

ENGINEERING NEWS

MARCH 2005

Dean's Corner



Dr. Ray Mankbadi

Colleagues, included in this newsletter is more exciting news from the ERAU College of Engineering in Daytona Beach. The Mechanical Engineering degree is the newest addition to the offerings in the College and a description of the degree and focal areas are included from the Chair. Courses in Mechanical Engineering have already been offered in the past year as technical electives to Aerospace Engineering students and have proven a popular option for broadening the breadth of engineering topics available to students. In addition, faculty have helped introduce Mechanical Engineering to students through projects like the SAE Mini Baja and the Miss Ta Fire jet dragster.

ERAU and the College of Engineering pride themselves on providing quality education to undergraduate and graduate students. A short summary of the College activity focuses on defining quality teaching that leads to defining measures for assessing quality in the classroom. Enjoy the newsletter and feel free to forward it to others who may be interested.

Mechanical Engineering Degree Program is coming to the Daytona Beach College of Engineering

The academic committee of the Board of Trustees has approved a mechanical engineering degree program, which will become available on the Daytona Beach campus in Fall 2005. The proposed program has cleared many hurdles toward its final approval, which will occur when the entire Board of Trustees meet in April.

Mechanical engineering, a discipline as old as engineering itself, is an exciting and fascinating study, in spite of having been around for thousands of years. Mechanical systems span the spectrum from the largest behemoths to systems so small (nano-scale), that their components involve a handful of molecules.

A number of additions to the College of Engineering will take place and have already taken place in preparation for the arrival of Mechanical Engineering. Faculty have worked to define focal areas in addition to the required courses needed for accreditation. The focus areas in the ERAU Mechanical Engineering degree will include:

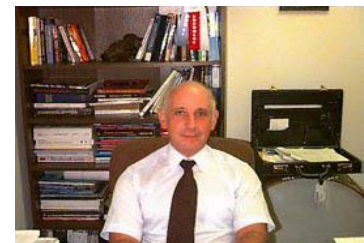
- High Performance Vehicles
- Robotics



Courses in Mechanical Engineering are planned for the Fall 2005 semester, including degree courses and technical

electives for other engineering degrees on campus.

The first year of the curriculum is common with all engineering degrees, with students exposed to introductory Engineering topics or part of the common Introduction to Engineering success course. The second year of the ME degree is identical to aerospace engineering curriculum, providing a sound base in the core engineering courses. The commonality allows flexibility for students choosing degrees without loss of academic credits.



Dr. Al Helfrick

A number of student projects, such as the Mini Baja team car and other performance vehicle projects, will have advisors who are Mechanical Engineering faculty. Already faculty have brought topics, projects, and speakers to the university to introduce ME to the Daytona Beach campus.

The Mechanical Engineering program is housed in the Engineering Sciences department, and any information relative to the program can be obtained by contacting the department chair.

By Dr. Al Helfrick ■

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High Performance Vehicles - New Ground For ERAU Students Jet Dragster "Miss Ta Fire"



"Miss Ta Fire" on ERAU campus

The Mechanical Engineering program at ERAU uses projects that provide applied design experience. Collaboration and multiple disciplines work through faculty and students to form a unique learning experience for students. Modifications for the Jet Dragster is an undergraduate student project to fulfill objective in vehicle dynamics, aerodynamics, structure, and stability.



The dragster, designed and built by owner Chris Larsen, is capable of traveling from zero to 60 mph

in one second, pulling five positive g's and reaching 270 mph at the quarter mile. In less than six seconds the quarter-mile run is over with the dragster out-accelerating the space shuttle. A Pratt & Whitney J-60 jet engine once used on a Navy T-2 Buckeye Fighter Trainer powers the "Miss Ta Fire."

With the afterburner the engine produces 6,500 pounds of thrust. Burning Jet-A fuel with a consumption of 30 gallons per quarter-mile pass, the weight of the car with fuel and driver is 1,800 pounds.

A 12-foot-diameter parachute is used for stopping, pulling seven negative g's when the parachute is deployed.

A team of 12 undergraduate Aerospace Engineering students modeled the

car in CATIA, an advanced drafting and 3D modeling software. Computational Fluid Dynamics (CFD)



analysis on the current configuration is being completed using Star-CD to enhance performance will be formulated and the owner will

Dr. H.K. Nakhla

oversee implementation of the findings. After modifications are implemented, further analysis will assess the before-and-after performance. Embry-Riddle's continued research involvement with race cars and Jet Dragsters will be a focal area of ERAU's new degree in Mechanical Engineering.

By Dr. H.K. Nakhla

SAE Mini-Baja Competition



The College of Engineering supports and encourages student involvement

in professional organizations and engineering activities.

The highlight group for this newsletter is the SAE student



Dr. D. White

chapter led by Dr. Darris White who came to ERAU in Fall of 2004 with a Ph.D. in Aerospace Engineering from University of Colorado.

