IE 655-851: Concurrent Engineering

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Dr. Ranky,

Loose, D.C. and Ranky, P.G.: A Case-based Introduction to IBM's Telematics Solutions; An interactive multimedia eBook publication with 3D objects, text and videos in a browser readable format on CD-ROM/ intranet by life.  


• Tools will play a larger role; just look at the millions of apps available now, following object-oriented development principles and very easy to use user interfaces. (In our course the eBook is built of web-browser compatible organizational, as well as IP (Intellectual Property) theft challenges of product development and delivery. It also raises the bar on cybersecurity.

...exercises based on the up-to-date articles I am sending you; all of this relates and helps you to innovate, collaborate and become a leader in this complex and rapidly changing world. And all of the above helps you to learn

Building products used to be simpler; although innovation was always hard. There were major limitations in the past; and still there are, nevertheless significantly less… just think of this: hardware products could only handle so

Customers today share opinions on-line in a matter of seconds, about all products all the time, around the world. As a result of this radical connectedness, hierarchies of communication have flattened the world, reshaped the

The world is changing rapidly… and those of us who don't want to accept change and cannot innovate for the better, will end up as followers… and will not be in leadership positions in engineering management, project

Examples of automotive companies taking the digital factory path in the U.S. include Maserati and Faraday Future (Faraday). Maserati teamed up with Siemens in launching the Maserati Ghibli in 2013 using a suite of

Educated labor force. Digital factories will need a large number of employees with degrees in science, technology, engineering, and mathematics (STEM) and the U.S. has one of the best workforces for meeting these

San Francisco, Seattle, and Boston. These clusters are crucial to the formation of talent pools necessary for all firms in the digital factory ecosystem and are supported by world-class educational facilities such as Stanford, the

digital factories to compete and win on a global scale. Among the advantages they see the U.S. as holding:

• Product lifecycle management (PLM) may sound like one of those deep-in-the-weeds business terms, but it has become one of the most important arenas for

It is truly amazing... Boeing, Toyota, Airbus, Honda, GM, Ford, Nissan, Renault Formula 1, and many others use it. It is the most powerful PLM system in the world. Boeing designs aircraft with it, the Dreamliner 787, and Airbus

Here is a very short video of a laboratory demo using our

present manufacturing needs without compromising the ability of future generations to meet their needs. In other words, the characteristic of green, sustainable advanced manufacturing is being able to

4. Learners need to participate actively in the learning process.

2. Start training / educating and socializing your people / students as you hire them / teach them,

The Toyota "human systems" consistently support and sustain high levels of performance... and this is exactly what I reward in this class too... why? ...because I would like you to become successful...

profession as a whole. Remember: Quality must be designed into every product, process and service system. The earlier you learn about quality focused concurrent engineering the better...

manufacturing and support to address defects, technology insertion, and evolving customer needs. The lack of integration in each phase results in inefficiencies, defect insertion, and limits the ability to assess change impacts

Ver. IE655 Fall 2020

is the big weapon now, that is not fully understood by many...
In the IE655 course we learn several well-established methods in-depth, such as quality function deployment, requirements analysis, collaborative concurrent engineering (and service) process modeling, process failure mode and effect analysis, etc. As an example, at a recent Design for Manufacturability conference in San Diego, CA, USA, the electronic engineering community expressed their views, that 'DFM / CE / PLM solutions have emerged to help designers to cope with the complexity of modern products.'

85% failure, therefore we really talk about saving 80% of $56 billion = $44.8 billion USA Dollars in the USA only. World-wide this figure is estimated to be several times this value. Imagine how many hungry kids we could feed with this saving!

It is also important to recognize, that as shown below, the cost of product design changes is extremely high. This is typical without deploying concurrent engineering/PLM methods. In the IE655 class, we learn methods, tools, and technologies to avoid dead-end paths and costly rework. The key then is to simulate these issues in advanced virtual (digital) environments and take decisions as early as possible (i.e., 'front loading').

Welcome to IE655: one of the most useful green engineering/engineering management, green PLM (Product Lifecycle Management) courses you'll ever take! Please read these notes and work hard on your assignments.

Contents

1. How to start a product development process/team?
2. What are the steps to follow for a product development process?
3. What are the key concepts of concurrent engineering?
4. What is the role of PLM in the product development process?
5. How to avoid dead-end paths and costly rework?
6. What are the benefits of using virtual environments for simulation?
7. What are the key decision points in the product development process?
8. How to prepare for the final exam?

Aim: The aim of this course is to provide you with a comprehensive understanding of product development processes and tools. The goal is to equip you with the knowledge and skills to design and develop successful products. You will learn how to effectively use the tools and techniques to meet the challenges of today's marketplace.

Dr. Ranky...

Happy Learning for REAL,

[Links to Siemens, NJIT, etc.]
Most early-stage companies have the first major growth problems at a level of about 15-25 employees and between $1 million and $2 million in revenue. This is the zone in which it is critical to begin to transition from raw processes to more systematic and structured approaches.

In particular, companies should focus on integrating various aspects of the business into a cohesive whole. For example, Concurrent Engineering (CE) is a philosophy that emphasizes collaboration and continuous improvement throughout the product development process. This approach helps companies to:

- Design products that meet customer needs
- Reduce costs and improve efficiency
- Increase productivity and reduce time to market
- Enhance product quality and reliability

CE is also widely known as Simultaneous or Parallel Engineering, and lately referred to as PLM (Product Lifecycle Management) reflecting the fact that in our modern world products and services are not just manufactured, but also widely sold and marketed. PLM is a holistic approach that addresses all aspects of a product's lifecycle, from design and development to manufacturing, sales, and service.

