

Educating Future Structural Engineers

The National Society of Structural Engineers Associations (NCSEA) is pleased to present the 2013 survey of schools and colleges throughout the United States. The schools surveyed offer educational opportunities for students desiring to become professional civil/structural engineers. NCSEA has sponsored the survey since 2002. Curriculum on which the survey is based is primarily that which practicing engineers have determined as appropriate for structural engineering students working to obtain recognition as a structural engineer in the workplace. Although the emphasis of the National Council of Structural Engineers Associations is on those structural engineers in the vertical and horizontal construction aspects of the industry, structural engineers have prominent roles in other related fields such as the airframe industry and industrial machine design.

For those following the progress of structural engineering education in the United States, it has long been recognized that the emphasis and focus of curriculum, and curriculum content, is constantly under review. Readers of STRUCTURE, NCSEA's monthly STRUCTURAL CONNECTION publication, and attendees at the NCSEA annual conference and Institutes have observed the ebb and flow of the process. Since the 2010 survey, NCSEA has gathered opinions from structural engineers and instructors regarding:

- Offering a single course split in Masonry and Timber
- Expanding the core curriculum to include non-traditional structural materials such as aluminum and cold formed steel
- Accepting the substitution of computers as an educational tool to improve the student's understanding of structural function, in lieu of Matrix Methods
- Changing the two concrete courses to be two core requirements for Cast-In-Place Concrete or reducing the demands within Concrete 1 and retaining Concrete 2 for Pre-Stress Post-Tensioning.

For the current proposed curricula and past survey results, visit www.structuremag.org/EducationSurveys.aspx.

And, for the first time, the 2013 survey sought to determine school interest in a student version of the structural certification available to registered engineers (SECB certification); 76% of responding schools expressed interest in the program.

Change follows discussion, and systematized discussion results in consensus. This same process established NCSEA's proposed curriculum over 10 years ago, and it is the process that will lead to modifications in the current curriculum, adjustments in school and college programs, and changes in the mindset of practitioners.

Parents as well as students use the survey to help plan for the future. Readers of this article and participants in the survey are effective in maintaining its relevance.

NCSEA is considering making the survey timelier by conducting a web based survey every year for two years, followed by a detailed interactive response survey from schools every 3rd year. We hope you enjoy reading the 2013 survey, studying the curriculum, and commenting on both.

NCSEA and its Education Committee would like to receive your thoughts on the current state of the proposed curricula and the latest survey results. Please send your comments to NCSEA.Education@structuremag.org.





Full Curricula

The following is a list of schools/universities who responded directly to the 2013 survey AND who have indicated that they provide the full curricula as proposed by the NCSEA Education Committee.



University

Arizona State University
 Auburn University
 Clemson University
 California Polytechnic State University
 California State University, Fresno
 Colorado State University
 Colorado State University – Fort Collins*
 Columbia University in the City of New York*
 Kansas State University
 Michigan Technological University
 Milwaukee School of Engineering
 Missouri University of Science and Technology*
 Montana State University
 New Jersey Institute of Technology
 New Mexico State University

North Carolina State University
 Oregon State University
 Rose-Hulman Institute of Technology
 Sacramento State*
 Texas A&M University
 University of Alabama
 University of Arkansas*
 University of Detroit Mercy*
 University of Florida
 University of Kansas
 University of Maine*
 University of Minnesota
 University of Nevada Las Vegas
 The University of New Hampshire
 University of North Carolina at Charlotte

University of Southern California
 University of Texas at Austin
 University of the Pacific
 University of Washington
 University of Wisconsin-Madison
 University of Wisconsin-Milwaukee
 University of Wyoming

* The schools/universities who did not respond directly to the 2013 survey, yet do list courses which comprise the full curricula (as determined by a review of the school's website).

Partial Curricula

The following is a list of schools/universities who responded directly to the 2013 survey but who have indicated that they do not provide the full curricula as proposed by the NCSEA Education Committee. The Table indicates which courses are, or are not, offered.