He has 8 years experience with the SAE Baja competition and leads a team of 10 students representing senior, junior, sophomore, and freshmen students. This will be the club's first year designing, building, and competing in the Mini-Baja competition. The team is exhilarated by the chance to gain real-world engineering experience and develop their teamwork, leadership, and business skills.

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Research Groups at the College of Engineering “Dependable Software Systems”

Dependable Software Systems is one of the Research Groups in the Department of Computer and Software Engineering. Software Quality, Real-Time Software Tools, Model Based Development and Verifications, and Software Architecture are the main areas of the group’s specialization.



Dr. Kornecki - Since 1999 he has engaged in research sponsored by the medical industry on methodologies supporting the development of dependable software for safety-critical

environments using a model-based development paradigm and tools with an automatic code generation feature. The research has helped industry to improve safety process in the development of software-intensive medical systems.

Since 2002 Dr. Kornecki has been engaged in FAA-sponsored research on real-time safety-critical software development tools evaluation. He is collaborating with European partners on research related to active safety in embedded airborne systems and delivering industrial training on real-time software for FAA Aircraft Certification Services. The research is exploring the discrete and continuous simulations for assessment of real-time databus architectures.

Selected Publications in 2004

- Kornecki, A., Zalewski, J., (2004), “Criteria for Software Tools Evaluation in the Development of Safety-Critical Real-Time Systems,” Proceedings of 28th PSAM7-ESREL’04 Conference, Berlin, Germany, June 2004
- Kornecki, A., Gluch, D., Seker, R. Kameli, N., “Technology Transition and Safety Critical Research,” Proceedings of the 22nd International

System Safety Conference, System Safety Society, August 2004

•Kornecki, A., Erwin, J., “Characteristics of Safety Critical Software,” Proceedings of the 22nd International System Safety Conference, System Safety Society, August 2004

•Kornecki, A., Hall, K., “Approaches to Assure Safety in Fly-by-wire Systems: Airbus vs. Boeing,” Proceedings of the Eighth IASTED International Conference on Software Engineering and Applications (SEA 2004), ISBN: 0-88986-427-6, MIT, Cambridge, MA, November 2004



Dr. Gluch - His research is focused on model-based software engineering (MBSE) of complex systems with a focus on high dependability performance-critical systems. MBSE integrates

formal methodologies into software systems design and analysis. His current work centers on the application of the SAE Architecture Analysis and Design Language (AADL) standard. Model-based software engineering techniques ensure predictable performance and reliability and enable efficient verification of software-dependent systems.

Selected Publications in 2004

- Hong Liu, David P. Gluch, “Query Generation Guidelines for Statecharts within Object-Oriented Designs,” Proceedings of IASTED International Conference on Advances in Computer Science and Technology, November 22-24, 2004.
- Feiler, P.; Gluch, D.; Hudak, J.; Lewis, B., “Embedded Systems Architecture Analysis Using SAE AADL,” Pittsburg, PA: Software Engineering Institute, Carnegie Mellon

University, Technical Note: CMU/SeI-2004-TN-005, June 2004.



Dr. Tadayon - His research focused on Neural Network, Software Cost Estimation, and Software Process Improvement within the Dependable

Software Systems research group.

Selected Publications in 2004

Tadayon, N., “Software Engineering based on the Team Software Process With Real World Project,” Proceedings of Consortium in Small Colleges (CCSC 2004), April 2004.

Tadayon, N., “Adaptive Dynamic COCOMO II in Cost Estimation,” Proceedings of International Multi-Conference in Computer Science and Computer Engineering, June 2004.



Dr. Towhidnejad - His research is focused on software quality assurance and testing research. His research helps industry and academia to incorporate activities that

will result in better quality software, within time and budget allocations. Areas of expertise include software process improvement, software measurements, software testing, and software quality practices.

Selected Publications in 2004

- “Quality Metrics,” Invited talk at VERITAS Corporation, Testers Conference, Heathrow, Florida, October 26-29, 2004
- “Disciplined Software Quality Practices,” Invited talk at Center for Computing Research Workshop, Mexico City, Mexico, September 1-3, 2004. ■

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Sneak Preview Day at the Daytona Beach Campus

Sneak Preview Day, formerly the Spring Accepted Student Open House, is scheduled for Saturday, April 2. The event will start at 8:30 a.m. with activities planned throughout the day. Prospective students and families are invited to attend to learn more about ERAU, the College of Engineering degrees, and life on campus, to meet faculty and students, and to tour the campus.

The College of Engineering is having informational sessions on every degree, in which faculty and current students will give demonstrations of the life of an engineering student. For those students still exploring the degrees the College of Engineering offers, the first-year engineering faculty will present sample projects that show how all degrees are introduced to students in their first semester

on campus. Faculty, graduate students, and lab assistants will be present to give lab tours and demonstrations and to answer questions.

