ABET
Self-Study Report

for the

Civil Engineering Program

at

University of Louisiana at Lafayette

Lafayette, Louisiana

Date June 2013

CONFIDENTIAL

Table of Contents

List of Tables

List of Figures

BACKGROUND INFORMATION

A. Contact Information

List name, mailing address, telephone number, fax number, and e-mail address for the primary pre-visit contact person for the program.

Kenneth L. McManis, Ph.D., P.E.
Professor & Department Head
Department of Civil Engineering
University of Louisiana at Lafayette
P. O. Box 42291
Lafayette, LA 70504-2291
Office: (337) 482-6512
Fax: (337) 482-6688
E-mail: kxm8888@louisiana.edu

B. Program History

Include the year implemented and the date of the last general review. Summarize major program changes with an emphasis on changes occurring since the last general review.

The years between 1930 and 1940 saw the University of Louisiana at Lafayette add sufficient faculty members and course offerings to form four branches of engineering: chemical, civil, electrical and mechanical engineering. Each had a separate department head and faculty. In 1939, the College of Engineering was officially designated, and, in 1956, the Accreditation Board accredited these four branches for Engineering and Technology. The last general ABET review of the Civil Engineering, Bachelor of Science degree program occurred during 2007-08. The site visit took place in October 2007.

Since the last general review by ABET, several programmatic changes have been implemented as part of continuous improvement efforts. The undergraduate program added CIVE 444, senior seminar, as a required course for those entering in the Fall 2009. This was in response to the program specific changes developed by the American Society of Civil Engineers (ASCE) Body of Knowledge Report and included in ABET criteria. In order to reinforce other course efforts and provide a focused attention to learning outcomes involving project management, business, public policy and leadership, the seminar course was added to the program. This resulted in a program with 129 semester credit hours.

The University recently (in 2010) had its regional accreditation reaffirmed by the Southern Association of Colleges and Schools Commission on Colleges (SACS-COC). In preparation for that reaccreditation effort, the University developed a Quality Enhancement Plan (QEP). The focus for the Quality Enhancement Plan was the development and deployment of a University-wide, First-Year Seminar for all incoming

freshmen, effective Fall of 2013. The UNIV 100, First Year Seminar: Cajun Connections, is a two-credit-hour interactive experience led by faculty facilitators and supported by peer mentors. The seminar focuses on stimulating incoming students' intellectual curiosity and social responsibility, providing them with knowledge and insights necessary for fulfillment and success in college and in their subsequent careers.

At the same time, the University decided to take a unified approach toward insuring that all of its students fulfill the "information literacy" component of the General Education requirements. UNIV 200, "Information Literacy," is a two-credit-hour course that all students at the university must take, as of the Fall of 2013. The course covers the use of word processing, presentation, spreadsheet, and database software for communication, research, and productivity. Basic computer technology operations and concepts are covered, as well as social, ethical, and human issues related to computer technology.

The results of the last regional accreditation review by the Southern Association of Colleges and Schools (SACS) have produced additional changes and an undergraduate program with 131 semester credit hours. The University now requires an additional four semester credit hours. In adjusting for these additional courses, the Civil Engineering program made several changes. These included dropping the PHIL 316, Ethics, requirement and the CIVE 142, Civil Engineering Computer Graphics. The ITEC 270, Computer Graphics, was added to replace the CIVE 142. Switching the computer graphics courses permitted the Civil Engineering Program to include the AutoCAD System that has been a recommendation of the Civil Engineering Advisory Board and a continual request by students. These changes take effect in the Fall 2013 semester.

C. Options

List and describe any options, tracks, concentrations, etc. included in the program.

There are not any options, tracks, concentrations, etc. within the Civil Engineering Program. All graduates complete a program of required courses involving structural, geotechnical, transportation, water resources and environmental engineering. With the exception of six semester credit hours of electives in Civil Engineering subjects, all students complete the same program. The undergraduate program prepares the student for a career as a professional civil engineer. The program of courses for the Bachelor of Science Degree in Civil Engineering consists of 131 total semester credit hours.

D. Organizational Structure

Using text and/or organizational charts, describe the administrative structure of the program (from the program to the department, college, and upper administration of your institution, as appropriate).

Figure 1 provides a schematic of the University of Louisiana at Lafayette organization structure for academics. The Civil Engineering Department has a Department Head who reports to the Dean of the College of Engineering. The Dean, in turn, reports to the Provost and Vice President of Academic Affairs who reports to the University President. The President reports to and serves at the pleasure of the Board of Supervisors for the University of Louisiana System.

E. Program Delivery Modes

Describe the delivery modes used by this program, e.g., days, evenings, weekends, cooperative education, traditional lecture/laboratory, off-campus, distance education, web-based, etc.

Civil Engineering courses are offered through scheduled classes that are taught by Civil Engineering faculty using the traditional lecture/laboratory delivery mode. Generally, all courses are presented in a similar mode. There could be an occasion where a course uses another delivery mode; however, this has not been the case for engineering courses. Courses are offered during the day and at early evening periods.

Correspondence Courses — No engineering, mathematics, or science courses taken by correspondence or other non-traditional means are accepted towards a degree in the College of Engineering. Up to 12 hours of other correspondence courses taken through an accredited college may be accepted if they are recommended by the Department Head concerned and approved by the Associate Dean of Engineering in writing.

F. Program Locations

Include all locations where the program or a portion of the program is regularly offered (this would also include dual degrees, international partnerships, etc.).

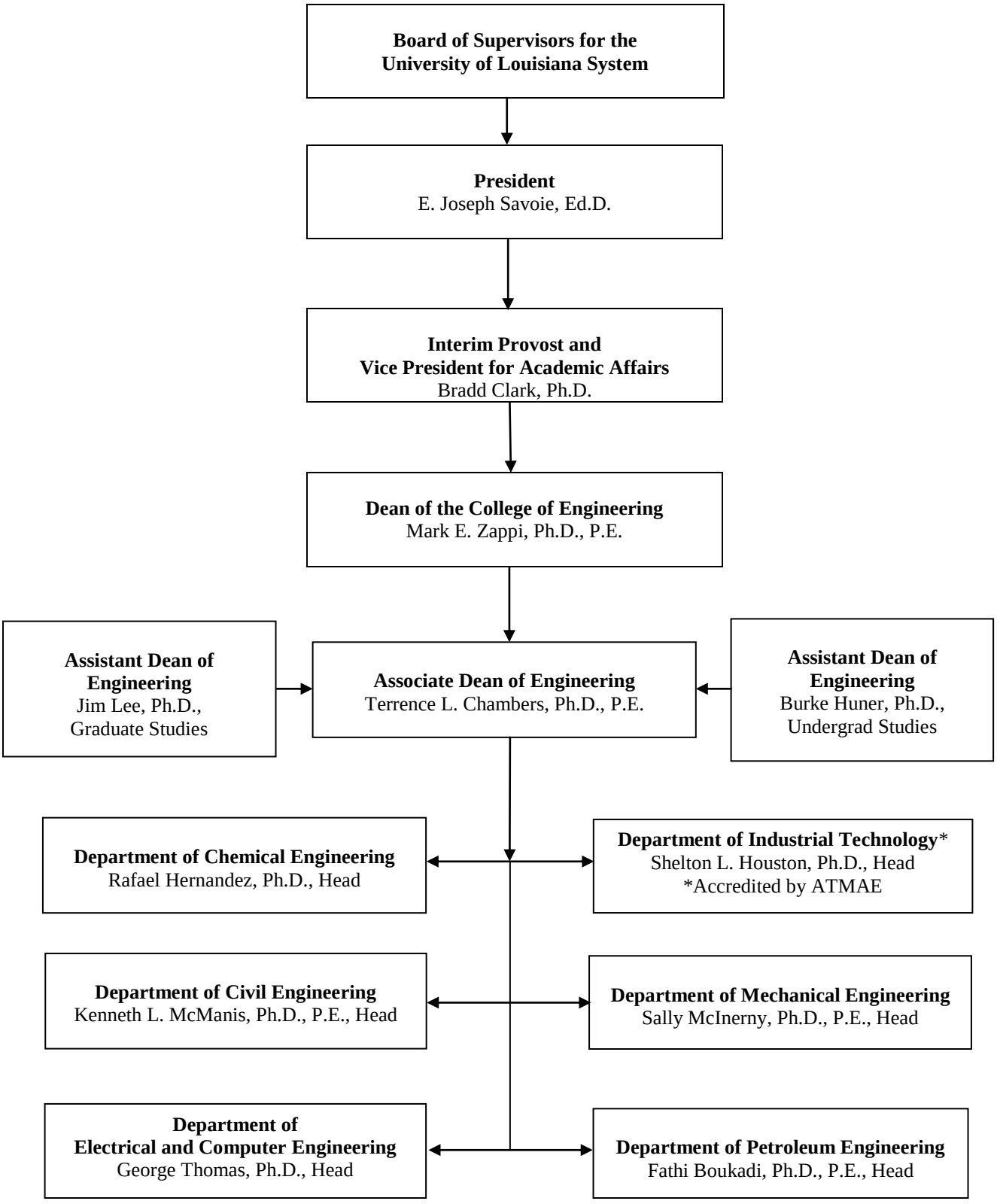
The program of courses is only offered at the University of Louisiana at Lafayette's campus.

G. Deficiencies, Weaknesses or Concerns from Previous Evaluation(s) and the Actions Taken to Address Them

Summarize the Deficiencies, Weaknesses, and/or Concerns remaining from the most recent ABET Final Statement. Describe the actions taken to address them, including effective dates of actions, if applicable. If this is an initial accreditation, it should be so indicated.

Initially, the 2007 ABET Review identified two environmental engineering laboratories lacking proper safety equipment (Criterion 6. Facilities). However, the Engineering Accreditation Committee (EAC) acknowledged that the institution quickly installed safety shower stations and eyewash stations that were more visible to students in the environmental engineering laboratories as well as others. The deficiency was resolved.

Figure 1: Organizational Chart



H. Joint Accreditation

Indicate whether the program is jointly accredited or is seeking joint accreditation by more than one commission.

The Civil Engineering program is seeking accreditation only through the ABET Engineering Accreditation Committee (EAC).

GENERAL CRITERIA

CRITERION 1. STUDENTS

For the sections below, attach any written policies that apply.

1.A. Student Admissions

Summarize the requirements and process for accepting new students into the program.

For admission, the College of Engineering and the department follow the admission standards approved by the Board of Regents and implemented in Fall 2005. The standards require 23 ACT composite with a minimum 2.0 high school grade point average (GPA), or ranking in the top 25% of the high school graduating class with a minimum 2.0 GPA.

All engineering freshmen are considered junior-division students, and are initially under the joint supervision of the College of Engineering and Office of the Academic Success Center. Once a student has completed 30 hours of non-remedial courses and has a GPA of 2.0 or better, and passed English 101 and 102 with a C-grade or higher and Math 105 with a C-grade or higher, and 18 hours applicable towards the preferred major may apply to enter a department in the College of Engineering.

For transfer students, a minimum adjusted 2.0 GPA is required to be admitted to the Civil Engineering program. All 300 and 400-level engineering courses must be taken from ABET-accredited programs to be accepted as transfer credits (this is also shown in the University Bulletin).

The UL Lafayette University Catalog is published every two years; the College of Engineering updates information pertinent to perspective students. These guidelines are used in the evaluation of students and their admission to the Civil Engineering Program.

1.B. Evaluating Student Performance

Summarize the process by which student performance is evaluated and student progress is monitored. Include information on how the program ensures and documents that students are meeting prerequisites and how it handles the situation when a prerequisite has not been met.

All continuing students must maintain a minimum of 2.0 adjusted GPA; there are specific rules on probation and suspension listed in the University Catalog. A minimum adjusted 2.0 GPA is required to be admitted to the Civil Engineering program for transfer students. All 300 and 400-level engineering courses must be taken from ABET-accredited programs to be accepted as transfer credits; this is also shown in the University Bulletin.

In previous catalogs, the Civil Engineering Department allowed no more than two 'D'grades in general engineering courses, ENGR courses, and/or the Civil Engineering courses, CIVE courses. C-grades or better were required for specific ENGR courses which were considered to be critical prerequisites for advanced CIVE subjects. These included Statics (ENGR 211), Mechanics of Materials (ENGR 219), and Fluid Mechanics (ENGR 304). This department policy was considered crucial for ensuring student success with the program's learning outcomes.

Beginning with the 2013 University Catalog, the Civil Engineering Department will require that a C-grade be achieved in all required courses. This new policy was instituted from the results of program assessments and established by the department in faculty meetings as part of its program for continuous improvement. This policy has also been put in place by the College of Engineering for all programs.

All students must be advised by a faculty member before being allowed to schedule and register for classes. The University places a hold on all student computer accounts that can only be released by the faculty advisor. To further ensure that students do not violate prerequisites or co-requisites, the Civil Engineering faculty is required to check the students enrolled on the first day of class. This includes requiring that the students verify completion of pre and co-requisites by signing a statement of satisfactory completion. Falsifying this statement results in immediate expulsion from the class and possibly the University.

1.C. Transfer Students and Transfer Courses

Summarize the requirements and process for accepting transfer students and transfer credit. Include any state-mandated articulation requirements that impact the program.

The Admissions Office performs a preliminary course evaluation on the transcript of college-level work submitted by the transfer student to determine which courses are transferable to the University. The articulation matrices maintained by the Board of Regents indicate correlation of courses among Louisiana's public colleges and universities. The matrices can be accessed through the Board of Regents webpage at www.regents.state.la.us. This site includes transfer equivalencies for most general education ("Core Curriculum") courses, but does not include advanced courses. Students are advised to contact the admissions office, the office of the Dean of their prospective college at UL Lafayette, or the Transfer Coordinator in Academic Success Center (transfer@louisiana.edu) to determine credit of coursework taken elsewhere and its application toward their chosen degree program at UL Lafayette.

For transfer students, a minimum adjusted 2.0 GPA is required to be admitted to the Civil Engineering program. All 300 and 400-level engineering courses must be taken from ABET-accredited programs to be accepted as transfer credits; this is also shown in the University Bulletin.

In some cases, courses with no direct equivalent may be accepted as electives in the general education area. Credit for engineering courses must come from an ABET-approved curriculum. Subjects, such as physics, chemistry, and 200 level engineering courses will be accepted toward degree credit based on the similarity of the math prerequisites to those at the University of Louisiana at Lafayette. After an evaluation of the courses accepted as transfer for degree credit by the department, the student will meet with the Department Head to finalize transfer of course credit.

1.D. Advising and Career Guidance

Summarize the process for advising and providing career guidance to students. Include information on how often students are advised, who provides the advising (program faculty, departmental, college or university advisor).

All first time freshmen are required to attend an orientation program designed to provide new students with an opportunity to become acquainted with all aspects of the University. Orientation sessions are held in the summer and prior to the beginning of classes in the fall, spring, and summer semesters. They are designed so that new students can gain insight into many aspects of the University environment (academic, administrative, social, and cultural). These sessions also help freshmen develop new friendships and become comfortable in the University community. Additionally, the 2013 UL Lafayette Catalog requires that all freshmen take UNIV 100 (Cajun Connection). This course is designed to familiarize new students with the college experience and offer knowledge and skills that improve academic success and facilitate lifelong achievement. It is restricted to freshmen with only 24 or fewer hours.

The Civil Engineering Department's advising system assigns each student to a faculty advisor who reviews and monitors the students' performance, and is available to discuss the students concerns and needs related to their academic program of study. This ensures that the department's advising and evaluation process is accurate and appropriate, and that it gives proper guidance to students. The Advisor Handbook is published by the Academic Success Center (http://studentsuccess.louisiana.edu/content/advising) to provide academic advisors and students with current procedures and resources for the successful academic advising of students.

The first-semester, Civil Engineering freshmen are initially advised by the Academic Success Center, and/or the Civil Engineering Department Head, or a department advisor. Thereafter, the student will be assigned to a faculty advisor that will monitor their progress until their senior year. The initial placement of each student in math or English courses is based on ACT, TOEFL or equivalent scores as provided in the Advisor Handbook. In their final year, the Department Head again advises and reviews the student's program to ensure that they meet all academic requirements. A final check of these requirements is then made at the Dean's office.

Extensive student advising is done each semester over a two-week period. This is a mandatory service of each faculty member as specified in the University Faculty

Handbook. Faculty members are required to post schedules outside their offices so that students can make advising appointments in advance. The faculty is also required to post their teaching schedule and office hours during the semester. Thus, students can seek advisement outside the two-week period. A curriculum flowchart, color coded to show which semester courses are offered, is also available and posted to help students and faculty in the planning of academic schedules; see Figure 5.1.

The advisor has access to the student's entire academic record, permitting the advisor and student to develop a schedule that meets the student's personal needs. Consideration is given to the student's GPA, co-requisites and prerequisites, part-time or full-time employment, and the schedule of semester-course offerings available in future semesters. The student cannot register for courses until he has been advised by his advisor who will then release the "registration hold."

The student follows the Civil Engineering Program, which is in effect at the time of his or her enrollment provided enrollment is continuous. They may also elect to follow the most recent catalog. Students who break enrollment must follow the latest bulletin at the time of their re-entry into the program.

1.E. Work in Lieu of Courses

Summarize the requirements and process for awarding credit for work in lieu of courses. This could include such things as life experience, Advanced Placement, dual enrollment, test out, military experience, etc.

Students may be eligible for college credit if they have participated in the College Board's "College Level Examination Program" (CLEP), the College Level GED program, the ACT Proficiency Examination Program (PEP), or another similar advanced placement program. The UL Lafayette Office of Admissions evaluates such tests for possible credit.

Also, students may apply to the appropriate academic dean to take a credit examination for skills-based and knowledge-based courses at the 100 or 200-level in which no term paper is required and class participation in discussion is not a central component for the course. In addition, certain 300 or 400-level courses may be appropriate for credit by examination. Academic departments will determine eligibility for this program, and credit may be automatic or may depend on successful completion of oral and/or written examinations conducted by the academic department in question. The academic dean of each college should maintain a list of courses in the college that have been determined by academic departments to be appropriate for credit by examination. Credit for life experiences are not accepted in the College of Engineering. The University permits only regularly enrolled students to take credit examinations.

Correspondence Courses – No engineering, mathematics, or science courses taken by correspondence or other non-traditional means are accepted towards a degree in the College of Engineering. Up to twelve hours of other correspondence courses taken

through an accredited college may be accepted if they are recommended by the Department Head concerned and approved by the Dean of Engineering in writing.

Additional information about all advanced placement programs is contained in Section VIII of "Rules and Regulations" of the University Catalog.

1.F. Graduation Requirements

Summarize the graduation requirements for the program and the process for ensuring and documenting that each graduate completes all graduation requirements for the program. State the name of the degree awarded (Master of Science in Safety Sciences, Bachelor of Technology, Bachelor of Science in Computer Science, Bachelor of Science in Electrical Engineering, etc.)

To graduate with a Bachelor of Science degree in Civil Engineering, the student must successfully complete all the course requirements of his/her/her bulletin and fulfill the following requirements of the College of Engineering.

Specific Degree Requirements of the College of Engineering

Grade Point Average – To be eligible for a Bachelor of Science Degree in the College of Engineering, a student must:

1. Earn at least a 2.0 adjusted cumulative average on all hours pursued at UL Lafayette and earn at least a 2.0 adjusted cumulative average on all hours attempted at all colleges and universities.
2. Earn at least a 2.0 cumulative average on all hours attempted at UL Lafayette in the major department and other engineering courses combined and earn at least a 2.0 cumulative average on all engineering work attempted at all colleges and universities. All major and engineering courses for which final grades have been recorded, including those repeated, are considered as hours attempted. In addition a candidate for a baccalaureate degree must be registered in the major department and must earn in residence a minimum for 24 semester hours in courses in the College of Engineering, of which 15 semester hours must be senior-level courses in the major.

Faculty advisors periodically review the student's progress using a check sheet as shown in Figure 1.1. The check sheet provides the advisor a means for monitoring the student's progress and for planning. It may not be possible to follow the exact sequential presentation of the semester courses; however, all co- and prerequisites must be followed. The check sheet is continuously updated as the student progresses and is maintained in the department's student files for the advisor's use.

The faculty advisor can also access the student's progress through the University's ULINK system. The ULINK system provides the courses, the accumulative GPA and individual semester GPA, sequentially, on a semester-by-semester basis. It also includes transfer courses and their UL Lafayette equivalence.

DEPARTMENT OF CIVIL ENGINEERING
Fall 2013 Catalog

Date: _____ Name: _____

Credits transferred from:

(1) _____ Address: _____

(2) _____ _____

FRESHMAN YEAR

First Semester			Credit	Second Semester			Credit
CHEM	107	General Chemistry I	3	CHEM	108	General Chemistry II	3
ITEC	270	Intro to CAD	3	CHEM	115	General Chemistry Lab	2
ENGL	101	Rhet and Comp	3	ENGL	102	Comp & Lit	3
MATH	270	Calculus I	4	MATH	301*	Calculus II	4
CIVE	101	Intro to Civil Engrg	1	PHYS	201	General Physics I	4
UNIV	100	Univ. Orientation	2	UNIV	200	Univ. Orientation	2
			16				18

SOPHOMORE YEAR

CIVE	225[4]	Surveying	3	ENGR	201	Electrical Circuits	3
ENGR	211*	Statics	3	ENGR	219*	Mechanics of Materials	3
MATH	302	Calculus III	4	ENGR	304*	Fluid Mechanics	3
		Elective (BIO SCI)[2]	3	MATH	350	Diff Equations	3
		Elective (ARTS)[1,2]	3	ENGR	313	Dynamics	3
			16				15

JUNIOR YEAR

CIVE	332[4]	Structural Mech I	3	CIVE	322	Envir Engrg I	3
ECON	430	Indust. Econ & Finance	3	CIVE	328	Geotech Engrg	3
ENGR	301	Thermodynamics	3	CIVE	429G	Hydrology	3
HIST		Elective	3	STAT		Elective (STAT)[1, 2]	3
		Elective(CMCN)[2]	3			Elective (Literature)[1]	3
		Elective (BHSC)[1]	3				15
			18				

SENIOR YEAR

CIVE	422	Envir. Engrg II	3	CIVE	426	Steel Design	3
CIVE	427	Reinf. Conc. Design	3	CIVE	435	Highway Engrg	3
CIVE	434	Hydraulics	3	CIVE	442	Senior CE Design	2
CIVE	438	Foundation Engrg	3	CIVE	444	Senior Seminar	1
CIVE	450	Highway Engrg	3	CIVE		CIVE Electives[2]	6
CIVE	480	Construction Engrg	3				
			18				15

* A minimum grade of "C" is required for graduation purposes.

1. Must be chosen from the College of Engineering approved list. BHSC electives must be chosen from ANTH, ECON, GEOG, POLS, PSYC, or SOCI.
2. Must be approved by department.

Figure 1.1 Faculty Advisor's Worksheet

Prior to graduation, a Graduation Check Sheet with a credit distribution analysis is prepared for each student based on their academic catalog, (Figure 1.2). This process documents the completion of each required course, the grade for each, hours completed, quality points, the GPA of the major courses and overall. It ensures that the graduating student will have a 2.0 minimum GPA in engineering work at UL Lafayette and a minimum 2.0 GPA in all engineering work at all universities, and if graduating under a bulletin preceding 2013, a maximum of two D's in civil engineering and maximum of two D's in general engineering. The Graduation Check Sheet is completed the semester before the anticipated graduation of the student.

1.G. Transcripts of Recent Graduates

The program will provide transcripts from some of the most recent graduates to the visiting team along with any needed explanation of how the transcripts are to be interpreted. Transcripts will be requested separately by the team chair. State how the program and any program options are designated on the transcript. (See 2013-2014 APPM, Section II.G.4.a.)

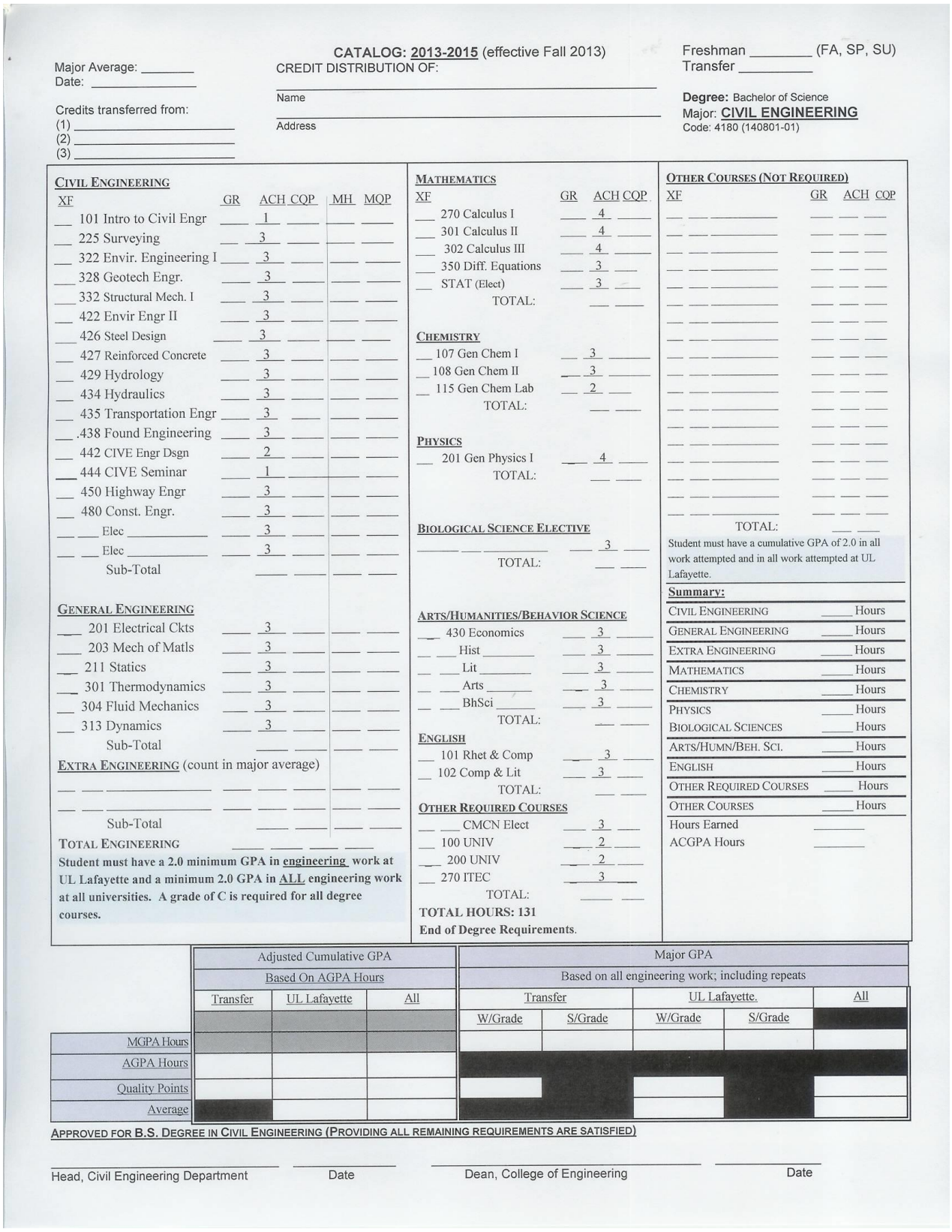
The program is designated as a Bachelor of Science in Civil Engineering. The program does not include any options. Upon completion of the program and after graduating, an "Institutional Awards" block will be shown at the end of the official transcript, providing the following information.

INSTITUTIONAL AWARDS
Award: Bachelor of Science Conferred: (Date)
Term: (fall/spring & year) Requirements Completed: (Date)
College: Engineering
Department: Civil Engineering
Major: Civil Engineering

Each page of the transcript includes the following information in the upper left-hand corner:

Official Transcript
University of Louisiana at Lafayette
Office of the Registrar
P.O. Box 41208
Lafayette, Louisiana 70504
Phone: (33) 482-6291 URL: www.louisiana.edu

Transcripts of recent graduates are available upon request.



Major Average: _____
Date: _____

Credits transferred from:
(1) _____
(2) _____
(3) _____

CATALOG: 2013-2015 (effective Fall 2013)
CREDIT DISTRIBUTION OF:

_____
Name

_____
Address

Freshman _____ (FA, SP, SU)
Transfer _____

Degree: Bachelor of Science
Major: CIVIL ENGINEERING
Code: 4180 (140801-01)

CIVIL ENGINEERING

XF		GR	ACH	CQP	MH	MQP
___	101 Intro to Civil Engr	____	1	____	____	____
___	225 Surveying	____	3	____	____	____
___	322 Envir. Engineering I	____	3	____	____	____
___	328 Geotech Engr.	____	3	____	____	____
___	332 Structural Mech. I	____	3	____	____	____
___	422 Envir Engr II	____	3	____	____	____
___	426 Steel Design	____	3	____	____	____
___	427 Reinforced Concrete	____	3	____	____	____
___	429 Hydrology	____	3	____	____	____
___	434 Hydraulics	____	3	____	____	____
___	435 Transportation Engr	____	3	____	____	____
___	.438 Found Engineering	____	3	____	____	____
___	442 CIVE Engr Dsgn	____	2	____	____	____
___	444 CIVE Seminar	____	1	____	____	____
___	450 Highway Engr	____	3	____	____	____
___	480 Const. Engr.	____	3	____	____	____
___ ___	Elec _____	____	3	____	____	____
___ ___	Elec _____	____	3	____	____	____
	Sub-Total	____	____	____	____	____

GENERAL ENGINEERING

___	201 Electrical Ckts	____	3	____	____	____
___	203 Mech of Matls	____	3	____	____	____
___	211 Statics	____	3	____	____	____
___	301 Thermodynamics	____	3	____	____	____
___	304 Fluid Mechanics	____	3	____	____	____
___	313 Dynamics	____	3	____	____	____
	Sub-Total	____	____	____	____	____

EXTRA ENGINEERING (count in major average)

___ ___	_____	____	____	____	____	____
___ ___	_____	____	____	____	____	____
	Sub-Total	____	____	____	____	____
	TOTAL ENGINEERING	____	____	____	____	

Student must have a 2.0 minimum GPA in engineering work at UL Lafayette and a minimum 2.0 GPA in ALL engineering work at all universities. A grade of C is required for all degree courses.

MATHEMATICS

XF		GR	ACH	CQP
___	270 Calculus I	____	4	____
___	301 Calculus II	____	4	____
___	302 Calculus III	____	4	____
___	350 Diff. Equations	____	3	____
___	STAT (Elect)	____	3	____
	TOTAL:		____	____

CHEMISTRY

___	107 Gen Chem I	____	3	____
___	108 Gen Chem II	____	3	____
___	115 Gen Chem Lab	____	2	____
	TOTAL:		____	____

PHYSICS

___	201 Gen Physics I	____	4	____
	TOTAL:		____	____

BIOLOGICAL SCIENCE ELECTIVE

_____	___ _____	____	3	____
	TOTAL:		____	____

ARTS/HUMANITIES/BEHAVIOR SCIENCE

___	430 Economics	____	3	____
___ ___	Hist _____	____	3	____
___ ___	Lit _____	____	3	____
___ ___	Arts _____	____	3	____
___ ___	BhSci _____	____	3	____
	TOTAL:		____	____

ENGLISH

___	101 Rhet & Comp	____	3	____
___	102 Comp & Lit	____	3	____
	TOTAL:		____	____

OTHER REQUIRED COURSES

___ ___	CMCN Elect	____	3	____
___	100 UNIV	____	2	____
___	200 UNIV	____	2	____
___	270 ITEC	____	3	____
	TOTAL:		____	____

TOTAL HOURS: 131
End of Degree Requirements.

OTHER COURSES (NOT REQUIRED)

XF		GR	ACH	CQP
___ ___	_____	____	____	____
	TOTAL:		____	____

Student must have a cumulative GPA of 2.0 in all work attempted and in all work attempted at UL Lafayette.

Summary:

CIVIL ENGINEERING	_____ Hours
GENERAL ENGINEERING	_____ Hours
EXTRA ENGINEERING	_____ Hours
MATHEMATICS	_____ Hours
CHEMISTRY	_____ Hours
PHYSICS	_____ Hours
BIOLOGICAL SCIENCES	_____ Hours
ARTS/HUMN/BEH. SCI.	_____ Hours
ENGLISH	_____ Hours
OTHER REQUIRED COURSES	_____ Hours
OTHER COURSES	_____ Hours
Hours Earned	_____
ACGPA Hours	_____

	Adjusted Cumulative GPA Based On AGPA Hours			Major GPA Based on all engineering work; including repeats				
	Transfer	UL Lafayette	All	Transfer W/Grade	Transfer S/Grade	UL Lafayette. W/Grade	UL Lafayette. S/Grade	All
MGPA Hours								
AGPA Hours								
Quality Points								
Average								

APPROVED FOR B.S. DEGREE IN CIVIL ENGINEERING (PROVIDING ALL REMAINING REQUIREMENTS ARE SATISFIED)

_____ _____ _____ _____
Head, Civil Engineering Department Date Dean, College of Engineering Date

Figure 1.2 Graduation Check-out Sheet

CRITERION 2. PROGRAM EDUCATIONAL OBJECTIVES

2.A. Mission Statement

Provide the institutional mission statement.

The University of Louisiana at Lafayette, the largest member of the University of Louisiana System, is a public institution of higher education offering bachelor, master, and doctoral degrees. Within the Carnegie classification, UL Lafayette is designated as a Research University with high research activity. The University's academic programs are administered by the Colleges of the Arts, Education, Engineering, General Studies, Liberal Arts, and Nursing and Allied Health Professions, and by the B. I. Moody III College of Business Administration, the Ray P. Authement College of the Sciences, and the Graduate School. The University is dedicated to achieving excellence in undergraduate and graduate education, in research, and in public service. For undergraduate education, this commitment implies a fundamental subscription to general education, rooted in the primacy of the traditional liberal arts and sciences as the core around which all curricula are developed. The graduate programs seek to develop scholars who will variously advance knowledge, cultivate aesthetic sensibility, and improve the material conditions of humankind. The University reaffirms its historic commitment to diversity and integration. Thus, through instruction, research, and service, the University promotes regional economic and cultural development, explores solutions to national and world issues, and advances its reputation among its peers.

Consistent with the above, the College of Engineering has adopted the following Mission Statement:

The College of Engineering is committed to excellence in education and research while maintaining national accreditation for all of its programs. These programs include Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, Petroleum Engineering, which are accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org , and the allied field of Industrial Technology, which is accredited by the Association of Technology, Management, and Applied Engineering (ATMAE), 3300 Washtenaw Avenue - Suite 220, Ann Arbor, MI 48104 – telephone: 734-677-0720.

With a view toward integrating its role with the educational mission and the statement of purpose of the University, the College directs its activities towards research and associated economic development. At the same time, it acts as a technical resource for the industrial and business communities by providing technology transfer and technical assistance. Engineering graduates of the College consistently score well on the Fundamentals in Engineering (F.E.) Exam, and graduates of the College of Engineering find employment locally, nationally, and internationally.

The Engineering and Industrial Technology curricula emphasize strong fundamental theory, intensive problem solving, hands-on laboratory experience, and enhanced management and business knowledge. The basic natural sciences and mathematics

component of the curricula, together with the required courses in humanities and social sciences, provide students an excellent educational basis for entry into the engineering or industrial professions or for further educational studies leading to advanced degrees.

The College also sets a high priority in terms of recruiting and hiring of students, faculty and other related personnel from under-represented minority groups.

CIVIL ENGINEERING MISSION STATEMENT

The mission of the Civil Engineering Department is to provide for a contemporary Civil Engineering education for the students, and is in keeping with the mission for all students as defined by the University. It provides a broad-based Civil Engineering curriculum in structures, geotechnical, water resources, environmental, and transportation engineering, including a program designed to utilize learned technical skills, accompanied by communicative skills, teamwork and leadership qualities. This mission envisions graduates employable by local, national, and international firms and with a sound educational foundation for those who pursue advanced degrees.

2.B. Program Educational Objectives

List the program educational objectives and state where these can be found by the general public.

The purpose of the academic program is to produce graduates that will ultimately qualify to practice as professional civil engineers. As such, graduates must demonstrate proficiency in the fundamental Civil ESngineering areas of structures, water resources, transportation, geotechnical, and environmental engineering. Along with this training, professional licensure is stressed and students are strongly encouraged to take the Fundamentals in Engineering Exam and later pursue a Professional License in Civil Engineering.

Compatible with the mission of the University of Louisiana at Lafayette, the College of Engineering and the Department of Civil Engineering, the program's educational objectives are to produce graduates who:

1. are immediately employable as a Civil Engineering Intern or prepared to continue in a graduate or professional program.

2. can achieve and maintain status as a Professional Engineer, and participate in professional engineering organizations and/or other professional activities.

3. are effective Civil Engineers and understand their responsibility to their profession and community.

The Program's Educational Objectives (PEOs) were selected with the intent that they be direct and simply stated with clarity of meaning. They were established prior to the 2007 ABET review and have been reviewed consistently by the program's constituents since their adoption. There has been little interest for any major modification in these reviews.

The program mission and educational objectives are posted in departmental office areas and on the department's web page. They are also published as part of the Civil Engineer's promotional brochure.

2.C. Consistency of the Program Educational Objectives with the Mission of the Institution

Describe how the program educational objectives are consistent with the mission of the institution.

The institutional mission is restated in the following with emphasis noted on those goals which are supported by the Educational Objectives of the Civil Engineering Program.

The University is dedicated to ***achieving excellence in undergraduate*** and graduate ***education***, in research, and ***in public service***. For undergraduate education, this commitment implies a fundamental subscription to general education, rooted in the primacy of the traditional liberal arts and sciences as the core around which all curricula are developed. The graduate programs seek to develop scholars who will variously advance knowledge, cultivate aesthetic sensibility, and ***improve the material conditions of humankind.*** The University reaffirms its historic commitment to diversity and integration. Thus, through instruction, research, and service, the University ***promotes regional economic and cultural development, explores solutions to national and world issues,*** and advances its reputation among its peers.

A graduate engineer must have the education and marketable skills recognized by industry for employment as a Civil Engineering intern. Working in the Civil Engineering profession, he or she will be engaged in the development of designs that are fundamental to the public services necessary for the support of communities and the nation. The Program's **Educational Objective 1** and the Institutional mission for ***excellence in its undergraduate academic programs and in public service*** is most compatible. The post graduation employment of the civil engineering students provides confirmation for the institutional mission and the program objective.

Protection of the public's safety, health and welfare is fundamental to the practice of engineering. Licensure as a professional Civil Engineer is required to offer or conduct engineering services. **Educational Objective 2** identifies this as a goal for professional practice and again supports the institutional mission in ***service and in the improved conditions and economic development of the public sector***. **Educational Objective 3** implies ***service to the community*** and a further commitment through ***active participation or leadership in professional and community organizations and activities.***

2.D. Program Constituencies

List the program constituencies. Describe how the program educational objectives meet the needs of these constituencies.

The constituencies of the Civil Engineering Program include those with an interest and need for the program's products. In the case of the Civil Engineering Program, this would include those wishing to make a career within the profession and those needing the services provided by graduates of the program. This includes 1) program graduates, 2) the employers of the program's graduates and 3) the public. Employers of the program's graduates include consultants, industrial and construction firms, and government agencies.

Educational Objective 1, the ability to be employed as a Civil Engineering intern, serves both the program graduate and the employer. The knowledge and ability gained by completing the program is verified to the graduate and the employer through employment as an engineering intern. Also, the admission to graduate school programs by those graduates continuing their studies demonstrates the quality of the program for providing an education necessary for advanced studies.

Educational Objective 2, the ability to become licensed as a Professional Civil Engineer (P.E.) and as promoted by the program, addresses all constituents; the individual, industry and the public. Success demonstrates that the engineering education and training necessary for the protection of the public's safety, health and welfare has been addressed.

Educational Objective 3, targets the reinforcement of service to the community and to the profession. As leaders and active participants in professional and civic groups, graduates of the program contribute to the economic development of society through personal growth and lifelong learning.

2.E. Process for Review of the Program Educational Objectives (PEOs)

Describe the process that periodically reviews the program educational objectives including how the program's various constituencies are involved in this process. Describe how this process is systematically utilized to ensure that the program's educational objectives remain consistent with the institutional mission, the program constituents' needs, and these criteria.

The PEOs are evaluated with two considerations; 1) are the PEOs appropriately stated for the constituency, and 2) does the program successfully achieve the goals or objectives. The review and evaluation of the program's educational objectives is determined by the opinion and needs of the program's constituents. The Civil Engineering Advisory Board (CEAB) conducts a significant part of the assessment of the program's educational objectives jointly and with extensive participation. The membership of this group is composed of representatives of the program's constituents. Review of the educational

objectives involves both formal and informal feedback from employers, alumni, students, and faculty.

Achievement of the PEOs can be quantifiably measured. The assessment is focused on the post-graduation activities of the graduate and indirectly on the attributes derived from the program's learning outcomes. Successful employment as a productive Civil Engineer or educational growth through advanced studies in a graduate program is a "yes" or "no" answer. (Objective 1) So, also, is the status of professional licensure and professional activity. (Objective 2) The achievement of the P.E. demonstrates a level of professional maturity gained through education, examination and experience. The experience is evaluated by state licensing boards and is based on a documented record showing engineering proficiency and responsibility, (Objective 3). The individual's assessment of their acquired program outcomes in the alumni survey is also an indirect indication of their confidence and acceptance of their responsibility to their profession and community. Table 2.1 lists the assessment measures used, the constituents involved, and the frequency to which the PEOs are reviewed. Some information is provided continuously and others are provided within an approximate five-year cycle. Significant documentation of the assessment results is available.

TABLE 2.1 – Assessment of the Program's Education Objectives (PEOs)

Instrument	Constituents	Frequency
Exit Interviews & Survey	Graduating Senior Students	At the end of each semester
Alumni Survey	Graduates within the last 10 yrs	+/- 5 years
Survey of Employers	Employers of Graduates	+/- 5 years
CEAB Reviews	Industry Representatives	On-going
FE Exam Pass Results	Students/Employers/Graduates	Each Semester
PE Licensure – LAPELS List	Public/Graduates/Employers	+/- 5 years

The current PEOs were established before the last (2007) ABET review. The information provided from the program's constituents has been continuously reviewed and there have been no major modifications. Table 2.2 provides a summary of the constituency feed-back received for satisfaction with the PEO statements. Table 2.3 provides a brief summary of graduate success in achieving the PEOs.

Civil Engineering Advisory Board (CEAB). The department's Advisory Board, consisting of industry representatives, provides advice on their industrial sector and the educational training requirements necessary for their engineers. It includes representation from major industrial firms, consultants, contractors and government agencies. It consists of 18 members with extensive professional experience and leadership positions in all areas of civil engineering that are addressed by the UL Lafayette academic program. The Dean of the College of Engineering approves all candidates nominated to the Board.

TABLE 2.2 Constituency Survey: Educational Objectives

PROGRAM EDUCATIONAL OBJECTIVES	MEASUREMENTS		
	2012 ALUMNI SURVEY SATISFACTION	2012 EMPLOYERS SURVEY SATISFACTION	Nov. 2009* & Oct. 2012** CEAB REVIEWS
1. EMPLOYMENT*/ GRADUATE SCHOOL	90% approve	100% approval	*valid & consistent **agree
2. PROFESSIONAL ENGINEER, PE*	93% approval	100% approval	*valid & consistent **agree
3. SERVICE	93% approval	100% approval	*valid & consistent **agree
RECOMMENDATIONS (comments)	-Add efficiently & ethically -Change PEO #2 to achieve FE	Stress involvement in ASCE as young engineer. Promote MS degree.	-No changes, Review in future Possibly: Combine 2 & 3 Modify #3 ?
ACTION	None	None	None

*employed in engineering position
** PE or FE

Table 2.3 Educational Objectives Achievement Status

PROGRAM EDUCATIONAL OBJECTIVES	MEASUREMENTS				
	LICENSURE/ CERTIFICATION		ALUMNI SURVEY		EMPLOYERS SURVEY
	PE	EI[2]			
1. EMPLOYMENT[1]/ GRADUATE SCHOOL			100% employed in engineering position		Agree with engineering capabilities
2. PROFESSIONAL ENGINEER, PE	21%-59% (4+ years)[3]	81% (ave)[4]	93% FE	34% PE	Survey instrument does not measure success
3. SERVICE			100% agreement		Survey instrument does not measure success

[1]Engineering position
[2]Licensure path
[3]Four years or more since graduation (2001-2008 classes)
[4]Average for graduating classes 2007-2011

This board meets biannually or as needed with the Department Head or within CEAB committees. The officers, with Department Head input, prepare the agenda for the biannual meeting. Faculty members are invited to attend, and occasionally make special presentations. Standing committees include: 1) curricula, 2) facilities, and ad-hoc committees for 3) internships and 4) funding opportunities. The Board's activities have

recently included an in-depth review of the Program's Educational Objectives. The statements were deemed to be satisfactory, but will be reviewed in the future. Other activities of this Board have included an assessment of the curriculum, physical facilities and participation in the department's survey of the program's alumni, and a survey of employers, professionals, and the industries served. These external reviewed surveys provide significant information from the program's constituency. The surveys address the validity and the extent of success to which the program has accomplished its educational objectives.

Exit Interviews. Exit interviews are also conducted in-house by the Department Head with individuals in each graduating class. This last survey provides senior students with the opportunity to make suggestions, retrospectively, and covers all aspects of the undergraduate program and the type of instruction they have received. Since many of the senior students are mature and already have work experience, their comments are often insightful and very helpful.

Employers Survey. A survey of the major employers of civil engineering graduates is conducted by the CEAB to determine the employer's satisfaction with civil engineering graduates and their educational needs. It is generally conducted on a five-year cycle. The survey form is also distributed to the CEAB membership. Table 2.2 and Table 2.3 provide a brief synopsis of the survey results with regards to the POEs.

Alumni Survey. Surveys of alumni are conducted to solicit input for needed changes in program educational objectives and the related curriculum. The most recent survey targeted the alumni who had graduated within the past 10 (+/-) years. Those alumni who responded represented 30% of the graduates over that period of time. At the time of the survey, one hundred percent (100%) of those responding were either employed as civil engineers or currently attending graduate school. At the time of the survey; five had attended graduate school and had earned either their M.S. degree (4) or Ph.D. degree (1). The total percentage that were either in graduate school, at the time of the survey or had been to graduate school, represented 27% of the respondents. Ninety-three percent (93%) had successfully passed the FE Exam and 34% were licensed professional engineers. The results indicate that Educational Objective No. 1 is being fulfilled and that the graduates are on the licensure path, i.e., Educational Objective No. 2.

The evaluation of the documented engineering experience as conducted by the state licensure boards provides a measure of the individual's professional performance; values and demonstrates responsibility, i.e., Educational Objective 3. The success of the group in accomplishing the FE Exam (93%) would indicate recognition of the importance of professional licensure and acceptance of professional values, i.e., obligation and responsibility to one's profession and community.

Licensure and the Fundamentals in Engineering Exam. Licensure as a Professional Civil Engineer is important for graduates of civil engineering programs and necessary to ensure the security of the health, safety and welfare of the community. It is a legal requirement for professional practice in all states and an important element of a Civil

Engineer's career. Thus, it has been identified as an educational objective for the Civil Engineering Program and it can be measured directly. The ability to become licensed after successfully completing the academic program can be initially measured by passage of the National Council for Examination of Engineers and Surveyors (NCEES) Fundamentals of Engineering (FE) Exam and or certification as an Engineering Intern (EI). Table 2.4 represents data from the Louisiana Professional Engineers and Land Surveyors Board (LAPELS) and shows the UL Lafayette students performance from 2001 to 2012 (data missing or incomplete for the fall graduates of 2012).