University	Analysis 1	Analysis 2	Matrix Methods	Steel Behavior and Design 1	Steel Behavior and Design 2	Concrete Behavior and Design 1	Concrete Behavior and Design 2	Timber Behavior and Design	Masonry Behavior and Design	Dynamic Behavior and Design	Foundation Mechanics / Soils	Technical Writing
Bucknell University	✓	✓	✓	✓		✓		✓			✓	
City College of New York				✓		✓				✓	✓	✓
Cleveland State University	✓		✓	✓		✓		✓	✓		✓	✓
Colorado School of Mines	✓			✓		✓				✓	✓	✓
Gonzaga University	✓	✓		✓		✓		✓	✓	✓	✓	
Hofstra University	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓
Idaho State University	✓			✓		✓		✓		✓	✓	
Illinois Institute of Technology	✓	✓		✓	✓	✓	✓		✓	✓	✓	
Lawrence Technological University	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓

table continued on next page

Schools/universities who have indicated that they do not provide the full curricula as proposed by the NCSEA Education Committee, continued.

University	Analysis 1	Analysis 2	Matrix Methods	Steel Behavior and Design 1	Steel Behavior and Design 2	Concrete Behavior and Design 1	Concrete Behavior and Design 2	Timber Behavior and Design	Masonry Behavior and Design	Dynamic Behavior and Design	Foundation Mechanics / Soils	Technical Writing
Lehigh University	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
Marquette University	✓		✓	✓	✓	✓	✓			✓	✓	
Midlands Technical College				✓		✓					✓	✓
Northeastern University	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
Northern Arizona University	✓	✓	✓	✓		✓			✓	✓	✓	✓
Ohio Northern University	✓			✓		✓					✓	
Ohio State University	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
Ohio University	✓	✓		✓		✓		✓	✓	✓	✓	✓
Oklahoma State University	✓	✓		✓	✓	✓	✓	✓			✓	
Old Dominion University	✓	✓	✓	✓		✓	✓	✓	✓	✓		
Owens Community College (Design Technologies)	✓	✓		✓		✓					✓	✓
Owens Community College (Architectural Engineering Technology)	✓			✓		✓		✓			✓	✓
Point Park University	✓			✓		✓					✓	✓
Rensselaer Polytechnic Institute	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
Rutgers University	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
Saint Martin's University	✓		✓	✓		✓		✓		✓	✓	
San Francisco State University	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓
Santa Clara University	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
South Dakota State University	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓
Stevens Institute of Technology	✓			✓		✓					✓	
The University of Akron	✓			✓		✓					✓	✓
Tufts University	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓
University of Alaska Anchorage	✓		✓	✓	✓	✓		✓		✓	✓	✓
University of California at Davis	✓		✓	✓		✓				✓	✓	✓
University of California, San Diego	✓		✓	✓		✓	✓	✓		✓	✓	
University of Colorado	✓			✓		✓				✓	✓	✓
University of Dayton	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
University of Evansville	✓			✓		✓					✓	
University of Hartford	✓	✓		✓	✓	✓	✓			✓	✓	
University of Houston	✓		✓	✓	✓	✓	✓			✓	✓	✓
University of Idaho	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
University of Kentucky	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	
University of Miami-Coral Gables	✓	✓		✓	✓	✓	✓	✓	✓		✓	✓
University of Michigan	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓
University of Mississippi	✓		✓	✓		✓					✓	



Schools/universities who have indicated that they do not provide the full curricula as proposed by the NCSEA Education Committee, continued.

University	Analysis 1	Analysis 2	Matrix Methods	Steel Behavior and Design 1	Steel Behavior and Design 2	Concrete Behavior and Design 1	Concrete Behavior and Design 2	Timber Behavior and Design	Masonry Behavior and Design	Dynamic Behavior and Design	Foundation Mechanics / Soils	Technical Writing
University of New Mexico	✓			✓	✓	✓	✓			✓	✓	✓
University of North Dakota	✓		✓		✓			✓	✓		✓	✓
University of Oklahoma	✓			✓		✓		✓	✓	✓	✓	✓
University of South Alabama	✓			✓		✓					✓	✓
University of Toledo	✓			✓	✓	✓	✓				✓	✓
Valparaiso University	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓
Virginia Tech	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓
Worcester Polytechnic Institute	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	

The following is a list of schools/universities who did not respond directly to the 2013 survey, and do not list the full range of courses which comprise the full curricula (as determined by a review of the school's website).