For more information on the Sneak Preview Day or admissions, email the admissions department at dbadmit@erau.edu or phone 800-862-2416. ■

What is “quality teaching”? Can anyone really define it or come up with a means to measure it? Certainly many have tried. It is more than simply a particular method of presenting the material (although that is an important part). Perhaps it is like trying to measure what constitutes a “good artist” since each individual instructor brings something special to the classroom environment that may be difficult to define or measure. The Aerospace Engineering (AE) Department Chair, Dr. Habib Eslami, being concerned about maintaining quality teaching in all engineering courses, formed the AE Teaching Effectiveness Committee to look into the matter. The committee consisted of Dr. Habib Eslami, Dr. Howard Curtis, Professor Charles Eastlake, Dr. Tej Gupta, Dr. Eric Hill, Dr. Lakshmanan Narayanaswami, and Dr. Frank Radosta (chair). The committee agreed that the items listed below are necessary qualities for a good teacher.

Qualities of a Good Teacher

Dedication

- ◆ Is committed to teaching.
- ◆ Is hard-working and is willing to go the extra mile.
- ◆ Continually seeks ways to improve and innovate.

Knowledge

- ◆ Has a thorough knowledge and understanding of the subject matter.

Quality of Teaching



- ◆ Keeps current in the field (by reading appropriate literature, attending conferences/ short courses/ workshops, doing research, etc.).

Enthusiasm

- ◆ Is enthusiastic and passionate for the subject matter.
- ◆ Is an inspirational role model for students.

Course Delivery

- ◆ Presents complex subject matter at a level the students can understand.
- ◆ Covers all the material in the catalog description and the course-monitor-approved syllabus for the course.
- ◆ Brings practical examples into the classroom using photos, drawings,

models, etc., and endeavors to relate the material to everyday real-world situations.

- ◆ Where appropriate, teaches the use of modern technology (e.g., software, hardware, etc.) that will

be beneficial for the student in industry.

- ◆ Grades fairly and avoids grade inflation.
- ◆ Attempts to make up missed classes (by scheduling an exam, having an appropriate video shown, finding a substitute, etc.).

Classroom Behavior

- ◆ Is well-prepared for class and presents the material in an organized manner.
- ◆ Acts professionally and behaves appropriately in class.
- ◆ Begins and ends the class on time.
- ◆ Encourages students to ask questions and is receptive to their opinions.

Relationship with Students

- ◆ Is available during office hours and welcomes students when they come.
- ◆ Is eminently approachable and able to empathize with students.
- ◆ Treats all students fairly and with respect, kindness, and courtesy.

All faculty teaching engineering courses will be encouraged to strive to implement the items listed above in their courses. After receiving the findings of the AE Teaching Effectiveness Committee, the dean of the College of Engineering, Dr. Reda Mankbadi, has subsequently formed a college-wide committee called the COE Quality Committee to look at quality in the entire college.

By Dr. Frank Radosta ■

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Order of the Engineer, Charter Ring Ceremony



The Charter Ring Ceremony for the Order of the Engineer was conducted in the Miller Instructional Center Auditorium at Embry-Riddle on Saturday evening, Feb. 12. Embry-Riddle's first ring ceremony, hosted by the American Society of Civil Engineers, was conducted by Order members: Mark D. Van Hala, P.E., FES, ASCE; Eyad S. Batarseh, E.I.; Nicole Berge, E.I.; and Karishma R. Desai, E.I. Thirty-three engineers were inducted into the Order when they took the ring and swore a formal public oath to uphold the standards and dignity of the engineering profession. Each inductee now wears a stainless steel ring on the fifth finger of the working hand as a symbol and reminder of the Order's Obligation.

The Order of the Engineer was formed in the 1960s by Ohio engineers who wanted to recognize the basic principle that the primary purpose of engineering is service to the public as well as to promote a feeling of fellowship between all engineers. The Order's Obligation is a formal statement, similar to that of the National Society of Professional Engineers Creed and the Hippocratic Oath that all medical professionals take, of the engineer's responsibilities to the

public and the profession. The engineer's ring in the United States is made of stainless steel and worn on the fifth finger of the working hand. It is a symbol and visual reminder of the engineer's Obligation (www.order-of-the-engineer.org).



This charter ceremony was the catalyst for Embry-Riddle to become a "Link" of the Order of the Engineer. ERAU is now one of over 200 Links scattered across the United States. Many thanks go out to Sheri Heshemi, Shane Coulter, Richard Endrzejewski, and Christa Barnhart for their help with the ceremonial ring and to the American Society of Civil Engineers Student Chapter for hosting the ceremony. In the future, Embry-Riddle will host one ceremony each semester, which will be open to all engineers within two semesters of graduation, enrolled in, or a graduate of an ABET-accredited degree program, as well as to faculty and local engineers who hold a license as a Professional Engineer. The next ceremony will be held Friday evening in May 2005 before spring graduation.

For more information about the upcoming ceremony, or if you would like to be involved, contact Maura Riddel at riddec@dca.erau.edu. ■



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