A Multidisciplinary Senior Design Project: Redesigned to Increase Interdisciplinary Interaction .......................................................... 7979
Steven G. Nordamp
Multidisciplinary Engineering Student Projects ......................................................... 7992
Matthew A. Dettman, Walter L. Colet

M653 – ASSESSING STUDENTS AND PROGRAMS

Mentoring with Index Cards: An Early Introduction to Formative Assessment for New Faculty ........................................................................... 7999
John K. Ezell, Nathaniel Bird, Firas Hassan
A Streamlined Approach to Developing and Assessing Program Educational Objectives and Program Outcomes ........................................ 8008
Christina Mele Weissbrod, William Schonberg
Interdisciplinary Sustainability Design and Development Education: Research, Development, and Discovery ........................................... 8031
Ronald Scozzari, Jennifer Astwood, Jennifer Astwood
M656 – SPECIAL SESSION CELEBRATING THE 10TH ANNIVERSARY OF THE MATE INTERNATIONAL ROV COMPETITION

Underwater ROVs in Pre-College Education: University-K12 Partnerships that go Beyond the Competitions
Douglas S. Oppen, Valerie Treusch, Jean Kampshe
The MATE International ROV Competition: A University Perspective
Thomas R. Consolino
Evaluating the Impact of an Underwater Robotics Competition: Questions, Methodologies, and Findings
Candace Mann
MATE ROV Competitions: Providing Pathways to the Ocean STEM Workforce
Jill M. Zande

M664 – SE CAPSTONE DESIGN PROJECTS, PART II

Improving Team Learning in Systems Design
Colin J. Neill, Joanna P. Dufrenco
SE Capstone: Integrating Systems Engineering Fundamentals to Engineering Capstone Projects: Experiential and Active
Steven Carrol, Chuan H. Dagi, Ivan G. Guardiola
Enhanced Airport Management Information System for Small and Medium-Sized Airports: A Systems Engineering Capstone Design Experience
Rahul P. Babicame, Daniel Rucker, Housam M. Al-Rizzo, Seanadr Mohan
Fostering Systems Engineering Education Through Interdisciplinary Programs and Graduate Capstone Projects
David R. Jacobs, John M. Colonomi, Richard G. Kohl
Hybrid Lessons in Multidisciplinary Senior Design: A Study
Jill M. Zande

T109 – BIOLOGICAL & AGRICULTURAL TECHNICAL SESSION II

Biology for First-Year Engineers, a New Course at Loyola Marymount University
Michael E. Manoogian
Integrating Biology and Engineering
Cindy Waters, Sanjiv Sarin
Biological Materials and Processes (BioMaP) Research Experiences for Undergraduates
Frankie Santos Lassman, Babaji Narasimhan, Monica H. Lannen, Corbin Lopez, Dimitri Lynette Jackson
Transatlantic Biosystems Engineering Curriculum and Mobility (TABE.NET)
Mary Leigh Wolfe, Nicholas M. Holden, Demetres Briasoulis, Francesco Ayuga, Giacomo Scaramuccia Mognozzi
Community Engagement in Biological & Agricultural Engineering
Marybeth Lima

T112 – PROJECT-BASED, INQUIRY-GUIDED, AND HIGH PERFORMANCE LEARNING ENVIRONMENTS: EFFECTIVE APPROACHES

Use of HiPcLE Approach in a Split-Level Chemical Engineering Elective Course
Adrienne R. Minerick
Assessment in the High Performance Learning Environment
Sharon G. Salter, Pedro E. Arce
Motivation and Engagement of Learning in the Cooperative Problem-based Learning (CPBL) Framework
Khaled Yousef, Syed Hameed Syed Hassaan, Mohammad Zamir-Jawad, Nor Farida Harun
An Inquiry-Guided Learning Approach to Process Integration, Simulation, and Economics
Lale Yettas, Mahmoud E. El-Halwagi, Hosseine A. Kheireddine
Team Building in a Project-Based Learning Course
Bernard J. Van Wic, Denny C. Davis, Paul B. Goller, Ashfaq A. Ansary, Baba Abdul
Student Teams: A Simulation or a Real Team Experience?
Joseph J. Biernacki

T113 – STATUS OF CE EDUCATION: TODAY & TOMORROW

What Does the Civil Engineering World Look Like? Let’s Show It by the Numbers
James J. O’Brien Jr., C. Ping Wei, Dion K. Coward
Today’s BSCE: A Survey of Credit Hour Requirements
Kenneth J. Fridley
Civil Engineering Master’s Programs: A Comprehensive Review of Types and Requirements
Jeffrey S. Russell, Juliana M. Rogers, Thomas A. Lannen, Dion K. Coward
The Civil Engineering Body of Knowledge and Accreditation Criteria: A Plan for Long-Term Management of Change
Stephen J. Ressler, Daniel R. Lynch
T115 - HARDWARE APPLICATIONS

