College of Engineering Laboratory Adoption Initiative (CELAI)

"Adopt a Lab Campaign"

For

Civil & Environmental Engineering Program
Electrical Engineering Program
Electronics Engineering Technology Program
Mechanical Engineering Program

Contact Person

Dr. Habib P. Mohamadian
Professor & Dean
E-mail: mohamad@engr.subr.edu

College of Engineering
Southern University and A&M College
Baton Rouge, LA 70813

Website: http://www.engr.subr.edu

Phone: (225) 771-5290 Fax: (225) 771-5712

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Introduction

A key element of success for U.S. engineering education lies in its effective preparation of students to address the challenges of increased efficiency and productivity in preserving the quality of national life and the environment. Many industry clients and educators express their concern that engineering students are not well prepared for entry into the workforce. Some deficiencies pointed out by the pundits include student's lack of:

- understanding of the role of an engineer in corporate organization;
- effective verbal and written communication skills;
- teamwork and team building experiences;
- hands-on experiences with engineering processes; and
- comprehension of design projects that are subjected to the constraints of cost, reliability, and maintainability.

One area of concern, namely, the lack of hands-on experience can well be imparted to the students by performing engineering experiments in state-of-the-art laboratories.

The College of Engineering at Southern University is focused on providing innovative pedagogical techniques covering the fundamentals of engineering principles and applications. One way of accomplishing the preparation of undergraduate engineering students is to integrate curriculum core courses with laboratory-based experiences associated with each of these courses. Program offerings in the college are comprised of four year programs in civil engineering, electrical engineering, electronics engineering technology, and mechanical engineering leading to a Bachelor of Science degree. Each program offers a comprehensive curriculum covering courses and laboratories in their respective sub-disciplines. However, as a result of rapid technological advances and frequent operating budget shortfalls, there is a critical funding need to support and strengthen our instructional effort. The needs for college laboratories and management of the College of Engineering Laboratory Adoption Initiative (CELAI) are explained in this brief.

Adopt –A- Laboratory Concept

The CELAI solicits sponsorships from industry to help support one or more instructional enhancement efforts. The sponsored contributions may be in-cash or in-kind, preferably in multiple units of $5,000 per year, per adopted activity. Sponsors will be acknowledged by 1-point per $5,000, or equivalent, of support. A scoreboard reporting sponsors and sponsorship points will be published regularly. A laboratory may be adopted with a minimum of one sponsorship point per year. Any laboratory that is fully adopted may be named after sponsoring organization, as long as the sponsorship remains current.

Contact Person

To adopt a laboratory, fully or partially, interested industry sponsors are requested to contact the appropriate college contact person. Dr. Habib Mohamadian, who is the Dean of the College of Engineering, is the contact person for CELAI. He will provide

you with details on any specific laboratory needs, desired activities, and expected outcomes.

Needs Categories

The CELAI needs and activities are grouped in four general categories:

Laboratory Maintenance- Funds are needed to supplement departmental budget to maintain existing laboratories in operational condition. A list of all equipment and instrumentation associated with each laboratory is available for each laboratory. Maintenance cost is calculated based on 5% of total cost of the equipment and instrumentation in a given laboratory.

Matching Funds for Equipment and Software- The National Science Foundation provides support for the development of experiments and laboratory curricula under the Instrumentation and Laboratory Improvement (ILI) program. ILI provides matching grants in the range of $5,000 to $100,000 for instrumentation that serves as the basis for undergraduate instructional improvement. The faculty focal in charge of a lab will submit a proposal to NSF and upon acceptance of the award, the lab adopter will provide all or part of the required matching fund.

Courseware Development- New laboratory courses should be developed to address the technological changes that engineering educators face constantly. Through release time, a faculty member may be assigned to develop new laboratory courseware or to integrate current research activities into the undergraduate curriculum. Both the development and implementation of such laboratory courseware, particularly in multi- and interdisciplinary concepts, are long overdue. The sponsor will agree to buy a quarter release-time for the faculty focal who will participate in this activity.

Faculty/Staff Development- Training of the faculty and staff is an essential part of developing teachers who are prepared to employ the most effective pedagogical methods and technological advances in laboratory development and instruction. The contribution in this area is possible by sponsoring faculty or staff members to attend training workshops or educational conferences.

Educational and Research Laboratories

The College of Engineering has 58 active laboratories that support both instruction and ongoing research projects. The research laboratories have been developed through funding by research projects, as a result of faculty participation in research activities. An impressive number of undergraduate students, who are involved directly in research, benefit from these facilities by gaining valuable hands-on experiences. Table -1 thru Table -4 provides a snapshot of current laboratory sponsorship status, along with faculty focal. Many of these laboratories are up for adoption and the specific needs for each laboratory are separately provided. Also, faculty members may be supported to visit sponsoring industries to assess desirable technological advances, related to engineering education, and to identify which are prime candidates to be transferred to instructional laboratories.

