14, 2010

Prof. Paul Westerhoff
Director, School of Sustainable Engineering and the Built Environment
Ira A. Fulton Schools of Engineering
Arizona State University

Dear Paul-

Thank you for sharing with the School of Sustainability your plans to establish new degree programs at the undergraduate and graduate level in Construction Engineering.

I have shared these plans with the Executive Committee for the School of Sustainability and we see no conflicts between our programs and your newly proposed BS and MSE in Construction Engineering. If the School of Sustainability can be of any assistance as you develop these programs, please let me know.

Sincerely,

Matthew P. Fraser
Associate Professor

PO Box 875502 Tempe, AZ 85287-5502
Tel: (480) 727-6963 Fax: (480) 965-8087
http://schoolofsustainability.asu.edu

Ira A. Fulton
Schools of Engineering
ARIZONA STATE UNIVERSITY

To: James Collofello, Associate Dean, Ira A. Fulton School of Engineering

From: Paul Westerhoff,
Director, School of Sustainable Engineering and the Built Environment

Date: March 1, 2010

RE: Proposal for a Sustainable Engineering Concentration in the Bachelor of Science in Engineering degree in Civil, Environmental, and Sustainable Engineering

The faculty of the School of Sustainable Engineering and the Built Environment support the proposal for a new concentration of Sustainable Engineering in the Bachelor of Science in Engineering degree in Civil, Environmental, and Sustainable Engineering. This new concentration will enable us to attract engineering students interested in complex systems, and help keep the civil engineering field at the front of leading technological change for society. The proposed concentration incorporates many of the ideas and classes in the new university wide sustainability minor. I served on the ad-hoc Provost committee to develop the sustainability minor with Chris Boone. The sustainable engineering concentration will allow students to take classes in the area of sustainability while also meeting ABET requirements. Overall, we anticipate the sustainable engineering concentration to increase enrollment in our program and provide a rigorous and focused series of courses designed to address a critical need for the future of the US economy.

School of Sustainable Engineering and the Built Environment
Civil, Environmental and Sustainable Engineering
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To: G Gibson
Subject: RE: UPAC Review of Curriculum Proposals

From: Katherine Spielmann
Sent: Monday, April 26, 2010 11:45 AM
To: G Gibson
Subject: RE: UPAC Review of Curriculum Proposals

Dear Edd,

The School of Sustainability is supportive of the BSE in Construction Engineering. Given that it
does not require a SOS course, we see no direct impact on our undergraduate classes.

Sincerely,

Katherine A Spielmann
Associate Director, School of Sustainability
Professor of Anthropology, School of Human Evolution and Social Change
Arizona State University
Tempe, Arizona 86287-2402

kate.spielmann@asu.edu
480-965-5138

From: G Gibson
Sent: Monday, April 26, 2010 6:17 AM
To: Matthew Fraser; Katherine Spielmann
Cc: Paul Westerhoff
Subject: FW: UPAC Review of Curriculum Proposals
Importance: High

Dear Kate and Matt,

I included the attached email in our proposal for the new Construction Engineering program a few
weeks ago. Apparently that was not acceptable as the email trail below outlines, so I was
wondering if I could get two separate letters, one for the BSE and one for the MSE programs,
stating impact. For the BSE degree, this is the only outstanding item. I am also enclosing both
proposals with this email.

There is a very short deadline (8am on the 28th) and I appreciate your help on this.

best regards

Edd