A review of Table 2.4 also shows that the graduates begin to achieve PE status approximately four years after completing the degree program. Approximately 60% is the largest number achieving PE from the 2001 data forward. This information is limited to just Louisiana, however. A number of the graduates have moved on to other states and geographic locations. Table 2.4 indicates that an approximate average of 81% (at least) of the graduates did achieve their EI certification status between the years 2007-2011.

To further improve the graduating student's performance on the FE exam, program standards were raised. These included a change in policy eliminating the previous allowance for two D-grades in either the basic engineering courses or the Civil Engineering courses and C-grade requirements for prerequisites. There has been a corresponding increase in passing the exam of the first-time test-takers as of 2008, i.e., FE passage rate for the UL Lafayette graduate engineers. It has improved significantly, Figure 2.1. The measured goal set by the department to meet or exceed the national average is being met and exceeded. Figure 2.1 demonstrates that this is not only true for the national average but is also true for the Carnegie 1 and 2 institutional groupings. The University of Louisiana at Lafayette is in the Carnegie 1 grouping of universities. The importance and requirement for licensure as being necessary to fully and successfully practice as UL Lafayette recognizes a professional civil engineer graduates and is a validation of the Program's Educational Objective 2.

Table 2.4 FE/PE Performance[1]
(as of January 2013)

YEAR	No. B.S. Graduates	EI Certification		PE License	
		No.	%	No.	%
2001	20	15	75	9	45
2002	22	20	91	13	59
2003	18	12	67	6	33
2004	22	16	73	10	45
2005	22	17	77	12	55
2006	17	9	53	5	29
2007	16	12	75	5	31
2008	14	11	79	3	21
2009	17	14	82	0	0
2010	11	10	91	0	0
2011	21	17	81	0	0
2012[2]	19	9	47	0	0

[1]Figures are limited to data found at LAPELS web site.
[2]Incomplete data, fall 2012 not complete

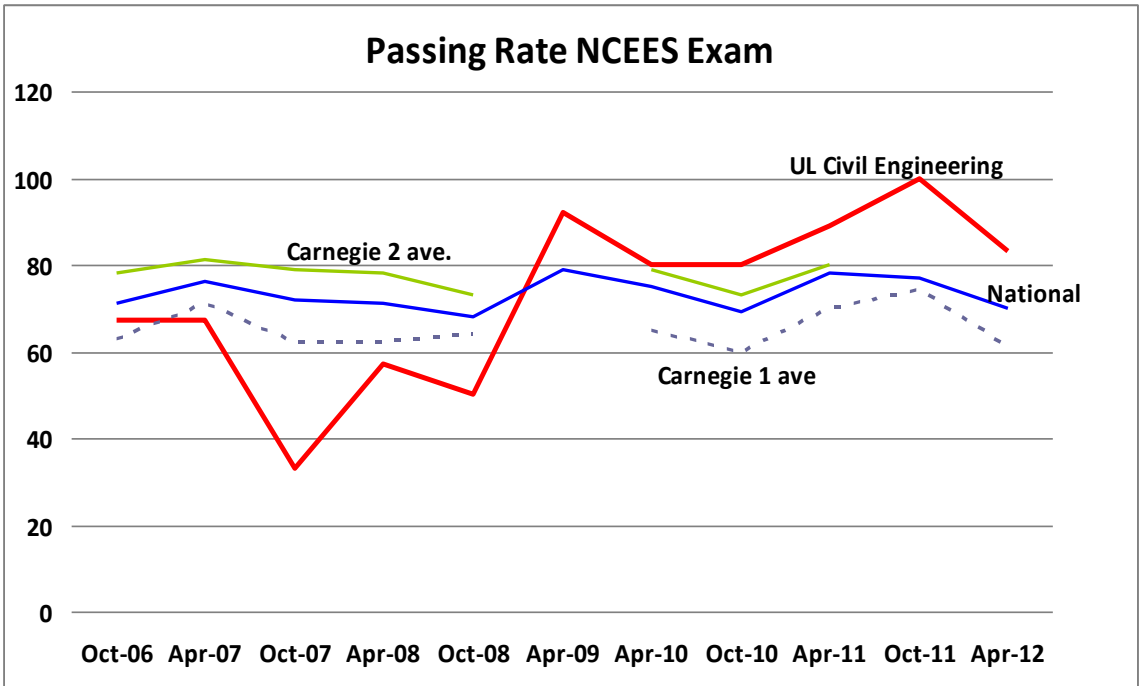


Figure 2.1 FE Performance & Comparison of FE Exam Passage Rate

CRITERION 3. STUDENT OUTCOMES

3.A. Student Outcomes

List the student outcomes for the program and indicate where the student outcomes are documented. If the student outcomes are stated differently than those listed in Criterion 3, provide a mapping to the (a) through (k) Student Outcomes.

American Society of Civil Engineers (ASCE) Policy Statement PS 465 established the Civil Engineering Body of Knowledge (ASCE, BOK1) and identified the learned outcomes needed for the practice of Civil Engineering in the 21st Century. The first 11 of the learned outcomes of the BOK1 (outcomes 1-11) are the same as that required in ABET Criteria 3c. However, BOK1 noted four additional outcomes which addressed a Civil Engineering specialization, project management, business and public policy, and leadership. In ASCE BOK1, the Civil Engineering specialization outcome is to be accomplished after the individual graduates with a B.S. in Civil Engineering. This is to be achieved through experience in professional practice and/or post-graduate studies. Changes in the ABET criteria for Civil Engineering and related programs were adopted in 2007-2008 and included outcomes where the graduate "*can explain basic concepts in management, business, public policy, and leadership; and can explain the importance of professional licensure.*"

The Civil Engineering Program's Outcomes are presented in Table 3.1. The outcome statements include the ABET Criterion 3c (a through k) with the ASCE BOK1 descriptions and the level of learning to be achieved, as per the concepts of Blooms Taxonomy. The additional outcomes (l through o) are also found in the ABET Civil Engineering program criteria and are consistent with ASCE's BOK1 descriptions. The general Criterion 3c outcomes and the program outcomes are noted as UL Lafayette's Civil Engineering Outcomes a through o, Table 3.1.

A listing and brief description of the learned outcomes are posted in departmental office areas and on the department's web page with the Educational Objectives (http://civil.louisiana.edu/mission.shtml).

Mapping Learning Outcomes

Learned outcomes occur through class instruction and may occur in extracurricular activities. Evaluating the achievement of an outcome may be conducted in different ways. These include a review of the performance of students on class relevant assignments by the faculty or other measures such as surveys and the performance on those outcomes tested by the Fundamentals in Engineering (FE) Exam. The location where the learning outcomes occur, within the academic program, and are measured, is mapped as presented in Table 3.2. Courses where technical outcomes (knowledge or skills) occur may be the course topic. However, other outcomes such as the outcomes that address ABET's "d" (the ability to function on multi-disciplinary teams), "h" (the global, economic, environmental, and societal impacts of a specific, relatively constrained engineering solution), "i" (life-long learning or the ability to learn on their own without

the aid of formal instruction), "j" (incorporating contemporary issues into the identification, formulation, and solution of a specific engineering problem) and others may not be obvious, but are unique to each course and the assigned role that it plays within the academic program. Thus, in addition to reviewing each course and their learning objectives, faculty were asked to identify what learning outcomes occurred in the courses that they are responsible for and teach, and how each were evaluated or measured with respect to success. ***An outcome was considered to exist only if it was identified as being integral to one of the courses' learning objectives or topics and only if success was measured and documented.*** Table 3.2 is the result of that program review on the location and frequency of the learning outcomes and provides a guide to faculty for their outcomes' review. The student outcomes-course mapping shown is the results of the recently updated effort by the faculty, (Faculty Minutes, November 2012).

3.B. Relationship of Student Outcomes to Program Educational Objectives

Describe how the student outcomes prepare graduates to attain the program educational objectives.

The UL Lafayette Civil Engineering's Educational Objectives envision graduates that will practice civil engineering at the professional level, which means practice as a licensed professional engineer. The UL Lafayette Civil Engineering program has adopted outcomes (a through o) identified as supporting the educational requirements necessary for the 21st Century professional civil engineer by ASCE. Thus, the UL Lafayette's Civil Engineering Program Educational Objectives are accomplished through the successful achievement of the ABET Criterion 3 and program outcomes which are the adopted UL Lafayette's learning outcomes, Table 3.3.

All of the outcomes provide support for succeeding in the three Program Educational Objectives. However, the learned outcomes (a – o) contributing the most to the individual Program Educational Objective are noted in Table 3.3. Professional practice and, thus, the pursuit of licensure is strongly encouraged, success in passing the Fundamentals in Engineering Exam and ultimately becoming licensed as a Professional Engineer is constantly promoted.

TABLE 3.1 STUDENT OUTCOMES

OUTCOME		FORMAL EDUCATION/KNOWLEDGE
		To satisfy the academic prerequisites for the professional practice of civil engineering, an individual must have:
a	**Technical core**	**An ability to apply knowledge of mathematics, science, and engineering.** Can ***solve*** problems in mathematics through differential equations, calculus-based physics, chemistry, and biology. *(Level 3)*
b	**Experiment**	**An ability to conduct experiments, as well as to analyze and interpret data.** Can ***design*** a civil engineering experiment to meet a need; ***conduct*** the experiment, and ***analyze*** and ***interpret*** the resulting data. *(Level 5)*
c	**Design**	**An ability to design a system, component, or process to meet desired needs.** Can ***design*** a complex system or process to meet desired needs, within realistic constraints such as economic, environmental, social, political, ethical and safety, constructability, and sustainability. *(Level 5)*
d	**Multi-disciplinary**	**An ability to function on multidisciplinary teams.** Can ***function*** effectively as a member of a multi-disciplinary team. *(Level 3)*
e	**Engineering problems**	**An ability to identify, formulate, and solve engineering problems.** Can ***solve*** well-defined engineering problems in structures, geotechnical, transportation, water resources, and environmental engineering. *(Level 3)*
f	**Professional /ethical**	**An understanding of professional and ethical responsibility.** Can ***analyz****e* situations involving conflicting professional and ethical interests, to determine an appropriate course of action. *(Level 4)*
g	**Communication**	**An ability to communicate effectively.** Can ***organize*** and deliver effective verbal, written, and graphical communications. *(Level 4)*
h	**Engineering impact**	**The broad education necessary to understand the impact of engineering solutions in a global and societal context**. Can ***determine*** impact of a specific, relatively constrained engineering *(Level 3)*
i	**Life-long learning**	**Recognition of the need for, and an ability to engage in life-long learning.** Can ***demonstrate*** the ability to learn on their own, without the aid of formal instruction. *(Level 3)*
j	**Contemporary**	**Knowledge of contemporary issues.** Can ***incorporate*** specific contemporary issues into the identification, formulation, and solution of a specific engineering problem. *(Level 3)*
k	**Engineering tools**	**An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.** Can ***apply*** relevant techniques, skills, and modern engineering tools to solve a simple problem. *(Level 3)*
l	**Project/Construction Management**	**An ability to explain key concepts** and problem-solving processes used in management. *(Level 2)*
m	**Business Concepts**	**An ability to explain key concepts** and problem-solving processes used in business. *(Level 2)*
n	**Public Policy & Administration**	**An ability to explain key concepts** and problem-solving processes used in public policy, and public administration. *(Level 2)*
o	**Leadership**	**An ability to explain** the role of the leader, leadership principles, and attitudes conducive to effective professional practice of civil engineering. *(Level 2)*

Table 3.2 Learning Outcomes Matrix

Courses		Measured Outcomes														
		a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
ENGL	101							X								
	102							X								
	LIT				X			X								
CMCN								X								
BHSC					X											
HIST					X											
ARTS					X											
MATH	270	X														
	301	X														
	302	X														
	350	X														
Statistics		X														
CHEM	107	X														
	108	X														
	115	X	X													
PHYS	201	X														
BIO		X														
ENGR	201	X														
	219	X														
	211	X														
	301	X														
	304	X														
	313	X														
ECON	430													X		
ITEC	270							X				X				
CIVE	101						X									X
	225	X	X		X	X	X	X				X				
	322	X				X				X						
	328	X	X		X	X		X				X				
	332	X				X										
	422		X	X	X	X		X	X		X	X			X	
	426		X	X		X			X			X				
	427		X	X	X	X		X	X			X				
	429			X		X			X	X	X	X				
	434	X	X	X	X	X					X	X				
	435			X		X		X	X		X	X			X	
	438			X	X	X		X	X	X						
	442		X	X	X	X	X	X	X	X	X	X				
	444						X		X	X	X		X	X	X	X
	450		X	X	X	X		X		X		X				
	480					X		X				X	X			

Table 3.3 Educational Objectives vs. Outcomes

Program Educational Objectives	Most Important Outcomes
1. Are immediately employable as a Civil Engineering Intern or prepared to continue in a graduate school program.	a, b, e, f, g, j, k
2. Can achieve and maintain status as a Professional Engineer, and participate in professional engineering organizations and/or other professional activities.	a, b, c, d, e, f, g, h, i, j, k, l, m, n, o
3. Are effective Civil Engineers and understand their responsibility to their community.	d, f, g, h, i, j, m, n, o

a. An ability to apply knowledge of mathematics, science, and engineering

Graduates will acquire the knowledge to qualify for and perform well in entry-level positions in structural, transportation, geotechnical, water resource, and environmental engineering; this includes qualification as an engineer intern. This category includes required basic science courses - physics, chemistry and biology; engineering sciences courses – statics, dynamics, mechanics of materials, fluid mechanics, thermodynamics, electric circuits, and engineering economics; and mathematics courses – differential and integral calculus, differential equations, and probability and statistics.

In the general engineering sciences courses (ENGR) alone, students are exposed to approximately 260 hours of lecture. Industry requires graduates who have the fundamentals necessary so that they can benefit from job specific training, Educational Objective 1. The fundamentals relate to our program's objectives in other ways: The Department has a responsibility to its graduates to properly prepare them for the professional licensing examinations, Educational Objective 2.

b. An ability to conduct experiments, as well as to analyze and interpret data

Laboratory experience for the program includes more than 270 hours of planning and performing experiments, analyzing and interpreting experimental data, and writing lab reports. The laboratory experiences include Chemistry, CHEM 115; Surveying, CIVE 225; Environmental Engineering, CIVE 322; Geotechnical Engineering, CIVE 328; Hydraulics, CIVE 434; Steel, CIVE 426; and Concrete Design, CIVE 427.

This training contributes to meeting Educational Objective No. 1. Graduates are qualified to perform experiments, and prepare reports. Consulting firms that conduct field and laboratory investigations such as foundation studies, storm water studies, water and wastewater treatment plants, and pilot studies employs many graduates. Similarly, industries need monitoring and performance testing requiring engineers to understand experimental procedures. The curriculum has been designed to provide graduates with the background to follow procedures for collecting data, and analyze, interpret and report their results according to specified standards. Students also become familiar with testing standards and the statistical implications of test measurements.

c. An ability to design a system, component, or process to meet desired needs

The Civil Engineering design course sequence includes an exposure to engineering design of nearly 380 hours that culminates with the capstone Senior Design course. Required courses that teach design principles include CIVE 422, 426, 427, 429, 435, and 438, and which culminate with the major design experience of the CIVE 442 design project. The student also has the opportunity to select six hours of Civil Engineering (CIVE) electives. Depending on what courses the student takes as an electives, they can easily gain 100 more hours in Civil Engineering design. Through these courses, Civil Engineering graduates understand the design process for systems and components, and they will be able to perform design at a level expected of an entry-level engineer. Furthermore, these courses give them exposure to many standards and codes used in the design process.

The program provides engineering design experience in the areas of water resources, environmental systems and pollution control, soils and foundations, transportation and structures that are relevant to the large industrial region in South Louisiana, where poor soils, flood protection, drainage, and waste disposal are common engineering challenges. The design experience is sufficiently broad that all graduates can find employment in South Louisiana or in other areas throughout the United States. Local industry requires graduates that are familiar design concepts, Educational Objective 1. The design component of the Civil Engineering Program provides the educational background and with relevant experience, graduates can successfully complete the P.E. examination, Educational Objective 2.

d. An ability to function on multidisciplinary teams

The Civil Engineering Program designates multidisciplinary projects as projects that encompass the design of multi-sub discipline areas of civil engineering, and/or other engineering, or other non-engineering disciplines. They have a basic understanding of the scope of the various engineering fields and recognize situations that are out of their areas of competence. However, the Civil Engineering Program, through the required humanities and social science courses, provides students with ample opportunity to interact with students from those disciplines. Similarly, the exposure of students to the physical, chemical, and biological sciences gives them the background to work on multi-disciplinary projects. It is in the best interest of the local community and regional industry to have graduates who can work effectively on multi-disciplinary teams since solutions to modern problems do not fall into any single specialty or discipline. The program of required core courses produce graduates with experience and sensitivity to different technical, social and cultural issues and an ability to function on multi-disciplinary teams.

A major design project involving multi-disciplinary teams occurs with the Senior “Capstone” Design Course, CIVE 442. It must be understood that the term "multidisciplinary,” outcome d, is presented as involving not only different areas of civil engineering, such as structural, geotechnical, environmental, water resources,

transportation, etc., but also economic considerations, and may include other areas of engineering, planning, social and political specialists. The projects selected involve the interaction of various professions and interests and has been currently provided by members of the Civil Engineering Advisory Board. The course utilizes a professional-mentoring system with a project, description, and supporting documentation provided by local design firms. In many cases it is a "real" project with all the professional expectations for completion and presentation. Outcome d is closely related to the Civil Engineering Program Educational Objective 3.

e. An ability to identify, formulate, and solve engineering problems

Students will be able to solve well-defined engineering problems in all of the technical areas addressed in the Civil Engineering Program. Problem solving methods are specific learning objectives in the basic science and engineering mechanics courses. Additionally, problem-solving techniques are emphasized throughout the Civil Engineering Program, in lecture material, homework, projects, and exams.

To further reinforce the program intent to produce graduates who can solve well-defined engineering problems in the five sub-discipline areas of the program, depth in each area is required by a two-course sequence providing advanced topics and exposure in each. This outcome is closely related to the Civil Engineering Program Educational Objective 1. Graduates of UL Lafayette use project management techniques in the solution of engineering problems in CIVE 480, 442 and other courses. This is particularly important for engineers that find employment in the industrial, consulting, and construction sectors. Finally, problem solving is an important component of design, which is reflected in the FE and PE examinations, Educational Objective 2.

f. An understanding of professional and ethical responsibility

The importance of conducting business in a professional and ethical manner is emphasized in the curriculum. In this curriculum, students are introduced to these concepts beginning in the first course, CIVE 101, Civil Engineering Orientation, and continued in various degrees in different courses throughout the program. The CIVE 444, Senior Seminar, was made a requirement beginning with the 2009 bulletin. In this class students review the ASCE Code of Ethics and critique various scenarios' involving ethical questions in engineering practice. The Senior Civil Engineering Design course, CIVE 442, draws the attention of the student on professional practice issues, licensure and the engineer's responsibility for public safety and welfare. In this significant design experience, the interrelated professional issues and ethical responsibility of the engineer is stressed throughout the exercise by the department's faculty and the practitioners serving as mentor-instructors. All civil engineering faculty are either registered professional engineers or engineering interns moving toward licensure. Outcome c supports Educational Objectives 2 and 3.

g. An ability to communicate effectively

Training in communication skills is intensive at UL Lafayette. Civil engineering students are required to take nine credit hours of English, namely ENGL 101, 102, and a literature elective. Also, students are required to take a communication course that must be related to public speech or writing classes. Technical Writing (ENGL 365) is highly recommended.

In addition to the English and communication course requirements, the Civil Engineering department has designated four (4) civil engineering courses as part of the Writing and Speaking Across the Curriculum (WSAC: CIVE 322, 328, 434, and 442). The principles of engineering communications are taught in the entry-level courses that include the Introduction to Civil Engineering (CIVE 101) and Civil Engineering Graphics (CIVE 142) and through laboratory reports in various laboratory courses. The students develop an ability to prepare and interpret engineering reports and documents, to make professional presentations, communicate electronically, and compile and document communications related to a task. Many courses require oral presentations of the students' engineering work. Graduates will have sufficient skills in written and oral communications to perform effectively in entry level engineering positions.

This outcome relates to Civil Engineering Program Educational Objectives 2 and 3. Communities requires engineering graduates who can effectively explain the scope and consequences of proposed projects to managers, clients, city councils, and the general public. They must be able to do this orally and in written reports. The need for effective communication skills is equally true for engineers working for industry.

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

To guarantee a broad general education, Civil Engineering students are required to take 27 credit hours of humanities and social science courses as shown in Criterion 5 (Table 5.1). This core of the general degree subject matter is taken by all students to develop an understanding of global values, issues, and the skills important for graduates to take their place as productive citizens. These subjects contribute to civil engineering student's understanding how the identification of selected design criteria and/or engineered solutions impact societal issues or how societal issues can influence engineered solutions. These courses support an understanding of the values and concerns important to the public, and help graduates to better appreciate how engineering may impact or be perceived to impact society and the environment. The global impact of engineering solutions is reinforced with presentations on this subject by professional practitioners serving as guest lecturers in the CIVE 444 (Senior Seminar) and followed with an assignment to be submitted for evaluation.

This outcome is related to both Educational Objectives 2 and 3 and is compatible with the University's general education requirements. It is important that UL Lafayette graduates have an awareness of what engineering decisions may have on society and the environment.

i. A recognition of the need for, and an ability to engage in life-long learning

By the time students complete the program they will have been required to provide answers or solutions to related problems that are only partially addressed in the material covered in the program of courses. It requires that resources and materials external to the course, even though a related topic, be researched and independently learned. To remain competitive and current, the student ultimately understands that only fundamental areas of civil engineering are covered in the program and that professional proficiency requires further in-depth study in the particular area of employment. Through their design courses they will also realize that new methods, products, and technology are constantly changing the practice of most areas. The need for life-long learning is emphasized in design courses when updated codes and specifications are used. Many CIVE classes (CIVE 450, 442 and others) require out of class research with reports or the use of information in projects that demonstrate the students' ability to learn without structured lectures. Successful completion of these exercises develops confidence and an ability to continue professional growth in areas of current practice or new and improved technologies. Through these class activities students develop an appreciation for continuing professional development activities needed in professional practice and that of professional licensure.

Outcome i relates to Educational Objectives 2 and 3 in maintaining the requirements for licensure and the ability to participate in the quest for solutions to problems confronting the profession and the community.

j. A knowledge of contemporary issues

Graduates will be expected to have fundamental knowledge of the current issues of concern in their areas, as well as the major current events related to Civil Engineering problems in the world-at-large. To be effective, professional civil engineers must appreciate the relationship of engineering to contemporary issues such as multicultural globalization of engineering practice; raising the quality of life around the globe; the growing diversity of society; and the technical, environmental, societal, political, legal, aesthetic, economic, and financial implications of engineering projects. The rich diversity of the faculty and the values, opinions, experiences, and training associated with these individuals greatly contributes to a greater exposure to students of a variety of contemporary issues. Contemporary issues related to specific engineering courses are integrated as they apply to the subject matter through discussion of news worthy events related to the topics of the courses. For example, some structural failures were discussed in Civil Engineering design courses. Specific topics are included in the CIVE 444, Senior Seminar, and integrated within the Civil Senior Design course, CIVE 442. This outcome relates to Educational Objective 3 where in order for a civil engineer to be effective in their community they must understand their responsibility to that community.

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

Graduates will be able to use the tools currently necessary for efficient operation in their areas. These tools include computer software applications used in Civil Engineering Graphics (CIVE 142), Transportation (CIVE 435), Structural Design (CIVE 426, 427, and 430), Environmental Engineering and Hydrology (CIVE 422 and 429) and other civil engineering courses, and the various degrees of exposure to testing and measuring equipment provided by the laboratories. Employers expect that all graduates will have the basic skills needed to apply software related to computer-aided-design, problem solution, and project management.

A familiarity of various codes and testing standards also provides an ability to use tools necessary in the analyses and design of engineering facilities. The student will develop an awareness and knowledge of these tools in laboratory courses (CIVE 225, 328, 422, etc.) and design courses (CIVE 422, 426, 427, 438 and 442). Included is the ability to select the appropriate tools for solving different types and levels of problems. Through hands-on experience, Civil Engineering graduates will have some knowledge of the operation and limitations of laboratory equipment and computational models and techniques.

Outcome k is related to the program Educational Objective 2 which requires an understanding of the role and use of appropriate information technology, contemporary analysis and design methods, and applicable design codes and standards as practical problem-solving tools to complement knowledge of fundamental concepts. The dramatic increases in information technology and the many advances made in the various areas of civil engineering prompted some of the faculty to incorporate Internet and computer usage for teaching and learning. This outcome is related to Civil Engineering Program Educational Objectives 1 and 2.

l. An ability to explain key concepts and problem-solving processes used in management.

Graduates will be able to explain *some* (but not all) of the key concepts in *any one of* the three-management area of project management, construction management; or asset management. The fundamentals of these concepts will be found in such courses as CIVE 480, Construction Engineering; CIVE 444, Senior Seminar; and other activities; including extra-curricular projects.

Outcome l supports the accomplishment of program Educational Objective 2. The ability to manage a project is fundamental to the performance of the professional civil engineer, Educational Objective 2. Graduates must be able to explain some of the key management concepts.

m. An ability to explain key concepts and problem-solving processes used in business.

Graduates will be able to explain *some* (but not all) of the key concepts in business. These are integrated into various courses and the student's knowledge is assessed and documented directly in courses such as CIVE 444, Senior Seminar, and CIVE 480,

Construction Engineering. The professional civil engineer typically functions within both the public and private sectors and requires an understanding of business. Thus, an understanding of basic business concepts is mandatory in the performance of a professional engineer and would be basic to the individual's ability be effective in community and/or professional service. Knowledge outcome m contributes to success in Educational Objectives 2 and 3.

n. An ability to explain key concepts and problem-solving processes used in public policy, and public administration.

Graduates will be able to explain some (but not all) of the key concepts in public policy or public administration. Exposure to these concepts occurs in different courses, but is integral to CIVE 322 and CIVE 422, Environmental Engineering I and II, and in CIVE 435, Transportation Engineering. Public policy may be further reinforced in CIVE 442, Senior Design, and CIVE 444, Senior Seminar. Basic public policy and public administration concepts would include the political process, formulation of public policy, laws and regulations, funding mechanisms, public education and involvement, government-business interaction, and the public service responsibility of professionals.

The professional civil engineer typically functions within both the public and private sectors and thus requires an understanding of business, public policy, and public administration fundamentals. This outcome contributes to Program Educational Objectives 2 and 3.

o. An ability to explain the role of the leader, leadership principles, and attitudes conducive to effective professional practice of civil engineering.

This topic is integrated into courses and/or curricular experiences. Leadership attributes and the importance of a positive attitude are introduced to students in the Civil Engineering Orientation Course, CIVE 101. It is further reinforced in the Senior Seminar, CIVE 444. There are many opportunities and students are encouraged to develop their leadership skills in courses through group projects, such as the CIVE 442 (Senior Project), extracurricular activities (ASCE, ACI, ITE, and Chi Epsilon activities), and the College of Engineering's Leadership Program. The Civil Engineering Department also awards a scholarship for professional leadership. Professional leadership is an important consideration in the selection of the Department's Outstanding Graduate.

Professional civil engineers are often called upon to assume leadership roles, in both the public and private arenas. Successful civil engineers develop leadership skills to complement their managerial abilities. Students are encouraged to adopt positive attitudes that can enhance their professional credibility, interpersonal relationships, and personal motivation. Outcome o is fundamental for the achievement of Educational Objectives 2 and 3.

CRITERION 4. CONTINUOUS IMPROVEMENT

4.A. Student Outcomes

Assessment Measurements Used to Assure That Graduates Have Achieved the Program Outcomes

The assessment techniques used to measure the learned outcomes are summarized in Table 4.1, Assessment Measurements. The measurement of the program outcomes uses typical evaluation techniques of a class, surveys, and external measures. The assessment method employs the program's faculty, students, and other constituents (employers and the professional community). The assessment frequency for individual measurements is noted in the Table 4.1. The information provides continuous indicators and support for a number of ongoing changes. However, Program Reviews on a three-year cycle were conducted by the department. These took place fall 2009 and fall 2012.

An abbreviated summary of the results from the different assessment methods of measurement conducted is provided in Table 4.2, Outcomes Assessments Results: 2007-2012. The following provides a description of the assessment methods used by the department.

4.A.1 Direct Measures of Student Outcomes by Faculty:

A review of the individual and the class performance at the end of the semester, i.e., a post course review, provides the means for evaluating whether the goals were achieved and what actions may be warranted for future improvements. The course objectives or outcomes are identified in the course syllabus in terms of the course subject matter. Evaluation of the degree of success with which the class achieves these outcomes can be derived from the instructor's review of the class' performance using different instruments.

The initial policy for evaluating course outcomes attempted to distribute the assessment effort between courses as noted by a faculty agreed upon matrix of outcomes and courses (see Table 3.2). Recently, however, department policy was modified such that all outcomes, integral to the course, are to be evaluated at the end of each session by the instructor (Civil Engineering Faculty Minutes Nov. 2012). An abbreviated summary listing of the Program's Reviews of the Student Outcomes for the 3-year cycles is provided in Table 4.3. Only the more problematic outcomes are noted. Greater detail is available in the Outcome binders.

Table 4.1 Assessment Measurements

Assessment Description	Assessment Frequency	Level of Attainment	Evaluation	Documentation
Course/Faculty Evaluation: • Entire course[1] • Exams • Exam questions • Projects • Assignments • Reports & presentation	End of semester by course. Each outcome is reviewed on a three year cycle[2].	Success measured by faculty in terms of group performance w/ faculty's scale for success.	Individual outcomes from the results are reviewed and critiqued with recommendations for future action.	Summary documented in Outcomes Books. Ultimately each outcome is evaluated in the program review cycle[2].
Student Surveys[3] on Course Objectives	End of semester, all courses.	Survey answers tallied on scale for student's evaluation of success.	Reviewed by instructor; compared with faculty evaluation.	Summary documented in Outcomes Books.
Student-Outcomes Portfolio	Each semester, CIVE 444[4].	Each outcome evaluated on rubric scale for success.	Individual & Group evaluation by Rubric.	Individual Student's Portfolio w/Rubric Evaluations.
Senior Design Panels/Rubrics	Each semester, CIVE 442.	Rubric scaled to note attributes required for acceptable performance or products.	Summary of Panel Reviews based on Rubric levels of acceptance.	Documented in Outcome Books.
Exit Interview/ Survey	Each semester.	Individual's evaluation w/outcome success on a scale of 1 through 10.	70% positive group agreement w/learned outcome.	Summary of Exit Interview/Survey Prepared/ Distributed to faculty & documented w/ABET files.
FE Exam: • Pass Rate • Individual Subject	Each semester.	Meet or exceed national pass averages and subject scores.	Continuous review w/periodic analyses of pass rates or individual subjects.	Results and analyses are maintained w/ABET.
Alumni Survey	~ 5 years.	Individual's evaluation w/outcome success on a scale of 1 through 10.	Group response as average on scale	Documented and maintained w/ ABET files
Advisory Board/ Employer Survey	~ 5years.	Individual's evaluation w/outcome success on a scale of 1 through 10.	Group response as average on scale.	Documented and maintained w/ ABET files.

[1]Some courses focused on outcome
[2]changed to a two year cycle effective fall 2012
[3]made a requirement spring 2011
[4]CIVE 444 became a required course in fall 2009

Table 4.2 Outcomes Assessments Results (2007-2012)

Outcomes	ASSESSMENTS						
	Faculty /Course[1]	Student Course Survey[2]	Student-Outcomes Portfolio[3]	Exit Interview[4]	Employers[5]	Alumni[5]	NCEES FE Exam[6]
a Math/Science			4.4	3.8 4.1	4.7	4.4	-not met -met
b Experiments	2009 2012		3.7	4.1 4.2	4.0	3.9	
c Design			4.5	3.9 3.8	4.3	3.5	-not met -met
d Multi-disciplinary Teaming			4.1	4.5 4.4	4.3	3.9	
e Engineering Problems			4.1	4.3 4.4	4.6	4.3	-met -met
f Ethics/Prof. Practice	2009		4.2	4.7 4.5	4.5	4.1	-met -not met
g Communication			4.5	4.1 4.2	4.3	4.2	
h Global Impact	2009 2012		3.9	3.9 4.0	3.7	3.8	
i Life Long Learning			3.9	4.4 4.7	4.3	4.0	
j Contemporary Engineering	2009		3.3	3.8 4.0	3.9	3.7	
k Engineering Tools			3.5	4.0 4.2	4.5	3.8	
l Project Management	2009		3.9	4.6	3.9	4.2	-not met -met
m Business Concepts	2009		3.7	3.7	3.9	2.5	
n Public policy	2009		3.4	3.7	3.9	3.4	
o Leadership	2009		3.4	4.4	4.0	3.7	

[1]Assessment cycles where outcome had problems or issues (two Program Review cycles, 2009 & 2012)
[2]Recently adopted measurement policy (limited or no data)
[3]On a scale of 1-5, CIVE 444 fall 2012 Rubric
[4]On a scale of 1-5 & summary of 2 Program Review assessment cycles (2009 & 2012) shown
[5]On a scale of 1-5
[6]Department goal: scores meeting or exceeding national average (2 Program Review cycles, 2009 & 2012)

Examinations. Tests are routinely used to evaluate the class and each individual student's success in achieving the learning objectives identified by the course. It permits the instructor and, ultimately, the department to identify the areas that need further enhancement or improvement. Civil Engineering undergraduate courses include general mid-session tests in addition to a final exam. Most tests involve the solution of problems related to the course with one correct answer, although in many courses partial credit is awarded for procedure. Most tests are in-class, one to one-and-one-half hours duration, open or closed book, depending on the type of course. There are a number of courses including the three (3) Civil Engineering design courses, in which open-ended solutions are encouraged in all areas of concentration.

Final Examinations. The final examination provides a means for evaluating students' global understanding of the material covered in the class and their ability to put these together in demonstrating their knowledge of the subject matter. All courses are required to have a final examination at the end of the semester. Final examinations are generally two hours and thirty minutes in length; the weight of the final examination in grading the students' learning of the subject may vary, but it generally ranges from 15 to 40 percent of the total grade.

Homework. Homework assignments ensure that the student is continuously engaged in learning the material and tries to eliminate the tendency to cram at the last minute. It can also permit a more in-depth review of the students' understanding of the material than provided by brief and infrequent tests. All undergraduate Civil Engineering courses generally require some form of written homework. The level at which it is evaluated may vary depending on the techniques used by the instructor.

Projects. A project normally involves a more extensive problem that requires the students' use of multiple engineering principles involving analysis and design solutions. These often require that prerequisites, organization and research of a problem be employed. The application of the engineering material to specific projects can often demonstrate the students' strengths and weaknesses on engineering topics. About one-third of the Civil Engineering required courses require an individual project. Project scope varies considerably from class to class. Design courses usually require individual or group projects that involve the preparation of a final report, including design drawings, selection of technical specifications for materials and equipment, and other details.

CIVE 442, Senior Project, is a major group design project requiring students to work in teams. These activities require and test the individual's ability to work with multidisciplinary teams consisting of the different sub-discipline areas of Civil Engineering. It requires the preparation of a final report with design drawings, selection of technical specifications for materials and equipment, and other details that make it as close, as possible, to a professional engineering report.

Table 4. 3 Program Reviews of Faculty-Course Outcomes:

MARGINAL or PROBLEM OUTCOMES (Fall 2007- Fall 2009)
"b" short of level 5 needs more attention in other courses "f" new course(s) w/more focus on ethics & professional practice "h" marginal, possibly met at level 2 "i" met at level 2 – measurement needed "j" inadequate, possibly level 2, measurement not emphasized "l" no measurement records for "l" from CIVE 480, not met "m" marginally met w/ECON 430 course (can explain some but not all key business concepts) "n" role needs to be identified w/measurement focus in class(s) "o" not addressed as a topic, possible experiences in extra-curricular activities at best.
MARGINAL or PROBLEM OUTCOMES (Fall 2009- Fall 2012)
"b" method/analysis are OK for level 4, but not level 5 – needs more "design" in advanced courses "d" inadequate measurements "e" inadequate evaluation "g" inadequate evaluation "h" met at level 2 in CIVE 444, other reinforcement and measurements needed "l" met at level 2 in CIVE 444, missing CIVE 480 evaluation "m" met at level 2 in CIVE 444, other reinforcement? "n" met at level 2 in CIVE 444, other reinforcement? "o" met at level 2 in CIVE 444, other reinforcement?

Oral Presentations. An oral presentation and defense of an engineering solution is a must for professional engineers. Verbal presentations demonstrate the individual's ability to communicate, but also provides feedback on the individual's knowledge of the subject. In most cases, this activity provides a two-way communication between the presenter and the audience. Some Civil Engineering courses require individual oral presentations on topics previously selected by the faculty member teaching the course. These have included CIVE 101, Introduction to Civil Engineering; CIVE 422, Advanced Environmental Engineering; and a number of other classes. Many assigned projects require oral presentation and written reports made to the class and to outside panels; such as required in the Senior Design Project, CIVE 442.

Laboratory Reports. The ability to prepare technical reports is most important in engineering. The ability to communicate relevant engineering information can be demonstrated in the technical report. The requirement of laboratory reports provides the students' assessment of the exercise and an instrument for the instructor to assess the students' understanding, knowledge of the activity, and ability to communicate in a technical document. All laboratory classes require reports on experimental results. These

reports generally list equipment, materials, theory, results, and conclusions; included also are tables, graphs, and statistical analysis of the data, as appropriate.

4.A.2 Faculty Evaluation of the Student's Personal Assessment for Learned Outcomes:

Student-Outcomes Portfolio. The CIVE 444 (Senior Seminar Course) is taken by all graduating seniors who entered the UL Lafayette's program in the fall 2009 or latter. The course requires that all students prepare a personal, Student-Outcomes Portfolio. The portfolio format requires that 1) the student define or describe the UL Lafayette's Civil Engineering outcomes, 2) identify those activities which included or required a demonstration of the learned outcome, 3) the measurement that was used in verifying success, and 4) the documentation of the measured outcome. A rubric is used in the evaluation of each outcome presentation in the student's portfolio. The rating for each outcome for the fall 2012 class is included in Table 4.2. This exercise helps to focus the student's attention on these important engineering knowledge items/outcomes and provides further assurance for a positive response to the question, "how do you know all graduates have achieved all outcomes?"

4.A.3 Surveys:

Student-Course Outcomes Survey. The students' evaluation of the course objectives provides a measure of the student's confidence in their ability to meet their perception of the outcome. It can reinforce and help verify the specific course outcomes hoped for. It also provides guidance for future efforts. The Civil Engineering faculty agreed to a student evaluation of all course student-outcomes in 2012. The practice was not routine in all courses prior to that date. However, the department policy now is that a student-course outcomes evaluation survey of all civil engineering courses be conducted near the end of each semester. Results of the survey are to be used by the faculty in the post-course review of the outcomes specific to that course. Students are also encouraged to include written comments and suggestions.

Student Exit Interviews/Surveys. The Civil Engineering department exit interview/survey of graduates provides a summary of the students' assessment of the academic program and the department (see Table 4.4a and b). This survey provides information on issues not covered elsewhere. Each semester, graduates are asked to complete an exit survey, which encourages their input on the effectiveness of the current program and requests suggestions for improvement. Resulting comments and suggestions are presented anonymously to the civil engineering faculty for their use in improving the course materials and the curriculum.

Alumni Surveys. The ability of the alumni to perform and grow in their professional positions is directly related to the quality of their educational program. Thus, they are in a unique position to compare their preparation to the job and tasks being required. The department and the advisory board conduct periodic surveys of alumni. The department concentrates on those who have graduated within, approximately, the last five (5+/-)

years. The frequency with which the alumni survey is administered is on an approximately five-year cycle. The survey provides reinforcement of the program's performance in achieving its educational goals and the program outcomes (see Table 4.2).

Employer Surveys. Employers are a major constituent of the program; therefore, a survey of those employing our graduates is a necessity for evaluating the program's mission, educational objectives and learning outcomes as they relate to job requirements. The Civil Engineering Advisory Board (CEAB) maintains contact and periodically participates in a survey of the program's major employers. Their satisfaction with the graduate's job performance is considered part of the continuous enhancement efforts. Within recent years, firms that have hired substantial UL Lafayette Civil Engineering graduates have been surveyed, as shown in Table 4.2.

4.A.4 External Reviews & National Exams:

Civil Engineering Advisory Board (CEAB). The Civil Engineering Advisory Board has been actively involved with program development. The Department solicits input from this group on curriculum and related issues. The Civil Engineering Advisory Board consists of professionals in positions of engineering leadership within industry, government, construction and engineering consulting. The Board's role critically assists the department with its (1) program goals and objectives, (2) assessment plan and instruments, (3) graduate learning outcomes, (4) program development, and (5) relationship with the professional world.

The CEAB also plays an important role in reviewing the program, curriculum changes that are considered, and assists in conducting alumni and employer surveys. Their assessment provides an analysis that is independent and external to the department and university. Their assessment, recommendations and opinions have contributed to many curriculum changes. The Board also initiates, reviews and makes recommendations that weigh heavily on many decisions made concerning the department's mission and educational objectives. The CEAB minutes document the Board's activities.

Graduate School Admission. The Civil Engineering Department informally monitors the number of graduating seniors who continue on to graduate school through alumni surveys or personal feedback with individual faculty. Most recent graduates seem to do well on the Graduate Record Exam (GRE) and generally attend the graduate schools of their choice. This is a measure of Educational Objective No. 1, concerning further education or post-graduate work. Currently, it is known that several graduates are enrolled or have recently completed the graduate programs (M.S. and Ph.D.) at Virginia Tech, Texas A&M University, Louisiana State University and our own, University of Louisiana at Lafayette. The UL Lafayette undergraduate degree has been competitive with other programs and our students have gained admission into many graduate programs of quality.

Table 4.4a Exit Interview - Fall 2007 – Spring 2010			
Satisfaction of Curriculum/Professional Component (Average w/1-strongly disagree to 10-strongly agree)		**ABET OUTCOMES** (scale: average w/1-least to 5-highest)	
Number & Quality of Electives	4.3	a. Math/science	3.8
Laboratory Experiences	7.0	b. Experiment	4.1
Improved Writing Ability	7.2	c. Design	3.9
Improved Oral Communications	7.5	d. Multi-disciplined	4.5
Time Management Skills	8.0	e. Engineering Problems	4.3
Team Experiences	7.7	f. Professionalism/Ethical	4.7
Design Skills	7.9	g. Communication	4.1
Preparation for Entry Level Civil Engineer	8.4	h. Engineering Impact	3.9
Number Graduating = 46 Employed* = Have Taken FE* = Grad School * = *at time of interview		i. Life-Long	4.4
		j. Contemporary	3.8
		k. Engineering Tools	4.0
		l. Management	
		m. Business	
		n. Public Policy	
		o. Leadership	

Table 4.4b Exit Interview - Fall 2010 – Spring 2013			
Satisfaction of Curriculum/Professional Component (Average w/1-strongly disagree to 10-strongly agree)		**ABET OUTCOMES** (scale: average w/1-least to 5-highest)	
Number & Quality of Electives	5.0	a. Math/science	4.1
Laboratory Experiences	7.5	b. Experiment	4.2
Improved Writing Ability	8.3	c. Design	3.8
Improved Oral Communications	7.7	d. Multi-disciplined	4.4
Time Management Skills	8.3	e. Engineering Problems	4.4
Team Experiences	8.3	f. Professionalism/Ethical	4.5
Design Skills	8.5	g. Communication	4.2
Preparation for Entry Level Civil Engineer	9.0	h. Engineering Impact	4.0
Number Graduating = 65 Employed* = Have Taken FE* = Grad School * = *at time of interview		i. Life-Long	4.7
		j. Contemporary	4.0
		k. Engineering Tools	4.2
		l. Management	4.6
		m. Business	3.7
		n. Public Policy	3.7
		o. Leadership	4.4

NCEES Fundamentals of Engineering Exam. All Civil Engineering students are strongly encouraged, but not required, to take the Fundamentals of Engineering Exam. The importance of professional licensure is emphasized throughout the program. The pass-fail performance of students on the overall exam and on individual subjects provides comparison of peer programs. It is a national, normalized exam that provides direct information on the technical learning outcomes and others, and our Educational Objective No. 2, licensure. It provides guidance for needed changes in individual courses and the overall program. It specifically addresses student outcomes math and science proficiency, outcome a; structural design, outcome c; the ability to solve civil engineering problems, outcome e; ethics and professional practice, outcome f; and project/construction management, outcome l. The department receives the results of the examination as provided by the National Council of Examiners for Engineering and Surveying (NCEES). The report includes a breakdown of success levels for the outcomes in the various subject areas, Figures 4.1 through 4.4. When a pattern of weakness is detected in a particular subject area, program adjustments are considered. The UL Lafayette metric for success is that the group meets or exceeds the national average. Table 4.2 provides a summary of the student outcomes covered in the FE exam and notes those outcomes which were achieved (met) and those which were not considered to be achieved (not met).

P.E. and E.I. Statistics. The results of alumni surveys and research of the State of Louisiana's Professional Engineer and Land Surveyor Board (LAPELS) records can provide some indication (i.e., in Louisiana) of the performance of Civil Engineering alumni as regards Educational Objective 2, licensure or licensure path. In the alumni surveys, the graduates are asked whether they have taken the FE and/or the PE exams, and are licensed as a professional engineer, P.E., or as an engineering intern, E.I. Through informal contact with alumni in the South Louisiana region, it is estimated that most of graduates become registered professional engineers within five to eight years after their graduation.

4.A.5 Assessment Frequency

The assessment measures for the outcomes are on-going. The frequency with which individual measurements occur is noted in Table 4.5. Many measurements are made on a semester basis. Other measurements, such as some surveys, take place over longer intervals, i.e., the alumni survey, the employer's surveys, etc. A summary of the results from any of the measurements may produce immediate change and is part of the continuous improvement process.

The Program Review of assessed outcomes has been on a three year cycle since the last ABET visit until Fall 2012. The Program Review of all outcomes took place during the Fall of 2009 and the Fall of 2012. In the fall 2012 (Faculty minutes, October 26, 2012), the frequency and schedule for the Program Review were changed to a two-year review cycle as shown in Table 4.5. A summary statement will be developed at the end of each cycle and recommendations for future efforts will be made. The report will be reviewed and approved by the entire faculty, if acceptable. The review cycle is shorter, but will cover only half of the outcomes in each review period.

