

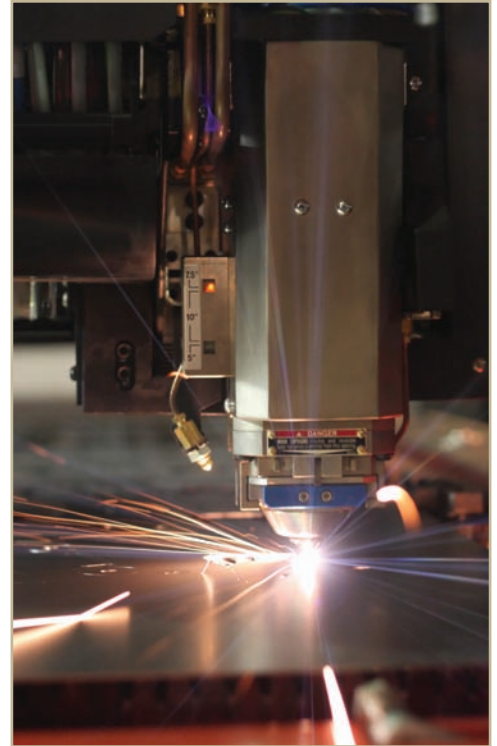
LEARN SYSTEMATIC DESIGN

The Certificate in Mechatronics Packaging is designed to help Boeing engineers get up-to-speed with Mechatronics, a systematic design approach for advanced electromechanical systems. Mechatronics is the synergistic combination of mechanical engineering, electronics, control engineering, and computer science. These areas are integrated through a systematic design process. Mechatronics products include many devices to control: heat; attitude and orbit; electrical power; telemetry and telecommand; as well as sensors and actuators. Enhanced performance, faster operation, and smaller sizes are the characteristics of typical Mechatronics systems. As a result, Mechatronics can be regarded as the multidisciplinary technology that is the foundation for future smart components, systems, and factories.

The Certificate in Mechatronics Packaging consists of four classes totaling 144 hours of lecture and hands-on experience. The certificate graduate will receive 14.4 Continuing Education Units

This program is suitable for all types of Boeing engineers: mechanical, electrical, design and robotic. It is also beneficial to engineers and managers who wish to accept leadership roles in multi-disciplinary engineering projects. Engineers with the enhanced knowledge developed in this program will be in an excellent position to become team leaders or engineering managers. Upon completion of the program students will be able to:

- Implement the latest techniques and tools
- Incorporate the best practices of Mechatronics up front in the design
- Understand control systems and the fundamentals of Mechatronics
- Work with microprocessors and microcontrollers
- Build applications for data acquisition, measurement, testing and engineering control systems
- Maximize the use of engineering mathematics
- Optimize engineering design
- Work with simulation and manufacturing software
- Understand the basics of electronic packaging



These classes are offered onsite and real-time remote
For more information, contact Mimi Lawson: 657.278.3313, mlawson@fullerton.edu



THE CLASSES

OVERVIEW OF MECHATRONICS – ADVANCED SMART SYSTEMS

(48 hours/4.8 CEUs)

Prerequisite: B.S. in Engineering or equivalent. This course will introduce the concepts of automatic control system design, and implementation of analytical and computer optimization techniques to address engineering design problems. Students will develop an understanding of the modeling of engineering systems, measures of performance, stability and time domain analysis, the Root Locus Method, Bode diagrams, and state variable models. Additional topics will include sensors, actuators, programmable controllers, components for control systems, data acquisition and control. Use of computer simulations, case studies or advanced design applications will be integrated into lectures and demonstrations.

TEXTBOOK/MATERIALS

Required: Introduction to Mechatronics and Measurement Systems, 2007: ISBN 9780072963052. Students are responsible for obtaining the required textbooks - check Learning Together for information regarding "Reimbursements".

HANDS-ON MECHATRONICS

(36 hours/3.6 CEUs)

Prerequisite: Overview of Mechatronics – Advanced SMART Systems. In this hands-on laboratory-based course, students will learn about design and assembly of microprocessor-based mechanisms. Lab experiments encompass machine/high level programming, and interfacing of microcontrollers with sensors and actuators. Students will design and develop virtual instruments using LabVIEW programming environment. Opportunities will be provided to build applications for data acquisition, measurement, testing, and control of engineering systems.

TEXTBOOK/MATERIALS

Required: LabVIEW 2009 Student Edition: ISBN 9780132141291. Students are responsible for obtaining the required textbooks - check Learning Together for information regarding "Reimbursements".

ENGINEERING MATHEMATICS REFRESHER

(30 hours/3.0 CEUs)

Prerequisite: B.S. in Engineering or equivalent. This course is geared toward providing the engineer with the mathematical tools needed to solve various problems encountered in Engineering. Included are mathematical modeling and analysis of simple engineering problems. Use of computer simulations, case studies or advanced mathematical applications will be integrated into lectures and demonstrations.

TEXTBOOK/MATERIALS

Required: Advanced Engineering Mathematics, 9th Edition, ISBN 978-0471726449. Students are responsible for obtaining the required textbooks - check Learning Together for information regarding "Reimbursements".

ELECTROMECHANICAL PACKAGING DESIGN AND ANALYSIS

(30 hours/3.0 CEUs)

Prerequisite: B.S. in Engineering or equivalent. This course is geared toward providing design engineers with the tools needed to understand how their designs will perform in various environments. Included are modeling, analysis, and design of simple electronic systems, and assembly operated in terrestrial and space environments. Introduction to thermal analysis and vibration analysis of electronic equipment will be covered. Use of computer simulations, case studies or advanced design applications will be integrated into lectures and demonstrations.

TEXTBOOK/MATERIALS

Required: Vibration Analysis for Electronic Equipment, 3rd edition ISBN 978-0471376859 Recommended Cooling Techniques for Electronic Equipment, 2nd edition ISBN 978-0471524519. Students are responsible for obtaining the required textbooks - check Learning Together for information regarding "Reimbursements".