Table -1 List of Educational and Research Laboratories and Faculty Focal for Mechanical Engineering Department, Dr. Samuel Ibekwe, Chairman

No	Laboratory	Faculty Focal	Industry Adopter
1	Aerospace	Dr. P. Mensah	
2	Composite Materials Processing	Dr. E. Woldesenbet	Raytheon Company
3	Computer Aided Design (CAD-I)	Dr. C. Wang	Shell Chemical
4	Computer Aided Design (CAD-II)	Dr. P. Razi	
5	Computer Aided Design (CAD-III)	Dr. H. Mohamadian	hp invent
6	Computer Aided Engineering (CAE)	Dr. H. Mohamadian	DELPHI Driving Tomorrow's Technology
7	Computer Integrated Manufacturing (CIM)	Dr. G. Joshi	
8	Corrosion	Dr. R. Diwan	DOW
9	Engineering Materials Selection	Dr. R. Diwan	ExxonMobil
10	Fluid Mechanics	Dr. C. Huang	Pratt & Whitney A United Technologies Company
11	Heat Transfer	Dr. P. Mensah	BASF
12	Internal Combustion Engines	Prof. E. Blevins	
13	Manufacturing Processes	Dr. G. Joshi	Procter&Gamble
14	Mechanical Testing	Dr. S. Ibekwe	ConocoPhillips
15	Instrumentation & Measurement	Dr. P. Mensah	Ford
16	Mechatronics	Dr. A. Jana	DUPONT The miracles of science
17	Model Shop & Design	Dr. S. Ibekwe	BOEING The Boeing Company
18	Alternative Energy	Dr. Chen	3M Company

Table -2 List of Educational and Research Laboratories and Faculty Focal for Civil & Environmental Engineering Department
Dr. Patrick Carriere, Chairman

No	Laboratory	Faculty Focal	Industry Adopter
1	CAD	Dr. Weatherton	
2	Concrete	Dr. Wang	PSI ENGINEERING
3	Structures	Dr. Azene	
4	Surveying	Prof. Sabbour	CN NORTH AMERICA'S RAILROAD
5	Environmental Testing	Dr. Onu	
6	Environmental Analytical	Dr. Onu	Shaw® The Shaw Group Inc.® **
7	Environmental Water Chemistry	Dr. Carriere	Shaw® The Shaw Group Inc.® **
8	Water Resources	Dr. Joseph	CZAR * *
9	Geotechnical	Dr. Alshibli	
10	Fluid Mechanics/Hydraulics	Dr. Carriere	Pratt & Whitney A United Technologies Company
11	Transportation	Dr. Wang	CN NORTH AMERICA'S RAILROAD

Table -3 List of Educational and Research Laboratories and Faculty Focal for Electrical Engineering Department
Dr. Pradeep Bhattacharya, Chairman

No	Laboratory	Faculty Focal	Industry Adopter
1	Power Systems Lab	Dr. Singleton	Entergy
2	Device Processing and Characterization Lab	Dr. Bhattacharya	
3	Electric Machines Lab	Dr. Singleton	
4	Pulse Circuits Lab	Dr. Majlesein	
5	Microprocessor Lab	Ms. McFarland	intel **
6	Electronics Lab	Dr. Shaban	
7	Senior Design Lab	Dr. Luo	Raytheon
8	Communications Lab	Dr. Smith	
9	Electrical Networks Lab	Dr. Majlesein	
10	Digital Logic Lab	Ms. McFarland	Launched by Motorola freescale semiconductor
11	Control Systems Lab	Dr. Luo	
12	Digital Signal Processing Lab	Dr. Majlesein	Texas Instruments
13	Electronic Materials and Processing Lab	Dr. Bhattacharya	
14	Advanced Telecommunications and Computer Networking Lab	Dr. Raife Smith	ADTRAN

** Under Consideration

Table -4 List of Educational and Research Laboratories and Faculty Focal for Electronics Engineering Technology Department
Dr. Manjit Randhawa, Chairman

No	Laboratory	Faculty Focal	Industry Adopter**
1	DC Circuit Lab		
2	AC Circuit Lab		
3	Electronic Circuit Lab I		
4	Electronic Circuit Lab II		
5	Microprocessor Lab		intel.
6	Digital Logic Design Lab		Launched by Motorola freescale semiconductor
7	Senior Electronics Design Project Lab		Raytheon
8	Digital Communications Lab		Texas Instruments
9	Linear Integrated Circuit Lab		
10	Electrical Machinery Lab		
11	Computer Assembly, Maintenance, Repair Lab		Entergy **
12	Digital Communication Lab		ADTRAN
13	Data and Computer Communications Lab		
14	Computer Networking Lab		
15	Fiber Optics Communications Lab		

**Under Consideration