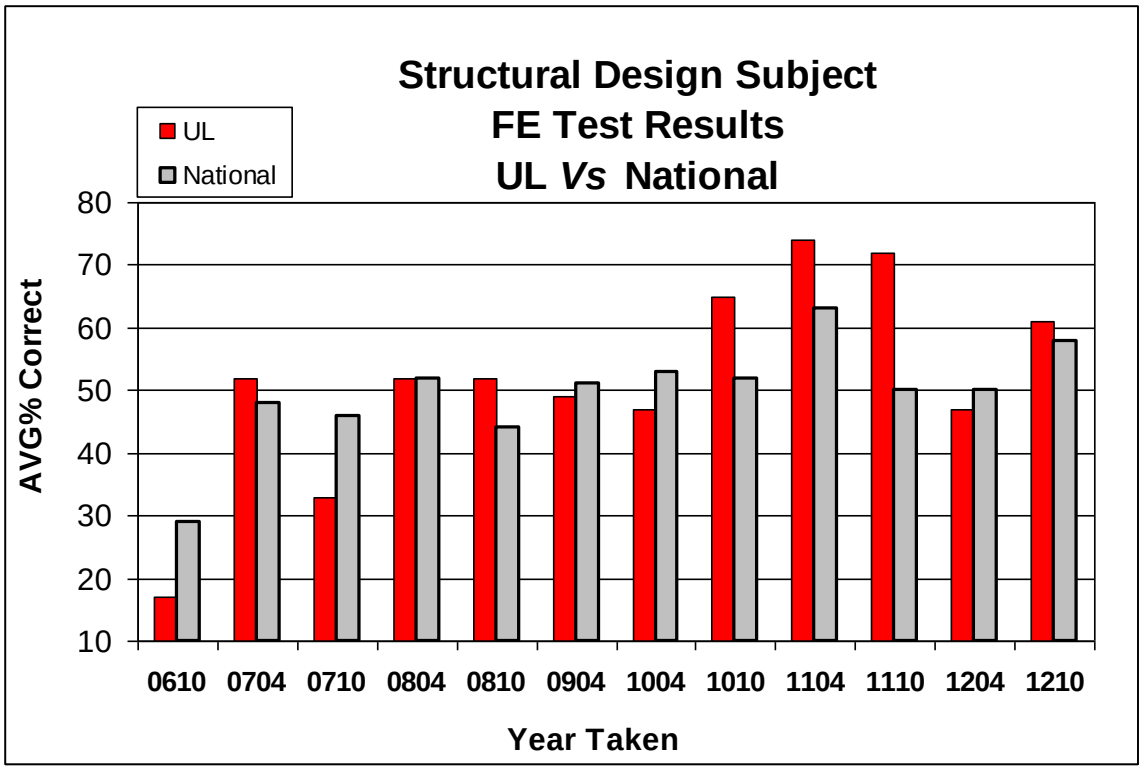


Figure 4.1 FE Exam Structural Design: Outcome "c"

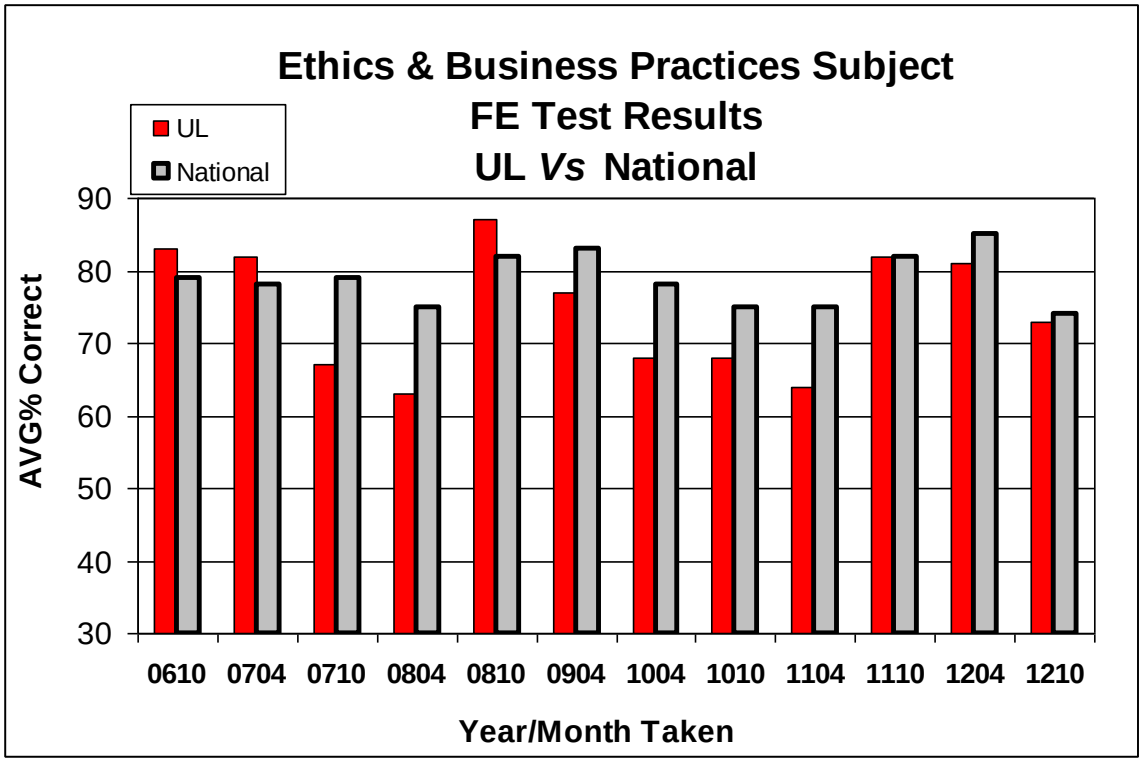


Figure 4.2 FE Exam Ethics: Outcome "f"

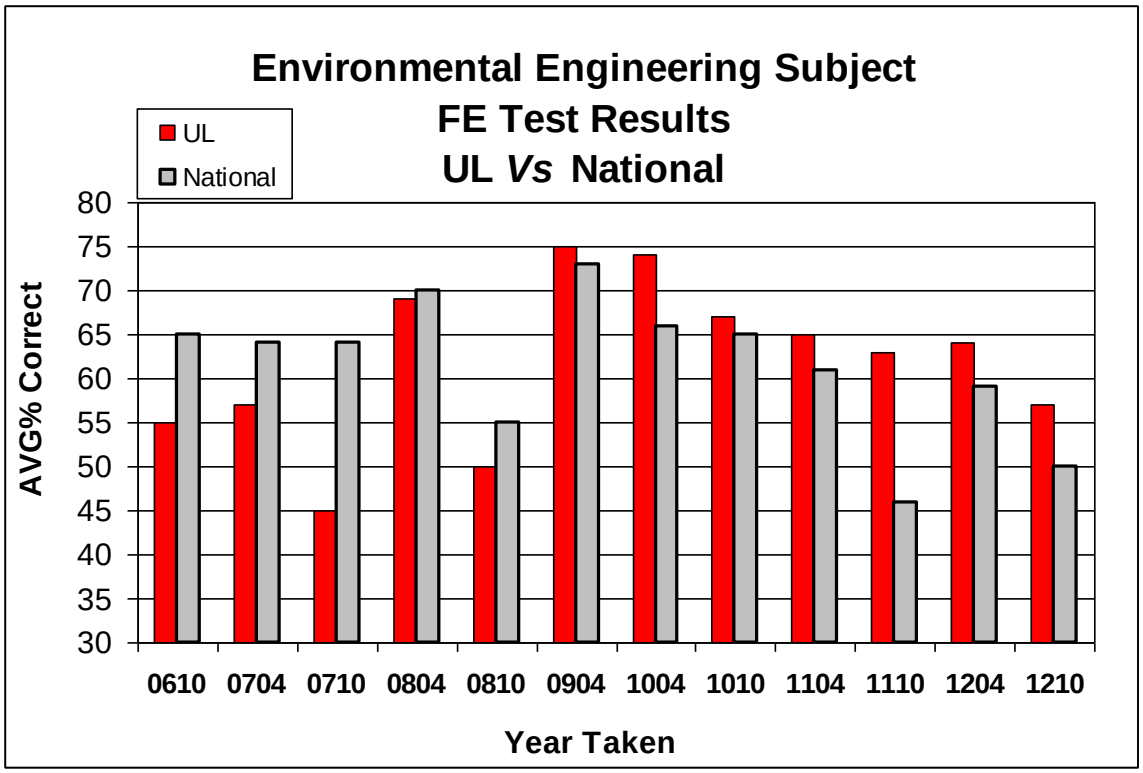


Figure 4.3 FE Exam Environmental: Outcome 'e'

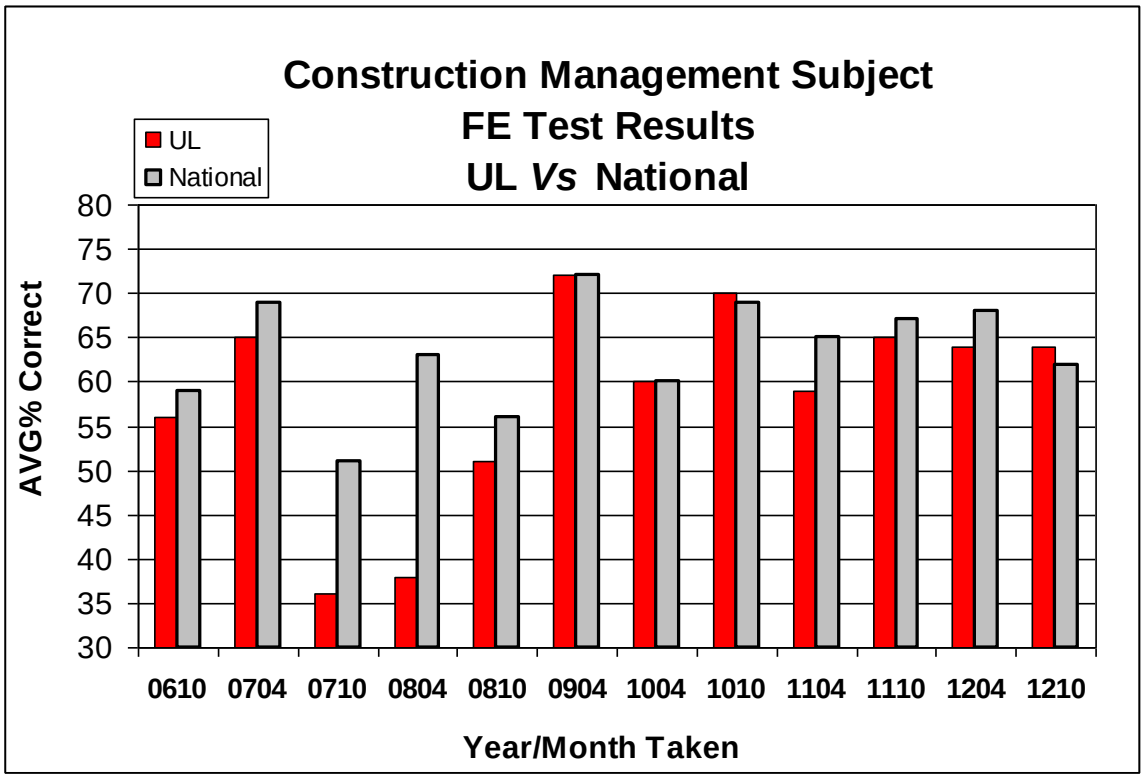


Figure 4.3 FE Exam Construction Management: Outcome ' l '

Table 4.5 Timeline for Program Review Assessment of Student Outcomes

OUTCOME	YEAR					
	2014	2015	2016	2018	2019	2020
a	✓		✓		✓	
b		✓		✓		✓
c	✓		✓		✓	
d		✓		✓		✓
e	✓		✓		✓	
f		✓		✓		✓
g	✓		✓		✓	
h		✓		✓		✓
i	✓		✓		✓	
j		✓		✓		✓
k	✓		✓		✓	
l		✓		✓		✓
m	✓		✓		✓	
n		✓		✓		✓
o	✓		✓		✓	

4.A.6 Level of Attainment: Metric Goals for Outcomes

Knowledge, skills, and attitudes exist at different levels of capability. The ASCE BOK Report (*Levels of Achievement Applicable to the Body of Knowledge Required for Entry Into the Practice of Civil Engineering at the Professional Level, September 2, 2005*) defines six learning levels for the outcomes identified for professional practice and achieved through formal education. The ASCE Body of Knowledge Outcomes Rubric and the proposed levels of achievement have been adopted for the Civil Engineering Program (Table 4.6).

In 2007-2008, the ABET criteria for Civil Engineering and related programs adopted outcomes where the graduate *"can explain basic concepts in management, business, public policy, and leadership; and can explain the importance of professional licensure."* To reinforce and to measure these outcomes, the CIVE 444, Senior Seminar, was added to the program as a required course. This represented an increase of one semester credit hour or a program total of 129 semester credit hours. CIVE 444 became a requirement for all students entering the Civil Engineering program as of Fall 2009 and is an example of the continuous improvement process.

Documentation for the evaluation of course outcomes are placed in the appropriate outcome binder (a – o) or in survey binders, as appropriate. The documentation and data files are kept in Madison Hall, Room 254D which is dedicated to this purpose.

Table 4.6 Metric Goals for Outcomes

OUTCOMES	OUTCOME LEVEL
Technical core **a**	**Level 3- Application:** Graduates can solve problems in mathematics through differential equations, calculus-based physics, chemistry, and biology.
Experiments **b**	**Level 5-Synthesis:** graduates can design a civil engineering experiment to meet a need; conduct the experiment, and analyze and interpret the results.
Design **c**	**Level 5-Synthesis:** graduates can design a system or process (e.g., a truss or water treatment process) to meet a well-defined set of requirements and constraints.
Multi-Disciplinary **d**	**Level 3- Application:** graduates can function effectively as a member of a multi-disciplinary team.
Engineering Problems **e**	**Level 3- Application:** graduates can solve well-defined engineering problems in four technical areas appropriate to civil engineering.
Professional/ Ethical **f**	**Level 4- Analysis:** graduates can analyze a complex situation involving multiple conflicting professional and ethical interests, to determine an appropriate course of action.
Communication **g**	**Level 4- Analysis:** graduates can organize and deliver effective verbal, written, and graphical communications.
Engineering Impact **h**	**Level 3- Application:** drawing upon a broad education, a graduate can determine the global economic, environmental, and societal impacts of a specific, relatively constrained engineering solution.
Life-Long Learning **i**	**Level 3- Application:** graduates can demonstrate the ability to learn on their own, without the aid of formal instruction.
Contemporary Issues **j**	**Level 3- Application:** graduates can incorporate specific contemporary issues into the identification, formulation, and solution of a specific engineering problem.
Engineering Tools **k**	**Level 3- Application:** graduates can apply relevant techniques, skills, and modern engineering tools to solve a simple problem.
Project Management **l**	**Level 2- Comprehension:** graduates can explain some (but not necessarily all) key concepts and problem-solving processes used in management.
Business Concepts **m**	**Level 2- Comprehension:** graduates can explain some (but not necessarily all) key concepts and problem-solving processes used in business.
Public Policy/Administration **n**	**Level 2- Comprehension:** graduates can explain some (but not necessarily all) key concepts and processes used in public policy.
Leadership **o**	**Level 2- Comprehension:** graduates can explain the role of a leader, the leadership principles, and attitudes of an effective professional civil engineer.

4.B. Continuous Improvement

Continuous Assessment of Program Outcomes

The information obtained through the above-described measures is used to evaluate the success of the program's student outcomes. The model for continuous evaluation of the educational objectives and program outcomes is presented in Figure 4.5. In following the Assessment Model, reviews of courses and those most opportune for the occurrence of student outcomes has produced changes in mapping for assessment measurements. These changes were documented in the faculty minutes of October 26, 2012 and represent an important part of the continuous improvement efforts. The assessment guidelines for the individual student outcomes, the associated courses and measurements are provided in Appendix E. The Program Outcomes Review for all measurements is the major function of the Civil Engineering Departments' Undergraduate Curricula Committee and is an on going charge. A review of all CIVE courses takes place at the end of each semester with each faculty conducting a post-semester, course review of the courses they taught. The post-semester, course review considers all course activities and the class performance with those techniques used to measure the learning of the subject matter and related outcomes. Learning outcomes are verified by the measurements determined through exams, homework, projects, etc. of the individual and of the class performance at large. Individual courses are reviewed, evaluated and changes for improvement noted on the review form. In many cases, the instructor within the course can make improvements. The analysis is archived in the Outcomes notebook. The instructor's evaluation is ultimately reviewed during the Program Review and considered in the evaluation for program modifications.

Other information that comes into play and is available at the end of each academic semester includes the Student–Course Outcomes survey for each class, the exit surveys of the graduating seniors, and the continuing Fundamentals of Engineering Exam results. Other data providing insight to the success of program outcomes such as employer surveys or alumni surveys are not taken as frequently but the results of previous measurements are considered and may have a bearing on the most current measures. Normally, the mass surveys of employers (and CEAB) and alumni are taken on a five year cycle.

4.B.1 Analysis of Qualitative and Quantitative Data

The assessment of the outcomes can include both qualitative and quantitative data. Direct measurements include the students' class performance (exams, homework, projects, presentations, lab reports, etc.) and can be scaled in terms of an acceptable value or level.

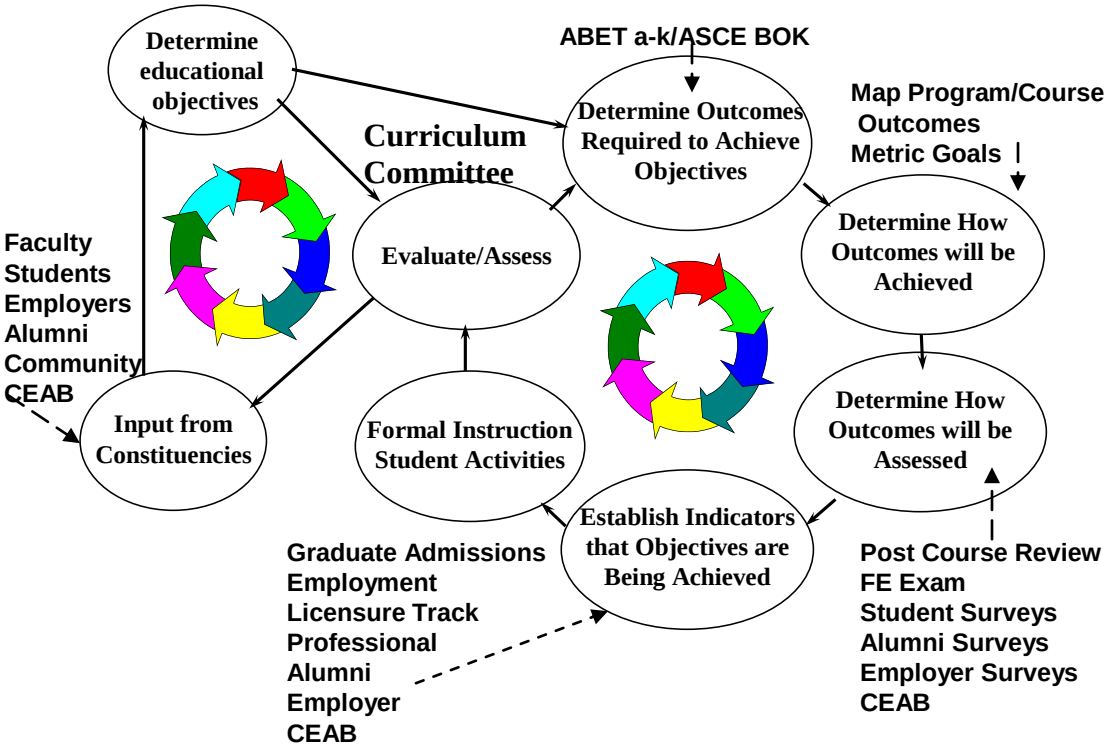


Figure 4.5 Assessment Model

The FE Exam results are direct measurements and provide comparative results with other programs. The graduating seniors exit survey and the student's course evaluation may represent opinions, but the response to the answers can be quantified statistically. The alumni survey, employer surveys, and other data that occurs on a three (3) to five (5) year cycle can also be quantified in terms of opinions. Other data such as unsolicited feedback from students, alumni or employers and reports of graduate's admission into other graduate programs is more qualitative. The overall results produce a "snap shot" in time of the program, the current and past student performance, and its compatibility with industry needs. With continuous monitoring, it permits the identification of needed changes or verifies the current approach.

Not all of the data received can be quantified. Much of it is qualitative and is received as unsolicited information or by word of mouth. For example, informal contacts between the faculty and alumni or employers provide data that may not produce a statistical evaluation. It does, however, contribute to a perception of the program's adequacy. Other types of information such as that from Advisory Board members, class discussions,

student and graduate honors, admission to graduate schools, graduate salaries, etc., do not come packaged or are not necessarily available as a periodic measure.

4.B.2 Student Outcomes: Continuous Improvement

The following tables portray the chronology of tactical changes that have occurred in the department's efforts for continuous improvement. They are based on the assessed outcomes and involve changes made 1) in the curriculum, Table 4.7, and 2) in courses, Table 4.8. The review corresponds to the 3 year cycles used in the Program Assessment Review from 2006 through 2012. Greater detail is provided within the assessment documentation.

Table 4.7 Curriculum Changes

DATE	ISSUE	SOLUTION
Fall 2009	ABET Civil Engineering Program criteria change: project management, business concepts, public policy, and leadership outcomes added. UL Lafayette program did not measure or include these outcomes consistently.	Outcomes project management (l), business concepts (m), public policy (n), and leadership (o) were added as student outcomes. CIVE 444, Senior Seminar, was made a required course: ▪ to reinforce these and other outcomes (h, i, and j) ▪ to provide focus and importance to these student outcomes ▪ to assess/measure student learning ▪ to document assessment these and others Program increased to 129 cr hrs
Fall 2013	University requirement to add UNIV 100, Cajun Connection, and UNIV 200, Computer Literacy, - 4 credit hours in response to SACS-COC accreditation need for retention & student success. CIVE faculty wanted to retain CIVE 101, Civil Engineering Orientation, 1 credit hour	University permission was granted to allow reduction of one course (3 cr hrs) from the general education core. PHIL 316, Professional Ethics, was dropped with intent to further stress engineering professional ethics and codes in CIVE 101, 442, 444 and other courses, and to improve FE exam performance for outcome f (ethics). CIVE 142, Computer Graphics-Intergraph, was dropped and ITEC 270, Computer Graphics – Auto CAD, added to address CEAB and student requests, and to address the availability of better instructional resources. Semester hours dropped from program = 5 credit hours. Semester hours added = 7 credit hours. Total credit hours in the program are 131 credit hours.

Future curriculum changes being considered include the addition of a business course, a course on material science and a construction materials laboratory. To accommodate these would require the elimination of courses such as thermodynamics or electrical circuits which will not be included in the civil engineering FE exam specifications in the future; or substitute for one of the CIVE electives

Table 4.8 Course Changes

OUTCOME	DATE	ASSESSMENT	SOLUTION-RECOMMENDATION
a Math & Science	Fall 2009	FE student performance acceptable in math/science, good in mechanics	Prerequisites reinforced to require C grade or better for CIVE 300 level courses
	Fall 2012	Marginal results on FE exam in math and science	Policy change: C grades required in all classes.
b Experiments	Fall 2009	Learning Level 4, Design, not achieved or found to be marginal. Only addressed at level 4 in the sophomore CIVE 225, Surveying, course.	Modification of courses to require experimental design. Possibilities CIVE 438 design a site characterization, CIVE 427 concrete projects, CIVE 450 transportation materials , etc.
	Fall 2012	Learning level 4 is improved but still more emphasis/documented success is desired	Projects and activities being further developed in CIVE 426, 427, 438, 450, and 442.
c Design	Fall 2009	In most design courses, design is limited to sizing or identifying system components. Very little synthesis or the incorporation of all design issues, e.g., risk & uncertainty, sustainability, environmental, global impact, etc. Students have difficulty in defining the requirements for the CIVE 442 design project; producing a delay in the initiation of the project. A further need for preparing the student is seen.	Design courses (CIVE 422, 426, 427, 434, 438, etc.) are requested to include more open-ended design problems and to include exercises that puts the design components together.
	Fall 2012	Measurements of outcomes in CIVE 442 need greater refinement. More introduction to synthesis and codes regulatory requirements are needed in introductory design courses, CIVE 422, 434, 426, 427, 435, 438, and 450.	Panels consisting of faculty and practitioners used in the evaluation of the designs by students and student teams in the CIVE 442. Several rubrics for evaluating the design, the presentations, teaming, professional practice, etc. were developed. Other design courses will include open-ended analysis and design projects CIVE 426, 437, 438, 459, etc.
d Teaming	Fall 2009	Many opportunities in laboratories and class projects are being used. Only CIVE 442 offers opportunity for multi-disciplinary teaming with projects that include structural, foundation, transportation, drainage, environmental or other engineering. Measuring success should be improved.	Opportunities to include other disciplines (architecture, electrical, mechanical, etc.) in the CIVE 442 projects should be included where possible. Include peer review of team members is suggested.
	Fall 2012	Good teaming results reported most courses. Multidisciplinary teaming only occurs in CIVE 442. Efforts to involve peer review in the assessment of teaming were not reliable. The group appears to mutually inflate the performance of other members.	Further development of a rubric to evaluate teaming and improve measurements of this student outcome.

e Solution of Civil Engineering Problems	Fall 2009	In general, assessment of course outcomes are favorable for outcome e. The FE performance is lacking in some areas, i.e., surveying, transportation, soil mechanics, and environmental.	Review the NCEES FE criteria for the different subject matter and ensure that sufficient coverage is provided, if it is compatible with the Civil Engineering program.
	Fall 2012	Course assessments are O.K. Significant improvements in hydrology and environmental and soil mechanics on the FE exam are noted. Surveying and transportation are marginal but better.	Continue to monitor FE performance and make course revisions where necessary.
f Ethics & Professional Practice	Fall 2009	Level 4, analysis, is not being achieved in the program of courses. The PHIL 316, Ethics, course provides good basics but does not appear to provide the professional practice of engineering, nor the application of codes. The student's performance on the ethics portion of the FE exam is poor.	Ethics should be expanded and given major emphasis in the CIVE 444, Seminar, course which will be required for all students entering in the fall 2009. Other courses are encouraged to address ethics where it may fit in the course.
	Fall 2012	The FE performance in ethics has not greatly improved. This is attributed to the fact that none of the graduating seniors have been required to take the CIVE 444 course since they were following earlier bulletins.	The CIVE 444 course will provide emphasis on activities, which require the analysis of situations using the ASCE/NSPE Codes or other Entering student should be impressed with an emphasis on the required ethical behavior of the professional engineer and be introduced to the ASCE Code of Ethics. Professional practice will be measured in the CIVE 442, Senior Design, course using a developed rubric in peer and instructor evaluations.
g Communi-cations	Fall 2009	There are several courses where a major activity involving communications takes place and is measured. These include CIVE 422, Environmental; various laboratories and CIVE 442, Senior Design. The outcome and level is being met.	No action required.
	Fall 2012	Significant experiences in the preparation of reports and presentations are noted in the Program Review. The review panel of faculty and practitioners uses a rubric for the group presentations. The outcome is being met.	The outcome is being achieved. Further refinement of measurements is on-going.
h Global impact of Engineering Solutions	Fall 2009	Measurements and documentation of course activities are weak The outcome is integral to courses, but doesn't seem to receive emphasis.	Include in CIVE 444, Seminar, as major topic. Require student involvement or effort through an assignment. Other design classes urged to incorporate where possible.
	Fall 2012	Not much assessment documentation between the Fall 2009 and this Program Review. Students under earlier bulletins are not required to take CIVE 444. Students under the 2009 bulletin took the course in fall 2012 and completed an assignment based on a presentation on this issue provided by a practitioner. Also, students enrolled in the CIVE 442, Senior Design, must address the issue in terms of considerations given to environmental, sustainability, risks, etc.	The outcome appears to be covered and is being measured. Further refinements and systematic activities are encouraged.

i Life-Long Learning	Fall 2009	There are a number of courses with activities that require the student to research or to learn something without instructional assistance and this is demonstrated successfully.. However, the continuous learning required for a career in engineering may not be fully understood. Also, there is very little instruction concerning the resources and activities available to the professional engineer to stay current.	Although the ability to learn on one's own is demonstrated, the student should also be made aware of the need to do so beyond their college and the resources available. It is recommended that the CIVE 444 course devote some effort to making the student aware of learning after school and the system of resources available for professional growth.
	Fall 2012	Success documented in CIVE 422 and CIVE 444.	In addition to demonstration on ability, CIVE 444 provides overview on resources available to the practicing professional engineer membership in computer resources, prof. groups, tech. & prof. journals, conferences, technical committees, etc.
j Contemp. Engineering	Fall 2009	More documentation of measurements needed. Assumed met with respect to civil engineering courses in the program.	More assessment required. Assignment that requires an explanation of contemporary engineering in the areas of civil engineering covered in the program could easily be included in the CIVE 444, Senior Seminar course.
	Fall 2012	Success documented in several courses including embedded assignment in CIVE 444.	Outcome met, but more direct and timely measurement suggested for CIVE 422, 426, 427, 435, 438, and 450 classes.
k Engineering Tools	Fall 2009	Measured assessments in labs (CIVE 142, 225, 325, 422, 427,434, 450, etc.), computer systems (CIVE 142, 225, 427, 429, 480, etc.), codes (CIVE 426, 427, 480, etc.). Outcome achieved.	Outcome achieved.
	Fall 2012	Fully assessed, documented and achieved.	Outcome achieved.
l Project/ Construction Management	Fall 2009	Not formerly or consistently addressed prior to 2009. Poor to marginal performance on the FE exam.	CIVE 480, Construction Engineering, should develop and devote larger portion of course to construction management.
	Fall 2012	Course measurement from outcome in CIVE 480 is weak. Assessed and documented in CIVE 444, Senior Seminar, as for explaining management concepts, level 2. FE performance is marginal.	Greater structure of CIVE 480 for covering and emphasizing the basic management concepts.
m Business Concepts	Fall 2009	Not systematically included in curriculum nor measured.	Should be addressed and measured through an assignment in the CIVE 444, Senior Seminar.
	Fall 2012	Limited measurement at level 2 (explanation) provided by CIVE 444. CIVE 444 is the course providing measurement and is just recently a required course for those entering in fall 2009.	Continue coverage in CIVE 444. Further consideration should be given to allowing a business elective to satisfy one of the CIVE electives. Or, change one of the CIVE electives to a required business course.

n Public Policy	Fall 2009	Not measured.	Should be included and measured in CIVE 435/437 and possibly 450, Transportation, and CIVE 322/422, environmental. Other areas such as hydrology (CIVE 429) and/or drainage, CIVE 434.
	Fall 2012	Covered and measured in CIVE 444. Other courses did not measure although included in some (CIVE 422).	Should be covered, measured and identified as a course objective in CIVE 422, 435, 429.
o Leadership and Attitude	Fall 2009	Not systematically covered or measured in courses. Integral to leadership roles in student organizations such as ASCE, Chi Epsilon, ITE, etc.	Should be addressed and assessed in CIVE 101, CIVE Orientation, and CIVE 444, Senior Seminar. Should be included as course objectives.
	Fall 2012	Measured and assessed at level 2 (able to explain) in CIVE 444.	Should be course objective and measured in CIVE 101 also. Should emphasize, not only, attributes of a leader but also the attitudes conducive to professional engineering practice.

Many other improvements have been achieved; including better advising techniques and advising guides. These efforts have produced improved communications to students and faculty. Also, pre and co-requisite changes have produced greater clarity in terms of course scheduling and improved timing when students take certain courses. One example would be the recently changed requirement for Dynamics (ENGR 313) to be made a co-requisite for Fluid Mechanics (ENGR 304). Also, greater improvements in the structure of the Senior Project Design Course (CIVE 442), and the rubrics developed for improved measurement of the outcomes with the use of panels of faculty and practitioners has produced a better course. There are many other procedural or curriculum changes that have been made (see faculty minutes).

4.C. Additional Information

Copies of any of the assessment instruments or materials referenced in Section 4.A and 4.B must be available for review at the time of the visit. Other information such as minutes from meetings where the assessment results were evaluated and where recommendations for action were made could also be included.

Copies of the program's educational objectives and outcome assessment instruments used, with summary and concluding statements, and/or recommendations made are, available in an office area dedicated to program assessment, Madison 254D. Information available in the assessment office includes the following documentation and resources:

1. Detailed descriptions of the assessment techniques and instruments
2. Course Portfolios
3. Individual Course Outcome Reviews
    a. Faculty Outcome Assessment & Instruments
    b. Program Reviews
    c. Student End-Of-Class Survey of Course Objectives
4. Faculty Meeting Minutes
    a. Including summary sheet of outcome assessments, curriculum and policy changes
5. FE Exam Results
6. CE Advisory Board (CEAB) Minutes & Reports
    a. Including summary sheet of reviews recommendations, etc.
7. Alumni Surveys (summary & data)
8. Employer Surveys (summary & data)
9. Senior Design Projects
10. Student-Outcomes Portfolios
11. Other (curriculum changes, courses changes, etc.)

CRITERION 5. CURRICULUM

5.A. Program Curriculum

5.A.1. Complete Table 5-1 that describes the plan of study for students in this program including information on course offerings in the required curriculum in the form of a recommended schedule by year and term along with maximum section enrollments for all courses in the program over the last two terms the course was offered. If there is more than one curricular path, Table 5-1 should be provided for each path. State whether you are on quarters or semesters and complete a separate table for each option in the program.

The UL Lafayette Civil Engineering program of courses is shown in Table 5-1. The courses are presented in a suggested sequence for the semesters ranging from the freshman year through the senior year. Table 5-1 notes the course as being required or elective, the nature of the course (math, science, engineering, design or other), the term when offered, and class enrollments. All students complete the same courses except the courses designated as electives.

5.A.2. Describe how the curriculum aligns with the program educational objectives.

The Educational Objectives of the program are to produce a graduate who is qualified to be employed as a civil engineering intern and with the education necessary to support the professional growth required of a professional engineer. Additionally, the program strives to produce graduates with a commitment to service to the community and the profession. The program of courses provides the knowledge necessary to achieve those postgraduate goals. It also addresses those outcomes, which contribute to the development of character for the responsibility and protection for the safety, health and welfare of the public and the environment.

The relationship of student outcomes to the program educational objectives was shown in Table 3.3. As noted previously, the curriculum is divided into components that address the different student outcomes. The activities, which produce the student outcomes, occur in the curriculum of courses noted in Table 3.2. The alignment of the curriculum with the outcomes and program objectives is provided, in detail, in Section 3.B (page 27). The end product is the B.S. Civil Engineering graduate with the potential to achieve the Program's Educational Objectives. The existing curriculum addresses the ABET 2013-2014 criteria for learning outcomes and, thus, the program objectives.

5.A.3. Describe *how the curriculum and its associated prerequisite structure support the attainment of the student outcomes.*

The curriculum consists of courses that are taken sequential in order to build knowledge to a level required for further study or to provide the ability to perform engineering functions. In some cases this requires the combination of knowledge areas or the achievement of greater maturity in a subject area.

The courses in the curriculum supporting the student outcomes are presented in the mapping of course vs. outcomes as presented in Section 3.A (page 25) and Table 3.2.

5.A.4 Attach a *flowchart* or worksheet that illustrates the prerequisite structure of the program's required courses.

Figure 5.1 provides a flow diagram of the courses, the sequence in which they should be taken, and the period of time in which the course would be scheduled. The course boxes are shaded to note the semester in which they are offered. Most courses are offered in both fall and spring semesters. However, some of the advanced CIVE courses are offered only once per year. The flowchart helps the student plan his/her/her program.

TABLE 5.1 CURRICULUM

Civil Engineering

Course (Department, Number, Title) List all courses in the program by term starting with the first term of the first year and ending with the last term of the final year.	Indicate Whether Course is Required, Elective or a Selected Elective by an R, an E or an SE.[1]	*Subject Area (Semester Credit Hours)*				Last Two Terms the Course was Offered: Year and, Semester, or Quarter	Maximum Section Enrollment for the Last Two Terms the Course was Offered[2]
		Math & Basic Sciences	Engineering Topics Check if Contains Significant Design (√)	General Education	Other		
Freshman – First Term							
ENGL 101 Introduction to Academic Writing	R			*3*		*13 spr, 12 fall*	*25, 25*
MATH 270 Calculus I	R	*4*				*13 spr, 12 fall*	*37,39*
CHEM 107 General Chemistry I	R	*3*				*13 spr, 12 fall*	*90, 95*
CIVE 101 Introduction to Civil Engineering	R		*1*			*13 spr, 12 fall*	*19, 29*
UNIV 100 Cajun Connection	R				*2*	*13 spr, 12 fall*	
ITEC 270 Introduction to CAD	R		*3*			*13 spr, 12 fall*	*45, 21*
Freshman – Second Term							
ENGL 102 Writing and Research About Culture	R			*3*		*13 spr, 12 fall*	*25, 24*
MATH 301 Calculus II	R	*4*				*13 spr, 12 fall*	*36, 38*
CHEM 108 General Chemistry II	R	*3*				*13 spr, 12 fall*	*77, 54*
CHEM 115 General Chemistry Laboratory	R	*2*				*13 spr, 12 fall*	*27, 26*
PHYS 201 General Physics I	R	*4*				*13 spr, 12 fall*	*95, 75*
UNIV 200 Information Literacy	R				*2*	*13 spr, 12 fall*	*40, 40*

1. **Required** courses are required of all students in the program, **elective** courses (often referred to as open or free electives) are optional for students, and **selected elective** courses are those for which students must take one or more courses from a specified group.
2. For courses that include multiple elements (lecture, laboratory, recitation, etc.), indicate the maximum enrollment in each element. For selected elective courses, indicate the maximum enrollment for each option.

TABLE 5.1 CURRICULUM (CONT.)

Civil Engineering

Course (Department, Number, Title) List all courses in the program by term starting with the first term of the first year and ending with the last term of the final year.	Indicate Whether Course is Required, Elective or a Selected Elective by an R, an E or an SE.[1]	*Subject Area (Semester Credit Hours)*				Last Two Terms the Course was Offered: Year and, Semester, or Quarter	Maximum Section Enrollment for the Last Two Terms the Course was Offered[2]
		Math & Basic Sciences	Engineering Topics Check if Contains Significant Design (√)	General Education	Other		
Sophomore – First Term							
Biology Elective	SE	*3*				*13 spr, 12 fall*	
MATH 302 Calculus III	R	*4*				*13 spr, 12 fall*	*32, 36*
Art Elective	R			*3*		*13 spr, 12 fall*	
ENGR 211 – Statics	R		*3*			*13 spr, 12 fall*	*90, 76*
CIVE 225 – Surveying	R		*3*			*13 spr, 12 fall*	*19, 21*
Sophomore – Second Term							
MATH 350 Differential Equations	R	*3*				*13 spr, 12 fall*	*18, 32*
ENGR 304 Fluid Mechanics	R		*3*			*13 spr, 12 fall*	*27, 44*
ENGR 219 Mechanics of Materials	R		*3*			*13 spr, 12 fall*	*33*
ENGR 201 Electrical Circuits	R		*3*			*13 spr, 12 fall*	*46, 23*
ENGR 313 Dynamics	R		*3*			*13 spr, 12 fall*	*70, 71*

1. **Required** courses are required of all students in the program, **elective** courses (often referred to as open or free electives) are optional for students, and **selected elective** courses are those for which students must take one or more courses from a specified group.
2. For courses that include multiple elements (lecture, laboratory, recitation, etc.), indicate the maximum enrollment in each element. For selected elective courses, indicate the maximum enrollment for each option.

Instructional materials and student work verifying compliance with ABET criteria for the categories indicated above will be required during the campus visit.

TABLE 5.1 CURRICULUM (CONT.)

Civil Engineering

Course (Department, Number, Title) List all courses in the program by term starting with the first term of the first year and ending with the last term of the final year.	Indicate Whether Course is Required, Elective or a Selected Elective by an R, an E or an SE.[1]	*Subject Area (Semester Credit Hours)*				Last Two Terms the Course was Offered: Year and, Semester, or Quarter	Maximum Section Enrollment for the Last Two Terms the Course was Offered[2]
		Math & Basic Sciences	Engineering Topics Check if Contains Significant Design (√)	General Education	Other		
Junior – First Term							
Social Science Elective	E			*3*		*13 spr, 12 fall*	
Communications Elective	SE			*3*		*13 spr, 12 fall*	
CIVE 332 Structural Mechanics	R		*3*			*13 spr, 12 fall*	*12, 24*
ENGR 301 Thermodynamics	R		*3*			*13 spr, 12 fall*	*94, 68*
ECON 430 Industrial Economics and Finance	R			*3*		*13 spr, 12 fall*	*103, 76*
History Elective	SE			*3*		*13 spr, 12 fall*	
Junior – Second Term							
Literature Elective	SE			*3*		*13 spr, 12 fall*	
Statistics Elective	SE	*3*				*13 spr, 12 fall*	
CIVE 322 Environmental Engineering I	R		*3*			*12 spr, 13 spr*	*30*
CIVE 429 Hydrology	R		*3*			*13 spr, 12 spr*	*26*
CIVE 328 Geotechnical Engineering	R		*3*			*13 spr, 12 fall*	*10, 31*

1. **Required** courses are required of all students in the program, **elective** courses (often referred to as open or free electives) are optional for students, and **selected elective** courses are those for which students must take one or more courses from a specified group.
2. For courses that include multiple elements (lecture, laboratory, recitation, etc.), indicate the maximum enrollment in each element. For selected elective courses, indicate the maximum enrollment for each option.

TABLE 5.1 CURRICULUM (CONT.)

Civil Engineering

Course (Department, Number, Title) List all courses in the program by term starting with the first term of the first year and ending with the last term of the final year.	Indicate Whether Course is Required, Elective or a Selected Elective by an R, an E or an SE.[1]	*Subject Area (Semester Credit Hours)*				Last Two Terms the Course was Offered: Year and, Semester, or Quarter	Maximum Section Enrollment for the Last Two Terms the Course was Offered[2]
		Math & Basic Sciences	Engineering Topics Check if Contains Significant Design (√)	General Education	Other		
Senior – First Term							
CIVE 480 Construction Engineering	R		*3(✓)*			*12 fall, 11 fall*	*18*
CIVE 422 Environmental Engineering II	R		*3(✓)*			*12 fall, 11 fall*	*28, 22*
CIVE 434 Hydraulics	R		*3*			*12 fall, 11 fall*	*26, 25*
CIVE 427 Reinforced Concrete	R		*3(✓)*			*12 fall, 11 fall*	*24, 19*
CIVE 438 Foundation Engineering	R		*3(✓)*			**13 spr, 12 spr*	*29, 24*
CIVE 450 Highway Engineering	R		*3(✓)*			*12 fall, 11 fall*	*26, 22*
Senior – Second Term							
CIVE Elective (CIVE 437)	SE		*3*			*13 spr, 12 fall*	*13*
CIVE Elective	SE		*3*			*13 spr, 12 fall*	
CIVE 444 Civil Engineering Seminar	R		*1*			*13 spr, 12 fall*	*12, 7*
CIVE 442 Senior Civil Engineering Design	R		*2(✓)*			*13 spr, 12 fall*	*1919, 7*
CIVE 435 Transportation Engineering	R		*3*			*13 spr, 12 spr*	*16, 31*
CIVE 426 Steel Design	R		*3(✓)*			*13 spr, 12 spr*	*28, 24*

1. **Required** courses are required of all students in the program, **elective** courses (often referred to as open or free electives) are optional for students, and **selected elective** courses are those for which students must take one or more courses from a specified group.
2. For courses that include multiple elements (lecture, laboratory, recitation, etc.), indicate the maximum enrollment in each element. For selected elective courses, indicate the maximum enrollment for each option.

* semester previously offered has been changed from spring to fall.

TABLE 5.1 CURRICULUM (CONT.)

Civil Engineering

		Subject Area (Semester Credit Hours)			
		Math & Basic Sciences	Engineering Topics Check if Contains Significant Design (√)	General Education	Other
TOTALS-ABET BASIC-LEVEL REQUIREMENTS		33	*70*	*24*	*4*
OVERALL TOTAL CREDIT HOURS FOR COMPLETION OF THE PROGRAM					
PERCENT OF TOTAL		25%	*54%*	*18%*	*3%*
Total must satisfy either credit hours or percentage	Minimum Semester Credit Hours	32 Hours	48 Hours		
	Minimum Percentage	25%	37.5 %		

3. **Required** courses are required of all students in the program, **elective** courses (often referred to as open or free electives) are optional for students, and **selected elective** courses are those for which students must take one or more courses from a specified group.
4. For courses that include multiple elements (lecture, laboratory, recitation, etc.), indicate the maximum enrollment in each element. For selected elective courses, indicate the maximum enrollment for each option.

Instructional materials and student work verifying compliance with ABET criteria for the categories indicated above will be required during the campus visit.

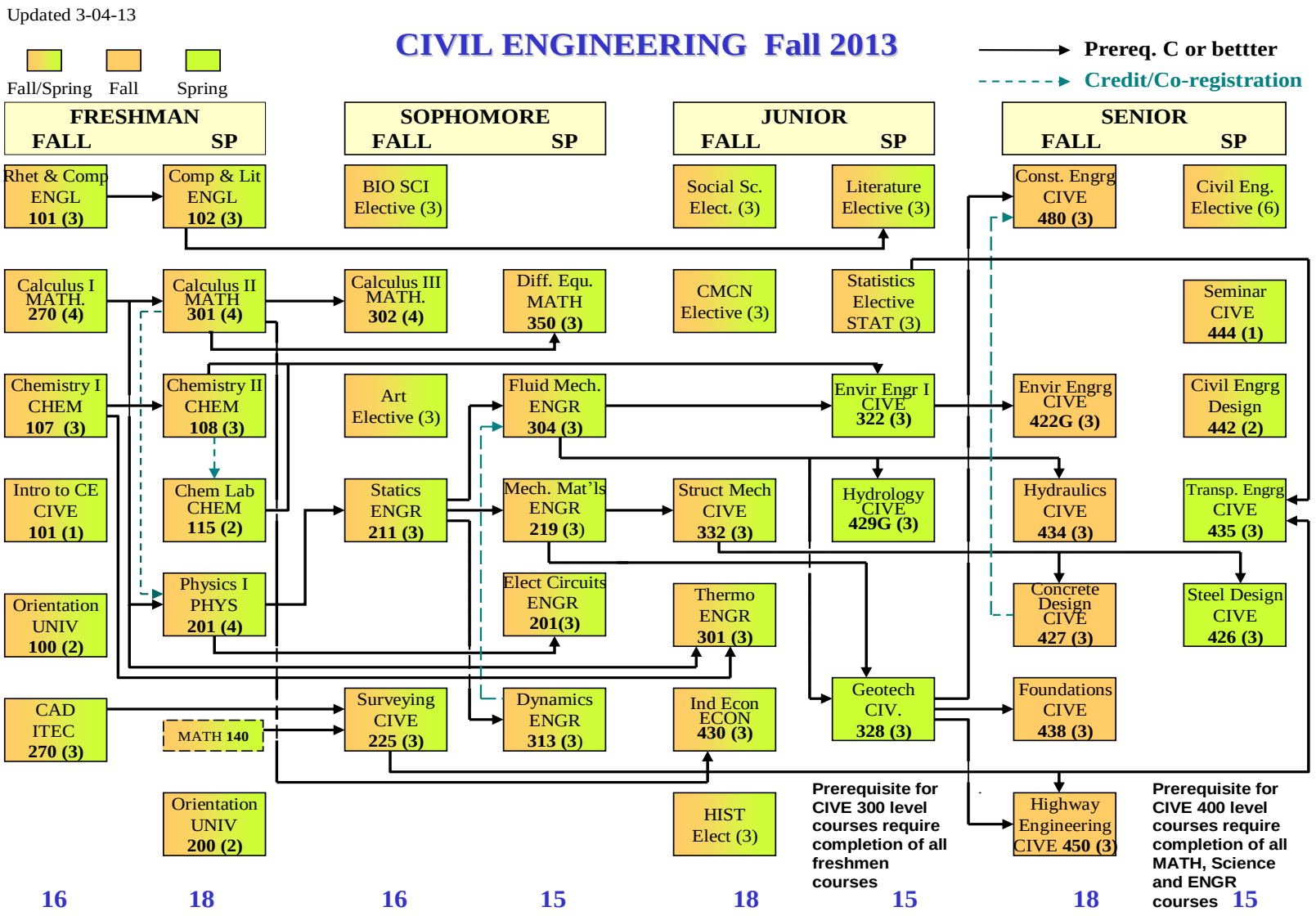


Figure 5.1. Civil Engineering Program Curriculum Flowchart.

5.A.5. **Describe** ***how your program meets the requirements in terms of hours and depth of study for each subject area (Math & Basic Sciences, Engineering Topics, and General*** Education) specifically addressed by either the general criteria or the program criteria.