The collaborative companies are not included properly. Sorry, you MUST collaborate!

According to the USA-based Aberdeen Group, 1. A good, successful design is based on culture, created by progressive thinkers (i.e. HUMANS!), and the processes is not the best way to implement product lifecycle management (PLM) programs. In fact, it might be a recipe for disaster because computerization could simply speed up unproductive processes without improving their quality.

To overcome these challenges, companies must focus on extending their traditional internal structures to include external stakeholders in the development process. This requires a shift in thinking about how products are designed and manufactured, and how companies collaborate with other organizations and individuals.

For example, the extended enterprise refers to the network of companies and individuals involved in the creation and delivery of a product. By focusing on the extended enterprise, companies can gain a better understanding of the needs of their customers and stakeholders, and design products and services that meet these needs.

The course is supported by a comprehensive eLearning package (this pack is the same for live, hybrid and distance learning students) with some printed material, and several web-browser readable, open source 3D interactive tools. We further illustrate this concept with Dr. Peter Rayson's GICCA enterprise lifecycle curve (Technology Innovation Centre, University of Central England, Birmingham, UK).

Last, but not least do not forget your social networking content at the end of this assignment, as part of it.

How to collaborate on a design issue with a local and global team via email and video-conferencing, and the web.

How to front-load the entire product development process and gain over competitors?

How to start a product development process/team?

What is frontloading, and why is it critical to understand this process?

Also, show how your (real or made up) company can collaborate with the companies given you in your Learning Pack (there are 4 companies you have to collaborate with; to avoid process failures. Explain HOW...)

Explain in detail what your engineering management decisions will be based on the calculated results in the PFRA spreadsheet. This is VERY important!

A project is supported by a reasonable amount of funding. This amount of funding however is not continuous, rather it is recurrent, and needs to be determined. So, you have to focus on how and where this be reduced? Is this a sustainable lean and green product/process? You must convince me, I represent your venture capitalists/angels who will support your startup!

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Title, Author (Name, Class, Date, your eLearning Pack ID number, and the 4 collab. companies you have (a MUST!)

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More on how to collaborate with your eLearning Pack. You can use any resources, including what we have learned, the library, the web, your company, anything legal...
Part 2: 10% of PLM: PLM / Digital Design & Manufacturing and Sustainable Green Transition Plan for a company of your choice: The Main Body of the assignment: Now that you understand CE, PLM / Digital Design & Manufacturing and the four basic NPI & I methods, tools and technologies over the Internet, try to collect at least 10 URLs with a short explanation of the method they cover. This is what you should document professionally (pls. note that if you don't document it as below I won't be able to five you teh extra grade points; sorry):

- Concurrent Engineering Team management methods and issues (Rated: Very High)
- Rapid prototyping methods and solutions (Rated: Very High)
- KANRI, KAISEN, MUDA, MURA, MURI, POKA-YOKE (Rated: High, some did not know what this meant, so we are going to discuss it in detail)
- FMEA: The Failure Mode and Effect Analysis, or Process Failure Risk Analysis methodology and its use in CE (Rated: High)
- Object Oriented Concurrent Engineering Information System Models (CIMpgr, Object Oriented Process Modeling is explained and discussed through exercises and examples) (Rated: Very High, with the exception of one, rated low (3))
- Process modeling methods and examples (Rated: Very High)
- Process modeling the digital enterprise (Rated: Very High)
- Concurrent Engineering Methods, Tools and Technologies (Rated: Very High)
- eLearning Pack (Rated: Very High)
- Web-based syllabus (Rated: Very High)

References and Bibliography (Including books, articles, the Internet as a source of information, DVD-ROMs and the serial numbers you have used zillions of separate files please!)

- During the semester, I will email you several links to short technical articles, that are really important for you to follow and understand what is going on in the world in our subject area. This is particularly important to some foreign students who are not used to get their news via the Internet. You suppose to chose three of these articles (for every assignment, including this one, as well as the Midterm) and then discuss at least THREE (3) of them with at least one more member in your class, and then document your findings in your social networking part of EACH assignment. I would like to see that you are discussing the content of these articles. Usually in a semester I send out about 20-25 short and 4-5 long articles to discuss, you have documented with one or more of your classmates via e-mail, in-person, and/or video conferencing. These articles are all part of each assignment now and therefore should be documented in your web page as an executive summary, just as the rest of your assignments are. The detailed discussions of these articles could be saved on Moodle, or any media acceptable to me (or in a digital format). Your executive summary in your assignment should hyperlink to the detailed discussions (where ever you have stored them). All in one, nice object-oriented principle, not zillions of separate files please!

14. On social networking (including blogs, tweets, forum posts, microblogging, Facebook, YouTube, Twitter, LinkedIn, Instagram, WhatsApp, Instagram, Facebook, etc., including photos, videos, graphics, etc., from your local as well as a global perspective)

15. Appendices (if necessary):

- Document yo

- Footprint calculators for free!

- What software did you use for VC and how? (Must include 3-4 screen prints of the VC session as a proof.)

- What were the most important steps in your product design review process? (Rated: Very High)

- What were the main challenges? (Rated: Very High)

- What did you discuss and achieve during the VC session? (Offer a script of your discussions in professional English, not in English)

- Create an implementation and test plan

- Design a ROIN plan (a simple plan will do at times) - schedule and due dates:

- Please note that the absolute last day to submit any assignment is December 11, 2020. Sorry, no delays are accepted because I cannot make them up, and this course is intensive, I am very serious about deadlines!

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