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Previous Pre-Engineering Newsletters can be accessed at <http://www.kent-school.edu/academics/preEngineering.cfm>

FIRST BELL



Engineering and Public Policy

Pre-Engineering Field trip to Pratt & Whitney

A site visit to Pratt & Whitney by 15 students involved in Kent School's Pre-Engineering Program took place on Monday, September 19, 2011. Mr. Paul Lanzoni P'12 helped to arrange the field trip. The students were guided through the facility by Mr. Keith Lindstrom, retired Program Manager, Operational Commercial Engines. The tour began in the front lobby where there is a Wasp engine and other displays about the history of the company. The tour then moved to the large engine displays on the shop floor, where students were able to examine engines and ask questions pertaining to their functionality.



The PW4000 engines on display (see picture above) are divided into three distinct categories based on fan diameter.

The 1st category is the 2.4 m diameter fan with certified thrust ranging from 230 to 275 kN. It powers the Airbus A310-300 and A300-600 aircraft and Boeing 747-400, 767-200/300 and MD-11 aircraft. The 2nd category is 2.5 m diameter fan engine developed specifically for Airbus Industry's A330 twinjet. It has certified thrust from 287 to 305 kN. The 3rd category is the 2.8 m diameter fan engine developed specifically for Boeing's 777 (from http://en.wikipedia.org/wiki/Pratt_%26_Whitney_PW4000)

Next Field trip: Trip to Optiwind, a wind turbine factory in Torrington CT. Contact Dr. Nadire if you are interested in joining the trip.

Mr. Andrews spends a Summer at Fermi National Laboratory

Through the generosity of the Wentz Engineering Fund, Math Department Member and Wentz Fellow, Mr. Ulysses Andrews IV, was given the chance to spend 8 weeks as part of Fermi Laboratory's Teacher Research Associate (TRAC) program. The goal of the program is to give Science, Technology, Engineering, and Mathematics teachers the chance to explore fundamental science research using cutting-edge technology. The hope is that the experience will allow for the teachers to imbue their classrooms with a perspective that will encourage students to explore these fields in their college majors and future career choices. Mr. Andrews reported: "While at Fermilab I had the pleasure of working with Ping Tan, who is working on the Compact Muon Solenoid experiment in conjunction with the Large Hadron Collider at CERN. The experiment seeks to explore questions such as:

Where did any of the parts of the Standard Model of Physics originate?

Why does the model have the structure that it has?

What is the nature of sub-atomic particles?

Why do the particles have the masses that they have?

Why do particles have mass at all? Does the Higgs boson really exist?

Why is there more matter than antimatter in the universe?

How does the existence of Dark Matter and Dark Energy affect our understanding of the universe?

The experience was invaluable because it has given me a first-hand look at the average day in the life of teams of scientists. I believe that even the students who do not wish to pursue scientific research can benefit from the skillset and mindset that one typically brings to scientific enquiry. Ultimately, I hope and expect to make a greater contribution to the intellectual life of the community."

The Judith B. and Howard B. Wentz Jr. College Scholarship Prize in Pre-Engineering Established in May, 2011

Description:

The Judith B. and Howard B. Wentz Jr. College Scholarship Prize in Pre-Engineering recognizes the superlative academic achievement of motivated students who show a command of STEM fields, have shown a strong commitment to pursuing Pre-Engineering studies while at Kent, and intend to major in engineering while in college. The recipient is selected by the faculty on the basis of curricular and extra-curricular accomplishments related to the completion of Kent's Pre-Engineering Certificate.

Obama Signs Patent Update Legislation Into Law.

President Obama visited Thomas Jefferson High School for Science and Technology in Alexandria, Virginia, where he signed the America Invents Act, the first major change to US patent law in nearly 60 years. The [AP](#) (9/16, Superville) reported the legislation, "passed in a rare display of congressional bipartisanship, was hailed as a milestone that would spur innovation and create jobs." It "aims to streamline the patent process, reduce costly legal battles and give the US Patent and Trademark Office money to process applications faster."

[Bloomberg News](#) (9/16, Decker) reported National Economic Council Deputy Director Jason Furman said, "By creating a faster process for the approval of patents and reducing the amount of uncertainty, it will increase investment in the economy today and start creating jobs today."

[The Hill](#) (9/16, Siegelbaum) reported the Administration said the new law "will speed the patent process and spur job growth."