The UL Lafayette Civil Engineering curriculum requires a program of courses that are fundamental to the practice of civil engineering. The program satisfies both the general ABET Criterion 5 and the program criteria for civil engineering in the following:

a) It consists of one year of a combination of college level mathematics and science that prepares graduates to apply mathematics through differential equations (MATH 350), calculus-based physics (PHYS 201), chemistry (CHEM 107,108, and 115), and biology elective for a total of 33 semester credit hours.

b) It requires more than one and one-half years of engineering science courses that include engineering mechanics (ENGR 211, 219, 304, 313), thermodynamics (ENGR 301), electrical circuits (ENGR 201), and courses that addresses more than four technical areas appropriate for civil engineering analysis and design. These include the areas of surveying (CIVE 225), structural engineering (CIVE 332, 426, 427), geotechnical and foundation engineering (CIVE 328, 438), transportation engineering (CIVE 435, 450), environmental engineering (CIVE 322, 422), water resources (CIVE 434, 429) and construction engineering (CIVE 480). The courses provide breadth and depth by requiring an introductory course followed by an advanced course in five of the technical areas. The course objectives of the civil engineering program of courses include outcomes that support the graduates ability to conduct civil engineering experiments and analyze and interpret test data; design systems or components or processes in more than one civil engineering area; provides the ability to explain the basic concepts in management, business, public policy, and leadership; will have a familiarity and the ability to apply the principles of engineering codes; and explain the importance of professional licensure.

c) The program of courses includes the University's general education core curriculum requirements. This set of courses ensures the graduate acquires the knowledge and skill to live a productive life as a responsible and knowledgeable citizen in their region, their country and the world, and the capability to work effectively with others while displaying openness to different viewpoints with an understanding of the diversity of human values.

The curriculum of the UL Lafayette Civil Engineering Program is provided in Table 5-1.

5.A.6. Describe the major design experience that prepares students for engineering practice. Describe how this experience is based upon the knowledge and skills acquired in earlier coursework and incorporate appropriate engineering standards and multiple design constraints.

CIVE 442, Senior Civil Engineering Design, provides the major design experience for graduating seniors. The catalog description for CIVE 442 reads as the following:

CIVE 442. Senior Civil Engineering Design (1, 3, 2) Major design experience in an engineering project involving realistic constraints and multiple sub-discipline areas of civil engineering. The design project incorporates engineering standards and professional issues; constructability, sustainability, ethics, economics, professional practice, safety and public welfare, and other topics. Coreq: ECON 430 and credit or registration in all required civil engineering courses in the current curriculum.

The course objectives are:

1. Design a system, component, of process to meet the objectives for a project that includes more than one civil engineering area and with consideration for realistic constraints such as economic, social, political, ethical, health and safety, constructability, and sustainability (ABET Criterion 3 c, Bloom's Taxonomy Level 5, synthesis).
2. Identification and development of a site investigation program, (ABET Criterion 3 b, Bloom's Taxonomy Level 5, synthesis).
3. Identification and development of material tests and the specifications required for quality control in construction (ABET Criterion 3 b, Bloom's Taxonomy Level 5, synthesis).
4. The ability to effectively function on multidisciplinary teams for a civil engineering design (ABET Criterion 3 d, Bloom's Taxonomy Level 3, application)
5. Develop and demonstrate an appreciation for professional and ethical responsibility with an ability to manage a schedule of activities; demonstrate initiative, good organizational skills, integrity and attitude (ABET Criterion 3 f, Bloom's taxonomy Level 2, comprehension)
6. Organize and deliver an effective verbal presentation, accompanied by a written design document, and design drawings (ABET Criterion 3 g, Bloom's Taxonomy Level 4, analysis).
7. Utilize a broad education background that considers the global impact of the project design on the economic, environmental and societal issues of the community (ABET Criterion 3 h, Bloom's taxonomy Level 2, comprehension)
8. Demonstrate knowledge through the applications of design codes, testing standards, and regulatory policies (ABET Criterion 3 k, Bloom's taxonomy Level 3, application)
9. An ability to identify and explain the key concepts and problem-solving processes for those public policies and authorities that must be satisfied for approval of the design (ABET Criterion 3, and Program Criteria n, Bloom's taxonomy Level 2, comprehension)

5.A.7. If* your *program allows cooperative education to satisfy curricular requirements specifically addressed by either the general or program criteria, describe the academic component of this experience and how the faculty evaluates it.

There are two courses; CIVE 315, Civil Engineering Internship I, and CIVE 415, Civil Engineering Internship II, that a student may take and receive academic credit for an internship of co-op experience. However, the courses do not apply toward the degree requirements in Civil Engineering.

The activity usually involves a joint effort through an employer and the Civil Engineering Department. The activity must be described and approved by the department. Progress reports by the student are required and must be approved by the industrial supervisor. At the end of the period, the student's performance is evaluated by his supervisor and the responsible faculty for a final grade.

5.A.8. Describe the *materials (course syllabi, textbooks, sample student work, etc.) that will be available for review during the visit* to demonstrate achievement related to this criterion. (See the 2013-2014 APPM Section II.G.6.b. (2) regarding display materials.)

Course portfolios will be available for all required courses. The information within the folders will include the following where appropriate:

1) Copies of course Material Planning & Outcomes Evaluation Review form(s)
3) Course Title & Description*
4) Course Syllabus (must include course learning objectives and program outcomes supported, portfolio syllabus may be longer than ABET Report requirements)*
5) Course-Learning Objectives survey results (average of students' input)
6) Outcome forms (one form per outcome addressed in the course)
7) Grade distribution
8) Test handout and copies of good, average, and poor students tests for each test given
9) Final exam and copies of good, average, and poor students final exam
10) Handout of homework problems assigned and copies of students' work, for each assignment given
11) Copies of good, average, poor project reports (if applicable), including handouts of project descriptions.
12) Copies of good, average, poor oral presentation material (if applicable)
13) Copies of good, average, poor of all other student-generated work not specifically mentioned above.
14) Copies of any relevant handouts.

Textbooks and other reference material will also be available for review.

5.B. Course Syllabi

In Appendix A, include a ***syllabus*** for each course used to satisfy the mathematics, science, and discipline-specific requirements required by Criterion 5 or any applicable program criteria.

Course syllabi are presented in Appendix A

CRITERION 6. FACULTY

6.A. Faculty Qualifications

Describe the *qualifications of the faculty* and how they are adequate *to cover all the curricular areas of the program*. This description should include the *composition, size, credentials, and experience of the faculty*. Complete Table 6-1. Include faculty resumes in Appendix B.

Summaries of faculty qualifications are provided in Table 6.1. Eight of the full-time faculty members have earned the Ph.D. degree in the Civil Engineering field in which they support. The adjunct faculty members possess extensive professional experience as practicing engineers and in national leadership positions within the engineering profession. All faculty members are either licensed professional engineers (9) or certified as engineering interns (2).

There are five major curricular areas in the program: structural engineering, geotechnical engineering, transportation engineering, environmental engineering, and water resources engineering. Members of the Civil Engineering faculty also provide support for the engineer mechanics needs of the college. The distribution of full-time faculty members is noted in the following by virtue of education, and background experience:

Engineering mechanics	2
Structural engineering	2
Geotechnical/materials engineering	2
Transportation engineering	1
Water resources engineering	1
Environmental engineering	1

The faculty expertise and interest is not necessarily limited to the areas shown above. Some individuals provide support to more than one area of Civil Engineering.

The faculty also includes dedicated adjunct instructors with specializations that complement the program of courses. These seasoned practitioners further enhance the program as a professional program. The size of the faculty consists of nine full-time faculty positions and two adjunct instructors. This faculty is adequate to cover the program offerings in addition to other responsibilities.

6.B. Faculty Workload

Complete *Table 6-2, Faculty Workload Summary*, and describe this information in terms of *workload expectations* or requirements.

All regular, continuing faculty members follow one of four workload tracks. The workload tracks reflect the relative weight ascribed to the two major components of faculty work, research and teaching. However, all Civil Engineering faculty members are also expected to actively participate in student advising of the undergraduate and/or graduate students.

Most of the civil engineering faculty members are routinely assigned a teaching load of six credit hours or two classes per semester. For those individuals involved with extensive research activities, the teaching load is three to six credit hours per semester. There are, however, other faculty members that teach three to four classes a session. They include some of the engineering mechanics classes that are taught by Civil Engineering faculty and are very large in some cases (100 students). The enrollment of the upper level Civil Engineering courses generally consists of 25 to 30 students. Instructors with the largest classes are provided a graduate teaching assistant. Also, laboratory instructors are provided graduate assistants. The distribution of the teaching, research and service workload activities for all faculty members are presented in Table 6.2 and in the faculty resumes of Appendix B.

6.C. Faculty Size

Discuss the *adequacy of the size of the faculty* and describe the extent and quality of faculty involvement in *interactions with students, student advising and counseling*, university *service activities, professional development,* and *interactions with industrial and professional practitioners including employers of students*.

The Civil Engineering faculty consists of nine full-time faculty members and is adequate to cover the existing program of classes and students. The program of courses includes some that are taught every semester and some that are taught once each year. This is shown in the Curriculum Flow Chart, Figure 5.1. For the current enrollment, the faculty numbers are sufficient to consistently offer the schedule as shown.

All Civil Engineering faculty members participate in the advising of undergraduate students. Much of this effort takes place in mid-semester during the pre-advising period. This takes place over a two-week period and requires that all faculty members make themselves available for student sign-up schedules. Faculty members post their schedules with office hours through out the semester and are available to students for out of class assistance, advising and career counseling, through out the year.

All faculty are actively involved with various service needs within the department, college, profession and community. All participate in committee activities. Five of the faculty, including an adjunct, serves as faculty advisors for student organizations, ASCE, ITE, ACI, and Chi Epsilon. These include Professors Carroll, DesOrmeaux, Fadden, Khattak and Sun. Another faculty, professor Galjour, systematically volunteers her time to assist students reviewing and preparing for the FE exam. The faculty also assists with the Science Olympiad activities for high schools students. Dr. Carroll heads up the University's STEM program, "Gear Up," working with high school students. Graduate and undergraduate students are actively involved and included in many of these activities. The interaction between faculty and students is significant. Students commonly cite the size of the program and accessibility of the faculty as being positive in their exit surveys.

All of the faculty participate and regularly attend professional and technical conferences. Many have served in positions of leadership and on committees with the ASCE, ITE, TRB, ASEE, NCEES, the Louisiana Engineering Society, and others. Most of the faculty members have also been engaged with limited levels of consulting which provide the means for staying current with the methods and needs of industry. Through research activities, participation in professional organizations, and the opportunities to be engaged with practitioners, the faculty are kept abreast of the Civil Engineering profession.

Through the support of the UL Lafayette Administration, the Civil Engineering Program does make significant use of industrial and professional practitioners. The Construction Engineering course, CIVE 480, and the Senior Design Project, CIVE 442, is consistently taught and led by a professional practitioner. The projects selected and the realistic constraints included in the Senior Design Project provide an intensive capstone experience. Members of the Civil Engineering Advisory Board and other practitioners often serve as mentors for the CIVE 442 students.

6.D. Professional Development

Describe the *professional development activities* that are available to faculty members.

Faculty members stay current with new developments in their area by attending conferences and seminars. The Civil Engineering faculty is actively involved in research and has established a leadership role in the development of coastal restoration studies, transportation safety, materials, the development of engineering texts and other civil engineering endeavors. All actively disseminate their research results through journal publications and in the presentation of papers at conferences to the professional community. Faculty members serve on committees of ASCE at the local as well as the national level. The department and ASCE have co-hosted seminars at the University of Louisiana. The professional development of the faculty is an on-going process.

Faculty members have taught and attended seminars that serve as professional development hour credit for licensure continuity. New faculties have also been provided with a start-up package that generally includes a travel allowance for conferences or travel that will assist in the development of their area of interest. These have included development programs for instruction, such as ASCE's EXCEED. Consulting activities of some faculty members also keep them current on new developments in the profession and which they bring into the classroom.

The University of Louisiana at Lafayette provides seminars and workshops for various issues that address the work areas of faculty. These include several sessions on advising that are offered annually. Instructional training and university resources that are available for faculty include:

- Moodle Training
- E teaching tools
- Advising toolbox and training

- The Writing Center
- Branded PowerPoint Slides
- Academic Calendar
- Discounted Software

6.E. Authority and Responsibility of Faculty

Describe the role played by the faculty with respect to their guidance of the program, and in the development and implementation of the processes for the assessment, evaluation, and continuing improvement of the program, including its program educational objectives and student outcomes. Describe the roles of others on campus, e.g., dean or provost, with respect to these areas.

The Civil Engineering faculty as a whole has a democratic voice in the planning of any changes, rules, regulations, or sometimes the general operations related to departmental activities. The organization of the Civil Engineering Department includes four standing committees:

1. Student Issues
2. Undergraduate Curriculum Committee
3. Facilities & Resources
4. Graduate Program

The faculty committees are charged with the maintenance and development of their respective areas of responsibility. When issues concerning the department or program arise, they are referred to the proper committee for review and recommendations. These are then brought before the entire faculty for a decision on program or policy changes.

Civil Engineering faculty actively participates in the assessment of the Student Outcomes, Program Educational Objectives, and in the continuous improvement efforts. They are responsible for continuously assessing the Student Outcomes that are part of their course objectives. They are further charged with periodic Program Reviews of all Student Outcomes.

The College of Engineering Dean's Office requires that accreditation be maintained and that the student outcomes assessment be conducted. The process and the results reside with the Civil Engineering Department. The UL Lafayette Administration endorses and actively seeks accreditation of its academic programs, as does the UL System Board of Supervisors.

Table 6.1. Faculty Qualifications

Civil Engineering

Faculty Name	Highest Degree Earned-Field and Year	Rank [1]	Type of Academic Appointment[2] T, TT, NTT	FT or PT[3]	Years of Experience			Professional Registration/ Certification	Level of Activity[4] H, M, or L		
					Govt./Ind. Practice	Teaching	This Institution		Professional Organizations	Professional Development	Consulting/summer work in industry
Chris Carroll	Ph.D. – Civil Engineering 2009	AST	TT	FT	1	4	4	EI	H	H	L
E. Ray DesOrmeaux	B.S.C.E. – Civil Engineering 1963	A	NTT	PT	50	6	6	PE, PLS	H	M	H
Matthew Fadden	Ph.D. - Civil Engineering 2013	AST	TT	FT	3	0.5	0.5	EI	M	H	L
Jasmine Galjour	M.S. - Civil Engineering 2008	I	NTT	FT	1	5	5	PE	M	H	M
Dianchen Daniel Gang	Ph.D. – Civil Engineering 2001	ASC	TT	FT	~	19	6	PE	M	H	L
Russell Hibbeler	Ph.D. – Civil Engineering 1968	P	TT	FT	7	42	36	PE	M	M	L

Table 6.1. Faculty Qualifications (cont.)

Civil Engineering

Faculty Name	Highest Degree Earned-Field and Year	Rank [1]	Type of Academic Appointment [2] T, TT, NTT	FT or PT [3]	Years of Experience			Professional Registration/ Certification	Level of Activity [4] H, M, or L		
					Govt./Ind. Practice	Teaching	This Institution		Professional Organizations	Professional Development	Consulting/summer work in industry
Md. Jamal Khattak	Ph.D. – Civil Engineering 1999	ASC	TT	FT	1.5	13	13	PE	M	H	L
A. J. Launey	M.S. – Civil Engineering 1969	A	NTT	PT	45	6	6	PE	H	M	H
Kenneth McManis	Ph.D. – Civil Engineering 1975	P	TT	FT	6	45	7	PE, PLS	M	M	M
Xiaoduan Sun	Ph.D. – Civil Engineering 1994	P	TT	FT	~	19	19	PE	M	H	L

Instructions: Complete table for each member of the faculty in the program. Add additional rows or use additional sheets if necessary. Updated information is to be provided at the time of the visit.

1. Code: P = Professor ASC = Associate Professor AST = Assistant Professor I = Instructor A = Adjunct O = Other
2. Code: T = Tenured TT = Tenure-Trac NTT = Non-Tenure-Track
3. Code: FT = Full-time PT = Part-time Appointment at the institution.
4. The level of activity (high, medium or low) should reflect an average over the year prior to the visit plus the two previous years.

Table 6.2. Faculty Workload Summary

Civil Engineering

Faculty Member (name)	PT or FT[1]	Classes Taught (Course No./ Credit Hrs.) Term and Year[2]	Program Activity Distribution[3]			% of Time Devoted to the Program[5]
			Teaching	Research or Scholarship	Other[4]	
Chris Carroll	FT	CIVE 101/1 – fall 2013, spring 2014 CIVE 332/3 – fall 332, spring 2014 CIVE 397-8/3 – fall 2013, spring 2014 CIVE 427/3 – fall 332 CIVE 508/3 – fall 2013	50%	40%	10%	100
E. Ray DesOrmeaux	PT	CIVE 335/3 – fall 2013, spring 2014 CIVE 336/3 – fall 2013, spring 2014 CIVE 480/3 – fall 2013 CIVE 442/2 – fall 2013, spring 2014	100%			100
Matthew Fadden	FT	CIVE 426/3 – spring 2014 CIVE 516/3 – spring 2014 CIVE 522/3 – fall 2013	25%	75%		100
Jasmine Galjour	FT	ENGR 218/3 – fall 2013, spring 2014 ENGR 304/3 – fall 2013, spring 2014 ECON 430/3 – fall 2013, spring 2014	100%			100
Daniel Gang	FT	CIVE 322/3 - spring 2014 CIVE 422/3 - fall 2013 CIVE 460/3 - fall 2013 CIVE 563/3 - spring 2014	50%	50%		100
Emad Habib	FT	CIVE 429/3 - spring 2014 CIVE 434/3 - fall 2013 CIVE 546/3 - fall 2013	33%	67%		100

Russell Hibbeler	FT	CIVE 211/3 – fall 2013, spring 2014 CIVE 219/3 – fall 2013, spring 2014 CIVE 313/3, fall 2013, spring 2014 CIVE 332/3 – spring 2014	100%			100
Md. Jammal Khattak	FT	CIVE 225/3 – fall 2013, spring 2014 CIVE 450/3 – fall 2013 CIVE 555/3 – spring 2014	50%	50%		100
Kenneth McManis	FT	CIVE 328/3 – spring 2014 CIVE 438/3 – spring 2013 CIVE 444/1 – fall 2013, spring 2014	33%		67%	100
Xaioduan Sun	FT	CIVE 435/3 - spring 2013 CIVE 437/3 – fall 2013 CIVE 553/1 – fall 2013 CIVE 591/1 – fall 2013, spring 2014	50	50		100

1. FT = Full Time Faculty or PT = Part Time Faculty, at the institution
2. For the academic year for which the self-study is being prepared.
3. Program activity distribution should be in percent of effort in the program and should total 100%.
4. Indicate sabbatical leave, etc., under "Other."
5. Out of the total time employed at the institution.

CRITERION 7. FACILITIES

7.A. Offices, Classrooms and Laboratories

Summarize each of the program's facilities in terms of their ability to support the attainment of the student outcomes and to provide an atmosphere conducive to learning.

7.A.1 Offices **(**such as administrative, faculty, clerical, and teaching assistants) and any associated equipment that is typically available there.

Most of the Civil Engineering faculty offices are located in Madison Hall. One individual who teaches a number of the larger engineering mechanics courses has an office in Rougeau Hall, which is convenient to his classes. The majority of the faculty resides within the Madison Hall, Office Suite 254; Rooms A through Q. The Civil Engineering administrative office is located in Madison Hall room 260. The department administrative assistant is in Madison Hall room 260 and the department head is located in Madison Hall room 260A. Adjunct faculty members are provided a desk area in Madison Hall room 260B.

All of the offices are equipped with desktop computers and printers and are connected to different printer systems and are regionally placed for faster or bulk printing. There is also a small conference room in the Madison Hall suite 254. Visiting professors or department guests are provided office space in the 254 suite. A room in the office suite, 254D, has been dedicated to the collection and storage of ABET and other accreditation documents and data.

Most of the graduate students and teaching assistants are grouped in different locations within Madison hall according to academic and research interest. They are generally provided with desk, a desktop computer and other supporting equipment. The areas provided for the graduate students include the following:

- Water Resources Group Madison Hall, Room 131 A & 152
- Environmental Group Madison Hall, Room 141
- Transportation Group Madison Hall, Room 123 & 125
- Structural/Materials Group Madison Hall, Room 127

The laboratory technician has an office and small adjoining workshop in Madison 148/150B with various tools.

Madison Hall, Room 154 is dedicated for use of the students. The student chapter of the American Society of Civil Engineers manages it. It includes a large conference table and smaller table. It has a few lockers for storage and a refrigerator for food items.

While not spacious, the available office space is adequate for supporting the departments various functions.

7.A.2. Classrooms and associated equipment that is typically available where the program courses are taught.

The Civil Engineering courses are generally taught in Madison Hall. Civil Engineering is given initial priority for Class Rooms 202, 256 and 258. Other classrooms are also available. Many of the general engineering courses (ENGR) are taught in Rougeou Hall. The standard equipment includes either a chalkboard or white board and a fixed screen. The department has two projectors on carts that are routinely available for classroom presentations. Other portable systems used for instruction by the faculty include an over-head digital camera with flashcard reader, a Fujitsu laptop tablet PC with projector system, and a TV/VCR on rolling cart (from the University Media Center).

7.A.3. Laboratory facilities including those containing computers (describe available hardware and software) and the associated tools and equipment that support instruction. Include those facilities used by students in the program even if they are not dedicated to the program and state the times they are available to students. Complete Appendix C containing a listing of the major pieces of equipment used by the program in support of instruction.

There are eight Civil Engineering laboratories used within the undergraduate program. The location and list of major equipment items is provided in Appendix C. A brief description of each laboratory is provided in the following:

Concrete Laboratory

The concrete lab has expanded its activities and location to include Rougeau Hall, Room 124. The new location allows for larger research projects and more involved undergraduate participation. The lab contains two concrete mixers, concrete compression tester, slump test equipment, air entrainment equipment, four hoppers for storing aggregates, a 5000 lb. scale, an overhead crane, a concrete bucket with release chute, and a table saw and miter saw for building form work. Equipment available in the concrete lab also includes that required for aggregate gradation tests, concrete mixers, slump test, molds for cylinders and beams. The space available is not sufficient for research and instruction. The lab is normally open during class time for undergraduate students, while graduate students have full access.

In general, the equipment available for conducting the laboratory session for the reinforced concrete class, CIVE 427, is located in Madison Hall, Room 151 and is adequate. There are basic concrete testing instruments available such as the Gilmore Cement Consistency Tester and the Vicat Needle apparatus. This laboratory is used for preparing concrete specimens, including concrete cylinders and reinforced concrete elements, for curing and testing. The facilities available have enough space for the students to do small design projects, such as that required in the CIVE 427 class. Students have used the area to build the concrete canoe, but it is too small to host that project. This lab is available to students at all hours.

Transportation Materials Laboratory
This laboratory is located in Madison Hall, Room 152 and serves as an integrated facility for asphalt geotechnical, and materials testing. The laboratory includes a viscometer, penetrometer, Marshall Test device, ovens, NCAT ignition furnace, and a computer controlled Universal Compression Machine, which can perform tests at various temperatures and loading rates. Also, supporting tools such as a masonry saw, rheometer, gyratory compactor, scale, freezer and sieves are included.

Geotechnical Laboratory
The Geotechnical Laboratory is located in Madison Hall, Room 150A. The lab is used for undergraduate instruction where the fundamentals of geotechnical engineering tests are covered. It is equipped for testing the physical and engineering properties of soil specimens. Specifically, there are apparatus for triaxial, direct shear, unconfined compression, and consolidation tests. Also, tests can be performed to determine the Atterberg limits, specific gravity, sieve and hydrometer analysis, proctor, and CBR compaction limits. The test capabilities of this lab meet the instructional needs for the course. The lab is normally open only during class time.

Hydraulics Laboratory
The hydraulics lab is located in Madison Hall room 150C. It contains various hydraulic simulation devices, including, weir, hydraulic jump, Reynolds apparatus, flume, energy loss in a pipe, and a Bernoulli apparatus. The lab is used for undergraduate instruction, and storage. The lab is small but large enough to accommodate class activities. The lab is normally open during class time for undergraduate students, while graduate students have full access.

The hydraulic laboratory meets the needs for undergraduate instruction. The equipment in the laboratory facility is adequate to perform the different experiments required in the CIVE 434, Hydraulics course. The following is a list of the equipment that is used in this laboratory.

- Universal Fluid Circuit
- Universal Flow Benches
- Hydraulic Jump Apparatus
- Stormier Viscosity Measuring Device
- Open Tanks
- Platform Weighing Scale
- Flow Visualization Apparatus
- Broad Crested Weir & Multi Opening Culvert Flume
- Pipe-Fitting Apparatus
- Impact of a Jet Apparatus
- Friction Losses in a Pipe System Apparatus

Environmental Laboratories
The undergraduate and graduate environmental laboratories are located in Madison Hall, Rooms 143, 145 and 147. Each laboratory provides ample space and has adequate

facilities for both teaching and research. Room 143 is primarily used for research and sample preparation. An Atomic Absorption Spectrophotometer with Graphite Furnace has just been added to this laboratory. Rooms 145 and 147 have eight workstations well equipped with safety glasses, aprons, glassware, pipettes, crucibles, pH meters, and DO meters to facilitate laboratory groups of up to four students each. The laboratory also has multiple ovens and a furnace for adequate space for drying samples. A vent hood is available for handling chemicals and samples that may produce undesirable fumes. A single spectrophotometer has been the primary delay in student laboratory analyses; that has been addressed by adding a new spectrophotometer.

Survey Laboratory
The surveying lab has traditional transits and levels that are calibrated and kept in good repair. In addition to this, there are three total stations and electronic distance-measuring devices. The existing equipment is adequate for teaching the basic surveying course, CIVE 225.

Materials Testing Laboratory (MTS)
The MTS Laboratory is located in Madison hall Room 136. The laboratory contains two loading frames; a 200-kip load capacity and a 20-kip load capacity. Both load frames can perform compression and tension testing. Tests conducted for undergraduate instruction include loading to failure of concrete cylinders and design projects. Steel specimens are failed in tension and beams are loaded for flexure tests. Many accessories related to asphalt testing have been purchased for the 20-kip load frame, including an environmental chamber, displacement transducers, fixtures and platens. This facility is used for both undergraduate instruction and research purposes. These units are made available to the entire college. Students are given access to this room as needed, but they are not allowed to operate the equipment.

Computer Laboratory
The computer laboratory is located in Room 129. It was used as a classroom for the computer graphics course CIVE 142. It contains 30 computers, a plotter and scanner, and a printer that provides individualized instruction on graphics and word processing applications. This facility is available for all student assignments. It includes a large-format color printer and scanner and a total of 30 PC computers with associate software licenses. The computer facilities in Room 142 are available during the hours of 8:00 a.m. until 5:00 p.m. Mondays through Fridays. It is possible for students to get access to this facility at other times (evenings and weekends).

In the Fall 2013 semester , the Civil Engineering students will take ITEC 270 computer graphics course instead of the CIVE 142., computer graphics. Those classes are held at Rougeau 210. This facility was recently developed as a high tech CAD classroom through a large donation by Mr. Donald Mosing (Mechanical Engineering, 1954). The classroom's hardware and software facilities will greatly enhance the instruction of computer graphics and responds to the request for improved instruction of Auto CAD from the CEAB and many graduating seniors in their exit interviews.

7.B. Computing Resources

Describe any computing resources (workstations, servers, storage, networks including software) in addition to those described in the laboratories in Part A, which are used by the students in the program. Include a discussion of the accessibility of university-wide computing resources available to all students via various locations such as student housing, library, student union, off-campus, etc. State the hours the various computing facilities are open to students. Assess the adequacy of these facilities to support the scholarly and professional activities of the students and faculty in the program.

The computer laboratory is located in Madison Hall, Room 131. It contains 30 computers, one laser printer, one color printer, one 24-inch plotter, and an LCD projector. This lab is used for classroom instruction, homework, and student projects. The lab is open to all students when not being used for instruction. The computers are connected through a network to the University domain. All lab computers on campus have roaming profiles that allows students to have the same personalized desktop on any computer they use. This allows students to save data in their personal folder. The data is stored on a universal server.

Software available for the students use in Madison Hall, Room 131 includes MS Office, Bentley MicroStation drafting software, HEC and GEO HMS hydraulic simulation software, ESRI GIS software, Synchro traffic simulation software, Matlab, and West Point bridge design software. The equipment and software is used for instruction, projects, and homework. The computer facilities in Room 142 are available during the hours of 8:00 a.m. until 5:00 p.m. Mondays through Fridays. It is possible for students to get access to this facility at other times (evenings and weekends).

The University library also has a sufficient number of computers for student use. The hours of operation are

Monday – Thursday	07:30 a.m. - midnight
Friday	07:30 a.m. - 04:30 p.m.
Saturday	10:00 a.m. - 05:00 p.m.
Sunday	02:00 p.m. - 11:00 p.m.

7.C. Guidance

Describe how students in the program are provided appropriate guidance regarding the use of the tools, equipment, computing resources, and laboratories.

The lab instructors include safety procedures in their syllabus. The students are asked to sign an acknowledgement of these rules. The faculty and the laboratory technician then demonstrate and supervise the use of tools and equipment in the laboratories.

7.D. Maintenance and Upgrading of Facilities

Describe the policies and procedures for maintaining and upgrading the tools, equipment, computing resources, and laboratories used by students and faculty in the program.

The department's technician is responsible for the maintenance and the upgrading of tools, equipment, computing resources, and the laboratories used by students and faculty, in general. He assesses the condition of all equipment items and provides normal in-house maintenance and repairs, where possible. He keeps the department head and lab instructor informed as to the state of the laboratories and makes recommendation for the most efficient solution when problems arise. Funding for the costs associated with normal or minor maintenance of equipment is possible through the department's annual budget or other accounts.

The faculty members that teach or use a laboratory facility are responsible for the development of a lab plan. The plan provides a current assessment of the lab facilities, and anticipates maintenance needs and the recommendations for further development. Lab plans for the different laboratories are available for review.

7.E. Library Services

Describe and evaluate the capability of the library (or libraries) to serve the program including the adequacy of the library's technical collection relative to the needs of the program and the faculty, the adequacy of the process by which faculty may request the library to order books or subscriptions, the library's systems for locating and obtaining electronic information, and any other library services relevant to the needs of the program.

The University library has been proven to be very adequate for the needs of our students. The seating capacity is 2,700. There is open access to 60 microcomputers including CD-ROM readers, scanners, and printers. Every student is given an account credit of $25.00 per semester from his or her University fees. At a cost of 10 cents per page, this gives each user the ability to print 250 pages. If they need to print more than 250 pages a semester, they can add money to their account.

The facility is open to engineering students during the 93.5 hours per week that it is open. All faculty members from their offices through a campus-wide fiber optics network or from off-campus can access the library's online catalog 24 hours, 6 days a week. The library provides students and faculty: ASTM Standards online, Math SCI Net, Applied Science and Technology Index, Web of Science (including Sciences Citation Index), and Journal Citation Reports. Reference librarians can conduct searches of various online databases available through vendors such as Chemical Abstracts.

The inter-library loan service supports the research and educational needs of the Lafayette community (students, faculty, and community). It generally takes about two weeks to receive the requested material. The actual length of time depends upon the

location of the lending library and delivery method. Two to three day turnaround is possible, but charges substantially increase.

7.F. Overall Comments on Facilities

Describe how the program ensures the facilities, tools, and equipment used in the program are safe for their intended purposes (See the 2013-2014 APPM Section II.G.6.b. (1)).

Safety is stressed in all laboratories and each lab has safety rules, which are posted, in place. The laboratory instructor is responsible for presenting the safety rules of the class as part of the class instruction. Students are not allowed to use automated equipment unless they are fully checked by the department technician or faculty. All academic activities are conducted under the supervision of department staff. Safety is given priority.

A Civil Engineering faculty member, Dr Khattak, serves as the department's Safety Coordinator (http://safety.louisiana.edu/Coordinators/index.shtml) and provides safety information for the faculty and graduate students assistants at various times during the academic year. The University requires that all faculty and graduate students sign off on the training information provided. Also, the department's technician plays a major role in keeping the department head informed on any safety issues associated with the facilities, tools, and equipment used in the program.

The University's Environmental Health and Safety Office (http://safety.louisiana.edu/) provides oversight and assistance in all safety matters and safety training. Periodically, the laboratory facilities are inspected for safety issues.

CRITERION 8. INSTITUTIONAL SUPPORT

8.A. Leadership

Describe the leadership of the program and discuss its adequacy to ensure the quality and continuity of the program and how the leadership is involved in decisions that affect the program.

The College of Engineering has maintained continuity of leadership since the last visit, with Dean Zappi having remained in the position of Dean of Engineering. The Dean provides the leadership and secures the resources necessary to allow the College of Engineering as a whole to thrive, even in an era of continual state budget cuts for higher education. For example, since the last visit the College of Engineering has grown from 1,085 undergraduates in the Fall of 2008, to 1,452 in the Fall of 2012. Because of the strong growth in the College of Engineering, the college has been spared many of the budget cuts that have been felt elsewhere across the university.

In addition, since the last visit, the institutional support structure for the College of Engineering has increased dramatically. In December of 2008, the College of Engineering was allowed to appoint its first Associate Dean, Dr. Terrence Chambers, a Mechanical Engineering faculty member, and its first Assistant Dean, Dr. Burke Huner, an Electrical and Computer Engineering faculty member. In April of 2013, the College of Engineering was able to appoint a second Assistant Dean, Dr. Jim Lee, also a Mechanical Engineering faculty member. Both Dr. Huner and Dr. Lee receive a half-time release from their normal faculty duties to serve as Assistant Deans, while Dr. Chambers has a full-time 12-month administrative appointment.

In April of 2013, the College of engineering was able to use endowed donated funds to hire a full-time Outreach Coordinator, Mrs. LaShaun Bordelon, to help manage several public relations, recruiting, and outreach initiatives within the college. The appointment of the Associate Dean and the two Assistant Deans and an Outreach Coordinator has greatly improved the ability of the Dean's Office to support the departments in their academic missions while increasing additional student development activities via non-traditional mechanisms.

In May 2013, the college hired a full time college development director, Ms. Darlene Breaux. This position focuses on development of college priorities inclusive of faculty development, large R&D program proposal development, management of the college's foundation accounts, and overseeing of college fund raising activities.

The Dean, the Associate and Assistant Deans, and the Department heads hold regular Department Head's Meetings throughout the academic year to plan activities, solve problems, and share information. The minutes from the Department Head's meetings since the last visit will be available for inspection during the visit.

The Department Heads are the administrative leaders for each engineering department. They are viewed, as both administrators and faculty in that they are accountable for all resources and growth aspects of the department, yet are required to maintain some academic activities, such as limited teaching and R&D activity. The college views the Department Heads as the foundational leadership positions within the college. The Department Head positions are tenured positions and also 9-month funding appointments, which encourages R&D activity; thus, providing leadership by example.

Professor Ken McManis, Ph.D., P.E., P.L.S has been the Department Head since 2006 at the University of Louisiana. Prior to that, he was professor and Department Chair of the Civil Engineering Department at the University of New Orleans (UNO). He served as Department Chairman at UNO from 1978 to 2004. He has also held other administrative positions, including the director of research centers. He has served on the Louisiana Professional Engineers and Land Surveyors Board for licensure registration from 2001-2006. He has extensive leadership experience in the accreditation process and as an academic administrator.

8.B. Program Budget and Financial Support

8.B.1 *Describe the process used to establish the program's budget and provide evidence of continuity of institutional support for the program. Include the sources of financial support including both permanent (recurring) and temporary (one-time) funds.*

The budget for the department is allocated by the university leadership based on the current budget provided by the University of Louisiana System, and it has remained relatively level for the College of Engineering since the last visit. The budget has been sufficient to maintain the salaries of all faculty and staff with no cuts or furloughs, and to provide for the basic operation of the department. Table 8.1 below shows the departmental budget for the 2012-2013 fiscal year.

Table 8.1 2007-2013 Civil Engineering Budget

Descript.	FY07	FY08	FY09	FY10	FY11	FY12	FY13
Personal Services	962,243	915,194	984,112	1,131,248	1,165,522	1,283,692	1,381,599
Travel	5,458	5,458	5,458	5,458	3,045	3,045	1,523
Operating Services	6,067	6,067	6,067	6,067	6,703	6,703	6,703
Supplies	6,450	6,450	6,450	6,450	7,228	7,228	7,228
TOTAL	980,218	933,169	1,002,087	1,149,223	1,182,498	1,300,668	1,397,053

Other than the allocated state funds, the department holds both endowed and non-endowed funds in the University of Louisiana at Lafayette Foundation. Foundation funds are obtained through donations from individuals and corporations. Since the last visit, over $5 million dollars of donations have been generated for the college. All of these

were for student education and faculty development enhancement programs. The largest was a gift from Mr. Donald Mosing (Mechanical Engineering, 1954) who donated $2.8M for the primarily the establishment of an Engineering Student Career Development Program and the construction of a high-tech CAD classroom. The Department Head manages the allocated budget and Foundation funds in accordance with the state regulations and restrictions, and in accordance with departmental goals.

Another source of funds for the maintenance of the undergraduate program is course fees associated with various laboratory classes.

The Student Technology Enhancement Program (STEP) is a student assessed and student managed course fee of $5/student credit hour. Since its inception in 1997, the STEP program has annually brought in over one million dollars per year that has been used exclusively to improve the technology infrastructure of the university. All students in the College of Engineering enjoy the benefits of these enhancements that are applied university-wide, such as numerous open computer labs, wireless Internet access, etc. But the individual departments are also able to propose to the STEP Council laboratory improvement projects specific to the College of Engineering or the department. During the previous evaluation period (2002 – 2007), the College of Engineering received $325,328 in STEP funding for laboratory equipment. During the period from 2008 – 2013, the College of Engineering has received $352,260, representing a slight increase in the amount of funding received during the previous evaluation period. An important difference now, however is that all STEP grants awarded since Spring of 2010 have perpetual maintenance built into them, so that once a piece equipment is purchased under the STEP program, it is automatically maintained using STEP funds. Additional information on the STEP program, including a complete list of STEP projects awarded to the College of Engineering can be found in Appendix D.

8.B.2 *Describe how teaching is supported by the institution in terms of graders, teaching assistants, teaching workshops, etc.*

The university allocates a certain number of M.S. graduate students lines and two Ph.D. student lines to each department. In many cases, these students are used as teaching assistants (TA's) and graders for large classes.

Instructional improvement is supported through Instructional Improvement Mini-Grants, Faculty Development Grants, Endowed Chairs and Professorships, Summer Research Awards, a Distinguished Professor Award Program, the Dr. Ray Authement Excellence in Teaching Award, and Outstanding Advisor Awards. These programs are administered through the Office of Academic Planning and Faculty Development, and more information regarding these programs can be found on their webpage (http://apfd.louisiana.edu/). Additionally, the college often sends faculty to career development workshops and meetings to further enhance their career development efforts and to improve their ability to provide high-quality instruction to the college's students. Both college level and foundation funds are used to support this training.

8.B.3 *To the extent not described above, describe how resources are provided to acquire, maintain and upgrade the infrastructures, facilities and equipment used in the program.*

The college periodically receives funding from the university as special needs arise for major equipment repairs. Since the last visit, Madison Hall has gone through a mid-level renovated inside in which the halls, bathrooms, and lobby areas were redone. Finally, the college has an annual account of approximately $60,000 that is used for addressing equipment repairs and/or purchases as well as paying some software fees. These funds have remained essentially flat since the last visit.

Large equipment purchases or major maintenance needs are beyond the Civil Engineering's Annual Budget. The department does have additional accounts derived from donations of alumni, industry and friends. These accounts are not very large; however, they do permit a modest expense. For large equipment needs, the department seeks help through the College of Engineering.

8.B.4. *Assess the adequacy of the resources described in this section with respect to the students in the program being able to attain the student outcomes.*

The resources available to the departments on a recurring basis are currently sufficient to allow the program to insure that the students achieve the Student Outcomes. The resources available have been relatively constant since the last visit, and there is every reason to believe that they will continue to be adequate to meet the department's needs. These funds support laboratory supplies, teaching expendables, and other classroom related supplies. All classrooms have access to A/V support along with being connected to wireless Internet services.

8.C. Staffing

Describe the adequacy of the staff (administrative, instructional, and technical) and institutional services provided to the program. Discuss methods used to retain and train staff.

The institution provides funding to the department for one full-time administrative assistant and one full-time laboratory technician. Note that the laboratory technician positions all require that the position holder have at least a BS/BA degree. Periodically, these positions are allowed to attend training programs and other career development activities. Additionally, they are encouraged to become embedded within the campus community via acceptance of committee and outreach position opportunities.

In addition, the university provides each department with the services of several Work-Study students, who each work in the department office for approximately ten hours per week, in support of the department staff.

The University provides an excellent benefit package that contributes significantly to the retention of staff members. In addition to the normal package of insurance and retirement benefits, the university also provides staff with a tuition waiver benefit that allows them to take up to one class per semester for free, and to allow their dependents to receive approximately a 50% discount on tuition. The use of the athletic facilities, discounts at the bookstore, and use of the library are a few more of the benefits that staff members find attractive.

8.D. Faculty Hiring and Retention

8.D.1 *Describe the process for hiring of new faculty.*

The Human Resources Department has established a set of guidelines and procedures for the hiring of new faculty that insures that the university is in compliance with all applicable employment laws. Those policies can be found at the following website: http://personnel.louisiana.edu/. In addition to following those guidelines, however, the general procedure is for a national search to be conducted to fill each position. The college views the hiring of faculty as one of the most critical activities undertaken by the college. An advertisement is purchased in various national-level publications, as well as Academic Keys. A Screening Committee from the department screens the applicants and recommends three to five candidates to be investigated further. Usually phone interviews are conducted, followed by an on-campus interview for up to three applicants, which is paid for by the institution. The interviews are structured so that the candidates have a chance to meet and interact with students, faculty, and administrators. Following the interviews, the Screening Committee recommends to the Department Head, and the Department Head recommends to the Dean a candidate to be selected. The Dean works in concert with the Department Head to make the final selection and then seeks permission of the Provost for initiating of hiring negotiations. The Dean and the Department Heads conduct the negotiations with the candidate with regard to starting salary and the size of the start-up package. Start-up packages or other start-up incentives have been offered to nearly all new faculty members hired since 2007. In addition, since the last visit, the college has initiated a 12-month instructor (for MS holding candidates) and 12-month professor of practice (for PhD holding candidates) positions in which these positions are filled with faculty having a passion and strong skillset for teaching. The 12-month appointment provides a very competitive salary (as compared to positions of similar types only being 9-month appointments) along with providing a group of faculty capable of servicing a solid summer semester offering.

8.D.2 *Describe strategies used to retain current qualified faculty.*

Most new faculty members are hired into a tenure-track, research active positions. The expectations for research, teaching, and service are made clear to the new faculty member and the Dean and Department Head jointly work very hard to help the new faculty member make the proper connections with potential industry and faculty collaborators. New faculty are given a certain amount of start-up funds to establish their laboratory to

conduct their research, and they are given a certain amount of travel funds to visit funding agencies, such as NSF. New faculty members are evaluated yearly and notes are made with respect to their progress, and suggestions are made for further improvement. By making the expectations for new faculty clear from the beginning, by providing the infrastructure necessary for success, and by constantly monitoring and reporting on the faculty member's progress, most new faculty members are able to achieve tenure after the initial probationary period. Each year, the faculty submits highly detailed annual activity reports to the Department Heads. After receipt of these reports, the Dean, associate Dean, and Department Heads meet to discuss the year's activities of each faculty member along with providing suggestions on how to improve upon the roles as faculty within the college. This interaction allows for all levels of college administrators to share observations and draft suggestions to the faculty within an open and informative format.

With regard to current faculty, incentives such as professorships, teaching awards, and advising awards are offered to help maintain career development and stimulate continued enthusiasm of the faculty toward the missions of the college and university. Additionally, since the last visit, several faculty development workshops have been organized along with the establishment of annual faculty and staff awards to highlight the college's appreciation for excellence among the faculty and staff. The awards given each year are to (1) Senior Faculty Researcher of the Year; (2) Early Career Faculty Researcher of the Year; (3) Student Outreach Faculty of the Year; and Staff Member of the Year. Some faculty have been either sent to or participated via on-line with faculty development training programs.

8.E. Support of Faculty Professional Development

Describe the adequacy of support for faculty professional development and how such activities such as sabbaticals, travel, workshops, seminars, etc., are planned and supported.

The college maintains an adequate program for continued growth the faculty and their professional training needs. New faculty have been able to get sufficient travel funds through their individual start-up package to travel to various conferences, workshops, and seminars to support the growth of their research programs and teaching development goals. Established senior faculty members are usually able to pay for their own travel to conferences and funding agencies out of their research grants and/or college/departmental funds. It is the duty of the Department Head to allocate these departmental travel funds in the way that best meets the needs of the department. A full-time college development director was hired in May 2013 with the goal being that this position will, among other activities, organize a series of annual faculty training programs. This new position will interact with other universities to ensure that the best training program can be designed for the college's faculty. Finally, often times, Foundation funds have been used to send faculty to career development courses and/or conferences. Several tens of thousands of dollars have been donated to the college for use with faculty development other than professorships and chairs.

PROGRAM CRITERIA

Describe how the program satisfies any applicable program criteria. If already covered elsewhere in the self-study report, provide appropriate references.

a) The UL Lafayette Civil Engineering curriculum was shown to be consistent with program criteria in the Curriculum Criterion 5, section 5.A.5, of this report. The compatibility of the program of courses with the Educational Objectives was presented and the program's compatibility with the ABET general and program criteria was also demonstrated, section 5.A.2. The civil engineering program of courses was shown to include outcomes that support the graduates ability to conduct civil engineering experiments and analyze and interpret test data; design systems or components or processes in more than one civil engineering area; provides the ability to explain the basic concepts in management, business, public policy, and leadership; will have a familiarity and the ability to apply the principles of engineering codes; and explain the importance of professional licensure.
b) The composition of the faculty was presented in Criterion 6, Faculty. The number of faculty with a wide diversity of civil engineering education and experience specialties were shown to be more than adequate to cover four and more civil engineering technical areas. In addition to education and professional practice, all were noted as being either licensed professional engineers (P.E.) or engineering interns (E.I.).

The UL Lafayette Civil Engineering program satisfies the ABET program criteria for civil engineering.

Appendix A – Course Syllabi

Please use the following format for the course syllabi (two pages maximum in Times New Roman 12 point font)

1. Course number and name

2. Credits and contact hours

3. Instructor's or course coordinator's name

4. Text book, title, author, and year
    a. other supplemental materials

5. Specific course information
    a. brief description of the content of the course (catalog description)
    b. prerequisites or co-requisites
    c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

6. Specific goals for the course
    a. specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.
    b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

7. Brief list of topics to be covered

GENERAL EDUCTION COURSES

Course Syllabus UNIV 100 Cajun Connection (SP 2013)

1. *Course number and name* **UNIV 100 Cajun Connection**

2. *Credits and contact hours* 2 Credits, 2 Contact Hours

3. *Instructor's or course coordinator's name*
   Dr. Theresa Wozencraft

4. *Text book, title, author, and year*

   Your Guide to College Success: Strategies for Achieving Your Goals, 7th ed. Halonen, J, & Santrock, D (Customized, shrinkwrapped and hole-punched. Includes access code for premium website. ISBN at UL bookstore: 9781285116464

   Shared Reading: From Every End of This Earth by Steven B. Roberts

   a. *other supplemental materials*

5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*

      Provides students the opportunity to engage fully in the college experience by increasing knowledge and skills that improve academic success and facilitate lifelong achievement. Restr: Freshmen only.

   b. *prerequisites or co-requisites*
      There are no pre-requisites

   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
      Required

6. *Specific goals for the course*
   a. *specific outcomes of instruction*

   Course Learning Expectations:
   1) To increase awareness about the University of Louisiana at Lafayette and to benefit from its programs, services, and resources.
   2) To maximize success in matriculation though the higher education curriculum.
   3) To create opportunities to build social, support, and professional networks.
   4) To start building the foundation for fulfillment and success in and beyond college.