- Alabama A&M
- Arkansas State University
- Berkeley University of California
- Blue Mountain Community College
- Bradley University
- Brigham Young University
- Broome Community College
- Brown University
- Cal State Long Beach
- Cal State University - Northridge
- California Tech
- California State University - Fullerton
- California State University - Los Angeles
- Carnegie Mellon University
- Case Western Reserve University
- Catholic University of America
- Central Connecticut State University
- Central Piedmont Community College
- Christian Brother University
- Cincinnati Technical College
- The Citadel
- City University of New York
- Clarkson University
- College of San Mateo
- Cornell University
- CSU Chico
- District of Columbia University
- Drexel University
- Fairleigh- Dickinson University
- Fairmont State University

- Florida Institute of Technology
- Georgia Institute of Technology
- George Washington University
- Georgia Southern University
- Horry-Georgetown Technical College
- Howard University

- Iowa State University
- Johns Hopkins University
- Lakeland Community College
- Lamar University
- Louisiana State University

continued on next page

Suggested Course/Curricula

Course	Semester Credit Hours Suggested	Comments
Analysis 1	3	
Analysis 2	3	
Matrix Methods	3	
Steel Behavior and Design 1	3	Including code application
Steel Behavior and Design 2	3	Including code application
Concrete Behavior and Design 1	3	Including code application
Concrete Behavior and Design 2	3	Including code application
Timber Behavior and Design	3	
Masonry Behavior and Design	3	
Dynamic Behavior and Design	3	
Foundation Mechanics / Soils	3	
Technical Writing	3	



Schools/universities who do not list the full range of courses which comprise the full curricula, continued.

Louisiana Tech University
 Loyola Marymount University
 Manhattan College
 Massachusetts Institute of Technology
 Merrimack College
 Metropolitan State College
 Miami University
 Michigan State University
 Middlesex County College
 Mississippi State University
 Missouri Western State University
 Morgan State University
 Murray State University
 Nassau Community College
 North Carolina A&T State University
 North Dakota State University
 Northwestern University
 Norwich University
 Oregon Institute of Technology
 Penn State
 Pennsylvania State University- Dunmore
 Polytechnic Institute of New York University
 Portland State University
 Prairie View A&M University
 Pratt Institute

Princeton University
 Purdue University
 Rice University
 Roger Williams University
 Rowan University
 San Diego State University
 San José State University
 Sandhills Community College
 Seattle University
 South Carolina State University
 Southern Illinois University
 Southern Methodist University
 Southern Polytechnic State University
 Stanford University
 Swarthmore College
 Syracuse University
 Temple University
 Tennessee State University
 Tennessee Tech University
 Texas A & M University
 Texas Tech University
 Tulane University
 United States Air Force Academy
 United States Coast Guard Academy
 United States Military Academy - West Point

University at Buffalo, The State University of New York
 University of Akron
 University of Alabama - Birmingham
 University of Alabama - Huntsville
 University of Alaska Fairbanks
 The University of Arizona
 University of California, Los Angeles
 University of Central Florida
 University of Cincinnati
 University of Colorado
 University of Connecticut
 University of Delaware
 University of District of Columbia
 University of Hawaii
 University of Hawaii Manoa
 University of Illinois at Chicago
 University of Illinois at Urbana-Champaign
 The University of Iowa
 University of Louisville
 University of Maryland
 University of Massachusetts Amherst
 University of Massachusetts Dartmouth
 University of Massachusetts Lowell
 University of Memphis
 University of Missouri
 University of Nebraska Omaha
 University of Nebraska-Lincoln
 University of Nevada, Reno
 The University of New Orleans
 University of Notre Dame
 University of Oregon
 University of Pennsylvania
 University of Pittsburgh
 University of Pittsburgh Johnstown
 The University of Rhode Island
 University of South Carolina
 University of Southern Indiana
 University of Tennessee - Knoxville
 University of Tennessee - Martin
 The University of Texas at Arlington
 University of Texas at El Paso
 The University of Utah
 University of Virginia
 University of Wisconsin - Platteville
 Utah State University
 Vanderbilt University
 Villanova University
 Virginia Military Institute
 Walla Walla University
 Washington State University
 Wayne State University
 Wentworth Institute of Technology
 West Virginia University Institute of Technology
 Western Kentucky University
 Widener University
 Youngstown State University

PHOTO BY: DAVID WAKELY



AIA San Francisco Chapter Integrated Project Delivery Award

PALO ALTO MEDICAL FOUNDATION



Seattle • Tacoma • Lacey • Portland • Eugene • Sacramento •
 San Francisco • Walnut Creek • Los Angeles • Long Beach •
 Pasadena • Irvine • San Diego • Boise • Phoenix • St. Louis •
 Chicago • New York

www.kpff.com

ADVERTISEMENT - For Advertiser Information, visit www.STRUCTUREmag.org