The [Seattle Post-Intelligencer](#) (9/16) reported online that the "biggest change is

that the US Patent and Trademark Office will now adopt a first-to-file system. Since 1835, patents have been granted to the first to invent, and the PTO has spent valuable time researching whether the technology in a patent application was already invented. With more than 1.2 million pending patents, the change to first-to-file should take a big burden off the system."

Workforce

Cisco Executive: Lack Of Women In Technology Will Hinder US Competitiveness.

[Bloomberg News](#) (9/17, Kucera) reported, "The lack of women in technology will hinder US companies' global competitiveness, leaving a valuable source of female workers untapped, Cisco Systems Inc. executive Kathy Hill said" Friday "at an Asia-Pacific Economic Cooperation conference in" California. "We need to unlock a vital source of growth that can power our economy in the decades to come, and that vital source of growth is women," Secretary of State Hillary Clinton said at the conference. "By increasing women's part in the economy and enhancing their efficiency and productivity, we can bring about a dramatic effect to the competitiveness and growth of our economies."

First Bell from ASEE is a service to the engineering & technology education community.

Pre-E COURSES at Kent

1) Structures: Design and Testing

Course Description:

Students build structures, test their strength and see how certain physical and mathematical principles contribute to the structural strength of a design. The analysis of design and of the performance of structures is from the point of view of materials science. It includes problems of form versus function. The practical consideration of strength versus cost is also studied. Prerequisite: Geometry and Algebra 2 & Trigonometry.

Highlights (Winter 2010-11):

Mr. Ulysses Andrews, who teaches the course reports: "Students really want to see how far they can go in the sense that they want to be free of constraints so that they can build the strongest structure possible. Quite a few times they wanted to have a budget so that they could research materials and build their structure out of different things. They were less interested in all using the same materials and letting their design and construction technique provide the results. Of the things that we did that they enjoyed, was figuring out what makes a structure stronger, and how to be creative with their design. They enjoyed the competitive aspect of it all. Many wanted their grade to be determined by how effective their structure was relative to their classmates rather than by how effectively they could analyze the performance of all of the structures. On testing days when we were seeing how effective a structure was in the earthquake machine or how much a structure could hold they spent 45 minutes grinning from ear to ear. Students who were less excited about reading and theory were thrilled to be able to do something with their hands and discuss strategies to problems."

2) Engineering Design

Course Description:

Engineering Design is a term-contained course which acquaints students with the principles and practice of design. It covers mechanical drawing and documentation, reverse engineering, design principles and design presentation (in both 2 and 3 dimensions). We live in a world surrounded by objects that have been intentionally conceived, designed, manufactured and assembled by other people. This course embraces two aims: to give the student greater appreciation and understanding of their designed world and to give the student an introduction to the skills inherent in the conception, design and manufacture of artifacts

Highlights(Spring 2011):

Mr. Mathew Austin, who teaches the course reports: "Projects included simple modeling, reverse engineering, a detailed look at the engineered features in (existing) inventions using primary sources, and a challenge to improve upon an everyday item. The students became campus celebrities when they were required to sit in one chair for a week and, though they hated the chair, they loved the project."

3) Manufacturing Engineering

Mr. Matthew Heslop, who designed the course, gives the following course description:

This course introduces students to manufacturing science and engineering and prototype part production. Manufacturing, and manufactured components, are all around us. Whether we are manufacturing golf clubs that will hit a golf ball farther than ever before, artificial hip stems that will improve the quality of life of a person with osteoarthritis, or monosteel pistons for heavy duty diesel engines, manufacturing and the things we manufacture was an important part of life yesterday, is today, and will be in the future.

This course complements the already existing Pre E courses at Kent School. It will be a term contained course. It makes use of our prototyping capabilities through the use of the 3D printer and CNC machining. Students are exposed to a lot of the creation of a product - the design aspect- in our Engineering Design and Structures courses. In addition, it answers the question of "how do I produce it, what materials do I need to produce the part, is the design too complex to manufacture, how can I improve on the design to increase manufacturability?"

By the end of the course, students will be able to

- o Understand how products are taken from 'art to part' using high performance machinery.
- o Identify manufacturing processes that work best for the different types of materials used and what manufacturing processes are best for the product being created
- o Accomplish at least 8 of the 11 criteria of student outcomes for accrediting engineering programs by ABET. In addition to those, an overview of what it means to be safe in an environment with heavy machinery.
- o Design, manufacture, test, and determine how to distribute their product.
- o Perform simple operations such as drilling, cutting, locating surfaces, finding dimensions in space when it comes to machining parts

Feel free to contact me if you need more information.

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