Course student interaction expectations: Students will be expected to engage in group work during some classes. Students are also expected to participate in class discussions and treat the instructor and classmates with respect. Repeated failure to show respect can lead to dismissal from the course. This course includes a required service learning assignment that will take place outside of the scheduled class time (probably on a Saturday or Sunday). Be sure to reserve this date on your calendar.

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

a -	h - 1
b -	i - 2
c -	j - 2
d - 1	k - 2
e -	
f -	
g - 1	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. Brief list of topics to be covered

1. Campus involvement, campus resources, and critical thinking skills
2. Time management
3. Money management
4. Study skills
5. Introduction to the major
6. Service Learning

Course Syllabus UNIV 200 Information Literacy (SP 2013)

1. *Course number and name* **UNIV 200 Information Literacy**

2. *Credits and contact hours* 2 Credits, 2 Contact Hours

3. *Instructor's or course coordinator's name*
   Dr. Mike Totaro

4. *Text book, title, author, and year*

   Cheri Manning, Catherine Manning Swinson, *Microsoft® Office 2010, A Skills Approach,* McGraw Hill Publishing – Triad Interactive, Inc. ISBN Number – 978-0-07-351647-9. (optional)

   a. *other supplemental materials*
      SimNet®/SimGrader® online program

5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*

      Introduction to word processing, spreadsheet, database, and presentation software; ethics; and societal impact of information technology. Prereq: Successful completion of SimNet Online basic skill test. Restr: Credit in only one introduction information of computer literacy course applicable toward degree.

   b. *prerequisites or co-requisites*
      There are no pre-requisites

   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
      Required

6. *Specific goals for the course*
   a. *specific outcomes of instruction*
      The student will be able to:
      1. Demonstrate basic electronic communication skills, as measured by the ability to use web-based email and a learning management system (i.e. Moodle).
      2. Search electronic sources for information; collect, evaluate, and utilize retrieved data to advance arguments; and access and use information sources ethically and legally.
      3. Demonstrate proficiency in the use of word processing applications.
      4. Demonstrate the ability to use spreadsheet applications at a basic level.
      5. Demonstrate the ability to use database management at a basic level.
      6. Demonstrate proficiency in the use of presentation applications.
      7. Demonstrate the ability to integrate various applications.

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

a -	h - 2
b -	i - 3
c -	j - 3
d -	k - 1
e -	
f -	
g -	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. Brief list of topics to be covered

7. Introduction: Moodle, email, Internet search and source verification
8. Word processing: Formatting, thesaurus, tables, charts, graphics, tracking changes, templates
9. Spreadsheet: Formulas, worksheets, pivot tables, data analysis
10. Database: Views, sorting and filtering, relationships, forms, queries, reports
11. Presentation: Formatting, slide show, charts and action buttons, recording show and audio; publishing

Course Syllabus **English 101 Spring 2013**

1. *Course number and name* English 101 Introduction to Academic Writing

2. *Credits and contact hours* 3 Credits, 3 Contact Hours

3. *Instructor's or course coordinator's name*
   Julie Clement

4. *Text book, title, author, and year*
   1. Writing Arguments: A Rhetoric With Readings, 6th Edition, John D. Ramage
   2. The Freshman Guide to Writing, 5th Edition, University of Louisiana, Lafayette

   a. *other supplemental materials*
   Writing materials, a one-subject notebook, and one cardboard pocket folder with metal tabs for turning in final papers and research materials.

5. *Specific course information*
   Introductory course to college level writing

   a. *brief description of the content of the course (catalog description)*
   Instruction in the fundamentals of effective argumentative writing, including critical
. reading and analysis, thesis/claim development and use of evidentiary support

   b. *prerequisites or co-requisites*
   English 90 with a grade of "C" or better or received a minimum score of 18 on the English section of the ACT.

   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
   N/A

6. *Specific goals for the course*
   a. *specific outcomes of instruction*
   1. Learn the ability to think more critically and to participate more fully in academic and public discourse.
   2. Put learned concepts into practice by developing a variety of thesis driven, well-argued essays.
   3. Learn ways of improving your skills in reading, analyzing, and responding to examples of academic writing as a means of improving comprehension, critical thinking, and expression.

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

a -	h -
b -	i -
c -	j -
d -	k -
e -	l -
f -	
g - ✓	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. Brief list of topics to be covered

1. Diagnostic essay
2. Narrative writing
3. Thesis and exposition development
4. Opposition acknowledgment
5. Defining propaganda
6. MLA format and documentation
7. Brainstorming
8. Identifying and incorporating sources
9. Refining thesis
10. Essay writing

Course Syllabus **English 102 Spring 2013**

1. *Course number and name* English 102 Writing and Research About Culture

2. *Credits and contact hours* 3 Credits, 3 Contact Hours

3. *Instructor's or course coordinator's name*

   Denise M. Rogers

4. *Text book, title, author, and year*

   1. Gumery, Keith, ed, International Views: America and the Rest of the World. New York: Pearson Longman, 2006
   2. Graff, Gerald and Cathy Birkenstein. They Say, I Say: The Moves That Matter in Academic Writing.
   3. Freshman Guide to Writing, 5th ed. University of Louisiana at Lafayette

   a. *other supplemental materials*

5. *Specific course information*

   a. *brief description of the content of the course (catalog description)*

      This course is designed to help students build on the critical reading, writing, and thinking skills essential to academic work.

   b. *prerequisites or co-requisites*

   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*

6. *Specific goals for the course*
   a. *specific outcomes of instruction*

      1. To be able to summarize, analyze, and critique the assigned readings and the writings of your classmates.
      2. To be able to write clear, coherent, grammatically and mechanically correct, effective, argumentative essays.
      3. To be able to accurately acknowledge differing points of view and to make connections between source materials, and between your own ideas and those presented in sources.
      4. To be able to document all sources used in your essays according to MLA guidelines.

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

a -	h -
b -	i -
c -	j -
d -	k -
e -	l -
f -	
g - ✓	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. Brief list of topics to be covered

11. Critically read and discuss how different cultures affect each other and how global citizens think about such influences.
12. Writing effective argumentation that integrates the course readings, class discussions, and your own research, while recognizing other points of view, leads to solid, informed conclusions.

Course Syllabus LITERATURE Elective (SP 2013)

1. *Course number and name* **LIT Elective**
   Students may select any course from the approved list below:
   ENGL Any course that focuses on literary texts (recommended: 201, 202, 205, 206, 210, 211, 212, 215, 216, 312, 319, 320, 321, 322, 333, 342, 371, 372, 380, 381)
   FORL 331, 332
   FREN 202, 311, 431(G), 441(G), 471, 472, 481(G), 491(G), 492(G)
   GERM 202, 311, 405(G), 441(G), 442(G), 471, 472
   LATN 301, 302
   SPAN 203, 311, 441(G), 442(G), 480(G)

2. *Credits and contact hours* 3 Credits, 3 Contact Hours
3. *Instructor's or course coordinator's name*
   Varies depending on elective selected
4. *Text book, title, author, and year*
   Varies depending on elective selected
   a. *other supplemental materials*
   Varies depending on elective selected
5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*
   LIT Elective – fulfills the General Education requirement for a Humanities/LIT elective.
   b. *prerequisites or co-requisites*
   Varies depending on elective selected
   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
   Selected elective
6. *Specific goals for the course*
   a. *specific outcomes of instruction*
   Varies depending on elective selected
   b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

a -	h - 1
b -	i -
c -	j -
d -	k -
e -	
f -	
g -	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. *Brief list of topics to be covered:* Varies depending on elective selected

Course Syllabus ENGL 365 Spring 2013

1. *Course number and name* **ENGL 365 Technical Writing**

2. *Credits and contact hours* 3 Credits, 3 Contact Hours

3. *Instructor's or course coordinator's name*
   Shelly M. Leroy

4. *Text book, title, author, and year*
   Pfeiffer, William S., and Kaye Adkins. Technical Communications: A Practical Approach, 8th ed. 2012

   a. *other supplemental materials*
   Access to MyTechCommLab

5. *Specific course information*

   a. *brief description of the content of the course (catalog description)*
   A course in technical communication with an emphasis on practical documents.

   b. *prerequisites or co-requisites*
   You should have completed six (6) hours of Freshman English (101 & 102) and atleast
   15 hours in your major field. You should also be in the second semester of your Sophomore year.

   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*

6. *Specific goals for the course*
   a. *specific outcomes of instruction*
   To prepare students for future technical writing situations with an emphasis on designing
   and producing practical documents of professional quality.

   b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

a -	h -
b -	i -
c -	j -
d -	k -
e -	l -
f -	
g - ✓	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. Brief list of topics to be covered

13. Review of the fundamentals of technical writing
14. Practical application of these fundamentals.

Course Syllabus CMCN 310 Spring 2013

1. *Course number and name* **CMCN 310 Public Speaking**

2. *Credits and contact hours* 3 Credits, 3 Contact Hours

3. *Instructor's or course coordinator's name*
   Ms. Jeanne LeBlanc

4. *Text book, title, author, and year*
   Sellnow, D., Verderber, K., & Verderber, R., *The Challenges of Effective Speaking*, 15th Edition, United States, Thompson Wadsworth.

   a. *other supplemental materials*
   None.

5. *Specific course information*

   a. *brief description of the content of the course (catalog description)*
   Theory and practice for the preparation and delivery of speeches through a variety of formats.

   b. *prerequisites or co-requisites*
   None.

   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
   Elective for CIVE. Required for CHEE and MCHE.

6. *Specific goals for the course*
   a. *specific outcomes of instruction*
   To understand and apply theories of effective public communications. Appreciate diversity issues. Create effective, well-organized speech outlines. Acquire presentations skills. Develop ability to critically evaluate speeches of others.

   b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

a -	h - 2
b -	i - 3
c -	j - 3
d -	k -
e -	
f -	
g - 1	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. Brief list of topics to be covered

15. Personal Experience speech.
16. Oral reading.
17. Informative Speech.
18. Persuasive Speech.
19. Impromptu Speech.

Course Syllabus HISTORY Elective (SP 2013)

1. *Course number and name* **HIST Elective**
   Students may select any course from the approved list below:
   HIST All history courses except HIST 390
   (recommended: 101, 102, 103, 104, 221, 222, 223, 224, 321, 322)

2. *Credits and contact hours* 3 Credits, 3 Contact Hours

3. *Instructor's or course coordinator's name*
   Varies depending on elective selected
4. *Text book, title, author, and year*
   Varies depending on elective selected
   b. other supplemental materials
   Varies depending on elective selected
5. *Specific course information*
   a. brief description of the content of the course (catalog description)
   HIST Elective – fulfills the General Education requirement for a HIST elective.
   b. prerequisites or co-requisites
   Varies depending on elective selected
   c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program
   Selected elective
6. *Specific goals for the course*
   a. specific outcomes of instruction
   Varies depending on elective selected
   b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

a -	h - 1
b -	i -
c -	j -
d -	k -
e -	
f -	
g -	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. *Brief list of topics to be covered*
   Varies depending on elective selected

Course Syllabus **PHIL 316** **Spring 2013**

1. *Course number and name* PHIL 316 Professional Ethics

2. *Credits and contact hours* 3 Credit, 3 Contact Hours

3. *Instructor's or course coordinator's name*

4. *Text book, title, author, and year*

   a. *other supplemental materials*

5. *Specific course information*

   a. *brief description of the content of the course (catalog description)*
      A study of some of the moral problems encountered in the professions of business, medicine, law, and engineering; different conceptions of the nature and source of moral obligation in the professions.
   b. *prerequisites or co-requisites*

   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*

6. *Specific goals for the course*
   a. *specific outcomes of instruction*

   b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

a -	h - 1
b -	i - 2
c -	j - 2
d -	k -
e -	l -
f - 1	
g -	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. *Brief list of topics to be covered*
   1. History of Ethics- Definition of Ethics-Ethical Dilemmas
   2. Types of Judgments
   3. History of Moral Law
   4. Business Ethics-Ethical Standards
   5. Moral Development-Kohlberg Moral Development Scale-Read Air Force Brake
   6. Kohlberg Continued-Gilligan-Air Force Brake Discussion
   7. Class Discussion of Air Force Brake
   8. Review Kohlberg-Homework-Read Bhopal
   9. Discuss Lesson VIII-Moral Responsibility-Moral Responsibility and Culpability
   10. Review Bhopal-Relativism and Absolutism
   11. Pluralism-Advantages of Changing Mandate for Business
   12. Justifying Ethical Decisions-Religious Based Ethics
   13. Introduction to Utilitarianism-Homework, read Ford Pinto Case
   14. Discussion of Ford Pinto Continued-Introduction to Human Rights Standards
   15. Human Rights Standards Continued-Introduction to Justice as Fairness
   16. John Rawls' Principles-Entrepreneurship Contrasted with Egalitarianism
   17. Donaldson Continued-Cummins' Model for Distinguished Bribes
   18. The Ethics of Advertising
   19. Gender Discrimination in the Workplace A Look at Sexual Harassment
   20. Gender Discrimination-Part II-The Company-How to Protect Itself from S.H
   21. The Ethics of Leadership-Maslow's Hierarchy
   22. The Ethics of Conflict
   23. The Ethical Problems Concerning Legalization of Marijuana
   24. The Case for Permissible Paternalism
   25. Affirmative Action

Art Elective

Course Syllabus MUS 300 Music Appreciation (SP 2013)

1. *Course number and name* **MUS 300 Music Appreciation**

2. *Credits and contact hours* 3 Credits, 3 Contact Hours

3. *Instructor's or course coordinator's name*
   Dr. Jonathan Kulp

4. *Text book, title, author, and year*

   Roger Kamien, Music: An Appreciation, 7th brief edition (New York: McGraw-Hill), and Connect access.

   a. *other supplemental materials*
      Kamien Connect website.

5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*
      Various traditions of Western Art Music.
   b. *prerequisites or co-requisites*
      There are no pre-requisites
   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
      Selected elective
6. *Specific goals for the course*
   a. *specific outcomes of instruction*
      The main goals of the course are the following:
      1. Develop and strengthen listening skills.
      2. Acquire a vocabulary of appropriate terms for musical discussion.
      3. Historical awareness (names, dates, places, people, important to the history of music.)
      ` 4. Recognition of musical styles.

   b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

a -	h - 1
b -	i -
c -	j -
d -	k -
e -	l -
f -	
g -	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. Brief list of topics to be covered

20. The Elements of Music
21. Music of the Middle Ages, Renaissance and Baroque
    Classic and Romantic Music
22. The Late 19th Century and the 20th Century (Lessons 17{20)

1. Course Number & Name: **ECON 430G Industrial Economics and Finance**

2. Credits & Contact Hours: 3 cr hrs & 3 lecture hrs

3. Instructor's Name: Jasmine Galjour M.S.C.E., P.E.
Office- Madison 254P

4. Textbook Title, Author and Year: Ristroph, Economic Notes

5. Specific Course Information

a. Catalog Description:
Economic and financial considerations in the design and selection of industrial projects. Capital growth. Net present value and related analytical procedures. Effects of taxes, inflation, and risk.

b. Course prerequisite:
MATH 301

6. Course Specific Goals: (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

a. Topics-the following is a brief list of topics to be covered in the course (Outcome m):

i. Simple/compound interest and balance equations
ii. Equivalence-present, future and annual equivalence,
iii. linear and geometric trend equivalence
iv. Loan computations
v. Economic criteria-future total worth, present worth, equivalent annual work, future worth
vi. Inflation, capital budgeting and tax analysis as related to project selection
vii. Planning horizon, risk and uncertainty
viii. Analyses-Benefit/cost, sensitivity
ix. Rates of return
x. Cost-estimation, sunk, average, incremental

IV. Course Goals

a. Students will gain a knowledge and understanding of the fundamentals of engineering economics.
b. Allow students to develop problem solving skills as related to engineering economics so that they may apply them in practice and on the fundamentals of engineering exam.
c. Students will meet the following outcomes as they relate to engineering economics:
    - (a) an ability to apply knowledge of mathematics, science, and engineering -students are required to solve homework problems in

fluid mechanics and also complete 3exams throughout the course to evaluate their application of basic knowledge in math science and engineering. Competency in calculus and advanced math is required to succeed in the course.

- (e) an ability to identify, formulate, and solve engineering problems-students will use the skills acquired during the lecture portion of the course to solve homework and exam problems . Students will learn basic industrial economic criteria and apply that to engineering project selection.
- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context-students solve problems related to selection of engineering projects based on economic criteria and economic factors that affect projects such as taxes, inflation, etc.
- (k) Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice and ASCE BOK Outcome 11-Graduates can apply relevant techniques, skills, and modern engineering tools to solve a simple problem (students are assigned homework problems that require the use of spreadsheets/graphing in order to obtain the solution to the problem).
- Graduates can apply relevant techniques, skills, and modern engineering tools to solve a simple problem (students are assigned homework problems that require the use of spreadsheets/graphing in order to obtain the solution to the problem).

MATH & BASIC SCIENCES

Course Syllabus MATH 270 Spring 2013

1. *Course number and name* MATH 270 Calculus I

2. *Credits and contact hours* 4 Credits, 4 Contact Hours

3. *Instructor's or course coordinator's name*

4. *Text book, title, author, and year*
   Calculus, 5th edition, Hughes-Hallett, McKallum, and Gleason, Wiley, 2009

a. *other supplemental materials*
   Graphing calculator

5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*
      Definitions, properties, and applications of derivatives and integrals

   b. *prerequisites or co-requisites*
      Math 140 or Math 143 with a grade of "C" or better, (b) transfer credit in equivalent
      courses from another university, or (c) a high score on one of the departmental
      placement exams.

   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
      Required

6. *Specific goals for the course*
   a. *specific outcomes of instruction*
      to learn the most important topics of calculus (limits, derivatives, integrals, etc.), but with emphasis on the graphical
      and numerical representation of functions and other relations as well as the traditional use of symbolic formulas.

b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

a - (1)	✓	h -	
b -		i -	
c -		j -	
d -		k -	
e -		l -	
f -			
g -			

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. Brief list of topics to be covered

23. Functions and Change
24. Exponential Functions
25. New Functions from Old
26. Logarithmic Functions
27. Trigonometric Functions
28. Powers, Polynomials, and Rational Functions
29. Introduction To Continuity
30. Limits
31. How Do We Measure Speed?
32. The Derivative At A Point
33. The Derivative Function
34. The Derivative Function
35. Interpretations of the Derivative
36. The Second Derivative
37. Differentiability
38. Powers and Polynomials
39. The Exponential Function
40. The Product and Quotient Rules
41. The Chain Rule
42. The Trigonometric Functions
43. The Chain Rule and Inverse Functions
44. Implicit Functions

Course Syllabus **MATH 301**

1. *Course number and name* MATH 301 Calculus II

2. *Credits and contact hours* 3 Credits, 3Contact Hours

3. *Instructor's or course coordinator's name*

4. *Text book, title, author, and year*

   Calculus: Single Variable, 5th edition, Hughes-Hallett, Gleason, McCallum, et. al., Wiley, 2009.

   a. *other supplemental materials*
      Graphing calculator

5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*
      Integration, applications and modeling, infinite series.
   b. *prerequisites or co-requisites*
      MATH 270 with grade of C or better.
   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
      Required
6. *Specific goals for the course*
   a. *specific outcomes of instruction*
      to learn the most important topics of calculus (limits, derivatives, integrals, etc.), but with emphasis on the graphical
      and numerical representation of functions and other relations as well as the traditional use of symbolic formulas.

   b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

a - (1) ✓	h -
b -	i -
c -	j -
d -	k -
e -	l -
f -	
g -	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. *Brief list of topics to be covered*
    1. Antiderivatives Graphically and Numerically
    2. Constructing Antiderivatives Analytically
    3. Differential Equations
    4. Second Fundamental Theorem of Calculus
    5. The Equations of Motion
    6. Integration by Substitution
    7. Integration by Parts
    8. Tables of Integrals
    9. Algebraic Identities and Trig. Substitutions
    10. Approximating Definite Integrals
    11. Simpson's Rule
    12. Improper Integrals
    13. Comparison of Improper Integrals
    14. Areas and Volumes
    15. Applications to Geometry
    16. Area and Arc Length in Polar Coordinates
    17. Density and Center of Mass

Course Syllabus **MATH 302**

1. *Course number and name* MATH 302 CALCULUS III

2. *Credits and contact hours* 3 Credits, 3 Contact Hours

3. *Instructor's or course coordinator's name*

4. *Text book, title, author, and year*
   Multivariable Calculus, 5th edition, McKallum, Hughes-Hallett, and Gleason, Wiley, 2009

   a. *other supplemental materials*
      Graphing calculator

5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*
      Partial derivatives, multiple integrals, vector fields in the plane and in space.
   b. *prerequisites or co-requisites*
      Math 301 with a grade of C or better, or transfer credit in an equivalent course from another university.
   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
      Required
6. *Specific goals for the course*
   a. *specific outcomes of instruction*
      To apply the most important topics of calculus (limits, derivatives, integrals, etc.), but with emphasis on the graphical and numerical representation of functions and other relations as well as the traditional use of symbolic formulas.

   b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

a - (1) ✓	h -
b -	i -
c -	j -
d -	k -
e -	l -
f -	
g -	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. *Brief list of topics to be covered*
    1. Functions of Two Variables
    2. Graphs of Functions of Two Variables
    3. Contour Diagrams
    4. Linear Functions
    5. Functions of Three Variables
    6. Limits and Continuity
    7. Displacement Vectors
    8. Vectors in General
    9. The Dot Product
    10. The Cross Product
    11. The Partial Derivative
    12. Computing Partial Derivatives Algebraically
    13. Local Linearity and The Differential
    14. Gradients and Directional Derivatives in the Plane
    15. Gradients and Directional Derivatives in Space
    16. The Chain Rule
    17. Second-Order Partial Derivatives
    18. Local Extrema

Course Syllabus MATH 350 Spring 2013

1. *Course number and name* MATH 350 Differential Equations

2. *Credits and contact hours* 3 Credits, 3 Contact Hours

3. *Instructor's or course coordinator's name*
   Dr. Ross Chiquet

4. *Text book, title, author, and year*
   Elementary Differential Equations , by Boyce and DiPrima, 9th edition

   a. *other supplemental materials*
      1. Graphing calculator (TI-84 or below), 6 blue books
      2. http://edugen.wileyplus.com/edugen/class/cls315713

5. *Specific course information*

   a. *brief description of the content of the course (catalog description)*
      First and second order equations, higher order equations, series solutions of second order equations, the Laplace transform, first order systems.
   b. *prerequisites or co-requisites*
      MATH 301 with grade of C or better.
   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
      Required

6. *Specific goals for the course*
   a. *specific outcomes of instruction*
      To perform applications of First and second order equations, higher order equations, series solutions of second order equations, the Laplace transform, first order systems.

   b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

a - (1) ✓	h -
b -	i -
c -	j -
d -	k -
e -	l -
f -	
g -	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. Brief list of topics to be covered

1. First Order Differential Equations
2. Second Order Differential Equations
3. Higher Order Linear Equations
4. Series Solutions of Second Order Linear Equations
5. The Laplace Transform

Course Syllabus STAT 214 Spring 2013

1. *Course number and name* STAT 214 Elementary Statistics

2. *Credits and contact hours* 3 Credits, 3 Contact Hours

3. *Instructor's or course coordinator's name*

4. *Text book, title, author, and year*
   Essential Statistics, David S. Moore, W. H. Freeman, 2010.
   a. *other supplemental materials*
      1. A TI-83 series or TI-84 series graphing calculator is required.
      2. A free open-access Companion Web site is available at http://www.whfreeman.com/essentialstats.

5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*
      Descriptive statistics, elementary hypothesis testing, confidence intervals, introduction to correlation and regression.
   b. *prerequisites or co-requisites*
      A minimum ACT Math score of 25 or credit for MATH 100 or 105.
   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
      Required
6. *Specific goals for the course*
   a. *specific outcomes of instruction*
      This course provides an introduction to statistics for students from various disciplines. The core topics are descriptive statistics,hypothesis testing, condence intervals, correlation, and regression. The precise order of presentation, emphasis, and depth of coverage of specific topics will vary by instructor.

   b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

a - (1) ✓	h -
b -	i -
c -	j -
d -	k -
e -	l -
f -	
g -	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. *Brief list of topics to be covered*
    1. Picturing Distributions with Graphs and Describing Distributions with Numbers
    2. The Normal Distribution
    3. Producing Data: Sampling and Producing Data: Experiments
    4. Introducing Probability and Sampling Distributions
    5. Introduction to Inference
    6. Inference about a Population Mean
    7. Binomial Distributions
    8. Inference About a Population Proportion
    9. Comparing Two Proportions
    10. Two-Sample Problems
    11. Two Categorical Variables: The Chi-Square Test
    12. One-Way Analysis of Variance: Comparing Several Means
    13. Scatterplots and Correlation
    14. Regression and Inference about Regression

Course Syllabus BIOL Elective (SP 2013)

1. *Course number and name* **BIOL Elective**
   Students may select any course from the approved list below:
   BIOL 110, 111, 121, 122, 300, 303, 304
   (recommended: BIOL 121 300, 303, 304)
2. *Credits and contact hours* 3 Credits, 3 Contact Hours

3. *Instructor's or course coordinator's name*
   Varies depending on elective selected

4. *Text book, title, author, and year*
   Varies depending on elective selected

   c. other supplemental materials
   Varies depending on elective selected

5. *Specific course information*
   a. brief description of the content of the course (catalog description)
      BIOL Elective – fulfills the General Education requirement for a BIOL elective.
   b. prerequisites or co-requisites
      There are no pre-requisites
   c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program
      Selected elective
6. *Specific goals for the course*
   a. specific outcomes of instruction
   Varies depending on elective selected

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

a - 1	h - 1
b -	i -
c -	j -
d -	k -
e -	
f -	
g -	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. *Brief list of topics to be covered*
   Varies depending on elective selected

Course Syllabus CHEM 107 SPRING 2013

1. *Course number and name* **CHEM 107 GENERAL CHEMISTRY I**

2. *Credits and contact hours* 3 credits, 3 contact hours per week (lectures)

3. *Instructor's or course coordinator's name*

   Jennifer M. De Guzman, PhD

4. *Text book, title, author, and year*

   General Chemistry: The Essential Concepts
   Chang, Raymond and Overby, Jason
   6th edition

   a. *other supplemental materials*
      Calculator

5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*
      Principles and problems of chemistry
   b. *prerequisites or co-requisites*
      MATH 100 or MATH 105

   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
      REQUIRED

6. *Specific goals for the course*
   a. *specific outcomes of instruction*
   Students should demonstrate their expertise of the following by the end of semester:

   1. Nomenclature
   2. Basic thermodynamics
   3. Knowledge of the periodic table
   4. Basic concepts of structure and bonding

b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

a - (1)✓	h - (2)
b - (3)	i - (1)
c -	j - (2)
d - (1)	k - (3)
e - (3)	l - (3)

f - (3)
g - (1)

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. Brief list of topics to be covered

1. Nomenclature
2. Properties of the elements
3. Properties of chemical compounds
4. Structure and bonding
5. Basic concepts of thermodynamics
6. Role of chemistry in daily life

Course Syllabus CHEM 108 SPRING 2013

1. *Course number and name* **CHEM 108 GENERAL CHEMISTRY II**

2. *Credits and contact hours* 3 credits, 3 contact hours per week (lectures)

3. *Instructor's or course coordinator's name*

   Daniel Wellman, MS

4. *Text book, title, author, and year*

   General Chemistry: The Essential Concepts
   Chang, Raymond and Overby, Jason
   6th edition

   a. *other supplemental materials*
      Calculator

5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*
      Continuation of principles and problems of chemistry

   b. *prerequisites or co-requisites*
      CHEM 105 or 107, MATH 105 or 140

   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
      REQUIRED

6. *Specific goals for the course*
   a. *specific outcomes of instruction*
   Students should demonstrate their expertise of the following by the end of semester:

   1. Problem solving in chemistry
   2. Basic kinetics, thermodynamics
   3. Acid-base reactions
   4. Equilibria
   5. Electrochemistry
   6. Nuclear chemistry

   b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

   a - (1)✓ h - (1)

b - (3)
c - (2)
d - (1)
e - (2)
f - (2)
g - (2)
i - (1)
j - (2)
k - (3)
l - (3)

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. Brief list of topics to be covered

1. Thermodynamics
2. Kinetics
3. Electrochemistry
4. Redox reactions
5. Nuclear chemistry
6. Acid-base chemistry

Course Syllabus CHEM 115 SPRING 2013

1. *Course number and name* **CHEM 115 GENERAL CHEMISTRY LAB**

2. *Credits and contact hours* 2 credits, 6 contact hours per week (labs)

3. *Instructor's or course coordinator's name*

   Jennifer M. De Guzman, PhD

4. *Text book, title, author, and year*

   Laboratory Manual for General Chemistry, Chemistry 115
   Created collaboratively by UL LAFAYETTE Chemistry Department, available at UL LAFAYETTE bookstore

   a. *other supplemental materials*
      Calculator

5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*
      Entry level general chemistry laboratory

   b. *prerequisites or co-requisites*
      CHEM 106 or 108

   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
      REQUIRED

6. *Specific goals for the course*
   a. *specific outcomes of instruction*
   Students should demonstrate their expertise of the following by the end of semester:

   1. Understanding of measurements
   2. Basic concepts of structure and bonding
   3. Colligative properties
   4. Spectrophotometry
   5. Calorimetry
   6. Titration
   7. Chromatography

   b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

   a - (1)✓ h -

b - (1)✓
c -
d -
e -
f -
g -
i -
j -
k - (
l -

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. Brief list of topics to be covered

1. Scientific measurements
2. Molar mass
3. Melting point depression
4. UV-Vis Spectrophotometry
5. Thermochemistry
6. Titration
7. Paper chromatography

Course Syllabus **PHYS 201** **Spring 2013**

1. *Course number and name* PHYS 201 General Physics I

2. *Credits and contact hours* 4 Credits, 4 Contact Hour

3. *Instructor's or course coordinator's name*

Dr. Andy Hollerman

4. *Text book, title, author, and year*

Halliday, Resnick, and Walker (HRW), *Fundamentals of Physics, 8th Edition, Special Volume 1 Edition for the Department of Physics, University of Louisiana at Lafayette,* Wiley and Sons, 2008.

   a. *other supplemental materials*
      WebAssign

5. *Specific course information*
   a. *brief description of the content of the course (catalog description)*
      Classical and relativistic mechanics, heat, mechanical waves.
   b. *prerequisites or co-requisites*
      Prereq: MATH 270 or 272 with grade of "C" or better. Coreq: MATH 301.

   c. *indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program*
      Required
6. *Specific goals for the course*
   a. *specific outcomes of instruction*
      Students will understand and be able to solve problems in the areas of classical and relativistic mechanics, heat, mechanical waves.

   b. *explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course*

a - 1	h -
b -	i -
c -	j -
d -	k - 2
e - 1	
f -	
g -	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. Brief list of topics to be covered

1. Classical Mechanics
2. Relativistic Mechanics
3. Heat
4. Mechanical Waves

GENERAL ENGINEERING

1. Course number and name – **ENGR 201 Electrical Circuits**

2. Credits and contact hours - **3, 3**

3. Instructor's or course coordinator's name - **Mohammad R Madani**

4. Text book, title, author, and year

   Electrical Engineering Principles and Applications, Allan R. Hambley, Pearson/Prentice Hall, 5th Edition

   b. other supplemental materials

5. Specific course information
   a. brief description of the content of the course (catalog description)

Analysis of DC, and AC electrical circuits using fundamental laws of electricity: study of diodes, and transistors, study of digital techniques including number systems, logic gates, and circuits, microcomputer organization; study of three phase electrical circuits, motors , transformers and generators.

   b. prerequisites or co-requisites PHYS 201, Physics

   c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program - Required Course

Specific goals for the course
   a. specific outcomes of instruction, ex. The student will be able to explain the significance of current research about a particular topic.

The student will be able to analyze DC and AC electrical circuits using fundamental laws of electricity.

   2. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course.

a - ✓ - level 3	h -
b -	i -
c -	j -
d -	k -
e -	l -
f -	
g -	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

Brief list of topics to be covered

Topics:

1. Introduction to electrical circuits laws
2. Resistive circuits
3. Inductance and Capacitance
4. Transient
5. Steady-State Sinusoidal Analysis
6. Frequency response and Body Plots and filters
7. Logic Circuits
8. Microcomputers
9. Computer-Based Instrumentation System
10. Diodes
11. Amplifiers
12. Field-Effect Transistors
13. Bipolar Junction Transistors
14. Operational Amplifiers
15. Magnetic Circuits and Transforms
16. DC Machines
17. AC Machines

Course Number: **ENGR 211**

Course Title: **Statics**

Credits: 3 hr. course, 3 lecture hours

Instructor: R.C. Hibbeler

Course Text: Engineering Mechanics: Statics, 13th ed., R.C. Hibbeler, Pearson Education, Inc.

UL LAFAYETTE Catalog description: Fundamental principles of engineering mechanics and their applications; static systems of forces, vectors, moments, couples, centroids, center of gravity, friction, and moment of inertia.

Course Prerequisites: Physics 201 with a C grade or better.

Course Objectives: The primary objective of this course is to provide civil and mechanical engineering students a chance to develop their problem solving skills as it relates directly to situations encountered in their field. It is important for the student to define and then analyze a statics problem by using their geometric and analytical skills. Solution to all problems requires a neat and orderly procedure.

Specific to this course the **most important objectives** that are emphasized are:

1. Being able to calculate the moment of a force about a point.
2. Draw a proper free-body diagram.

3. Analyze the forces acting on a member, truss, and pin-connected frame or machine.

It is these three items that are required for success in the follow-up courses.

Course Topics: Introduction to Units
Addition of Rectangular Components
Cartesian Vectors
Position and Force Vectors
Dot Product
2-D Particle Equilibrium
3-D Particle Equilibrium
Moment of Force
Moment of a Force about a Specific Axis
Moment of Couple
Simplification of a Force Systems
Further Simplification of a Force System

2–D Rigid Body Equilibrium
Method of Joints
Frames and Machines
Pappus and Guildinus Theorem
Hydrostatic Loadings
Moment of Inertia

ABET Outcome a Level 3 ABET a an ability to apply knowledge of mathematics, science, and engineering. This is determined by homework and exams.

Course Number: **ENGR 219**

Course Title: **Mechanics of Materials**

Credits: 3 hr. course, 3 lecture hours

Instructor: R.C. Hibbeler

Course Text: Mechanics of Materials, 8th ed., R.C. Hibbeler, Pearson Education, Inc.

UL Lafayette Catalog description: Load classification, normal and shearing stresses and strains, thermal effects, material properties, displacements and stresses due to axial, torsional, and combined loadings, shear and moment equations and diagrams, statically indeterminate elements, columns under centric and eccentric loadings.

Course Prerequisites: ENGR 211 (or ENGR 218) with a C grade or better.

Course Objectives: The primary objective of this course is to provide civil engineering students with a chance to develop their problem solving skills as it relates directly to situations encountered in their field. The primary objective is to extend their skills learned in Statics and to provide further training in setting up a problem by using geometric and analytical methods. Solution to all problems requires a neat and orderly procedure.

Specific to this course, the **most important concepts** emphasized are:

1. Ability to correctly apply the axial, torsional, bending and shear formulas, and show the results on a differential element, as in the case of combined stresses.

2. Being able to draw a shear and moment diagram.

Course Topics:
Equilibrium–Internal loadings
Average normal and shear stress
Allowable stress
Stress–Strain diagrams and strain energy
Poisson's ratio, and shear stress-strain diagram
Deformation of an axial loaded bar
Indeterminate loaded bar
Thermal stress
The torsional formula
Angle of twist
Indeterminate torque –loaded members
Shear and moment diagrams

The flexure formula
The shear formula
Shear flow in built-up members
Combined loadings
Plane-stress transformation
Principal stresses
Mohr's Circle
Absolute stress
Strain transformation
Material property relations
Design of beams and shafts
Slope and displacement of a beam by integration
Method of superposition
Statically indeterminate beams and shafts
Buckling of columns

ABET Outcome a Level 3 ABET a an ability to apply knowledge of mathematics, science, and engineering. This is determined by homework and exams.

1. *Course number and name* **ENGR 301 – Thermodynamics**

2. *Credits and contact hours* 3 credit hours, 3 contact hours

3. *Instructor's or course coordinator's name* *Christopher Dalton*

4. *Text book, title, author, and year*

Y.A. Cengel and M.A. Boles, Thermodynamics: An Engineering Approach 7th edition,

McGraw Hill, 2011.

a. other supplemental materials

5. *Specific course information*
   a. brief description of the content of the course (catalog description)

      Study of the laws of thermodynamics, available energy, mixtures, thermodynamic properties of matter, and applications to engineering systems.

   b. prerequisites or co-requisites

      CHEM 107, MATH 270

   c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program

      Required

6. *Specific goals for the course*
   a. specific outcomes of instruction

      Identify and understand basic thermodynamic terms, cycles and laws, and understand their importance in the global aspect of engineering and thermodynamics; Take thermodynamic data to analyze basic processes and cycles; See the importance of thermodynamics in everyday life, as well as future courses; Understand current news and events related to thermodynamics; Be able to locate additional resources on thermodynamics

   b. explicitly indicate which of the student outcomes listed in Criterion 3 or any other outcomes are addressed by the course

a - ✓	h -
b -	i -
c -	j -
d -	k -
e -	l -
f -	
g -	

1-strongly covered, 2-covered, 3-briefly covered, and Blank-not covered

7. Brief list of topics to be covered

45. Basic Concepts of Thermodynamics and Properties
46. Energy Transfer and First Law of Thermodynamics
47. Second Law of Thermodynamics and Entropy
48. Gas and Vapor Power Cycles

1. Course Number & Name: **ENGR 304-Fluid Mechanics**

2. Credits & Contact Hours: 3 cr hrs & 3 lecture hrs

3. Instructor's Name: Jasmine Galjour, M.S., P.E.

4. Textbook Title, Author and Year:
Fluid Mechanics, Cengel and Cimbala, 2010

a. Other supplemental materials: N/A

1. Specific Course Information

a. Catalog Description:
ENGR 304. Fluid Mechanics. Static and dynamic behavior of incompressible fluids. Continuity, energy and momentum equations, using the control volume approach. Dimensional analysis, similitude and model testing laws. Steady, incompressible fluid flow in series, parallel, and branching pressure conduits. Turbulent and laminar boundary layer concepts..

b. Course prerequisite:
ENGR 211 C or Better and Corequisite of ENGR 313

c. Required Course, Elective, or Selected Elective:
The course is required for the Civil Engineering and Mechanical Engineering undergraduate program

2. **Course Specific Goals:** (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)
    a. Students will gain a knowledge and understanding of the fundamentals of fluid mechanics. (outcome a, level 1 knowledge)
    b. Allow students to develop problem solving skills as related to fluid mechanics so that they may apply them in practice and upper level civil and mechanical engineering courses. (outcome a, level 1 knowledge)

7. Brief List of Course Topics:

1 Introduction and Basic Concepts
2 Properties of Fluids
3 Pressure and Fluid Statics
4 Fluid Kinematics
5 Bernoulli and Energy Equations
6 Momentum and Analysis of Flow Systems
7 Dimensional Analysis and Flow Systems
8 Flow in Pipes

1. **Course Number & Name**: **ENGR 313 -Dynamics**

2. **Credits & Contact Hours**: 3 cr hrs & 3 lecture hrs

3. **Instructor's Name:** Russell Hibbeler, Ph.D., P.E.

4. **Textbook Title, Author and Year:**
Engineering Mechanics; Dynamics, 13th ed., R.C. Hibbeler, Pearson Education, Inc.

5. **Specific Course Information**

a. Catalog Description:
Kinematics and kinectics of particles and rigid bodies; Newton's Laws of Motion, work and energy principles, impulse and momentum; and applications to two- and, three-dimensional problems.

b. Course prerequisite:
ENGR 211 with a C grade or better.

c. Required Course, Elective, or Selected Elective:
The course is required for the Civil Engineering undergraduate program

6. **Course Specific Goals:** (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

The primary objective of this course is to provide civil engineering students, a chance to develop their problem solving skills as it relates directly to situations encountered involving dynamics. The primary objective is to extend their skills learned in Statics, and to provide training in setting up a dynamics problem by using their geometric and analytical skills. Solution to all problems requires a neat and orderly procedure.

Specific to this course is an ability to understand and apply the principles of Kinematic Mechanics for the solution of engineering problems (outcome a, level 3)

1. Establish a correct coordinate system and draw a proper free-body diagram.
2. Being able to identify the most efficient method for solving a kinetic problem; that is, selecting whether to use the equation of motion, work and energy, or an impulse and momentum method, and then applying these principles to obtain the solution.

7. **Brief List of Course Topics:**

Particle Motion
1. Rectilinear Motion
2. Graphical Solutions
3. Curvilinear *x,y,z* Motion
4. Curvilinear *n,t,b* Motion

5. Dependent Motion
6. Independent Motion
7. Curvilinear *x,y,z* Motion
8. Curvilinear *n,t,b* Motion
9. Principle of Work and Energy
10. Power and Efficiency
11. Conservation of Energy
12. Principle of Linear Momentum
13. Conservation of Linear Momentum
14. Impact
15. Principle of Angular Momentum

Rigid Body 2-D Motion

1. Rotation about a Fixed Axis
2. Absolute Motion Analysis
3. Relative Velocity Analysis
4. Instantaneous Center of Zero Velocity
5. Relative Acceleration Analysis
6. Mass Moment of Inertia
7. Equation of Motion–Translation
8. Equation of Motion–Fixed Axis Rotation
9. Equation of Motion–General Plane Motion
10. Principle of Work and Energy
11. Conservation of Energy
12. .Principle of Impulse and Momentum

ABET Outcome a Level 3 ABET a an ability to apply knowledge of mathematics, science, and engineering. This is determined by homework and exams.

Syllabus for ITEC 270

1. *Course number and name*:
   ITEC 270, Introduction to CAD

2. *Credits and contact hours*:
   3 Credit Hours (2 lecture and 2 laboratory)

3. *Instructor*: Charles Williams, Instructor of Industrial Technology

4. *Textbook, title, author and year*:
   Instructor Notes

5. *Specific course information*:

a. *Course description*:
   Computerized drafting techniques as applied to mechanical design problems.

b. *Prerequisites*: ITEC 103.

c. *Indicate whether a required, elective, or selected elective course in the program*:
   Required for Industrial Technology

6. *Specific goals for the course*:

   - By the end of the course, students will be able to an ability to identify, analyze and solve technical problems with 2-D and 3-D CAD software. (Criterion E)

   - By the end of the course, students will be able communicate effectively through engineering drawings. (Criterion G)

   - By the end of the course, students will have a commitment to quality, timeliness, and continuous improvement (Criterion H, I, K)

7. *Brief list of topics to be covered*:

Sketching and Scaling Systems
2-D and 3-D CAD Tools
Dimensioning Concepts
Threads and Fasteners
Auxiliary, Oblique, Isometric, Multi-View and Section views
Working Drawings, Pipe Drawings, Gear Drawings, Architectural Drawings
Engineering Drawing, Part Modeling, Parametric Modeling
3-D Obliques and Isometrics
Common Conventions, Notations, Symbols and Tolerances

CIVIL ENGINEERING

1, Course Number & Name: **CIVE 101 – Introduction to Civil Engineering**

2. Credits & Contact Hours: 1 cr hr (1 lecture hr)

3. Instructor's Name: Chris Carroll, Ph.D., E.I.

4. Textbook Title, Author and Year: N/A
a. Other supplemental materials: N/A

5. Specific Course Information
a. Catalog Description:
CIVE 101. Introduction to Civil Engineering. (1, 0, 1). Introduction to the technical practice areas, professional requirements, history and ethics of civil engineering.
b. Course prerequisite: N/A
c. Required Course, Elective, or Selected Elective:
The course is required for the Civil Engineering undergraduate program

6. Course Specific Goals: (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)
1. Obtain a thorough understanding of the Civil Engineering profession and technical specialty areas (outcome d, level 3).
2. Learn the professional and ethical responsibilities associated with being a Professional Engineer (outcome f, level 2).
3. Recognize the close association between Civil Engineering, Infrastructure, Public Policy, Society, and the Environment (outcome h, level 2).
4. Understand the contemporary issues associated with the Civil Engineering profession (outcome j, level 2).
5. Be able to explain the importance of leadership and a good attitude for the professional practice of engineering (outcome o, level 2).
6. Be prepared to be successful in the UL Lafayette Civil Engineering program.

7. Brief List of Course Topics:

1) Introduction
2) History of Civil Engineering
3) Construction Engineering
4) Environmental Engineering
5) Geotechnical Engineering
6) Structural Engineering
7) Transportation Engineering
8) Water Resources Engineering
9) Professional Ethics
10) Professionalism/Professional Licensure

1. **Course Number & Name**: **CIVE 142 – Civil Engineering Graphics**

2. **Credits & Contact Hours**: 2 & 4

3. **Instructor's Name:** Emad Habib, Ph.D., P.E.

4. **Textbook Title, Author and Year:**
   No textbook is required

   a. Other supplemental materials: N/A

5. **Specific Course Information**

   a. Catalog Description:
   Civil Engineering Graphics (0, 4, 2). Fundamentals of data presentation, interpretation, and analysis, including object sketching, graphing, computer-aided drafting and graphing, data base management and geographic information systems.

   b. Course pre and co-requisites:
   No pre-requisites; co-requisites: MATH 140/143

   c. Required Course, Elective, or Selected Elective:
   The course is required for the Civil Engineering undergraduate program

6. **Course Specific Goals:** (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)
   7. Students will be able to use the techniques, skills, and modern engineering tools (Outcome k, level 3):
      a) Introduction to Computers
         i. Memory
         ii. Input/output
         iii. CPU
         iv. Hard drive
         v. Multiprocessing
         vi. Internet
      b) Basics of WORD processing:
         i. Text and Formatting
         ii. Tables
         iii. Graphs & Charts
      c) Basics of Spreadsheet operations:
         i. Formulas and Functions
         ii. Graphs
         iii. Plotting functions
         iv. Solving equations graphically
         v. Solving equations numerically using SOLVER & GOALSEEK
         vi. Basics of data statistical analysis (mean, variance, histograms)

d) Use of Computer Aided Drawing techniques and software

8. Students will be able to communicate effectively through technical drawings (Outcome g, level 1):
    e) Geometric drawings and scales
    f) Orthographic projections

7. Brief List of Course Topics:

1. Introduction to WORD
2. WORD Basics, Text and Formatting, Tables and Graphs
3. Spreadsheet Basics, Formulas and Functions, Charts
4. Advanced Operations in EXCEL
5. Sketching Techniques & Use of Scales and Drawing Tools
6. Geometric Constructions
7. Orthographic Projection
8. Microstation: Starting Up
9. Microstation: First Full Drawing
10. Microstation: Drawing Aids and Tools
11. Microstation: Printing a Hard Copy
12. Microstation: Lines, Circles, and Polygons
13. Microstation: Text
14. Microstation: Measurements and Information
15. Microstation: Changes and Modifications
16. Microstation: Manipulations
17. Microstation: AccuDraw and SmartLine
18. Microstation: Patterning
19. Microstation: Dimensioning
20. Microstation: Cells and Cells Libraries

1. **Course Number & Name**: **CIVE 225 –Surveying**

2. **Credits & Contact Hours**: 3 & 5

3. **Instructor's Name:** Kenneth McManis, Ph.D., P.E.