An Instructional Processor Design Using VHDL and an FPGA
Ronald J. Hayne

Teaching Ground-Floor Digital Circuits to Pre-Engineering Students
Christopher R. Carroll

Computer Interface Innovations for an ECE Mobile Robotics Platform Applicable to K-12 and University Students
Alisa N. Gilmore, Jose M. Santos, Aaron Joseph Mills

The Chip Prototyping System
Gary Spivey

Hands on Programmable Logic Controller (PLC) Laboratory for an Industrial Controls Course
Steven F. Barrett, Anan L. Purdy, Cameron H. G. Wright

T121 - DESIGN TOOLS & METHODOLOGY I

IDEALS: A Model for Integrating Engineering Design Professional Skills Assessment and Learning
Denny C. Davis, Michael S. Trevisan, Howard P. Davis, Steven W. Beyeckin, Susanah Howe, Phillip L. Thompson, Jay McCormack, Patricia Bruckin, M. Javed Khan

Enhanced Concept Selection for Students
John Ferris, Hugh Jack

Tweaking Product Design and Development
Bill Crockett, Bruce Hamby

Safety Policies and Procedures for Engineering Design Courses
Junichi Kanai, Samuel Chiappe

An Expert System to Teach Engineering Students Sustainably and Creativity Design Method Selection
Pedro Renato Acosta, Rafael Gonzalez, Nee Vargas Hernandez

T122A - OPEN ENDED PROBLEMS AND STUDENT LEARNING

Moving Beyond Formulas and Fixations: Exploring Approaches to Solving Open-Ended Engineering Problems
Karen M. Burris, Larry J. Shuman, Mary Besterfield-Sacre

Improving Student Attainment of ABET Outcomes Using Model-Eliciting Activities (MEAs)
Amanda S. Fry, Monica E. Cordelia, Heidi A. Diefes-Dux

Evaluating Student Responses in Open-Ended Problems Involving Iterative Solution Development in Model-Eliciting Activities
Amanda S. Fry, Monica E. Cordelia, Heidi A. Diefes-Dux

Student Responses to and Perceptions of Feedback Received on a Series of Model-Eliciting Activities: A Case Study
Nore Stromberg, Larry J. Shuman, Mary E. Besterfield-Sacre, Ron Goldstein

T122B - PERSISTENCE AND RETENTION II: CURRICULAR ISSUES

Retention: Quantifying the Apples and Oranges
Thomas F. Wolff, Steven M. Cramer, Barbara A. Masi

Time to Completion of an Engineering Baccalaureate at Texas A&M University
Margaret Hobson, Jaryn Kimball

Itasca CC Engineering Block Scheduling Model
Barb N. Johnson, Ronald R. Ullrich, Glen D. Hodgson, Ed Dumani, Glen Duane Hodgson

Learning in Context: Recognizing Challenges and Rewards of Engineering Curriculum Reform
Aileen A. Dingwall, Lorrinete N. Fleming, Robbie Adams, Junaid A. Siddiqui

T123A - INNOVATIONS IN POWER ENGINEERING EDUCATION

Electric Energy and Power Educational Programs Development Symposium

A Modern Education Power Electronics Laboratory to Enhance Hands-on Active Learning
Nicholas Czad, Maryam Stacefield, Rohit Sherry

Smart Grid development in Electrical Distribution Network
Saeed Saeid Minaei, Nipun M. Patel, Jesse Curr, Yew Cheong Tan, Christopher John Bolton, Bryan Scott Watkins

An Active Power Factor Correction Laboratory Experiment for Power Electronics Course
Dale S. L. Dolan, Tadak Tanhki
A Design of Sustainable Energy Laboratory
Linfeng Zhang, Xingguo Xiong, Navaran Gupta

Implementation of Laboratory-Based Smart Power System
Vahid Soley Pour Mehr, Ali Meiloomadeh, Osama A. Mohammed, Juan Francisco Fernandez, Javier Parra

T123B – TEACHING ANALOG AND DIGITAL COMMUNICATION: NOVEL IDEAS FOR LECTURE COURSES, LABORATORIES, AND PROJECTS

Accelerated Undergraduate Research Experience in Cognitive Radio Communications
Ratchaneekorn Thanvichai, Tonya Smith-Jackson, Carl B. Dietrich Jr., Tamal Bose

Wireless Communication Systems: A New Course on the Wireless Physical Layer with Laboratory Component
Bruce E. Dunne, Codie Wilson

Analog and Digital Communications Laboratory Experiments Using Emona TIMS
Jay Wierer, Edward W. Chandler

Digital Communication Systems Education via Software-Defined Radio Experimentation
Alexander M. Wyglinski, Daniel J. Cullen