4. **Textbook Title, Author and Year:**

   a. Surveying: Principles and Applications, Barry Kavanagh, 8th Ed., 2009

5. **Specific Course Information**

   a. Catalog Description:
   CIVE 225. Surveying (2, 3, 3). Surveying operations and computations; errors and analysis; horizontal and vertical and angular measurements, and control systems; route surveying; traverse computations, topographic maps; geo-positioning; and state plane coordinate systems.

   b. Course pre and co-requisites:
   Prereq: MATH 143. Coreq: ITEC 270

   c. Required Course, Elective, or Selected Elective:
   This is a required sophomore course and is taught every semester..

6. **Course Specific Goals:** (Letters and numbers in parentheses correspond to specific student outcomes and level of learning)

Upon successful completion of the course, the student can

1. apply the fundamentals of plane surveying in the solution of problems involving site measurements, conduct an analysis measurement errors; perform differential leveling; measure angles and directions; perform traverse surveys; develop the geometry of simple horizontal and vertical curves; conduct a topographic survey (Level 3, outcome a)
2. solve surveying problems using fundamental engineering principles with modern computational and measurement equipment. (Level 2 Application, outcomes e and k)
3. specify and conduct the surveying techniques required for the development of a topographic map and the basic analysis for earthwork quantification. (Level 3e, k)
4. identify the role of surveying in the practice of civil engineering., and be familiar with surveying licensure requirements (Level 2, ABET Outcomes f)

7. Brief List of Course Topics (3 hr. of laboratory per week)

COURSE TOPICS AND SCHEDULE (2 hr. of lecture and 3 hr. of lab per week)

Topics	**No. Hours**
1. Horizontal measurements, corrections, errors, leveling.	5
2. Trigonometric, differential and profile leveling.	5
3. Measurement of angles; azimuths, bearings.	4
4. Traverse computations, closing the traverse, area calculations.	4
5. Use of rectangular coordinates.	3
6. Simple and compound curves.	3
7. Horizontal & Vertical curves.	3
8. Exams.	4

Laboratory Projects

1. Introduction to basic surveying instruments, care and use of instruments, fieldwork	3
2. Measurement of horizontal distances using steel tape, transit or theodolite stadia .	3
3. Measurement of horizontal and vertical distances and angles using total station.	3
4. Differential and profile leveling using the engineering level and Philadelphia rod.	3
5. Plan-profile and cross-section survey for an embankment and compute the earthwork volumes required.	3
6. Traverse survey, measuring distances and angles using transit, steel tape, range poles.	
7. Running a closed circuit traverse, measuring distances and angles using total station, steel tape, range poles. Perform associated checks and calculations.	6
8. Conduct a topographic survey and to prepare a large scale contour map.	6
9. Laying out a horizontal curve.	3

Fieldwork usually encompasses ~14 labs.

Computer Usage:
Spreadsheet solutions for traverse closure and other

1. Course Number & Name: **CIVE 322 – Environmental Engineering I**

2. Credits & Contact Hours: 3 cr hrs & 3 lecture hrs

3. Instructor's Name: Daniel D. Gang, Ph.D., P.E.

4. Textbook Title, Author and Year:
Introduction to Environmental Engineering and Science, Gilbert M. Masters, 3rd Edition, 2007.

6. Specific Course Information

a. Catalog Description:
CIVE 322. Environmental Engineering I (3, 0, 3). Mass transfer, environmental chemistry, mathematics of growth, water pollution, risk assessment, water and wastewater treatment, air pollution, global atmospheric change, and hazardous and municipal solid wastes management.

b. Course pre and co-requisites:
ENGR 304, CHEM 108 and CHEM115 or permission from instructor

c. Required Course, Elective, or Selected Elective:
This is a required junior course and is currently taught every Spring Semester.

6. Course Specific Goals: (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

9. Students will be able to understand and apply the basic principles of Environmental Engineering including (outcome e, level 3):
   g) Mass balance and conservation of energy analyses
   h) Common mathematical functions and their environmental applications
   i) Basic water quality parameters and their significance
   j) Explain and solve basic air pollution problems

10. Students will be able to identify and solve environmental engineering problems including (outcome e, level 3):
   k) Apply chemical kinetics, ideal reactor theory to solve quantitative treatment of environmental problems.
   l) Conduct risk analysis in evaluating environmental remediation alternatives
   m) Quantitative design and modify the various unit operations employed for water and wastewater treatment

11. Generate a technical report to discuss the most critical environmental problem and the contemporary issue of the twenty-first century: catastrophic climate change (outcome g, level 4 & outcome j, level 3)
   n) Estimate the carbon content of the atmosphere
   o) Analysis the future carbon emissions
   p) Understand the ocean changes due to the global atmospheric change
   q) Incorporate climate change into the environmental engineering problem.

7. Brief List of Course Topics:

There are 42 class hours including 2 mid-term exams and a final exam

Topics	No. Hours
1. Mass Balance	5
3. Environmental Chemistry	5
4. Mathematics of Growth	4
5. Risk Assessment	4
6. Water Pollution	4
7. Water Quality Control	8
8. Air Pollution	5
9. Global Climate Change	3
10. Hazardous and Solid Waste Management	2
11. Examinations	2

1. Course Number & Name: **CIVE 328- Geotechnical Engineering**

2. Credits & Contact Hours: 3 cr hrs, 2 lecture, 3 laboratory

3. Instructor's Name: Mohammad Jamal Khattak, Ph.D., P.E.

4. Textbook Title, Author and Year:

Braja Das, Principles of Geotechnical Engineering, 7th Ed., 2010.

Braja Das, Soil Mechanics Laboratory Manual, 6th Edition, Oxford University Press, 2002 or newer edition 2002-2011.

a. Other supplemental materials: N/A

7. Specific Course Information

a. Catalog Description:

CIVE 328. Geotechnical Engineering. (2, 3, 3). Fundamental, chemical and physical properties of soils. Basic structure and composition; index and classification of soils, compaction, capillarity, permeability, seepage, effective stress, settlement, stresses in a soil mass, shear strength, earth retaining structures. Prereq: ENGR 203 and ENGR 211 with grade of" C" or better in both. Coreq: ENGR 304.

b. Course pre and co-requisites:

ENGR 203:	Mechanics of Materials (Prereq)
ENGR 211:	Statics (Prereq)
ENGR 304:	Fluid Mechanics (Coreq)

c. Required Course, Elective, or Selected Elective:
The course is required for the Civil Engineering undergraduate program

6. Course Specific Goals: (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

1. To understand and apply the basic principle of geotechnical engineering including (e-level 3):
   a. The basic aspects of soils such as structure, composition, engineering classifications of soils based on index properties, permeability and compaction.
   b. The effective stress concept to determine stresses within a soil mass and stress increase due to external loads.
   c. The shear behavior of soil which leads to the analysis of lateral earth pressures against earth retaining structures and foundations.
   d. The elastic and consolidation settlement of foundations.
2. To identify and solve geotechnical engineering problems including (e-level 3, i-level 2):
   a. The stresses in soil mass and lateral earth pressures.

b. The seepage through the dams and embankments, uplift pressure and piping.
c. The elastic and consolidation settlements of foundations due to external loads.

3. To conduct experiments to determine the physical and engineering characteristics of soils according to established procedures, and analyze and interpret the results (b-level 4, k-level 3).

4. To organize and deliver effective written and graphical laboratory reports in geotechnical engineering (g-level 4).

7. Brief List of Course Topics:

Topics	**No. Hour**
1. Rock cycle, soil origin, clay minerals.	3
2. Phase relationships, Atterberg limits.	3
3. Soil classification.	3
4. Permeability, seepage, flow nets.	3
5. Effective stress.	2
6. Stresses in a soil mass.	3
7. Consolidation.	4
8. Shear strength, failure theory and slope stability	4
9. Lateral earth pressure.	2
10. Compaction.	3
11. Exams.	4
Laboratory projects	
1. Soil boring, field identification, water content.	3
2. Determining the specific gravity of soil.	3
3. Sieve and Hydrometer analysis for grain size distribution.	3
4. Determining the Atterberg limits.	3
5. Permeability test	3
6. Performing Standard and Modified Proctor compaction test.	6
7. Determining the field density of soil	3
8. Unconfined compression test.	3
9. Direct shear test.	3
10. Consolidation test data and interpretation	6
11. Problems involving Mohr's Circle and compaction.	6

1. **Course Number & Name**: **CIVE 332 – Structural Mechanics I**

2. **Credits & Contact Hours**: 3 cr hrs (3 lecture hrs)

3. **Instructor's Name:** Chris Carroll, Ph.D., E.I.

4. **Textbook Title, Author and Year:**
   Course Notes, Chris Carroll, 2012
   Structural Analysis 8th Edition, R. C. Hibbeler, 2011

   a. Other supplemental materials: N/A

8. **Specific Course Information**

   a. Catalog Description:
   CIVE 332. Structural Mechanics I. (3, 0, 3). Statically determinate and indeterminate analysis. Deflections by geometrical and energy methods, flexibility and stiffness methods of indeterminate analysis, slope-deflection equations, moment distribution methods.

   b. Course prerequisite:
   ENGR 203 with a grade of "C" or better

   c. Required Course, Elective, or Selected Elective:
   The course is required for the Civil Engineering undergraduate program

6. **Course Specific Goals:** (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)
   1. Identify and apply loadings to buildings with standard layouts (outcome e, level 3).
   2. Determine the external reactions and internal loadings of statically determinate structures (outcome e, level 3).
   3. Analyze various types of statically determinate trusses (outcome e, level 3).
   4. Calculate the deflections of statically determinate structures based on elastic beam theory and energy methods (outcome e, level 3).
   5. Determine the external reactions and internal loadings of statically indeterminate structures using the force method and method of superposition (outcome e, level 3).
   6. Develop influence lines for statically determinate and indeterminate structures (outcome e, level 3).
   7. Analyze statically indeterminate structures using moment distribution (outcome e, level 3).
   8. Analyze statically determinate and indeterminate structures using the stiffness method (outcome e, level 3).

7. **Brief List of Course Topics:**
   1. Types of Structures and Loads

2. Statically Determinate Structures
3. Analysis of Trusses
4. Internal Loadings
5. Cables and Arches
6. Approximate Analysis
7. Deflections
8. Virtual Work for Trusses
9. Virtual Work for Beams/Frames
10. Force Method
11. Influence Lines
12. Slope Deflection
13. Moment Distribution
14. Stiffness Method

1. Course Number & Name: **CIVE 422 – Environmental Engineering II**

2. Credits & Contact Hours: 3 cr hrs (2 lecture hrs and 3 lab hrs)

3. Instructor's Name: Daniel D. Gang, Ph.D., P.E.

4. Textbook Title, Author and Year:

b. Warren Viessman, Jr., & M. J. Hammer, Water Supply and Pollution Control, 8th Ed., 2009.

c. CIVE 422 Environmental Engineering Laboratory Supplemental Materials

9. Specific Course Information

a. Catalog Description:

CIVE 422. Environmental Engineering II (2, 3, 3). Physical, chemical, and biological treatment of water and wastewater and design of water and wastewater treatment units. Examination of water and wastewater quality.

b. Course pre and co-requisites:

CIVE 322 Environmental Engineering I

c. Required Course, Elective, or Selected Elective:

This is a required senior course and is currently taught every Fall Semester.

6. Course Specific Goals: (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

1) Students will be able to apply chemistry and physics knowledge to conduct water and wastewater quality experiments and to critically analyze and interpret the experimental data (outcome b, level 5).
   a) Color, turbidity, and dissolves oxygen (DO) analyses of rive water
   b) Alkalinity and acidity analyses of rive and well waters
   c) Hardness analysis of river and well waters
   d) Chlorine residue test of tap water
   e) BOD test for raw sewage and wastewater effluent
   f) Solid contents analysis for drinking and waste water

6

2) Students will be able to design a drinking water treatment experiment to find the optimum coagulation dosage and to analyze and interpret the resulting data (outcome b, level 5).
   a) Coagulation dosages tests
   b) Basic water quality parameters and their significance

3) Students will be able to design water and wastewater treatment units, and treatment process including the following (outcome c, level 5):

   a) Clarifiers and flocculators,
   b) Water softening processes, and disinfection processes,

c) Water filters, and biological treatment units, such as activated sludge and trickling filter processes.

4) Generate an engineering field trip report documenting an existing wastewater plant to the extent that it could serve as a starting point for process modifications, capacity upgrades, and operational improvements (outcome g- level 4)
   a) Organize and deliver the field trip report in verbal and written formats

7. Brief List of Course Topics (2 hr. lecture and 3 hr. lab per week)

There are 27 class hours, 39 laboratory hours, including 2 water and wastewater treatment plants field trips, 2 middle exams and a final exam.

Topics	**No. Hours**
1. Water and wastewater characteristics	2
2. Selection of water and wastewater treatment processes	2
3. Physical treatment processes	5
4. Chemical treatment processes	6
5. Biological treatment processes	6
6. Sludge treatment and disposal	4
7. Examinations	2

Laboratory projects	**No. Hours**
1. Standard solution	3
2. Color/Turbidity analyses of water	3
3. Alkalinity/Acidity analyses of water	6
4. Hardness/Chlorine residue	6
5. Solid Lab	3
6. Coagulation dosages	6
7. Dissolved oxygen (DO)	3
8. BOD test	3
9. Water plant field trip	3
10. Waste water plant field trip	3

1. Course Number & Name: **CIVE 426- Steel Design**

2. **Credits & Contact Hours**: 3 cr hrs, 2 lecture, 2 Design Suite/laboratory

3. Instructor's Name: Allison J. P. "Sonny" Launey, P.E.

4. Textbook Title, Author and Year:

Steel Design, William T. Segui, 5th Ed., Cengage Learning

Steel Construction Manual, 14th Ed., AISC

b. Other supplemental materials: Minimum Design loads for Buildings and Other Structures, ASCE 7-10, ASCE and International Building Code, 2009, International Code Council. Also, AISC Teaching Resources

10. Specific Course Information

a. Catalog Description:

CIVE 426. Steel Design. (2, 2, 3). Properties of structural steel; design of steel members; tension, compression, bending, axial and bending stress combinations. Design criteria and interpretation of codes, allowable stress and load resistance factor designs, aluminum structural elements. Testing of materials. Prereq: CIVE 332 with a grade of C or better

b. Course pre and co-requisites:

ENGR 332: Structural Mechanics I (Prereq)

c. Required Course, Elective, or Selected Elective:
The course is required for the Civil Engineering undergraduate program

6. Course Specific Goals: (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

1. To have 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. (outcome c, level 5):
    a. Describe the basic properties of structural steel.
    b. Recognize the uncertainty in steel design and the need for load and resistance factors.
    c. Describe the load paths from floor slab to floor beams to columns to footings of a typical steel framing system.
    d. Calculate capacity and design of most commonly used steel members in tension and bending.
    e. Calculate capacity and design of steel columns and beam-columns.
    f. Calculate capacity and design of welded and bolted connections.
2. Use the AISC sculpture as a teaching aid in understanding connections.

3. Use actual case data/findings to show impact of construction and/or design failures.

7. Brief List of Course Topics:

Topics	**No. Hour**
1. Properties of Steel/Materials .	1
2. Load Combinations / Load Paths.	1
3. Tension Members.	4
4. Flexural Members.	8
5. Shear.	3
6. Columns Design.	6
7. Beam Columns.	4
8. Connections.	4
9. AISC Sculpture.	1
10. Forensic Evaluation of Failure of a Structure.	1
Exams.	

1. Course Number & Name: **CIVE 427 – Reinforced Concrete**

2. Credits & Contact Hours: 3 cr hrs (2 lecture hrs and 2 lab hrs)

3. Instructor's Name: Chris Carroll, Ph.D., E.I.

4. Textbook Title, Author and Year:
Course Notes, Chris Carroll, 2012
ACI 318-11 Building Code and Commentary, American Concrete Institute, 2011
Design of Reinforced Concrete – 8th Edition, Jack C. McCormac and Russell H. Brown, 2009

a. Other supplemental materials: N/A

11. Specific Course Information

a. Catalog Description:
CIVE 427. Reinforced Concrete. (2, 2, 3). Behavior, analysis, and design of reinforced concrete columns, beams, slabs, retaining walls, and footings. Testing of materials.

b. Course prerequisite:
CIVE 332 with a grade of "C" or better

c. Required Course, Elective, or Selected Elective:
The course is required for the Civil Engineering undergraduate program

6. Course Specific Goals: (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

1. Describe the basic properties of concrete and reinforcing steel.
2. Recognize the uncertainty in reinforced concrete design and the need for load and resistance factors (outcome c, level 5).
3. Describe the load paths from floor slab to floor beams to columns to footings of a typical reinforced concrete framing system (outcome e, level 3).
4. Calculate strength and design reinforced concrete members in bending, including rectangular beams, T-beams, doubly reinforced beams, and one-way slabs (outcome c, level 5) (outcome e, level 3).
5. Calculate strength and design reinforced concrete beams in shear (outcome c, level 5) (outcome e, level 3).
6. Construct a column interaction diagram and design a reinforced concrete column (outcome c, level 5) (outcome e, level 3).
7. Design, construct, and analyze a small reinforced concrete frame subjected to static and impact loadings and prepare a professional project report (outcome g, level 4) (outcome i, level 3)
8. Perform standard tests on fresh and hardened concrete, including slump, unit weight, compressive strength, and tensile strength and evaluate the results (outcome b, level 5).

7. Brief List of Course Topics:

1. Introduction
2. History Channel, Modern Marvels Concrete Video
3. Material Properties
4. Loads
5. Load Paths
6. Live Load Reduction
7. Flexure – Uncracked Elastic Stage
8. Flexure – Cracked Elastic Stage
9. Deflections
10. Detailing
11. Flexure – Equivalent Rectangular Stress Block
12. Flexure – Failure Types
13. Flexure – Design
14. Flexure – Doubly Reinforced
15. Flexure – T-beams
16. Influence Lines
17. One-way Slabs
18. Shear – Introduction
19. Shear – ACI 318
20. Shear – Uniform Stirrup Spacing
21. Shear – Variable Stirrups Spacing
22. Shear – Pattern Live Loads
23. Columns – Interaction Diagram
24. Columns - Design

1. Course Number & Name: **CIVE 429 - Hydrology**

2. Credits & Contact Hours: 3 cr hrs & 3 lecture hrs

3. Instructor's Name: Emad Habib, Ph.D., P.E.

4. Textbook Title, Author and Year:
Engineering Hydrology, Victor Miguel Ponce, Prentice-Hall, Inc., 1989.

a. Other supplemental materials: N/A

12. Specific Course Information

a. Catalog Description:
CIVE 429. Hydraulics. (3, 0, 3). Principles of hydrologic science and their application to the solution of hydraulic, hydrologic, environmental, and water resources engineering problems; environmental restoration and protection techniques.

b. Course prerequisite:
ENGR 304 or permission from instructor

c. Required Course, Elective, or Selected Elective:
The course is required for the Civil Engineering undergraduate program

6. Course Specific Goals: (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

1. Students will be able to understand and apply the basic principles of hydrologic engineering including (outcome e, level 3):
    a. Hydrologic cycle and basic terminologies
    b. Rainfall and Catchment Properties
    c. Hydrologic Measurements
    d. Small Catchments
    e. Midsize Catchments
    f. Reservoir Routing – Storage routing
    g. Stream Channel Routing
2. Students will be able to identify and solve hydrologic engineering problems including (outcome e, level 3):
    a. Catchment Delineation – Estimating drainage areas.
    b. Estimating catchment drainage properties
    c. Calculations of hydrologic abstractions (losses)
    d. Calculations of surface runoff.
3. Students will be familiar with the use and applications of hydrologic computer models (outcome k, level 2).

7. Brief List of Course Topics:

1. Introduction to Engineering Hydrology: Hydrologic cycle
2. Basic Hydrologic Principles: Rainfall and Catchment Properties

3. Mass Balance Equation
4. Rainfall - Precipitation, Temporal and Spatial distribution
5. Hydrologic Abstractions: Infiltration & Evaporation
6. Infiltration indices, Evaporation and Evapotranspiration formulas
7. Catchment Properties and Runoff Characteristics
8. Area, Shape, Relief, Rainfall-Runoff relations
9. Concentration time, Hydrograph components
10. Hydrologic Measurements
11. Small Catchments: Rational Method
12. Small Catchments: Composite Catchments
13. Overland flow runoff
14. Midsize Catchments – Runoff Curve number
15. Unit hydrograph techniques
16. SCS TR-55 Method
17. Reservoir Routing – Storage routing
18. Stream Channel Routing

1. Course Number & Name: **CIVE 430 – Structural Mechanics II**

2. Credits & Contact Hours: 3cr hrs & 3 lecture hrs

3. Instructor's Name: Russell Hibbeler, Ph.D., P.E.

4. Textbook Title, Author and Year:
Structural Analysis, 7th ed., RC Hibbeler, Pearson Education, Inc. Handouts of the ASCE 07 Loading Standard

13. Specific Course Information

a. Catalog Description:
CIVE 430 STRUCTURAL MECHANICS II. Formulation and calculation of structural stiffness matrix, nodal displacements, reactions, and internal loadings. Includes matrix analysis software applications and solution of practical examples.

b. Course pre and co-requisites:
CIVE 332 STRUCTURAL MECHANICS I

c. Required Course, Elective, or Selected Elective:
The course is required for the Civil Engineering undergraduate program

6. Course Specific Goals: (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

The primary objective of this course is to gain an understanding and an ability to apply methods of how to conduct structural analyses. (outcome e, level 3)

Specific to this course the **most important concepts** emphasized are:

1. Obtain a sense of how an actual structure is modeled and analyzed by computer.

2. Use the ASCE 7 standard to obtain loadings and show its application to typical structures made from wood, steel, and masonry/concrete.

7. Brief List of Course Topics:

Topics
Course Topics:

1. Matrix algebra for structural analysis
2. Truss analysis using the stiffness method
3. Beam analysis using the stiffness method

4. Frame analysis using the stiffness method

5. Beams and frames having a variable moment of inertia

Field Projects

1. Analysis of roof load on a gymnasium–wood and masonry structure
2. Structural wall loading analysis
3. Steel frame floor loading analysis

1. Course Number & Name: **CIVE 434 – Hydraulics**

2. Credits & Contact Hours: 3 & 3

3. Instructor's Name: Emad Habib, Ph.D., P.E.
Professor, Civil Engineering
Room: 254E, MDSN, phone 482-6513
E-mail: habib@louisiana.edu

4. Textbook Title, Author and Year:
Hydraulic Engineering: Roberson, Cassidy, and Chaudhry, 2nd edition John Wiley & Sons, Inc.

a. Other supplemental materials: N/A

14. Specific Course Information

a. Catalog Description:

CIVE 434: Hydraulics (2, 3, 3). Flow in open channels, flow through hydraulic structures, drainage analysis, laboratory flow measurements, non-uniform flow analysis. Prerequisite: ENGR 304

b. Course pre and co-requisites:
ENGR 304 (Fluid Mechanics) or permission from instructor (ENGR 211, PHYS 201, MATH 270)

c. Required Course, Elective, or Selected Elective:
The course is required for the Civil Engineering undergraduate program

6. Course Specific Goals: (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

Upon successful completion of the course you should be able to apply the principles of hydraulics to solve engineering hydraulics problems. This means that specifically you should be able to:

1) To *understand* and *apply* the basic principles of hydraulic engineering including the governing laws on Continuity, Energy and Momentum, and their applications in open-channel and closed-conduit flows (outcome a, level 3)

2) To *identify* and *solve* hydraulic engineering problems including (outcome e, level 4):
   a. Calculations of pressure and discharge at various locations in a pipe system.
   b. Energy losses in pipe systems due to friction and to fittings.
   c. Solving steady, uniform and non-uniform open channel flow problems.
   d. Classification and calculation of water surface profiles and discharge distribution in non-uniform open-channel flow
   e. Analysis of a hydraulic jump and other rapidly varying flow transitions.
   f. Solving hydraulic problems involving pumps and using pump performance/characteristics curves

g. Solving hydraulic problems involving pumps in parallel, and pumps in series.
h. Solving conduit system problems including branching pipes, multiple-reservoirs, and pipes in parallel
i. Solving Pipe Network Problems for Water Distribution Systems

3) To *conduct* laboratory experiments and *analyze* and interpret data on (outcome b, level 4):
   a. Calculation of energy losses due to pipe fittings
   b. Calibration of sharp crested weirs.
   c. Analysis of drainage of an open tank
   d. Analysis of a hydraulic jump

4) To *communicate* results of laboratory experiments through properly formatted written and graphical reports in hydraulic engineering (outcome g, level 4).

5) To be able to *apply* modern hydraulic engineering computer modeling tools (e.g., HEC-RAS and related software) to simulate real-world hydraulic systems and *analyze* and interpret the results (outcome k, level 4).

7. Brief List of Course Topics:

1. Open Channel Flow
   a. Steady Uniform Flow in Open Channel
   b. Steady Non-Uniform Flow in Open Channel
      i. Hydraulic Jump
      ii. Gradually Varied Flow
      iii. Classification of water surface profiles
   c. Measurements of discharge in open channel flow
   d. Flow over weirs
2. Closed Conduit Flows
   a. Energy equation
   b. Head losses
   c. Hydraulic and Energy Grade Line
   d. H-Q relations for pumps
   e. Conduit systems
   f. Branching and Parallel Pipes
   g. Pipe Networks
3. Application of HEC-RAS software to simulate open-channel hydraulic systems.
4. Laboratory Experiments
   a. Experiment # 1: Energy Losses due to pipe fittings
   b. Experiment # 2: Weir Calibration
   c. Experiment # 3: Drainage of an open tank
   d. Experiment # 4: Analysis of a hydraulic jump

1. **Course Number & Name**: **CIVE 435 – Transportation Engineering**

2. **Credits & Contact Hours**: 3 & 3

3. **Instructor's Name:** Xiaoduan Sun, Ph.D., P.E.

4. **Textbook Title, Author and Year:**
   Transportation Engineering and Planning by C.S. Papacostas & P.D. Prevedouros, Third edition, Prentice-Hall, ISBN 0-13-081419-9

   a. Other supplemental materials:
   Highway Capacity Manual, 2000 edition
   Manual on Uniform Traffic Control devices (MUTCD), 2004 edition

5. **Specific Course Information**

   a. Catalog Description:
   CIVE 435 (3, 0, 3): Introduction to traffic flow models, highway capacity and level of service analysis, traffic control devices, transportation panning models, and highway safety

   b. Course pre and co-requisites:
   Senior or junior standing in civil engineering

   c. Required Course, Elective, or Selected Elective:
   The course is required for the Civil Engineering undergraduate program

6. **Course Specific Goals:** (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

3. Students will be able to understand and apply the basic principles of transportation engineering including (outcome e, level 3):
   a. fundamental knowledge of traffic flow
   b. capacity and level of service analysis
   c. basic function of traffic control devices
   d. transportation planning
   e. statistical analysis of collected traffic data
   f. highway safety analysis and "forgiving design" concept

4. Students will be able to identify and solve transportation engineering problems including (outcome e, level 3):
   a. Estimating capacity of various transportation facilities
   b. Evaluating transportation facility performance – Estimating level of service for freeways and intersection
   c. Selecting the traffic control devices for the given situation
   d. Calculations of trip generation, distribution, and traffic assignment
   e. Calculations of accident rates for roadway segment and intersection

5. Students will be familiar with the use and applications of traffic simulation models (SYCHRO) (outcome k, level 2).
6. Student will be familiar with the contemporary transportation issues, such as traffic congestion, energy efficient transportation options, safety, and ITS (outcome j, level 3)

7. Brief List of Course Topics:

1. Introduction to transportation systems
2. Traffic Stream Flow Models
3. Shock wave and data collection methods
4. Capacity and Level of Service Analysis
5. Application of Traffic Flow Simulation Model
6. Traffic Control Devices (MUTCD)
7. Characteristics of Transportation Modes
8. Introduction to Transportation Planning and Urban Transportation Systems
9. Travel Demand Forecasting models
10. Highway Safety
11. Impact Analysis and Evaluation

1. **Course Number & Name**: **CIVE 437- Highway Safety**

2. **Credits & Contact Hours**: 3 credit hours & 3 lecture hours

3. **Instructor's Name:** **Xiaoduan Sun, Ph.D., P.E.**
4. **Textbook Title, Author and Year:**
   No textbook available.
   Instructor provides all lecture notes.

   a. Other supplemental materials:
   Highway Safety Manual by AASHTO
   Roadside Safety Design Guide by AASHTO
   NCHRP Human Factors Guidelines for Road Systems
   Observational Before-After Studies in Road Safety by Ezra Hauer
   Others

5. **Specific Course Information**

   a. Catalog Description:
   b. **Course prerequisite:**
   Senior status in Civil Engineering
   c. Required Course, Elective, or Selected Elective:
   The course is an elective course for the Civil Engineering undergraduate program

6. **Course Specific Goals:** (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

   1. Students will be able to understand and apply the basic principles of roadway safety design and evaluation to solve safety problems (outcome e, level 3):
      a. Identifying most promising safety Improvement locations
      b. Estimating safety of any roadway facilities.
      c. Proposing targeted crash countermeasures
      d. Evaluating effectiveness of a crash countermeasure
      e. Calculations of benefit and cost of crash countermeasure
   2. Students will be familiar with the use and applications of safety analysis computer models (outcome k, level 2)
      a. Interactive Highway Safety Design Model by FHWA

7. **Brief List of Course Topics:**

1. Introduction to Roadway Safety
   a. Roadway Crashes- an un-ignorable Problem
   b. Roadway Safety – a complex field
   c. A Comprehensive 4E approach

2. Fundamental Safety Concepts and Basic Safety Evaluation Principles
   a. Basic Safety Concepts

b. Safety Predictive Models

3. Scientific Roadway Safety Evaluation Method
    a. The Problems with Naïve Evaluation Methods
    b. Scientific Safety Evaluation Methods

4. Human Factor in Roadway Safety
    a. Introduction to Human Factor
    b. Driving Task Model
    c. Basic Roadway Users' Characteristics and Limitations
    d. Human Factors and Roadway Design
    c. Roadway Users' Behavior on Roadway Safety

5. Design roadway Facilities with Substantial Safety in Mind
    a. Introduction to Roadway Design Procedure
    b. Nominal Safety and Substantive Safety
    c. Linking Highway Design Elements to Safety Performance

6. Forgiving Roadside Design Principles and Practice
    a. Introduction to Roadside Forgiving Design Concept
    b. Roadside Forgiving Design Practice

7. Safety Management System
    a. Network Screening
    b. Diagnosis
    c. Select Countermeasures
    b. Economic Appraisal

1. **Course Number & Name**: **CIVE 438- Foundation Engineering**

2. **Credits & Contact Hours**: 3, 3

3. **Instructor's Name:** Mohammad Jamal Khattak, Ph.D., P.E.

4. **Textbook Title, Author and Year:**

Braja Das, Foundation Engineering, 7th Ed., 2010. (Text Book)

c. Other supplemental materials:
Joseph Bowles, Foundation Analysis and Design, 4th Edition, McGraw Hills, Inc. 1988. (Reference Book)

1) Specific Course Information

a. Catalog Description:
CIVE 438. Foundation Engineering (3, 0, 3) Theory of consolidation, stress/strain relationship of soils, drained and un-drained conditions, design of shallow and deep foundations, settlements, retaining structures and structural design of foundation. Prerequisites: ENGR 219, ENGR 304, and CIVE 328 with a grade of "C" or better

b. Course pre and co-requisites:

CIVE 328. Geotechnical Engineering
ENGR 304.Fluid Mechanics

c. Required Course, Elective, or Selected Elective:
The course is required for the Civil Engineering undergraduate program

6. **Course Specific Goals:** (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

1. To apply the knowledge of fundamental principles of geotechnical engineering in solving problems related to (e-level 3):
    a. Bearing capacity of shallow and deep foundations
    b. Elastic and consolidation settlements of shallow and deep foundations
    c. Stability analysis of retaining structures
2. To apply the knowledge of fundamental principles of geotechnical engineering in designing the following (c-level 5, e-level 3):
    a. Shallow and deep foundations including column, mat and pile foundations
    b. Retaining structures including gravity and cantilever retaining walls
3. To demonstrate the ability to learn on your own without the aid of formal instruction through a written report on a given design project by using handouts and reference materials (c-level 5, g-level 4, i-level 2).

7. **Brief List of Course Topics:**

Topics	No. Hour
1. Basic soil properties and mechanics	3
2. Consolidation and settlement of shall foundations	3
3. Soil exploration	2
4. Bearing capacity and proportioning of shallow foundations	6
5. Settlement of shallow foundations on clay and sand	3
6. Eccentrically loaded shallow foundations	3
7. Structural design of footings	2
8. Bearing capacity and proportioning of mat foundations	4
9. Structural design of mat foundations	2
10. Pile foundations in clay and sand	8
11. Lateral earth pressure and retaining walls	6

1. Course Number & Name: **CIVE 442 – Senior Civil Engineering Design**

2. Credits & Contact Hours: 2 & 4

3. Instructor's Name: E. R. DesOrmeaux, P.E.
K. L. McManis, Ph.D., P.E.

4. Textbook Title, Author and Year: N/A

a. **Other supplemental materials**:

1. Textbooks used in previous Design classes.
2. American Society of Steel Construction (ADCI), Manual of Steel Construction, (ASD, 9th Edition)
3. Concrete Reinforcing Steel Institute, Design Handbook
4. Various Building Codes: IBC, Life Safety Code
5. Other books, periodicals, literature, etc. required for the individual project assigned for that semester
6. EJCDC and AIA Construction Documents
7. American Society of Civil Engineers (ASCE) – Code of Ethics

2) Specific Course Information

a. Catalog Description:
CIVE 442. Senior Civil Engineering Design (1, 3, 2) Major design experience in an engineering project involving realistic constraints and multiple sub-discipline areas of civil engineering. The design project incorporates boundary and control surveys, site development and subdivision of real estate, road geometry and route surveys, the location and position of facilities and utility systems, engineering standards and professional issues; constructability, sustainability, ethics, economics, professional practice, safety and public welfare, and other topics.

b. Course pre and co-requisites:
Coreq: ECON 430 and credit or registration in all required civil engineering courses in the current curriculum.

c. Required Course, Elective, or Selected Elective:
The course is required for the Civil Engineering undergraduate program

6. Course Specific Goals: (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

10. Design a system, component, of process to meet the objectives for a project that includes more than one civil engineering area and with consideration for realistic constraints such as economic, social, political, ethical, health and safety, constructability, and sustainability (ABET Criterion 3 ***c***, Bloom's Taxonomy Level 5, synthesis).
11. Identification and development of a site investigation program, (ABET Criterion 3 b, Bloom's Taxonomy Level 5, synthesis).
12. Identification and development of a material tests and the specifications required for quality control in construction (ABET Criterion 3 b, Bloom's Taxonomy Level 5, synthesis).

13. The ability to effectively function on multidisciplinary teams for a civil engineering design (ABET Criterion 3 d, Bloom's Taxonomy Level 3, application)
14. Develop and demonstrate an appreciation for professional and ethical responsibility with an ability to manage a schedule of activities; demonstrate initiative, good organizational skills, integrity and attitude (ABET Criterion 3 *f*, Bloom's taxonomy Level 2, comprehension)
15. Organize and deliver an effective verbal presentation, accompanied by a written design document, and design drawings (ABET Criterion 3 g, Bloom's Taxonomy Level 4, analysis).
16. Utilize a broad education background that considers the global impact of the project design on the economic, environmental and societal issues of the community (ABET Criterion 3 *h*, Bloom's taxonomy Level 2, comprehension)
17. Demonstrate knowledge through the applications of design codes, testing standards, and regulatory policies (ABET Criterion 3 k, Bloom's taxonomy Level 3, application)
18. An ability to identify and explain the key concepts and problem-solving processes for those public policies and authorities that must be satisfied for approval of the design (ABET Criterion 3 – Program Criteria – n, Bloom's taxonomy Level 2, comprehension)

7. Brief List of Course Topics:

Teams consisting of four (4) or more students participate in multidisciplinary projects. Each Multidisciplinary Project contains elements of the following: Surveying, environmental, water resources, transportation, foundation, structural engineering and design, and other design elements – as required by the project (codes and loads, plans and specifications, estimate of costs, professional & ethical practice)**.** Students will be required to successfully conduct the following:

Topics

1. Design Project:
   a. Project Scope and Organization
   b. Contract (with particulars on scope, design and delivery dates)
   c. Plans and Specifications and Calculations
   d. Project Presentation (individual & team defense before faculty panel)
2. Students are expected to use the following in performing the work required of this course:
   a. Basics of Project Planning, Scheduling & Control – CPM
   b. Use of the Uniform Construction Index and how it is applied to plans, specifications, and construction cost control
   c. Use the various codes and standards, and its applicability to infrastructure design and construction – International Building Code, Life Safety Code, etc.
   d. Use the standards for various types of pavement construction, testing and inspections of infrastructure elements in materials, including soils, concrete, and asphalt, when applicable

1. **Course Number & Name**: **CIVE 444 – Civil Engineering Seminar**

2. **Credits & Contact Hours**: 1 & 4

3. **Instructor's Name:** Kenneth McManis, Ph.D., P.E.

4. **Textbook Title, Author and Year:**
   a. Engineering Your Future: The Non-Technical Side of Professional Practice in Engineering and Other Technical Fields, Stuart G. Walesh, Ph.D., P.E., ASCE , 3rd Ed., 2012 (http://www.asce.org/Product.aspx?id=25769805789&productid=149358322)

3) Specific Course Information

a. Catalog Description:
CIVE 444. Civil Engineering Seminar - Professional issues in the practice of civil engineering.

b. Course pre and co-requisites:
Restr: Senior Standing in Civil Engineering Program and permission of instructor required.

c. Required Course, Elective, or Selected Elective:
This is a required senior course and is currently taught every semester..

6. **Course Specific Goals:** (Letters and numbers in parentheses correspond to specific ABET/ASCE BOK1 outcomes covered in this course and the expected levels of attainment)
   - The student can explain the professional and ethical responsibilities of a civil engineer (ABET f/ASCE BOK1 6 – level 2, comprehension)
   - The student can demonstrate the ability to organize and deliver effective verbal, written, and graphical communications (ABET g/ASCE BOK1 7 – level 4, analysis)
   - Drawing on a broad education, the student can explain the global, economic, environmental, and societal impacts of engineering solutions (ABET h/ASCE BOK1 8 – level 2 comprehension).
   - The student will demonstrate an ability to learn on their own, without the aid of formal instruction (ABET i/ASCE BOK1 9 – level 3, application).
   - The student will be able to explain key concepts and problem-solving processes used in management (BOK1 13 – level 2, comprehension)
   - The student will be able to explain key concepts and solutions used in business, public policy, and public administration. (ASCE BOK1 14 – level 2, comprehension)
   - The student will be able to explain the role of the leader and list the leadership principles and attitudes conducive to effective professional practice of civil engineering (ASCE BOK1 15 – level 2, comprehension).

7. **Brief List of Course Topics (3 hr. of laboratory per week)**

1. Professionalism – ethics & responsibility
    - What is the justification or need for the professional licensing of engineers? Cite your source or reference.
    - Who has jurisdiction for licensing professional engineers?
    - Complete the LAPELS online professional exam.
    - List the specific professional and ethical responsibilities of a civil engineer? (Chapter 12)
    - Conduct an analysis & report on a case involving professional ethics.
2. Communications –
    - Given information for an engineering analysis, 1) provide a written report with supporting graphics, and 2) organize. Prepare and deliver a 10-minute oral presentation before a panel of your peers and/or faculty.
    - Organize and prepare written reports for all CIVE 444 assignments.
3. Socio/Economic/Environmental/Cultural - the impact of engineering solutions.
    - Evaluate the engineering or other solutions proposed for Louisiana's coastal restoration problems with considerations on their impact to the social, economic, environmental and cultural of the area.
    - Evaluate the consequences of an engineering solution on the social, economic, environment and/or cultural identity of an area. (case study).
4. Lifelong learning –
    - Demonstrate through the product of your reporting efforts for the CIVE 444 assignments, the ability to conduct independent research and to learn on your own without the aid of formal instruction.
    - Given a technical problem beyond the course objectives covered in the CIVE program of courses; research and demonstrate the approach and/or solution.
5. Management – project management, construction, and asset management
    - Identify (list) the key concepts and problem solving processes used in the management of projects, construction, or asset management.

4) Public Policy – areas relevant to the engineering profession, business, public policy & public administration
    - Identify areas of public policy that are important to the engineering profession and the ways in which public policy may eliminate or minimizes adverse impacts resulting from civil engineering projects.
    - List and explain the key concepts and problems solving processes used in business, public policy, and public administration.

5) Leadership – leadership principles & attitudes
    - Define and explain the role of the leader, leadership principles, and the attitudes conducive to the effective professional practice of civil engineering.

6) ABET's Learning Outcomes –
    a. Review ABET & ASCE BOK1
    b. Prepare your student portfolio and document the accomplishments of the ABET/ASCE BOK1 learning outcomes

1. **Course Number & Name**: **CIVE 450 - Highway Engineering**

2. **Credits & Contact Hours**: 3, 5

3. **Instructor's Name:**

Mohammad Jamal Khattak, Ph.D., P.E.
Associate Professor (Endowed)
254J- Madison Hall (Engineering Building)
Email: mxk0940@louisiana.edu

4. **Textbook Title, Author and Year:**

Paul H. Wright and Karen K. Dixon, Highway Engineering, 7th Edition, John Wiley and Sons, INC. 2004. (Text Book)

d. Other supplemental materials:
A Policy on Geometric Design of Highways and Streets, 5th Edition, 2004. (Ref. Book)
AASHTO Guide for Design of Pavement Structures, 1993. (Ref. Book)

7) Specific Course Information

a. Catalog Description:
CIVE 450(G). Highway Engineering. (2, 3, 3). Geometric design of highways vertical and horizontal alignments and drainage design, flexible and rigid pavement design, laboratory testing of transportation materials, and asphalt mix design. Prerequisites: CIVE 225, Co-requisites: CIVE 328.

b. Course pre and co-requisites:

CIVE 225. Surveying (Preq)
CIVE 328. Geotechnical Engineering (Coreq)

c. Required Course, Elective, or Selected Elective:
The course is required for the Civil Engineering undergraduate program

6. **Course Specific Goals:** (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

3. To apply the knowledge of fundamental characteristics of drivers, pedestrians and vehicle interactions for solving highway related problems. (e-level 3)
4. To apply the knowledge of fundamental principles of engineering in designing the following (c-level 5, e-level 3):
    a. Geometric and cross-sectional elements of highways.
    b. Horizontal and vertical alignment and drainage of highways.
    c. Flexible and rigid pavements.
    d. Hot mix asphalt mixtures

5. To conduct experiments to determine the physical and engineering characteristics of transportation materials and perform mix design according to established procedures, and analyze and interpret the results (b-level 4, c-level 3).
6. To organize and deliver effective written and graphical reports in (g-level 4):
    a. Transportation materials and mix design laboratories.
    b. Geometric and pavement design projects.

7. Brief List of Course Topics:

Topics	**No. Hour**
12. Introduction to highways, development and classifications	2
13. Drivers, pedestrian and vehicle characteristics	3
14. Design controls and cross-section.	3
15. Circular curves, super elevation, spiral curves and curve widening	8
16. Grades, vertical curves, stopping and passing sight distances.	4
17. Introduction to Intersections and interchanges	2
18. Flexible pavement design.	5
19. Rigid pavement design.	5
20. Drainage design	4
21. Introduction to pavement rehabilitation and management	2
22. Exams.	4
Laboratory projects	
1. Preparation and testing of asphalt binders.	6
2. Preparation and testing of aggregates	6
3. Preparation and testing of asphalt mixtures using the Superpave Mix Design Procedure including: gradation, specific gravities, optimum asphalt content, moisture sensitivity and tensile strength.	9

1. **Course Number & Name**: **CIVE 460 – Wastewater Treatment**

2. **Credits & Contact Hours**: 3 & 3

3. **Instructor's Name:** Daniel D. Gang, Ph.D., P.E.

4. **Textbook Title, Author and Year:**

   d. Small and Decentralized Wastewater Management Systems: Crites and Tchobanoglous; WCB/McGraw-Hill, 1998

   e. Wastewater Engineering: Treatment and Reuse; Metcalf and Eddy, Inc; McGraw-Hill; 4th Edition; 2003

8) Specific Course Information

a. Catalog Description:
460(G) WASTEWATER TREATMENT. (3, 0, 3). Pollutants of importance; design approach; pretreatment; primary, secondary, tertiary treatment alternatives; biological process design; sludge characterization and treatment.

b. Course pre and co-requisites:
CIVE 322 Environmental Engineering I

c. Required Course, Elective, or Selected Elective:
This is a senior elective and is currently taught every Fall Semester.

6. **Course Specific Goals:** (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

   1. Analyze and solve engineering problems involving waste water treatment processes (ABET Outcome E – Engineering Problems)
   2. Design and evaluate sedimentation processes such as primary sedimentation tanks and secondary clarifiers (ABET Outcome C – Design)
   3. Design and modify suspended growth biological treatment systems such as activated sludge basins, aerated lagoons, and oxidation ditches (ABET Outcome C – Design)
   4. Analyze and design attached growth biological treatment systems such as tricking filters and rotating biological contactors (ABET Outcome C – Design)
   5. Explain and design sludge treatment facilities such as thickeners, digesters, and dewatering processes (ABET Outcome C – Design)
   6. Prepare a preliminary design of a centralized municipal wastewater treatment system to meet the NPDES needs (ABET Outcomes C – Design, K – Engineering Tools)
   7. Deliver the preliminary design in verbal and written formats (ABET Outcome G– Communication)

7. Brief List of Course Topics (3 hr. lecture)
There are 39 class hours, including 1 wastewater treatment plant field trip, 5 hours student presentations, 2 middle exams and a final exam.

Topics	No. Hours
1. Introduction – wastewater quality parameters, BOD, and COD	3
2. Wastewater treatment process selection and treatment trains	3
3. Preliminary treatment processes, screens, and flow equalization	3
4. Grit removal; flow measurement, sedimentation tank design	3
5. Secondary aerobic biochemical treatments	3
6. Suspended growth processes- activated sludge	3
7. Attached growth processes - trickling filter, RBC systems	3
8. Lagoons and waste stabilization ponds	3
9. Sludge treatment processes, stabilization- anaerobic/aerobic digestion	3
10. Sludge disposal	3

1. **Course Number & Name**: **CIVE 480 – Construction Engineering**

2. **Credits & Contact Hours**: 3 cr hrs & 3 lecture hrs

3. **Instructor's Name:** E. R. DesOrmeaux, P.E.

4. **Textbook Title, Author and Year:**
   None

   a. Other supplemental materials:

- Project Management and Construction Management Notes prepared by the Instructor
- Introduction to EJCDC and AIA Construction Documents
- American Concrete Institute (ACI) Documents relating to Concrete Slabs on Grade, including Concrete Parking Lots and Drives
- Building Code Requirements for Structural Concrete (ACI 318), and Commentary (ACI 318-05)
- Welded Wire Institute – various publications relating to Distributed Steel Reinforcing
- American Society of Steel Construction (ADCI), Manual of Steel Construction, (ASD, 9^{th} Edition)
- Steel Joist Institute – Load Tables
- Steel Stud Manufacturers Association (SSMA) Product Technical Information
- Concrete Masonry Handbook
- Masonry Handbook, prepared by the Instructor
- Various Building Codes: IBC, Life Safety Code
- American Society of Civil Engineers (ASCE) – Code of Ethics

9) Specific Course Information

a. Catalog Description:

CIVE 480. Construction Engineering. (3, 0, 3). Construction planning, scheduling, and control; contract documents and public bid laws; Uniform Construction Index. Soil stabilization; concrete and steel construction; soil, drainage, and pressure piping. Construction engineering terminology and inspection techniques.

b. Course prerequisite:
Prereq. CIVE 328; Coreq. CIVE 427.

c. Required Course, Elective, or Selected Elective:
The course is required for the Civil Engineering undergraduate program

6. Course Specific Goals: (Letters and numbers in parentheses correspond to specific ABET outcomes covered in this course and the expected levels of attainment)

At the completion of the course, students should have a basic knowledge of:

1. Students are expected to understand basic construction techniques, the standards and codes used by practicing professional engineers. (Outcomes b – level 4, c – level 4, d – level 4, e – level 3, k – level 3, l – level 3, m – level 2, n – level 2)

2. An ability to work with licensed engineers in industry, government, or private consulting firms, with an appreciation and understanding of basic construction issues. (outcomes g-level 3, j- level 3)

7. Brief List of Course Topics:

- Project Management, including the preparation of CPM charts
- The ability to prepare Organizational Breakdown Structure (OBS) charts and Work Breakdown (WBS) Structure of a project
- The use and application of Unified Construction Index (UCI) documents
- An understanding of the concepts of soil stabilization methods, and the required calculation methods
- The differences (and similarities) of Distributed Reinforcing vs. Structural Reinforcing as it applies to Concrete Slabs On Grade
- The various methods used for Concrete Slab on Grade design, and construction techniques
- The use of related ACI documents for the design and construction of Concrete Slabs on Grades and Concrete Parking Lot and Drives
- The understanding of design methods for Standard Steel Bar Joists
- An understanding of the design methods for Light Gauge Structural Framing, especially for exterior curtain wall design and construction using steel studs
- The basic principles of Pre-engineered Steel Buildings, including materials and terminology
- Understand the principles of Masonry Construction
- Understand the basic principles of Wood Design and Construction, using principles studied in Statics, Mechanics, and Structural courses
- Additional reinforcing of ethics principles covered in previous courses, and especially as related to ASCE
- The preparation of a quality Resume' and how to prepare for an effective employment interview
- An appreciation for Sustainability in each of the studied areas, and an appreciation for Risk and Uncertainty

Appendix B – Faculty Vitae

Please use the following format for the faculty vitae (2 pages maximum in Times New Roman 12 point type)

1. Name

2. Education – degree, discipline, institution, year

3. Academic experience – institution, rank, title (chair, coordinator, etc. if appropriate), when (ex. 1990-1995), full time or part time

4. Non-academic experience – company or entity, title, brief description of position, when (ex. 1993-1999), full time or part time

5. Certifications or professional registrations

6. Current membership in professional organizations

7. Honors and awards

8. Service activities (within and outside of the institution)

9. Briefly list the most important publications and presentations from the past five years – title, co-authors if any, where published and/or presented, date of publication or presentation

10. Briefly list the most recent professional development activities

J. CHRIS CARROLL, Ph.D., E.I.

EDUCATION

Ph.D. Civil & Environmental Engineering 2009, Virginia Tech, Blacksburg, VA
M.S. Civil & Environmental Engineering 2005, University of Tennessee, Knoxville, Knoxville, TN
B.S. Civil & Environmental Engineering 2003, University of Tennessee, Knoxville, Knoxville, TN

ACADEMIC EXPERIENCE

2009 – Present Assistant Professor, Department of Civil Engineering, UL at Lafayette
2007 – 2009 Instructor, Department of Civil and Environmental Engineering, Virginia Tech
2006 – 2007 Workshop Leader, Department of Engineering Education, Virginia Tech
2004 – 2005 Graduate Teaching Assistant, Engineering Fundamentals, University of Tennessee

PROFESSIONAL REGISTRATION

- Engineer Intern (Tennessee)

CURRENT PROFESSIONAL MEMBERSHIPS

- American Society of Civil Engineers (ASCE), 2002 - present
- American Concrete Institute (ACI), 2006 – present
- American Society for Engineering Education (ASEE), 2007 - present

HONORS AND AWARDS

- ASCE Outstanding Civil Engineering Educator (Acadiana Branch - 2012)
- ASCE Student Chapter Faculty Advisor of the Year (Region 5 - 2012)
- Student Outreach Activity Faculty of the Year (UL Lafayette - 2012)
- UL Lafayette Chi Epsilon/ASCE Student Chapters Favorite Professor (2012)
- UL Lafayette Chi Epsilon/ASCE Student Chapters Favorite Professor (2011)
- ASCE Outstanding Young Government Civil Engineer (Louisiana Section - 2010)
- ASCE Outstanding Young Government Civil Engineer (Acadiana Branch - 2010)
- GT STRUDL Award of Excellence for Presentation (2005)

SERVICE ACTIVITIES

- FACULTY ADVISOR, UL LAFAYETTE ASCE STUDENT CHAPTER (2010-PRESENT)
- MEMBER, ACI COMMITTEE 345, BRIDGE CONSTRUCTION, MAINTENANCE, AND REPAIR (2010-PRESENT)
- MEMBER, ACI COMMITTEE S802, TEACHING METHODS AND EDUCATIONAL MATERIALS (2008-PRESENT)
- ASSOCIATE MEMBER, ACI COMMITTEE 423, PRESTRESSED CONCRETE (2007-PRESENT)
- GEAR UP K-12 ENGINEERING OUTREACH PROGRAM (2010-PRESENT)

PUBLICATIONS

Peer-reviewed Publications

1. Carroll, J. C., Cousins, T. E., Roberts-Wollmann, C. L. (2008). "Top Strand Effect." 2008 PCI National Bridge Conference, Orlando, FL.
2. Carroll, J. C. (2013). "Competition Based Learning in the Classroom." 2013 ASEE Annual Conference, Atlanta, GA.

Invited Lectures

1. Carroll, J. C. (2012), "Sustainability from the Perspective of an Ancient Engineer." Michigan Technological University Graduate Seminar, Houghton, MI.

CONFERENCE PRESENTATIONS

1. Carroll, J. C. (2012), "Engaging Students in STEM." 2012 Louisiana Science Teachers Association and Louisiana Association of Teachers and Mathematics Joint Conference. Shreveport, LA.
2. Carroll, J. C., Sheppard, P., Aucoin, T., Carlson, G., and Lejuene, B. (2012), "Lafayette Parish GEAR UP Program – Powerful Partnerships." Fall 2012 Louisiana GEAR UP Conference, Baton Rouge, LA.
3. Carroll, J. C., Sheppard, P., Aucoin, T., Carlson, G., and Lejuene, B. (2012), "Lafayette Parish GEAR UP Program – Powerful Partnerships." 2012 GEAR UP Conference, Washington, D.C.
4. Carroll, J. C. (2012), "Sustainability from the Perspective of an Ancient Engineer." 2012 Louisiana Joint Engineering Societies Conference, Lafayette, LA.
5. Carroll, J. C. (2012), "Communicating Key Concepts to a Non-technical Audience – Pervious Concrete." ACI Spring 2012 Convention, Dallas, TX.
6. Carroll, J. C. (2011), "University of Louisiana at Lafayette GEAR UP Engineering Program." ACI Spring 2011 Convention, Tampa, FL.
7. Carroll, J. C., (2010), "Finite Element Analysis of Small Scale Roman Pantheon." 2010 GT STRUDL Annual User's Group Meeting, New Orleans, LA.
8. Carroll, J. C., (2010). "Practical Modeling Technique for Transfer Length." 2010 GT STRUDL Annual User's Group Meeting, New Orleans, LA.
9. Carroll, J. C., (2010), "Effective Use of Tablet PC's." ACI Spring 2010 Convention, Chicago, IL.
10. Carroll, J. C., (2010), "Top-strand Effect in Prestressed Concrete." 2010 Louisiana Joint Engineering Societies Conference, Lafayette, LA.
11. Carroll, J. C., (2009), "Prestressed Concrete Design and Analysis." ASCE Acadiana Branch 2009 Fall Technical Seminar, Lafayette, LA.
12. Harris, D. K., Carroll, J. C., (2008). "Evaluation of the Sandwich Plate System in Bridge Decks Using a Plate Approach, a Comparison between ANSYS and GT STRUDL Models." 2008 GT STRUDL Annual Users Group Meeting, Las Vegas, NV.
13. Carroll, J. C., Cousins, T. E., Roberts-Wollmann, C. L. (2007). "Top Strand Effect." ACI Spring 2007 Convention Research in Progress, Atlanta, GA
14. Carroll, J. C. (2005) "Modeling of Unreinforced Construction Joints in Plain Concrete Using GT STRUDL." 2005 GT STRUDL Annual Users Group Meeting, Las Vegas, NV.

E. RAYMOND DESORMEAUX, P.E.

Education

B.S. Civil Engineering, University of Louisiana at Lafayette, 1963

Academic experience

University of Louisiana, Adjunct, 2006- Present, Part-time

Non-academic experience

- E. R. DesOrmeaux, Inc., President, General Contractor, 1972 – Present
- LeTriomphe Golf & Country Club, Chief Operating Officer, 1987-1990
- SSI, Inc., Executive Vice President, 1969-1972
- Domingue, Szabo & Associates, Chief Field Engineer, Consulting Engineers, 1963-1969
- City of Lafayette
    - Special consultant to the Mayor and City Council Office – selected work assignments and related construction and engineering issues. 1985 - 1992
    - Responsible for managing the remaining engineering and construction needs for the opening of the Cajun Dome in 1985
    - Feasibility studies – Lafayette Consolidated Government. 2004
- Performed selected consultative work for a State Banking Group – selected assignments
- Consulting for Developers, Architects, Engineers, Attorneys,
- Corporate entities and Individual Investors – selected assignments
- Forensic investigations related to construction issues – selected assignments
- Developer Projects - Principal or Partner
    - 148 lot residential subdivision
    - Commercial office park – 3 buildings - approximately 100,000 sq.ft.
    - Town home development
    - Golf Course & Residential Community
    - Shopping Center
    - Climate Control Mini-Storage

Professional registration:

Louisiana Professional Engineer No. E-9332
Louisiana Registered Land Surveyor No. L-1224 Non Active

Membership in professional organizations

- American Society of Civil Engineers Member 1963 – current
    i. Fellow – 1986
    ii. Life Member - 2003

iii. Louisiana Section President 2007-08
iv. President Elect – 2006
v. Vice-President – 2005-06
vi. Sec/Treas. – 2005
vii. Region 5 – ASCE Governor - Region 5 (LA, Miss., Ala., GA., Fla.)

- National Society of Professional Engineers 1966 - current
- Louisiana Engineering Society 1964 – current
- Lafayette Chapter President - LES 1973
- American Concrete Institute 1978 – current
- Tau Beta PI (Engineering Honor society)
- Chi Epsilon (Civil Engineering Honor Society)

Honors and awards

- University of Louisiana – Lafayette Distinguished Alumni Award 1977
- Outstanding Catholic Student Award 1962
- Louisiana Engineering Society LA Young Engineer of the Year Award 1974
- American Society of Civil Engineers LA Section
- Louisiana Civil Engineering "Wall of Fame" 2012, LA Section
- Outstanding Civil Engineer of the Year 2010, Region 5
- "Practitioner Advisor of the Year" 2007
- LA Section President's Medal 2005 & 2006
- Student Presentation Award 1st place 1961, Regional Meeting– Houston, TX.
- Junior Achievement of New Orleans Junior Achiever of the Year 1957

Service activities

1. Boys & Girls Club of Acadiana Former Board Member 1990 -2002
2. Univ. of Louisiana – Lafayette Foundation Board Member 1989 -1994
3. Greater Lafayette Chamber of Commerce Board Member 1980
4. Lafayette Economic Development Authority Board Member 1989 -1992
5. St. Pius X Church Trustee 1968 -1972
6. Lafayette Toastmaster's Club Past President 1975
7. Acadiana Arts Council Past President 1983
8. Mardi Gras Krewe of Troubadours Past "King" 1984
9. Ducks Unlimited Former Area Chairman; Life Member

Publications and presentations

E. R. DesOrmeaux, "Connecting the Issues" Louisiana Civil Engineering Journal, Vol. 4, No.3 1996

E. R. DesOrmeaux , "Practical Considerations for Concrete Slabs-on-Grade," Louisiana Civil Engineering Journal, Vol. 14, No.1 2005

MATTHEW FLOYD FADDEN, Ph.D., E.I.

EDUCATION

Ph.D. Civil Engineering 2013, University of Michigan, Ann Arbor, MI
M.S.E. Civil Engineering 2008, University of Michigan, Ann Arbor, MI
B.S. Civil Engineering 2007, University of Illinois, Urbana, IL

ACADEMIC EXPERIENCE

2013 – Present Assistant Professor, Dept. of Civil Engineering, University of Louisiana at Lafayette

NON-ACADEMIC EXPERIENCE

2007 – Structural Engineering Intern, American Institute of Steel Construction, Chicago, IL
2006 – Structural Engineering Intern, KJWW Engineering Consultants, Rock Island, IL
2005 – Construction Engineering Intern, Centennial Contractors, Leesburg, VA

PROFESSIONAL REGISTRATION

- Registered Professional Engineer Intern (Illinois) License No. 061033102

CURRENT PROFESSIONAL MEMBERSHIPS

- American Society of Civil Engineers (2009-Present)
- American Institute of Steel Construction (2006-Present)
- American Concrete Institute (2006-Present)
- Precast Concrete Institute (2010-Present)
- Earthquake Engineering Research Institute (2008-Present)

HONORS AND AWARDS

- 2007 University of Michigan Civil Engineering Graduate Fellowship

SERVICE ACTIVITIES

- **CO-ADVISOR, AMERICAN SOCIETY OF CIVIL ENGINEERS STUDENT CHAPTER (FALL 2013)**

PUBLICATIONS

Peer-reviewed Publications

1. Fadden, M. and McCormick, J. (2013). "Design and Behavior of Welded HSS-to-HSS Moment Connections for Seismic Applications." (Drafted).
2. Fadden, M. and McCormick, J. (2013). "Finite Element Model of the Cyclic Bending Behavior of Hollow Structural Section Beam Members." (Submitted to ASCE Journal of Structural Engineering).
3. Fadden, M. and McCormick, J. (2012). "Cyclic quasi-static testing of hollow structural section beam members." ASCE Journal of Structural Engineering. 138:5, 561-570.

Conference Proceedings

1. Fadden, M. and McCormick, J. (2013) "Evaluation of HSS-to-HSS Moment Connections for Seismic Applications." ASCE Structures Congress
2. Fadden, M. and McCormick, J. (2012). "Finite Element Modeling of HSS-to-HSS Moment Connections" 15 WCEE, September 24-28, 2012, Lisbon, Portugal.
3. Fadden, M. and McCormick, J. (2012) "Parametric Finite Element Analysis of the Cyclic Flexural Behavior of Hollow Structural Sections." ISTS 2012.
4. Fadden, M. and McCormick, J. (2012). "Effect of Width-Thickness and Depth-Thickness on the Cyclic Flexural Buckling Behavior of Hollow Structural Sections" Annual Stability Conference of the Structural Stability Research Council.
5. Fadden, M. and McCormick, J. (2012) "Finite Element Model of the Cyclic Flexural Behavior of Hollow Structural Sections." STESSA 2012.

6. Saftner, D.A., Green, R.A., Hryciw, R.D., Fadden, M.F., and DaCosta, A. (2011). "Characterizing spatial variability of cone penetration testing through geostatistical evaluation." Georisk 2011, June 26-28, 2011, Atlanta, GA.
7. McCormick, J., Fadden, M., and Buison, J. (2010). "Cyclic testing of hollow structural sections for seismic applications in low to mid-rise moment frames." ISTS 2010.
8. Fadden, M. and McCormick, J. (2010). "Evaluation of the bending behavior of hollow structural section (HSS) members for seismic applications." 9NCEE and 10CCEE , July 25-29, 2010, Toronto, ON.
9. Fadden, M. and McCormick, J. (2010). "Large-Scale Testing of Hollow Structural Sections for Seismic Applications." ASCE Structures Congress/NASCC.
10. Fadden, M. and Rajek, J., (2008). "Keeping up with the AISC Spec" Modern Steel Construction. June: 19.
11. Winters-Downey, E. and Fadden, M. (2008). "Simple shear connection limit states." Modern Steel Construction. February: 43-48.
12. Fadden, M. and Rajek, J., (2007). "There's a flagpole spec?" Modern Steel Construction. July: 53-54.

Presentations

1. National Institute of Standards and Technology (2012, Invited Lecture) – Application of Hollow Structural Sections (HSS) toward Innovative Earthquake Resistant Design
2. University of Oklahoma (2012, Invited Lecture) – Application of Hollow Structural Sections (HSS) toward Innovative Earthquake Resistant Design
3. University of Louisiana at Lafayette (2012, Invited Lecture) – Application of Hollow Structural Sections (HSS) toward Innovative Earthquake Resistant Design
4. American Institute of Steel Construction Research Committee Meeting (2011, Co-Presenter) – Seismic Applications of Hollow Structural Sections in Moment Resisting Frames
5. University of Michigan CEE Technical Symposium (2011) – Experimental Testing and Finite Element Modeling of Hollow Structural Section Beam Members
6. 9th U.S. National and 10th Canadian Conference on Earthquake Engineering (2010) – Evaluation of the Bending Behavior of Hollow Structural Section (HSS) Members for Seismic Applications
7. University of Michigan CEE Technical Symposium (2008) – Environmental Scanning Electron Microscopy (ESEM) of the Self-Healing Phenomenon in Engineered Cementitious Composites (ECC)
8. ASCE Structures Congress 2010/North America Steel Construction Conference (2010, Poster) – Large Scale Testing of Hollow Structural Sections for Seismic Applications
9. Earthquake Engineering Research Institute Annual Meeting (2010, Poster) – Cyclic Testing of Hollow Structural Sections in Bending
10. University of Michigan Engineering Graduate Symposium (2009, Poster) – Consideration of the Plastic Hinge Behavior in Hollow Structural Section Beam Members for Seismic Structural Applications'

Professional Development

1. ASCE ExCEEd Teaching Workshop (July 2013) Ft. Meyers, FL

JASMINE GALJOUR, P.E.

EDUCATION

B.S. Civil Engineering University of Louisiana at Lafayette 2006

M.S. Environmental Engineering University of Texas at Austin 2008

PhD Systems Engineering University of Louisiana at Lafayette (In Progress)

EMPLOYMENT

University of Louisiana at Lafayette, Instructor 2008-present

Huval and Associates, Civil Engineering Consultant
Structural design and evaluation, geotechnical design, bridge design
2012-present (Part time)

Registered Professional Engineer in the State of Louisiana #36754

PROFESSIONAL SOCIETIES

ASCE, ASEE, Tau Beta Pi, Chi Epsilon

AWARDS

Louisiana Engineering Foundation Faculty Professionalism Award 2013

SERVICE

Science Olympiad,
Volunteer Instructor for FE Review Courses

DANIEL DIANCHEN GANG, Ph.D., P.E.

EDUCATION

Ph.D. Civil & Environmental Engineering 2001, University of Missouri, Columbia, MO

M.S. **Civil & Environmental Engineering 1999, University of Missouri, Columbia, MO**

M.S. Fine Chemical Engineering 1988, Huazhong University of Science and Technology (HUST), Wuhan, China.

B.S. Chemistry & Chemical Engineering 1985, Henan University, Kaifeng, China

ACADEMIC EXPERIENCE

2012 – Present Professor, Dept. of Civil Engineering, UL at Lafayette
2007 – 2012 Associate Professor, Dept. of Civil Engineering, UL at Lafayette
2003 – 2007 Assistant, Associate Professor (with tenure), Dept. of Civil Engineering, West Virginia University Institute of Technology, Montgomery, WV
2001 – 2003 Research Assistant Professor, Civil and Environmental Engineering Department, University of Missouri, Columbia, Missouri
1997 – 2001 Graduate Research Assistant, Civil and Environmental Engineering Department, University of Missouri, Columbia, Missouri
1988 – 1997 Assistant Professor, Instructor, Associate Professor, Wuhan Institute of Technology (WIT), Wuhan, P. R. China

PROFESSIONAL REGISTRATION

- Registered Professional Engineer (Missouri) NO: PE-2003001035
- Registered Professional Engineer (West Virginia) NO: 16091

CURRENT PROFESSIONAL MEMBERSHIPS

- Association of Environmental Engineering Professors (AEESP), 2005 - present
- Water Environment Federation (WEF), 2010 - present
- American Water Works Association (AWWA), 2000 – present
- American Society of Civil Engineers (ASCE), 2001 – present
- American Chemical Society (ACS), 2003 – present

HONORS AND AWARDS

- 2011– present Phillip J. Burguieres/BORSF Endowed Professorship
- 2007 – present SLEMCO/BORSF Endowed Professorship

SERVICE ACTIVITIES

- **CHAIR, CIVIL ENGINEERING DEPARTMENT GRADUATE COMMITTEE (2011-2014)**
- **MEMBER, WATER ENVIRONMENT FEDERATION (WEF), LITERATURE REVIEW COMMITTEE (2004-2014)**
- **MEMBER, FACULTY SENATE (2010-2012), FACULTY GRIEVANCE COMMITTEE (2010-2012)**
- **MEMBER, UL LAFAYETTE-WIT COOPERATION AD-HOC COMMITTEE (2010-2014)**

PUBLICATIONS

1. Yan, D.; **Gang, D**; Zhang, N.; and Lin, L.-S. **(2013)** "Adsorptive Selenite Removal Using Iron-Coated GAC: Modeling Selenite Breakthrough with the Pore Surface Diffusion Model." ***ASCE Journal of Environmental Engineering***, 139(2), 213-219
2. Deng, Z.-Q., Sun, S., and **Gang, D. (2012)** "Modeling Nitrate-nitrogen Removal Process in First Flush Reactor for Stormwater Treatment." ***Bioprocess and Biosystems Engineering (Springer)***, 35, 865-874
3. Nie, Jing; **Gang, D.;** Benson, B.; and Zappi, M. **(2012)** "Non-point Source Pollution." ***Water Environment Research (WEF)***, 84(10), 1642-1657.
4. Yan, D.; **Gang, D**; Zhang, N.; and Lin, L.-S. **(2011)** "Iron Oxide Coated GAC Adsorbents: Diffusion Controlled Sorption of Selenite." ***Industrial & Engineering Chemistry Research (ACS)***, 50(4), 2214-2219
5. Tong, Y.; Deng, Z.-Q.; and **Gang D. (2011)** "Non-point Source Pollution." ***Water Environment Research (WEF)***, 83(10), 1683-1703.
6. **Gang, D**.; and Lin, L.-S. **(2010)** "As(III) Removal Using an Iron-Impregnated Chitosan Sorbent." ***Journal of Hazardous Materials (Elsevier Science)***, 182(1-3), 156-161
7. Zhang, N.; **Gang, D**. **(2010)** "Adsorptive Removal of Ppm-Level Selenate Using Iron-Coated GAC Adsorbents." ***Journal of Environmental Engineering (ASCE)***, 136(10), 1089-1095.
8. Sun, S.; Deng, Z.-Q.; and **Gang D. (2010)** "Non-point Source Pollution." ***Water Environment Research***, 82(10), 1875-1894.
9. Zhu, J.; Deng, B.; and **Gang, D. (2009)** "Modifying activated carbon with hybrid ligands for enhancing aqueous mercury removal." ***Carbon (Elsevier)***, 47(8), 2014-2025
10. Lin, L.; Deng, Z.-Q.; and **Gang D. (2009)** "Non-point Source Pollution: review." ***Water Environment Research (WEF)***, 81(10), 1996-2018.
11. Zhang, N.; Lin, L.; and **Gang, D. (2008)** "Adsorptive Selenite Removal from Water Using Iron-Coated GAC Adsorbents." ***Water Research (Elsevier)***, 42 (14), 3809-3816

Conference Proceedings

12. Ruixuan, Guo; and **Gang, D. (2012)**. "Synthesis and Modification of Ordered Mesoporous Carbons for Resorcinol Removal." Proceedings of the 42nd International Conference on Environmental Systems, AIAA 2012. July 15–19, San Diego, California
13. Ruixuan Guo; and **Gang, D**. **(2012)**. "Synthesis and Surface Modification of Ordered Mesoporous Carbons for Resorcinol Removal." Proceedings of the Sixth International Conference on Environmental Science and Technology. June 25-29, Houston, TX
14. Ruixuan, Guo, Lu Lin, Victoria Hover, and **Gang, D. (2011)**. "Development and Evaluation of OMCs for Resorcinol Removal*." Proceedings of the 41st International Conference on Environmental Systems*, July 17–21, Portland, Oregon

EMAD HABIB, Ph.D., P.E.

EDUCATION

2001 Ph.D. in Civil Engineering (Hydrology and Water Resources), Department of Civil & Environmental Engineering, the University of Iowa, USA.

1996 M.Sc. in Civil Engineering, Department of Civil Engineering (Irrigation and Hydraulics), Ain Shams University, Cairo, Egypt.

1992 M.Sc. in Irrigation Engineering, Mediterranean Institute of Bari and Water Engineering Department, Polytechnic of Bari, Italy.

1987 B.Sc. in Civil Engineering, Cairo University, Egypt.

ACADEMIC EXPERIENCE

2003-Present Professor, Associate, Assistant, Department of Civil Engineering, University of Louisiana at Lafayette, Lafayette, Louisiana, USA.

2010- Present Associate Director, Consortium for Computation and Visualization Enterprise University of Louisiana at Lafayette

2001-2003 Assistant professor, Civil and Environmental Engineering, Tennessee Technological University, Cookeville, Tennessee, USA.

1997-2001 Graduate Research Assistant, Ph.D. Candidate, Iowa Institute of Hydraulic Research, Department of Civil Engineering, the University of Iowa, USA.

PROFESSIONAL REGISTRATION

- Professional Engineer in state of Louisiana
- Professional Engineer in state of Texas

CURRENT PROFESSIONAL MEMBERSHIPS

- American Geophysical Union (AGU)
- American Society of Civil Engineers (ASCE)
- American Meteorological Society (AMS)
- International Association of Hydrological Sciences (IAHS)

HONORS AND AWARDS

2013 Certificate of Achievement in Research & Sponsored Activities, presented by the President of the University of Louisiana at Lafayette

2011 Researcher of the Year, College of Engineering, University of Louisiana at Lafayette

2011 Best Paper Award, Journal of Hydrologic Engineering, Environmental Water Resources Institute-American Society of Civil Engineering (EWRI-ASCE).

2010 Engineering Faculty Professionalism Award; Louisiana Engineering Foundation

2009 The ASCE-EWRI Watershed Council Excellence Award for the Task Committee on the Use and Application of Radar Rainfall Data

2009 Endowed Professorship – BORSF Professorship in Water Studies

2007 Outstanding Advisor Award, the University of Louisiana at Lafayette.

2005 Team Achievement, by the US Army Corps of Engineers and the State of Louisiana in recognition of contributions associated with completion of the Louisiana Coastal Area (LCA), Louisiana Ecosystem Restoration Study.

2005 Endowed Professorship – Matthew G. Stuller BORSF Professorship in Engineering

SERVICE ACTIVITIES

- Chair, Promotion and Tenure Peer Review Committee, College of Engineering, UL Lafayette
- Chair, Graduate Faculty Peer Review Committee, College of Engineering, UL Lafayette

- Chair, Under-graduate Curriculum & ABET Committee, Civil Eng. Dept., UL Lafayette.
- Advisor of the American Society of Civil Engineers (ASCE) Student Chapter
- Panelist on the UL LAFAYETTE Office of Sponsored Research workshop on BOR Support Funds
- Committee Member, University committee to survey and make recommendations on LITE facilities and service to campus needs
- Committee Member, Search Committee for the Professor and Head of the Department of Civil Engineering, UL-Lafayette

RECENT PEER-REVIEWED PUBLICATIONS

1. **Habib** E., and D. Reed (2013): "Uncertainty Analysis for the Predictive Modules in Louisiana's 2012 Coastal Master Plan"; Special Issue in *Journal of Coastal Research* (accepted)
2. **Habib**, E., Qin*, L., Seo D J, Ciach, G., and B. R. Nelson (2013): Independent Assessment of Incremental Complexity in the NWS Multi-sensor Precipitation Estimator Algorithms. *ASCE Journal of Hydrologic Engineering*, 18:143-155.
3. **Habib**, E., Haile* A. T., Tian, Y., and R. Joyce (2012): Evaluation of the High-Resolution CMORPH Satellite-Rainfall Product Using Dense Rain Gauge Observations and Radar-Based Estimates, *Journal of Hydrometeorology*, 13(6), 1784-1798, doi: 10.1175/JHM-D-10-017.1.
4. Haile* A.T., E. **Habib**, T. Rientjes (2012): Evaluation of the CMORPH rainfall product on hourly time scales over the source of the Blue Nile. *Hydrological Processes* doi: 10.1002/hyp.9330.
5. **Habib** E., Elsaadani*, M. and Haile* A. (2012): Climatology-focused Evaluation of CMORPH and TMPA Satellite Rainfall Products over the Nile Basin. *Journal of Applied Meteorology and Climatology*, 51, 2105–2121.
6. Amitai, A., Unkrich, C. L., Goodrich D. C., **Habib**, E., and Thill, B. (2012): Assessing Satellite-based Rainfall Estimates in Semi-Arid Watersheds using the USDA-ARS Walnut Gulch Network and TRMM-PR, *Journal of Hydrometeorology*, **13**, 1579–1588.
7. **Habib**, E., Ma, Y., Williams, D., Sharif, H. O., and Hossain, F.: HydroViz: design and evaluation of a Web-based tool for improving hydrology education, Hydrol. Earth Syst. Sci., 16, 3767-3781, doi:10.5194/hess-16-3767-2012, 2012.
8. **Habib**, E and Qin* L. (2012): Application of a Radar-Rainfall Uncertainty Model to the US NWS Multi-sensor Precipitation Estimator Products. *Journal of Meteorological Applications*, Royal Meteorological Society, doi: 10.1002/met.301.
9. A. AghaKouchak*, N. Nakhjiri, and E. **Habib** (2012): An educational model for ensemble streamflow simulation and uncertainty analysis. *Hydrology and Earth System Sciences*, in press.
10. Borst C. W., J-P Tiesel, E **Habib**, and K Das (2011): "Single-pass Composable 3D Lens Rendering and Spatiotemporal 3D Lenses", *IEEE Transactions on Visualization and Computer Graphics*, vol. 17 no. 9, pp. 1259-1272.
11. Sun X., Hu H. , **Habib** E and D. Magri (2011) 'Quantifying Crash Risk under Inclement Weather with Radar Rainfall Data and Matched-Pair Method', *Journal of Transportation Safety & Security*, 3: 1, 1 — 14
12. T. H. M. Rientjes, A. T. Haile*, C. M. M. Mannaerts, E. Kebede, and E. **Habib** (2011): Changes in land cover and stream flows in Gilgel Abbay catchment, Upper Blue Nile basin – Ethiopia, *Journal of Hydrology and Earth System Sciences*, 15, 1979–1989, 2011 doi:10.5194/hess-15-1979-2011.

RUSSELL CHARLES HIBBELER

Educational Background:

B.S., Civil Engineering, University of Illinois, Urbana, Illinois, 9/61-6/65
M.S., Nuclear Engineering, University of Illinois, Urbana, Illinois, 9/65-8/66
Ph.D., Theoretical and Applied Mechanics, Northwestern University, Evanston, Illinois, 9/66-8/68

Academic Experience:

8/77 - Professor of Civil Engineering, University of Louisiana, Lafayette, Louisiana.
9/74-8/77 Union College, Department of Civil Engineering.
9/68-6/71 Youngstown State University, Department of Civil Engineering, Youngstown, Ohio. Assistant Professor.

Industrial Experience:

6/65-9/65 - Civil Engineer, Department of Engineering, City of Chicago. Work included design of highway curves and calculations for road gradients.
6/67-9/67 - Research Engineer for Chicago Bridge and Iron Company, Plainfield, Illinois. Work included the design of water towers, off-shore structures, and experimental equipment for a cylindrical shell buckling test.
9/67-6/68 - Research Engineer, Argonne National Laboratory, Metallurgy Division (support from NASA-AEC); worked on Ph.D. thesis – "Creep Ratchetting of Nuclear Reactor Fuel Elements."
9/68-6/71 - Consulting (part-time), Pennsylvania Engineering Corporation and Truscon Engineering Company.
6/72-6/73 Research Engineer = Argonne National Laboratory in the Reactor Analysis and Safety Division (NSF-AEC Postdoctoral Fellowship). Worked on various engineering mechanics problems elated to reactor safety and analysis and reviewed existing design procedures.
1/72-7/74 Staff Consultant, Sargent and Lundy Engineers, Structural Analysis Division. Wrote design reports for coalbunker and chimney analysis. Also solved earthquake related problems of pipelines and structures used in the nuclear power industry.

Professional Societies:

Registered Professional Engineer – Louisiana.
American Society of Mechanical Engineers
American Society for Engineering Education
American Society of Civil Engineers
Textbook Authors Association

Awards:

Honors Day Distinction, University of Illinois, March 1963.
Teaching Assistantship, University of Illinois, 9/65-8/66.
NASA Fellowship, Northwestern University, 9/66-8/68.
Tau Beta Pi, Sigma Xi, Honorary Fraternities.
Reviewer for Applied Mechanics Reviews,
AMOCO Teaching Award, University of Louisiana, May 1979,
University of Louisiana-Distinguish Teacher 2010,
Teaching Awards - ASCE & Louisiana Professional Engineering Society
"American Men of Science", "Who's Who in Engineering", "Who's Who in Technology Today", and "Who's Who in the East".

University of Louisiana Education related Activities:

Member of Student Evaluation of Instruction Committee
On the Board of Directors of St. Charles College, Grand Couteau, LA.

Textbooks:

The Engineering Handbook, First Chapter. 3rd Edition. CRC Press, 2005
Engineering Mechanics: Statics (with solutions manual) 13th Edition, R. C. Hibbeler, Pearson Education, 2009. (Translated in multiple languages.)
Engineering Mechanics: Dynamics (with solutions manual) 13th Edition, R. C. Hibbeler, Pearson Education, 2009. (Translated in multiple languages.)
Mechanics of Materials (with solutions manual) 8th Edition, R. C. Hibbeler, Pearson Education, 2007. (Translated in multiple languages.)
Structural Analysis (with solutions manual) 8h Edition, R. C. Hibbeler, Pearson Education, 2008.(Translated in multiple languages.)
Fluid Mechanics (with solutions manual), R.C. Hibbeler, Pearson Education, To be published 2013.

MOHAMMAD JAMAL KHATTAK, Ph.D., P.E.

Education

Ph.D. in Civil Engineering Michigan State University, Dec 1999
M.S. in Civil Engineering, Michigan State University, 1995
B.S. in Civil Engineering, NWFP University of Engineering & Technology, Pakistan, 1992

Academic Experience

University of Louisiana at Lafayette, Associate Professor of Civil Engineering, 2006-till date
University of Louisiana at Lafayette, Assistant Professor of Civil Engineering, 2000-06
Michigan State University, Research Assistant,
August 1995 to August 1998
June 1997 to June 1999

Non Academic Experience

Assistant Design Engineer, January 1994 to August 1994
Public Health Engineering Department, Peshawar, Pakistan
Assistant Design Engineer, July 1993 to December 1993
Water and Power Development Authority, Peshawar, Pakistan
Engineer in Training, September 1992 to June 1993
BAK Consulting Engineers, Terbella, Pakistan

Certifications or Professional Registerations

Registered: Louisiana since 2004, Pakistan Engineer Council (PEC), 1992
Certification: Engineering Intern/Fundamentals of Engineering (EIT/FE),1998

Current membership in professional organizations

American Society of Civil Engineers (ASCE)
International Society of Soil Mechanics and Geotechnical Engineering
Chi Epsilon Honor Society for engineers

Honors and awards

Best Paper Award- ICCOEE2012 Conference, Malaysia, 2012
Professionalism Award- Louisiana Engineering Society, 2007
Endowed Professorship -McDermott International BORSF in Engineering, 2004
Mentor- Ronald E. McNair Program, 2003-7
ASCE-Obligation of an Engineer Certificate
Outstanding Graduate Student of Civil Engineering for 1998-99, Michigan State University

Service activities

Safety coordinator - Department of Civil Engineering, Advisor Chi Epsilon Honor Society, President ASCE Acadiana Branch

Principal publications of last five years

- Khattak, M. J., Landry, C., Veazey, J., and Zhang, Z. Rigid and Composite Pavement Index-based Performance Models for Network Pavement Management System in the State of Louisiana. *International Journal of Pavement Engineering*, Paper No: GPAV-2010-0079.R1, 2012. (In press)
- Khattak, M. J., Khattab, A., Rizvi, H.R., and Zhang, P. The Impact of Carbon Nano-fiber Modification on Asphalt Binder Rheology. *International Journal of Construction & Building Materials*, Vol. 30 pp. 257–264, 2012.
- Khattab, A., Khattak, M. J., and Fadhil, I. Micro-Mechanical Discrete Element Modeling of Fiber Reinforced Polymer Composites. *Journal of Polymer Composites*. Vol. 32, Issue 10, pages 1532-1540, October 2011.
- Khattak, M. J., Mohammad, L., Yuan, F., and Abadie, C. Variability of in-situ HMA volumetric and mechanistic characteristics using non-destructive test: case study, *International Journal of Pavement Engineering*, Article No. DOI: 10.1080/10298436.2011.597858, July, 2011.
- Khattak, M. J., and Roussel, C. Micromechanical Modeling of Hot-Mix Asphalt Mixtures by Imaging and Discrete Element Methods. *Journal of the Transportation Research Board*, Transportation Research Board of the National Academies, Vol. 2127, 2009.
- Khattak, M. J., Kyatham, V. Visco-elastic modeling of lime-modified asphalt matrix and hot mix asphalt under moisture damage. *Journal of Transportation Research Board*, No. 2057. National Research Council, Washington D.C., January 2008.
- Khattak, M. J., Baladi, G.Y., Zhang, Z., and Ismail, S. A Review of the Pavement Management of the State of Louisiana, Phase-I. *Journal of Transportation Research Board*, No. 2084. National Research Council, Washington D.C., January 2008.
- Khattak, M. J., and Baladi G. Y. Low Temperature Binder Aggregate Adhesion and Mechanistic Characteristics of Modified Asphalt Mixture. *Journal of Material Engineering, American Society of Civil Engineering (ASCE)*, Vol. 19, No. 5, 2007.
- Louay Mohammad, Shadi Saadeh, Zhang Chenggang, Sam Cooper, Chris Abadie, Mohammad Jamal Khattak. Comparative Study of the Mechanical Properties of HMA Mixture: "Field Vs Laboratory." *Journal of Association of Asphalt Pavement Technologist (AAPT)*, Vol. 76, 2007.
- Khattak, M. J., Khattab, A., Rizvi, H. R., and Pesacreta, T.C. Effect of Carbon Nanofiber Modification on the Mechanistic Properties of HMA Mixtures. Proceedings of International Conference on Civil, Offshore and Environmental Engineering (ICCOEE), Kualalumpur, Malaysia, June 12-14, 2012.
- Khattak, M. J., and Khattab, A. Micro-Mechanical Modeling of PCC mixtures. Proceedings of International Conference of Civil, offshore and Environmental Engineering. Kuala Lumpur, June 12-14, 2012.
- Khattab, A., Zhang, P., Khattak, M. J. Process Development and Characterization of Carbon Nanofibers Sprayed Carbon Fiber reinforced polymer Composites. Proceedings of SAMPE Technical Conference, Long Beach, CA, May 23-26, 2011.
- Khattak, M. J., Khattab, A., and Rizvi, H.R. Mechanistic Characteristics of Asphalt Binder and Asphalt Matrix Modified with Nano-fibers. Proceedings of the Geo-Frontiers Conference, Geotechnical Special Publication No. 211 Advances in Geotechnical Engineering, pp 4812-4822, March, 13 2011, Dallas, Texas.

ALLISON J. P. "Sonny" LAUNEY, P.E.

EDUCATION

MS, Civil Engineering, UL Lafayette, 1969
BSCE, Civil Engineering, UL Lafayette, 1967

ACADEMIC EXPERIENCE

Adjunct Professor, since 2006

NON-ACADEMIC EXPERIENCE

USAF, Captain, Engineering Operations/Research/Intelligence (1969 – 1974)
Freeport-McMoRan, Director, Engineering Design, Mining and Marine Operations (1974-2006)
Denson Engineers, Inc., Forensic and Civil Engineering (1996 –Present)

PROFESSIONAL REGISTRATION

PE in Louisiana (1974) and Texas (2001)

CURRENT MEMBERSHIPS IN PROFESSIONAL ORGANIZATIONS

ASCE – Life Member;
NSPE,
AISC

HONORS AND AWARDS

Phi Kappa Phi (1968)
Chi Epsilon,
NCEES Distinguished Service Award

SERVICE ACTIVITIES (within and outside of the institution)

Member, NCEES (member - Structural Exam committee since 1995 and chair/member of numerous NCEES committees and task forces), Emeritus Member – Louisiana Professional Engineering and Land Surveying Board, Past President of the UL Lafayette Alumni Association, member of UL Lafayette Diversity Committee, Member of development committee of the Catholic Student Center of UL Lafayette

PUBLICATIONS – None

PROFESSIONAL DEVELOPMENT ACTIVITIES

AISC webinars
ASCE/LES joint conferences (twice a year)
Frequent speaker on Ethics/Licensing/Rules for Professional Conduct
NCEES Structural Engineering Licensing Exam Committee
Chair of the NCEES Industrial Exemption Task Force (2012-13)
Member of the NCEES Engineering Policy and Procedures Committee (2012-13)

KENNETH L. MCMANIS

Degrees with fields, institution, and date

Ph.D., Civil Engineering, Louisiana State University, 1975
M.S., Civil Engineering, Louisiana State University, 1966
B.S., Civil Engineering, University of Louisiana at Lafayette, 1963

Academic Experience

Contractors Educational Trust Fund Professorship at UNO, 1994-2004
Professor of Civil Engineering, University of New Orleans, 1989-2004
Associate Professor of Civil Engineering, UNO, 1978-1989
Chairman, Department of Civil & Environmental Engineering, 1978-2004
Director, Schlieder Urban Environmental Systems Center , UNO, 1990-2004
Director, Maritime Environmental Resources Information Center, Gulf Coast Region Maritime Technology Center, UNO, 1995-2003
Delgado Community College, 1968-1979
Dean, Engineering & Industrial Technology Division, Delgado, 1974-1979
Prof & Chair, Arch. & Civil Engineering Technology, Delgado Comm. College
Professor, Assoc./Assist. Professor, Delgado Arch. & Civil Eng'r Technology,
Research Associate/Assistant, Division of Engineering Research, Louisiana State University, 1971-1974

Non-academic experiences

Consultant, Soil Test Engineers, Inc., Baton Rouge, LA., 2004-2006
Systems & Programming Section, NOD Corps of Engineers, 1981-1984
Design Civil Engineer: 1) Fromherz Engineers, Inc.. New Orleans, 1968
2) Waldemar S. Nelson, Engineers & Architects, Inc., New Orleans, LA, 1966-1968
Production Engineer, Mobil Oil Co., Morgan City, LA, 1963-1964

Professional registration:

Professional Engineer (Louisiana) No.9508
Professional Land Surveyor (Louisiana) No. 2613 (inactive)

Scientific and professional societies of which a member

ASCE, Louisiana Engineering Society, NCEES

Honors and awards

LSU Civil Engineering Hall of Distinction (2006),
UNO Distinguished Service Award (2004),
UNO Emeritus Professor & Chair (2004),
Contractors' Trust Fund Professorship (1994&2004),
LEF Professionalism Award (1992, 2011),
Chi Epsilon,
Sigma Chi,
Phi Kappa Phi

Institutional and professional service in the last five years

Education Committee, Louisiana Professional Engineers & Land Surveyors Board
Department Head, university/college committees/task groups –UL Lafayette
University, College and Department Committees – UL at Lafayette

Principal publications of last five years:

Kenneth McManis, "How the Civil Engineering BOK2 Can Be Implemented at the University of Louisiana," 2010 Annual Conference & Exposition. American Society for Engineering Education, Louisville, Kentucky, June 2010 (21 pages)

Kenneth Fridley, Kevin Hall, Debra Larson, Kevin Sutterer, James Alleman, Kenneth McManis**,** Jean-Pierre Bardet, Brett Gunnink, George List, Roger Smith, Thomas Lenox, "Educating the Future Civil Engineer for the New Civil Engineering Body of Knowledge," 2009 Annual Conference & Exposition, American Society for Engineering Education, Austin, Texas, 2009 (19 pages)

Ranjan Satyamurthy; Mysore S. Nataraj; Kenneth L McManis; Gordon P Boutwell; "Investigations of Pile Foundations in Brownfield," ASCE Journal of Geotechnical and Geoenvironmental Engineering, October 2008, pp 1469-1475.

Bhaskar Kura, Kenneth L. McManis, Kurt Wilson, Amitdyute Sengupta, and Mairice Falk, "Waste Management after Katrina: Technical, Economical and Managerial Issues in New Orleans and the Gulf Coast," AWMA 99th Annual Conference & Exhibition, Air Waste Management Association, New Orleans, LA, June 20-23, 2006, 13 pages

Ricardo C. de Abreu , Kenneth L. McManis , and Gordon P. Boutwell, "A New Model for Immediate Settlement Predictions in Landfills, " International Conference for Soil Mechanics and Geotechnical Engineering, Osaka, Japan, Sept. 12-16, 2005, pp 2233 -2236.

M.S. Nataraj, G.P. Boutwell, and K.L. McManis, "Selected Cases in Slope Stability," GEOPRACTICE – 2005, National Conference on Case Studies in Geotechnical Engineering, July 25-26, 2005. Interline Publishing, Bangalore, India, pp 25-34

Gordon P. Boutwell, Kenneth L. McManis, Mysore S. Nataraj, and Ranjan Satyamurthy, "Installation of Driven Piles in Brownfield Sites," 2005 PDCA Winter Roundtable, Pile Driving Contractors Association, Charleston, S.C., February 19, 2005.

Ricardo C. de Abreu, Ph.D., Enrique J. La Motta, Ph.D., Kenneth L. McManis, "Facultative Landfill Bioreactors (FLB): Results of a Pilot-Scale Study," Proceedings of the Geo-Frontier Conference, ASCE Geo-Institute, January 10-12, 2005

Professional development activities in the last five years

LAPELS Education Sub-Committee
NCEES Annual Regional & National Meetings
ASCE/LES State Conferences / University Training Sessions

XIAODUAN SUN

Academic Rank: Professor

Degree with fields, institution, and date

Ph.D. The Ohio State University, Civil Engineering Department, 1994
M.S. Xian Highway Transportation University, Civil Engineering, China, 1985
B.S. Xian Highway Transportation University, Civil Engineering, China, 1982

Academic experience – institution, rank, title

Civil Engineering Department, University of Louisiana at Lafayette, Interim Department Head: 2005-2006
Civil Engineering Department, University of Louisiana at Lafayette, Professor: 2006-present
Civil Engineering Department, University of Louisiana at Lafayette, Associate Professor: 2000 – 2005
Civil Engineering Department, University of Louisiana at Lafayette, Assistant Professor: 1994 – 2000
Center for Analysis of Spatial and Temporal Systems, University of Louisiana at Lafayette, Director: 1999-Present

Non-academic experience None

Certifications or professional registrations

Professor Engineer, Louisiana, License # 28806

Current membership in professional organizations

American Society of Civil Engineers
Deep South Institute of Transportation Engineers
Association of Transportation Safety Information Professionals

Honors and awards

b. Endowed John E. and Joretta A. Chance Professor: 2002 – Present, Civil Engineering Department, University of Louisiana at Lafayette
c. Endowed SLEMCO/LEQSF
d. Engineering Faculty Professionalism Award, Louisiana Engineering Foundation (2004)
e. Certificate of Achievement, Lafayette Chapter of Louisiana Engineering Society (2005)
f. The James M. Todd Technological Accomplishment Medal, Louisiana Engineering Society (2006)

Service activities (within and outside of the institution)

Panel Member of NCHRP 17-60 "Benefit-Cost Metrics for Behavioral Highway Safety Countermeasure" 2011-2013
Member of TRB Committee on Transportation in Developing Countries (2003-2009)
Member of TRB Committee on Safety Performance (2011-present)
Member of the Lafayette Metropolitan Expressway Commission.
Member of Lafayette Consolidated Government Transportation Technology Committee

Briefly list of most important publications and presentations from the past five years

X. Sun, Subasish Das and Nicholas Fruge "Four-lane to Five-lane Urban Roadway Conversions for Safety" Journal of Transportation Research and Security, 2012

X. Sun, Emad Habib and Han Hu "Quantifying Crash Risk under Inclement Weather with Radar Rainfall Data and Matched-Pair Method" Journal of Transportation Research and Security, Volume 3, No.1, 2011

X. Sun "Studying characteristics of operating speed for proper speed limit: an age-old subject with new evidence from a developing country", Advances in Transportation Studies an international Journal Section A 22, 2010

X. Sun "Estimate the Safety Impact of Differential Speed Limit and Truck Lane Restriction on Interstate-10 through Atchafalaya Basin in Louisiana" Journal of Transportation Research and Security, Volume 1 No.3, 2009

X. Sun "Modeling Highway Safety with Data from Chinese Freeways" peer reviewed Proceedings of SAFE 2009 Conference, Rome, Italy, July 2009, published by WIT Press

X. Sun "Development of an Inexpensive Crash Countermeasure for Urban Undivided Roadways, presented at the 2012 TRB Annual Meetings, Washington D.C., January, 2012

X. Sun "Application of Highway Safety Manual: Louisiana Experience with Rural Multilane Highways" presented at The 2011 TRB Annual Meetings, Washington D.C., January, 2011

X. Sun "Highway Safety – A Grossly Underemphasized Problem" presented at the 14th Annual LA Joint Engineering Societies Conference (JESC), Lafayette, Louisiana, January 2010

Briefly list the most recent professional development activities

Principal Investigator, "A Comprehensive Study on Pavement Edgelines" 2012-2013, $54,000, Louisiana Transportation Research Center (LTRC)

Principal Investigator, "Developing a Highway Safety Fundamentals Course" 2012-2013, $52,000, National Center for Intermodal Transportation for Economic Competitiveness, UTC

Co- Principal Investigator, "Developing Inexpensive Crash Countermeasures for Louisiana Local Roads" 2010-2012, $100,000, LTRC

Principal Investigator, "Developing Louisiana Crash Reduction Factors," 2009-2011, $175,000, LTRC

Principal Investigator, "Developing A Comprehensive Highway Accident Data Analysis Program with GIS: Part III," 2006-2009, $175,000, LTRC

Principal Investigator, "Safety Improvement from Edge Lines of Rural Two-Lane Highway, LTRC 2007-2010, $107,060, LTRC

Principal Investigator, "Developing an Innovative 3D Models for Highway Safety Analysis" $190,000, University of Louisiana, ITI, 2007-09

Appendix C – Equipment

Please list the major pieces of equipment used by the program in support of instruction.

General Classroom Instruction

2 LCD projectors on portable arts
1 – projector w/over-head digital camera and flashcard reader
1 - Fujitsu laptop tablet PC with projector system
1 - TV/VCR on rolling cart (from the University Media Center),

Civil Engineering Computer Lab
(classroom instruction, homework, and student projects)

29 – computer stations
1 - laser printer
1 - color printer
1 - 24 inch plotter
1 - LCD projector

Survey Laboratory

4 sets - Engineering steel tapes, chaining pins, cloth tapes, tension scales, grips, plumb bobs, range poles, etc. (equipment for measuring distances)
4 sets - Dumpy Levels / Philadelphia Rods, Invar Rods, etc
4 sets - Transits, Theodolites
3 - Total Station Systems, support equipment: reflectors, support systems, etc.

Materials Testing Laboratory

Material Test System 810 Series Load Frame with 22 kips capacity
Material Test System 311 Series Load Frame with 220 kips capacity
Environmental Chamber for Material Test System 810 Load Frame
2 sets of Flex Test SE Controller for both 311 Series and 810 Series Load Frames
Hydraulic pump for both 311 Series and 810 Series Load Frames
Basic accessories for conduction compression and tension test

Concrete Laboratory

set of sieves for determine aggregates grades,
2 – medium size concrete mixers,
3 - concrete slump test sets, including slump cone, testing rod and immersion pan
1 – air entrainment device
4 – hoppers for storing aggregate1 – 5,000 lb scale
1 over-head crane

1 – concrete bucket w/release chute
1 table and miter saw for form work
3” and 6” diameter concrete cylinder molds
5 - 6”x6”x36” concrete beam forms
Gilmore Cement Consistency Tester
Vicat Needle apparatus
1 concrete co0mpression tester

Transportation Materials Laboratory

- Universal Testing Machine for testing samples at variable rate integrated with computer control data acquisition and recording system.
- Pine SUPERPAVE Gyratory Compactor with 6” and 4” molds and loading ramps.
- Dynamic Shear Rheometer (DSR)
- Rotational Viscometer and Penetrometers.
- NCAT Ignition Furnace
- Laboratory Ovens, SUPERPAVE aggregate testing equipment and some basic instruments for conventional testing of asphalt and aggregate and asphalt mixtures.
- Indirect Tension Test Stiffness and Strength Apparatus
- Exhaust Hood-Ventilation System
- Marshall Mix design apparatus with molds and compactor

Geotechnical Laboratory

- Grain size Distribution and specific gravity
- Atterberg Limits tests
- Proctor test set, California Bearing Ratio (CBR) test set
- Consolidation test (four load frames)
- Direct sheer test machine (one set)
- Unconfined compression test machine (one set)
- Triaxial test set (one set)

Hydraulics Laboratory

- Universal Fluid Circuit
- Universal Flow Benches
- Hydraulic Jump Apparatus
- Stormier Viscosity Measuring Device
- Open Tanks
- Platform Weighing Scale
- Flow Visualization Apparatus
- Broad Crested Weir & Multi Opening Culvert Flume

Environmental Engineering Laboratory

- Acid hood and storage cabinet
- Flammable liquid storage cabinet
- Incubator/Constant temperature unit
- Distilled/DI water generation unit
- Standard Laboratory Oven and Graphite Furnace
- Several benchtop balances and one a nalytical balance on a marble table for stability
- Several portable Dissolved Oxygen/Conductivity meters
- 2 Spectrophotometers
- Hach turbidity meter
- Large, vented digestion unit
- 2 sets Jar test apparatus
- Several TSS vacuum manifolds
- pH Meters

Rooms 145-147 also include a Perkin Elmer AAnalyst 800 AA/Graphite Furnace for advanced analysis of water, soils, sediments, and air constituents.

Appendix D – Institutional Summary

Programs are requested to provide the following information.

1. The Institution

a. Name and address of the institution

University of Louisiana

Lafayette, LA 70504-2291

b. Name and title of the chief executive officer of the institution

E. Joseph Savoie, D.Ed.
President
University of Louisiana at Lafayette

c. Name and title of the person submitting the self-study report.

Kenneth McManis, Ph.D., P.E.
Professor & Department Head
Civil Engineering Department

d. Name the organizations by which the institution is now accredited and the dates of the initial and most recent accreditation evaluations.

The University of Louisiana at Lafayette is accredited by the
Commission on Colleges of the Southern Association of Colleges and Schools (SACS)
1866 Southern Lane
Decatur, GA 30033-4097
(404) 679-4501
to award Baccalaureate, Master's, and Doctoral Degrees.

Initial accreditation by SACS occurred in 1925 and the most recent accreditation evaluation occurred in 2010.

The University of Louisiana at Lafayette is also a member of:

Southern University Conference
Association of Collegiate Schools of Architecture
American Assembly of Collegiate Schools of Business
American Association of State Colleges and Universities
Conference of Southern Graduate Schools
Council of Graduate Schools

Accredited Programs

Program	Accrediting Agency
Architecture	National Architectural Accrediting Board (NAAB)
Athletic Training	Commission on Accreditation of Athletic Training Education (CAATE)
Business Administration	International Association to Advance Collegiate Schools of Business (AACSB International)
Chemistry	American Chemical Society[a]
Computer Science	Computing Accreditation Commission of ABET, http://www.abet.org.[a]
Communication	Accrediting Council on Education in Journalism and Mass Communications
Dietetics	Commission on Accreditation for Dietetics Education (CADE)
Education	National Council for Accreditation of Teacher Education
Chemical Engineering	Engineering Accreditation Commission of ABET, http://www.abet.org.[b]
Civil Engineering	Engineering Accreditation Commission of ABET, http://www.abet.org.[b]
Electrical Engineering	Engineering Accreditation Commission of ABET, http://www.abet.org.[b]
Mechanical Engineering	Engineering Accreditation Commission of ABET, http://www.abet.org.[b]
Petroleum Engineering	Engineering Accreditation Commission of ABET, http://www.abet.org.[b]
Health Information Management	Commission on Accreditation for Health Informatics and Information Management Education (CAHIIM)
Industrial Design	National Association of Schools of Art and Design (NASAD) Council for Interior Design Accreditation (CIDA)
Industrial Technology	Association of Technology, Management and Applied Engineering (ATMAE), Association of Technology, Management and Applied Engineering, 3300, Washtenaw Avenue, Suite 220, Ann Arbor, MI 48104, telephone: (734) 677-0720

Music	National Association of Schools of Music (NASM)
Nursing	Commission on Collegiate Nursing Education (CCNE)[c]
Professional Land and Resource Management	Curriculum approved by the American Association of Petroleum Landmen[d]
Speech Pathology and Audiology	Council on Academic Accreditation in Audiology and Speech-Language Pathology[e]
Teacher Education	National Council for Accreditation of Teacher Education
Visual Arts	National Association of Schools of Art and Design (NASAD)
[a]Accredits only undergraduate programs [b]Accredition sought for undergraduate program only [c]Accredits both undergraduate and graduate programs [d]The national professional association; not an official accrediting agency [e]Accredits only graduate programs	

Table D.1 – Accredited Programs

2. Type of Control

Description of the type of managerial control of the institution, e.g., private-non-profit, private-other, denominational, state, federal, public-other, etc.

Public state university

3. Educational Unit

Describe the educational unit in which the program is located including the administrative chain of responsibility from the individual responsible for the program to the chief executive officer of the institution. Include names and titles. An organization chart may be included.

Organizational Chart

Figure D-1 below provides an organizational chart showing the position of the Engineering educational unit within the University.

a. Academic Departments

The following five Engineering departments, included in the College of Engineering, teach engineering subjects at the undergraduate and graduate levels leading to the B.S., M.S., and Ph.D. degrees.

Chemical Engineering
Civil Engineering
Electrical & Computer Engineering
Mechanical Engineering
Petroleum Engineering

b. Research Units

The University has approved the creation of several Centers in the College of Engineering (see listing below) to provide a focus for economic development, research, and industrial relations. These units are funded through a University budget and/or funded research projects and industrial grants. These Centers are administered and/or operated using engineering faculty and provide the opportunity for interdisciplinary cooperation for research studies.

Energy Institute
Bioprocessing Research Laboratory
Center for Louisiana Inland Water Studies
Center for Analysis of Spatial & Temporal System
Center for Materials Testing
Center for Telecommunications Studies
Center for Advanced Technology
Center for Corrosion Research
Environmental Engineering Laboratory
Institute for Coastal Engineering and Ecology
Louisiana Immersive Technologies Enterprise
Materials Testing Center

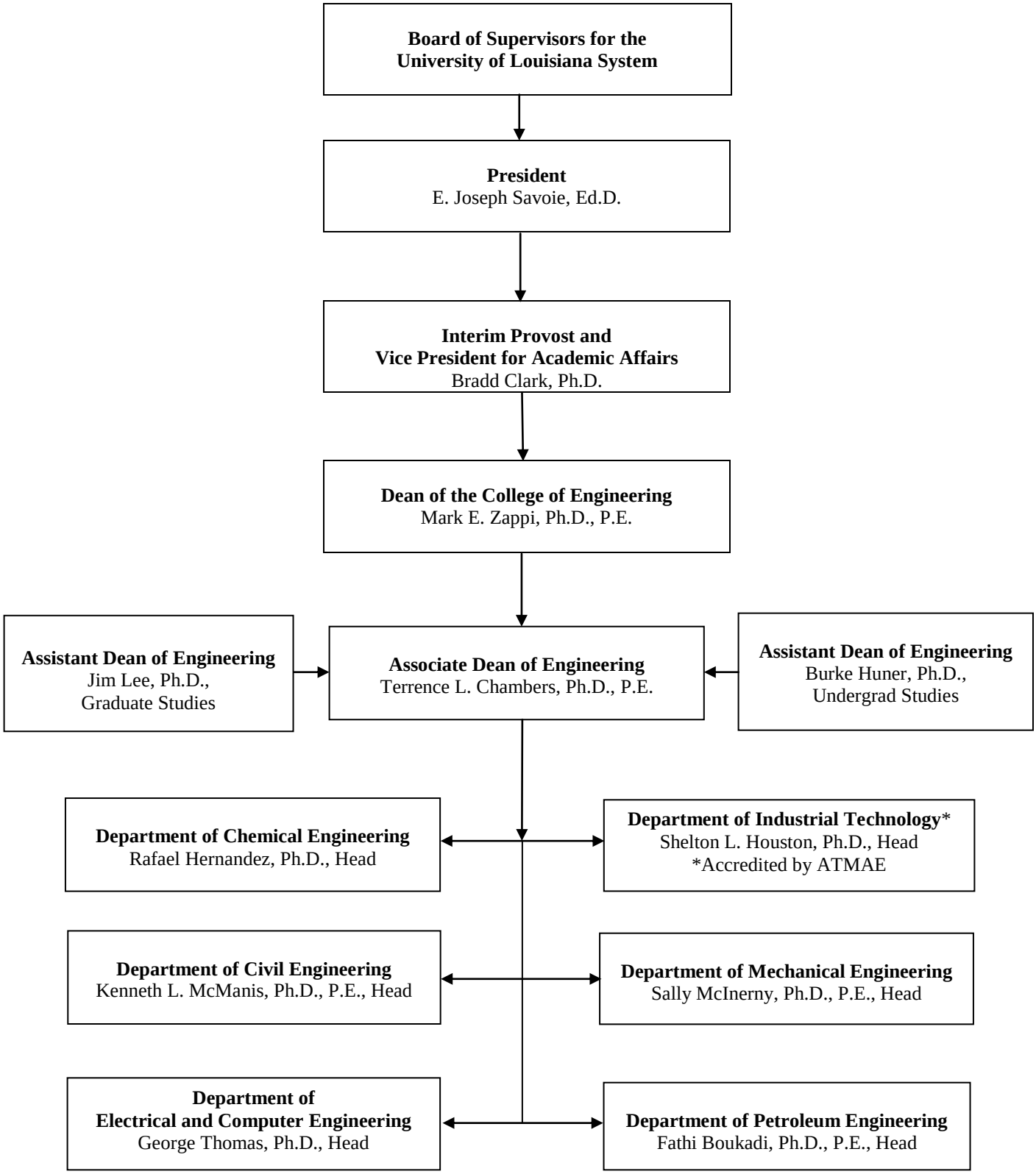
c. Other

The Center for Advanced Computer Studies (CACS) was formed by combining the graduate programs in Computer Science from the College of Sciences and Computer Engineering from the College of Engineering. This unit performs computer engineering and computer science research and teaches courses only at the graduate level leading to the M.S. degree and Ph.D. degree in both Computer Engineering and Computer Science. The Director of this Center, Dr. Magdy Bayoumi, while reporting to the Dean of Science, coordinates planning and activities with the Dean of Engineering.

d. Administrative Heads

The Dean of the College of Engineering is Mark E. Zappi, Ph.D., P.E. Dean Zappi maintains overall supervision and control of the entire College of Engineering and focuses on strategic planning, research production, giving, recruiting, and outreach. The Associate Dean of Engineering is Terrence L. Chambers, who focuses mainly on issues related to Academic Affairs. The Assistant Dean of Engineering for Graduate Studies is Jim Lee, Ph.D., while the Assistant Dean for Undergraduate Studies is Burke Huner, Ph.D. The Department head for Chemical Engineering is Dr. Rafael Hernandez. The Department Head for Chemical Engineering is Dr. Rafael Hernandez. The Department Head for Civil Engineering is Dr. Ken McManis. The Department Head for Electrical and computer Engineering is Dr. George Thomas. The Department Head for Mechanical Engineering is Dr. Sally McInerny. The Department Head for Petroleum Engineering is Dr. Fathi Boukadi, as shown in figure D-1 below:

Figure D-1 Organizational Chart



4. Academic Support Units

List the names and titles of the individuals responsible for each of the units that teach courses required by the program being evaluated, e.g., mathematics, physics, etc.

Department or Unit	Department Head
Mathematics	Dr. Azmy Ackleh
Physics	Dr. Natalia Sidorovskaia
English	Dr. James McDonald
Economics	Dr. Rand Ressler
Communications	Dr. T. Michael Maher
History, Philosophy, & Geography	Dr. Robert Carriker

Table D-2. Supporting Academic Departments For Academic Year: 2012

5. Non-Academic Support Units

List the names and titles of the individuals responsible for each of the units that provide non-academic support to the program being evaluated, e.g., library, computing facilities, placement, tutoring, etc.

a. Office of Information Technology (OIT)

The Office of Information Technology is headed by Mr. Gene fields, Chief Information Officer for the University. He oversees four smaller offices, which provide IT services across campus. The offices include the following:

- The IT Security Office

  The purpose of the IT Security Office is to insure the integrity of the university's networks, computing facilities, and sensitive faculty and student data to insure that they are safe from attack from worms, viruses, and hackers. The office provides regular audits, conducts user awareness training, and establishes computing policies to defend the university's computing facilities.

- Information Media Networks Office

  The purpose of the Office of Information Media Networks is to provide support to the university community relative to its phone and other communication equipment.

- Office of Information Systems

The Office of Information Systems provides the following facilities and services:

The IBM Mainframe (MVS). ISIS accounts on MVS provide administrative database access. TSO accounts on MVS provide a few academic and administrative applications. This system is accessible from any terminal or personal computer that can connect to the network.

The ISIS Database. The ISIS database incorporates most of the administrative information in the University. Faculty advisors and administrative staff may obtain accounts to access student records.

On-line Registration. Students are provided the ability to register for classes on-line via their individual password protected ULink account.

- University Computing Support Services (UCCS)

  University Computing Support Services (UCSS) is a service center for many administrative, instructional, and research computing activities at UL Lafayette. Computing Support Services provides the following facilities and services:

  The UCS Sun facility, which provides email, the primary campus web server, statistical packages and other tools of interest to academic users.

  Automated test scoring via the Tescan facility.

  Network configuration for on-campus PCs.

  The IT Help Desk, which provides consultation, documentation, and other assistance to faculty, staff and students using PCs, Macs, or UNIX.

The Office of Information Technology has several initiatives underway, including the implementation of an integrated administrative information system (or ERP) system, a university-wide network enhancement to replace dated network equipment in order to upgrade the campus network to handle the increased traffic attendant to growth and increased usage, a university wireless initiative to make wireless internet access available in most places on campus, and the renovation of various open computer labs across campus.

Major funding for many of these initiatives has been through the Student Technology Enhancement Program (STEP). The STEP program is funded by a self-assessed student fee of $5.00/Credit Hour up to a maximum of

$60.00/semester administered through the Student Government Association (SGA). The STEP program is intended to upgrade and increase the availability of technology on the UL Lafayette campus. Since its inception in 1997, STEP funding has been used to establish numerous open computer labs across campus, including the following locations: Bourgeois Hall, Cafe Fleur de Lis, Conference Center, Edith Garland Dupre Library, FG Mouton Hall, Griffin Hall, James R. Oliver Hall, Lee Hall, and Stephens Hall. STEP funds have also been used to create "smart classrooms" all across campus, and to upgrade and maintain that portion of the university's technology infrastructure that directly impacts the students.

One of the most important new features of the STEP Plan is that a permanent mechanism has been put in place for the maintenance and support (not simply the initial purchase) of all student funded technologies on campus. On April 15, 2010, the STEP Council approved a STEP Sustainability Plan designed to ensure that laboratories, smart classrooms, and infrastructure funded by STEP can be maintained and continue to provide satisfactory service to students. The Plan allocates one third (33%) of STEP revenues to a fund for the following six primary purposes:

- Hardware Maintenance and replacement
- Software licensing, maintenance, and assurance
- Network infrastructure (core and distribution)
- Wireless data network services on campus
- Managed laboratory printers
- Adequate and uniformly trained lab managers

A complete listing of funded STEP projects since the Fall of 2010 can be found is found on the OIT web site http://cio.ucs.louisiana.edu/stepawards. During the previous evaluation period (2002 – 2007), the College of Engineering received $325,328 in STEP funding for laboratory equipment. During the period from 2008 – 2013, the College of Engineering has received $352,260, representing a slight increase in the amount of funding received during the previous evaluation period. An important difference now, however is that all STEP grants awarded since Spring of 2010 have perpetual maintenance built into them. A listing of STEP grants received by the College of Engineering from the Fall of 2008 until the Spring of 2013 is included in Table D-3 below:

Table D-2 – STEP Funding for the College of Engineering (Fall 2008 – Spring 2013)

Fall 2008	Rougeou Hall Computer labs Projector Upgrade	Mr. Harvey Ozbirn	$19,809

Fall 2008	A/V System for Undergraduate Instruction	Dr. Shelton Houston	$3,337
Fall 2008	Engineering Computer Lab Upgrade	Dr. Terrence Chambers	$21,290
Spring 2009	Engineering Computer Lab Upgrade	Dr. Ahmed Khattab	$24,858.80
Spring 2009	Fermentation Equipment for Student Engineering Labs	Dr. Stephen Dufreche	$3,967.85
Spring 2010	Advanced Visualization and Virtual Reality Lab	Dr. Carolina Cruz-Neira & Dr. Terry Chambers	$32,000
Fall 2010	Chemical Engineering: Computer Lab Upgrade, Madison Hall Room 216	Mr. Jim Dooley	$13,476.50
Fall 2010	Electrical and Electronics Technology Laboratories Upgrade	Dr. G.H. Massiha, Mr. Harvey Ozbirn	$13,153.40
Fall 2011	Chemical Engineering: Computer Lab Upgrade, Madison Hall - Phase II	Mr. Jim Dooley	$19,845.00
Fall 2011	Rougeou Room 324 Projector & Podium Upgrade	Mr. Harvey Ozbirn	$10,000.00
Spring 2011	Civil Engineering Step Lab Upgrade	Mark LeBlanc	$3,000.00
Spring 2011	Document Viewers and Projectors	Dr. William Emblom and Jeff Guidry	$11,350.00
Spring 2011	Electronic Swipe Card Access for Rougeau Hall	Dr. Ted Kozman	$2,500.00
Spring 2011	Wireless Internet, Rougeau Hall	Dr. Sally Anne McInerny	$15,000.00
Spring 2012	Extraction Equipment for Engineering Laboratories	Dr. Stephen Dufreche	$63,400.00

Spring 2012	Enhancement of the Microprocessor control system Technology laboratory	Cherif Aissi	$17,256.50
Spring 2012	Robotics Engineering and Technology Laboratory Upgrade	Dr. G.H. Massiha and Harvey Ozbirn	$22,346.00
Fall 2012	Smart Multimedia Classrooms in Rougeou Hall	Dr. Ahmed Khattab	$30,000.00
Spring 2013	EE Electronics Laboratory	Dr. Mohammad R. Madani and Shelby A. Williams	$11,662.90
Spring 2013	Enhancement of the Integrated Systems Technology Laboratory	Cherif Aissi	$14,007.00
Total			$352,260

Additional institutional support units are described below.

b. Edith Garland Dupré Library**.**

Edith Garland Dupré Library is led by Dean Charles Triche. The library is centrally situated on the main campus of the University of Louisiana at Lafayette at 400 E. St. Mary Blvd. The library is open to students, faculty, staff, and the public. In 2000 two major construction projects were completed: (1) the renovation of the building which had existed since the middle of the 1960s and (2) an addition to the back of that building which resulted in double the amount of previous floor space. The Instructional Materials Center (IMC), a branch library, serves students and faculty from the University by providing materials to be used in classroom instruction on the elementary and secondary levels. It is located in Maxim Doucet Hall, Room 101. Other affiliated libraries include the Enterprise Sugar Library and the Hilliard University Art Museum.

Dupré Library recently added its one millionth bound volume (The Nature of Things at Lake Martin: exploring the Wonder of Cypress Island Preserve in Southern Louisiana by Nancy Camel) and has over 2 million microform units. Some 6,000 serial titles are currently under subscription, and backfiles are being collected in print and non-print format. Special collections include: U.S. government publications, Louisiana government publications, materials pertaining to the history and culture of Acadiana (in the Jefferson Caffery Louisiana Room), the University Archives and Acadiana Manuscripts Collections, the Ernest J. Gaines Center collection and the Rare Book Collection. Funds from a BORSF grant received in 2003 have been used to

establish the Cajun and Creole Music Collection, a collection of commercial recordings of Cajun, Creole, Zydeco and swamp pop music.

The library oversees the administration and supervision of several high traffic student computer labs. These include the STEP Lab, consisting of approximately 150 networked computers, printers, servers; the Reference Online Center, consisting of approximately twenty-four networked computers; and the Gloria S. Cline Bibliographic Instruction SMART Classroom, which includes approximately thirty computers, an operator's workstation, telephone conferencing and projection equipment. As a service to the university's graduate students, the library also provides a graduate study room equipped with six computers.

Most of the library's collections are available online through the library's catalog. Patrons may access the catalog over the Internet from home, office, or campus. Educational materials housed in the Instructional Materials Center may be searched separately or in conjunction with a search of Dupré Library's holdings.

A trained professional and civil service staff with interests and talents in many fields provides high quality service to its patrons. Constant effort is being made to improve the University library system. The library is a member of the regional library organization, Lyrasis, which provides nationwide networked cataloging and other professional services. The rapid growth of the collection, the professional competence and interest of its staff, the utilization of the latest technologies in providing efficient library service and the active cooperation of the teaching faculty all work together to assure students and faculty of UL Lafayette the finest in library service available. Additional details, including library hours and other library services not mentioned here, may be found on the library's web site: http://library.louisiana.edu/.

c. Academic Success Center (ASC).

The Academic Success Center is led by Director Bette Harris. The ASC is a department that provides academic support services for all students and helps new students make a successful transition to the University. It reports to the Assistant Vice President for Academic Affairs. Junior Division provides academic support services to all students, regardless of classification. The professional staff provides academic, career, and personal counseling; teaches Academic Skills (ACSK) courses; and supervises the Learning Center which provides tutoring services and individualized instruction in specialized areas, along with academic and video programs. Junior Division spearheads the student retention program for the University. Services provided by Junior Division include:

Counseling: Professional counselors in the Junior Division counsel and

assist students in their adjustment to college. Each student in Junior Division is assigned to a specific counselor on the basis of his/her college major. Counselors provide both individual and group sessions which target adjustment to college, career decision-making, study skills, math anxiety, time management, and other significant areas of concerns for students.

Advising: Junior Division is that unit of the University responsible for providing academic counseling and support services to students from the time they are admitted to the University until they are accepted into the upper division. Upon entry to the University, Junior Division students are assigned to the academic department of their major for advising. During the Orientation-Registration sessions, faculty advisors discuss academic regulations, assist with course selection, and explain scheduling procedures. At other times, they hold individual and group conferences to help freshman understand the requirements of their field of study and to guide students in appropriate course selection for the next semester. Faculty advisors make suggestions about wise budgeting of time, effective study and learning techniques, tutoring assistance, and other matters important for student success.

Career Center: A library of career literature is available to students for help in decisions relating to choice of major curriculum and career. This library can be used for browsing or for serious research regarding career options. ACSK 140, Career Decision Making, is offered each semester and is particularly aimed to meet the needs of students with an undeclared major. Career testing, including interest surveys, personality and ability tests, is also available for the counselors in Junior Division.

Learning Center: The Learning Center provides various academic support services to facilitate learning. These services are offered in coordination with various academic and administrative departments on campus. Free tutoring in freshman, sophomore, and in upper level courses is offered by the Learning Center. Other Learning Center services include assessments of students' learning needs, supplementary instruction, and short courses for study improvement. A library of microcomputer and video-taped instruction, study guides, and background information needed in specific courses is available to supplement classroom instruction, and individual tutoring.

Services For Students With Disabilities: Services which facilitate adjustment to college for students with disabling conditions are available through the SSD Office which is an administrative unit of the University's Counseling and Testing Office. Students receive individual counseling, assistance for scheduling, and needed arrangements in class conditions, housing, parking, and other campus offerings. Auxiliary aides and services as well as information on campus resources for students with disabilities are also coordinated through the Office for Services to Students with Disabilities.

In addition to the above services, Junior Division sponsors Advisor Workshops for new faculty, or for older faculty, allowing them to stay abreast of new rules and techniques of advising. These workshops are held frequently during each semester.

6. Credit Unit

It is assumed that one semester or quarter credit normally represents one class hour or three laboratory hours per week. One academic year normally represents at least 28 weeks of classes, exclusive of final examinations. If other standards are used for this program, the differences should be indicated.

At UL Lafayette, one semester hour is normally defined as nominal one contact-hour class period or a laboratory period of 2 – 3 contact hours, each week for 15 weeks. Thus one academic year consists of 30 weeks of instruction.

7. Tables

Complete the following tables for the program undergoing evaluation.

Table D-4. Program Enrollment and Degree Data

Civil Engineering

	Academic Year		Enrollment Year					Total Undergrad	Total Grad	Degrees Awarded			
			1st	2nd	3rd	4th	5th			Associates	Bachelors	Masters	Doctorates
Current Year	2012	FT	62	31	34	52		179	20		20	9	
		PT	3	4	4	8		10	5				
1	2011	FT	61	38	26	45		170	31		20	8	
		PT	1	2	6	9		18	3				
2	2010	FT	61	24	28	39		152	14		8	5	
		PT	1	3	5	7		16	4				
3	2009	FT	53	29	24	31		137	14		23	5	
		PT	4	4	5	6		19	7				
4	2008	FT	49	31	20	34		134	15		9	8	
		PT	2	6	2	9		19	3				

Give official fall term enrollment figures (head count) for the current and preceding four academic years and undergraduate and graduate degrees conferred during each of those years. The "current" year means the academic year preceding the fall visit.

FT--full time
PT--part time

Table D-5. Personnel

Civil Engineering

Year[1]: __2012-2013_____

	HEAD COUNT		FTE
	FT	PT	
Administrative[2]	1		0.5
Faculty (tenure-track)[3]	9		8.5
Other Faculty (excluding student Assistants)	1	1	2
Student Teaching Assistants[4]	5		5
Technicians/Specialists	1		1
Office/Clerical Employees	1		1
Others[4]			

Report data for the program being evaluated.

[1] Data on this table should be for the fall term immediately preceding the visit. Updated tables for the fall term when the ABET team is visiting are to be prepared and presented to the team when they arrive.

[2] Persons holding joint administrative/faculty positions or other combined assignments should be allocated to each category according to the fraction of the appointment assigned to that category.

[3] For faculty members, 1 FTE equals what your institution defines as a full-time load.

[4] For student teaching assistants, 1 FTE equals 20 hours per week of work (or service). For undergraduate and graduate students, 1 FTE equals 15 semester credit-hours (or 24 quarter credit-hours) per term of institutional course work, meaning all courses — science, humanities and social sciences, etc.

[4] Specify any other category considered appropriate, or leave blank.

Appendix E - Civil Engineering Assessment

Mission

The mission of the Civil Engineering Department is to provide a contemporary education in civil engineering for students within the mission defined by the university. It provides a broad based civil engineering curriculum in structures, geotechnical, water resources, environmental, and transportation engineering, including a program designed to utilize learned technical skills, accompanied by communicative skills, teamwork and leadership qualities. This mission envisions graduates employable by local, national, and international firms and with a sound educational foundation for those who pursue advanced degrees. The department's mission includes assistance to industries and government agencies through the application of civil engineering knowledge in addressing the infrastructure needs with well-founded engineering solutions; the development of research that can be implemented with measurable results and with the expectation of improving the quality of life and economic well-being of the community.

Educational Objectives

1. Are immediately employable as a Civil Engineering Intern or prepared to continue in a graduate or professional program

2. Can achieve and maintain status as a Professional Engineer, and participate in professional engineering organizations and/or other professional activities

3. Are effective Civil Engineers and understand their responsibility to their profession and community

The following provides the means for assessing the level of success and justification for the educational objectives:

1. Civil Engineering Advisory Board
2. Exit Interviews
3. Alumni Surveys
4. Employer Surveys
5. Alumni PE or Licensure Status

The University of Louisiana's Civil Engineering Learning Outcomes & Measurement

UL LAFAYETTE CIVE LEARNING OUTCOMES	DESCRIPTION	Measurement		
		Course	Survey	FE
a **Math and Science** **(ABET Criteria 3-a, BOK1-1)**	Graduates can solve problems in mathematics through differential equations, calculus-based physics, chemistry, and one additional area of science.	✓	✓	✓
b **Experimentation** **(ABET Criteria 3-b, ASCE BOK1-2)**	Graduates can design a civil engineering experiment to meet a need; conduct the experiment, and analyze and interpret the resulting data.	✓	✓	
c **Engineering Design** **(ABET Criteria 3-c, ASCE BOK1-3)**	Graduates can design a complex system or process to meet desired needs, within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.	✓	✓	✓
d **Multi-Disciplinary Teams** **(ABET Criteria 3-d, ASCE BOK!-4)**	Graduates can function effectively as a member of a multi-disciplinary team.	✓	✓	
e **Engineering Problem-Solving** **(ABET Criteria 3-e, ASCE BOK1-5)**	Graduates can solve well-defined engineering problems in four technical areas appropriate to civil engineering.	✓	✓	✓
f **Professional & Ethical Responsibilities** **(ABET Criteria 3-f, ASCE BOK1-6)**	Graduates can analyze a complex situation involving multiple conflicting professional and ethical interests, to determine an appropriate course of action.	✓	✓	✓
g **Communication Skills** **(ABET Criteria 3-g, ASCE BOK1-7)**	Graduates can organize and deliver effective verbal, written, and graphical communications.	✓	✓	
h **Impact of Engineering Solutions in a Global, Economic, Environmental, and Scietal Context** **(ABET Criteria 3-h, ASCE BOK1-8)**	Drawing upon a broad education, graduates can determine the global, economic, environmental, and societal impacts of a specific, relatively constrained engineering solution.	✓	✓	
i **Life-Long Learning** **(ABET Criteria 3-i, ASCE BOK1-9)**	Graduates can demonstrate the ability to learn on their own, without the aid of formal instruction.	✓	✓	
j **Contemporary Issues** **(ABET Criteria 3-j, ASCE BOK1-10)**	Graduates can incorporate specific contemporary issues into the identification, formulation, and solution of a specific engineering problem.	✓	✓	
k **Techniques, Skills and Modern Engineering Tools** **(ABET Criteria 3-k, ASCE BOK1-1)1**	Graduates can apply relevant techniques, skills, and modern engineering tools to solve a simple problem.	✓	✓	
l **Project Management** **(ABET Program Criteria, ASCE BOK1-13)**	Graduates can explain key concepts and problem-solving processes used in management.	✓	✓	✓
m **Business Concepts** **(ABET Program Criteria, ASCE BOK1-14)**	Graduates can explain key concepts and problem-solving processes used in business.	✓	✓	
n **Public Policy** **(ABET Program Criteria, ASCE BOK1-14)**	Graduates can explain key concepts and problem-solving processes used in public policy, and public administration.	✓	✓	
o **Leadership** **(ABET Program Criteria,, ASCE BOK!-15)**	Graduates can explain the role of the leader, leadership principles, and attitudes conducive to effective professional practice of civil engineering.	✓	✓	

COURSE OUTCOMES ASSESSMENT

- COURSE SYLLABUS
  - ✓ Use ABET Format
  - ✓ Identify Learning Outcomes relative to course activities
  - ✓ List as Course Objectives using ABET/ASCE language and noting ABET Outcomes & Level of Learning
- COURSE MEASUREMENT
  - ✓ Use the usual course activities for measuring the student's knowledge (HW, quizzes, exams, projects, reports, oral presentation-defense, etc.)
  - ✓ Note the specific activity that evaluates learned knowledge (ultimate course performance, exam, question on exam, HW set, report)
  - ✓ Individual Evaluation by Instructor, Rubric (Instructor/Panel)
  - ✓ Student Survey of Course Objectives
- COURSE BINDER/PORTFOLIO with EXAMPLES
  - ✓ Course syllabus
  - ✓ Class documents/guidelines
  - ✓ Exams, homework, quizzes, reports, presentations (slides), lectures, etc
  - ✓ Examples of student work (good/bad & OK)
  - ✓ Class performance – grade book
  - ✓ Copy of previous assessment
- INSTRUCTOR COURSE ASSESSMENT
  - ✓ Address each of the course objective statements referencing the measurement and using examples in the course binder
    - For each objective statement, provide an explanation for the results with any suggestions for further action
  - ✓ Summary statement of previous course assessment
  - ✓ Summary Statement considering previous report, the most recent assessment and recommendations for future improvement.
  - ✓ Place copy of course assessment in binder & in each Outcomes Book addressed.

DEPARTMENT COURSE OUTCOME ASSESSMENT

- Outcomes to be reviewed by faculty committees at scheduled interviews (2 years)
- Report
  - ✓ ID the courses involved
  - ✓ Briefly review each course's stated measurement and assessed results
  - ✓ Provide summary for previous department review
  - ✓ Summarize the current findings and identify action needed or suggested
  - ✓ Place report in Outcome Book in front of assessment reports for that period of time

A summary report of all assessment activities will be provided by the Curriculum Committee to faculty with recommendations.

PERFORMANCE CRITERIA	MEASUREMENT	
	Course-based (Direct) Tools	Other Tools
(a) an ability to **apply knowledge of mathematics, science, and engineering**		
MATH 270 MATH 301 MATH 302 MATH 350 STAT 325/425 PHYS 201 CHEM 107 CHEM 108 CHEM 115 BIOL ELECT ENGR 201 ENGR 211 ENGR 219 ENGR 301 ENGR 304 ENGR 313 CIVE 225 CIVE 322 CIVE 328 CIVE 332 CIVE 434	Application of math and science in engineering problems: knowledge documented in fundamental courses with application demonstrated in the ENGR and CIVE courses. Success measured by the material covered (syllabi) in the classes (with a performance indicative of a "C" grade or better in all classes.	FE Exam results SURVEYS: ▪ Exit survey ▪ Alumni ▪ Employers ▪ Class Surveys
(b) an ability to **design and conduct experiments, as well as to analyze and interpret data**		
CIVE 322/422 CIVE 328/438 CIVE 426/427 CIVE 429/434 CIVE 450	Performance evaluated by observations of student's ability to conduct lab tests, analyze data, and interpret results as demonstrated with submission of a lab report. The student must earn a "C" grade or better to represent work that is acceptable. A specific requirement that each student will be assigned and be able to design an experimental (testing) program to meet a need upon the completion of all +lab tests.	SURVEYS: ▪ Exit survey ▪ Alumni ▪ Employers ▪ Class surveys
CIVE 442	The CIVE 442 design groups should identify, plan and submit a testing program for the information needed and/or specifications standards to be used to with the design plans. Faculty/practitioner panel evaluation.	SURVEYS: ▪ Exit survey ▪ Alumni ▪ Employers ▪ Class survey
(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**		
CIVE 422 CIVE 426 CIVE 427 CIVE 434 CIVE 438 CIVE 450	All design classes will require an end-of-class design project to meet a need within realistic constraints as noted – to be evaluated for completeness by the instructor.	FE Exam Results. SURVEYS: ▪ Exit survey ▪ Alumni ▪ Employers ▪ Class surveys
CIVE 442	CIVE 442, Senior Design, design will be evaluated by faculty/practitioner panels for products, approach and completeness of design. Faculty Panel: Rubric Analysis	FE Exam Results. SURVEYS: Exit survey Alumni Employers Class survey

(d) an ability to **function on multidisciplinary teams**		
CIVE 442	**Evaluation of individual's ability to work with others and consideration for integrated needs of project as measured by student peer surveys, faculty panel review and instructor observations. Rubric: Peer Evaluation** **Other – laboratory activities and team project reports.**	**SURVEYS:** ▪ **Exit survey** ▪ **Alumni** ▪ **Employers** ▪ **Class surveys**
(e) an ability to **identify, formulate, and solve engineering problems & ABET Program Criteria/ASCE -**The program must demonstrate that graduates...can apply knowledge of four technical areas appropriate to civil engineering….		
CIVE 322/422 **CIVE 328/438** **CIVE 332/426** **CIVE 332/427** **CIVE 429/434** **CIVE 435/450** **CIVE 480**	**Documented by course material covered (syllabi) with student's performance being satisfactory (i.e., "C" grade or better).**	**FE Exam Results** **SURVEYS:** ▪ **Exit survey** ▪ **Alumni** ▪ **Employers** ▪ **Class surveys**
(f) an **understanding of professional and ethical responsibility & ABET Program Criteria/ASCE BOK1 - explain the importance of professional licensure.**		
CIVE 442	**Time Management (meeting of deadlines, necessity for redirection, punctuality); Initiative (assumption of responsibility, facilitation of discussions, leverage of resources); Organizational Skills (completion of tasks in a timely manner, state of preparation); Integrity (respectful w/peers, others and learning environment, follow through and attitude on assigned tasks, honest in word and actions, ethical in dealings) – Rubric analysis by peers and instructor.**	**FE Exam results.** **SURVEYS:** ▪ **Exit survey** ▪ **Alumni** ▪ **Employers** ▪ **Class survey**
CIVE 444	**Licensure need/justification. Specific Cases requiring student's analysis and opinion of an ethical issue support by ASCE Cannon of Ethics guidelines. Other issues involving professional attitudes to job, timeliness, etc. through reading assignments, discussions, reports**	**FE Exam results.** **SURVEYS:** ▪ **Exit survey** ▪ **Alumni** ▪ **Employers** ▪ **Class survey**
(g) an **ability to communicate effectively**		
CIVE …….. 442, 444 + labs/projects	**Panel evaluations of student's presentation and defense of senior design. Evaluations of lab reports and other assigned projects (written, graphics, oral, etc.) Peer evaluation Rubric.**	**SURVEYS:** ▪ **Exit survey** ▪ **Alumni** ▪ **Employers** ▪ **Class surveys**
(h) the broad education necessary to **understand the impact of engineering solutions in a global, economic, environmental, and societal context**		
CIVE 422 **CIVE 434** **CIVE 435** **CIVE 442** **CIVE 444**	**A specific exercise covering the above areas (environmental, waterways, transportation, social, political, etc.) is to be assigned and evaluated as an indication of the student's understanding for broader issues in CIVE, 422, 434, 435 and 444,** **Consideration given to these issues in the Senior design, CIVE 442, may be evaluated by the faculty panels and instructor.**	**SURVEYS** ▪ **Exit survey** ▪ **Alumni** ▪ **Employers** ▪ **Class surveys**
(i) a **recognition of the need for, and an ability to engage in life-long learning**		
CIVE ….422, 444……	**Students' recognition for need and the skills required for developing independent learning skills is included in other courses, but will be specifically measured in CIVE 422 – research assignment & written report and CIVE 444 (reading assignments, discussions & documentation of independent investigations).**	**SURVEYS:** ▪ **Exit survey** ▪ **Alumni** ▪ **Employers** ▪ **Class surveys**

(j) a **knowledge of contemporary issues**		
CIVE 422 **CIVE 429** **CIVE 426** **CIVE 427** **CIVE 434** **CIVE 438** **CIVE 444** **CIVE 442** **CIVE 450** **CIVE 480**	**Each course includes coverage or requires independent research by the student to address a contemporary issue relevant to that field of civil engineering. The student's response is evaluated for their familiarity of the topic.**	**SURVEYS:** ▪ **Exit survey** ▪ **Alumni** ▪ **Employers** ▪ **Class surveys**
(k) an ability to **use the techniques, skills, and modern engineering tools necessary for engineering practice.**		
ITEC 270 **CIVE 225** **CIVE 328** **CIVE 422** **CIVE 426/427** **CIVE 429/434** **CIVE 442** **CIVE 480** **CIVE 450**	**"C" or better in Autocad. Use of surveying equipment and lab equipment utilized in CIVE labs as demonstrated by the evaluation of the student's lab performance. Evaluation of the student's ability to work with computer/software systems used in classes. Knowledge demonstrated with design codes, testing standards, and regulatory policies. Each class should include measurement of lab and project reports/products produced and/or by embedded questions on exams and quizes.**	**SURVEYS:** ▪ **Alumni** ▪ **Exit survey** ▪ **Employers** ▪ **Class surveys**
(l) ABET Program Criteria/ASCE BOK1 - Graduates can explain key concepts and problem-solving processes used in management.		
CIVE 442 **CIVE 444** **CIVE 480**	**Applied in development of design groups/tasks (CIVE 442) – evaluated by instructor, student peer groups(?), faculty panels(?)** **Project report assignment (CIVE 444) – evaluated by instructor** **Examination on Management concepts and problem solving processes (CIVE 480) – evaluated in exam by instructor.**	**SURVEYS:** ▪ **Exit survey** ▪ **Alumni** ▪ **Employers** ▪ **Class surveys**
(m) ABET Program Criteria/ASCE BOK1 - *Graduates can explain key concepts and problem-solving processes used in business.*		
ECON 430 **CIVE 444** **CIVE 480**	**Ability to conduct decisive economics analysis in the ECON 430 class** **Project reports & HW assignments requiring an explanation of key business factors in CIVE 444.**	**SURVEYS:** ▪ **Exit survey** ▪ **Alumni** ▪ **Employers** ▪ **Class surveys**
(n) ABET Program Criteria/ASCE BOK1 - *Graduates can explain key concepts and problem-solving processes used in public policy, and public administration.*		
CIVE 422, **CIVE 434** **CIVE 435** **CIVE 444** **CIVE 442**	**HW, embedded Exam/quiz question, or assigned project report (CIVE 422, 434, 435, 444 – instructor's review), and** **used or recognized in design (CIVE 442 – faculty panel evaluation)**	**SURVEYS:** ▪ **Exit survey** ▪ **Alumni** ▪ **Employers** ▪ **Class surveys**
(o) ABET Program Criteria/ASCE BOK1 - Graduates can explain the role of the leader, leadership principles, and attitudes conducive to effective professional practice of civil engineering.		
CIVE 101 **CIVE 444** **Student activities, ASCE, etc.**	**Presentations with assignments on topics, or project report.** **Service and responsibility in ASCE, ITE, Chi Epsilon.**	**SURVEYS:** ▪ **Exit survey** ▪ **Alumni** ▪ **Employers** ▪ **Class surveys**

Signature Attesting to Compliance

By signing below, I attest to the following:

That Civil Engineering Department has conducted an honest assessment of compliance and has provided a complete and accurate disclosure of timely information regarding compliance with ABET's *Criteria for Accrediting Engineering Programs* to include the General Criteria and any applicable Program Criteria, and the ABET *Accreditation Policy and Procedure Manual.*

Mark Zappi, PhD, P.E.
Dean's Name (As indicated on the RFE)

	6-26-2013
Signature	**Date**