Ver. IE673 Summer 2013

This is your latest, therefore the most current schedule. Last update: **May 16, 2013** (Update history: April 14, 2013)

First, a few words about...

ASQ (American Society for Quality) Student Chapter at NJIT. ASQ is the largest quality society in the world. Join us, see what is ging on, hear and network with professionals! We have weekly short meetings at NJIT, as well as almost every month a really nice technical meeting with a presentation and FREE dinner (usually in a VERY nice restaurant in Newark, or New York City) with our parent section, ASQ Section 300. For the student membership Information PDF file: click here. More from your instructor, Dr. Ranky, the founding academic member of the NJIT ASQ Student Chapter. The actual ASQ Chapter Section 300 web site we are part of is here. Please consider joining ASQ. This is a perfect fit for this course as well as for the EM profession as a whole.

Please Read This Syllabus! It contains Vital Information about the course as well as all the Assignments, Homework and Grades! Without reading, understanding and following this syllabus you won't be able to get a good grade in this course. (Yes, I know it is long, and detailed, but it intends to answer ALL your questions.)

Academic Integrity: Please refer to NJIT's Academic Integrity web site that contains much information about strategies to promote academic integrity and avoid cheating on class work and exams (http://integrity.njit.edu/). Also, please refer to the Academic Integrity web site that contains much information about strategies to promote academic integrity and avoid cheating on classwork and exams. http://integrity.njit.edu/index.html. The “Best Practices” document developed and is published on the Provost’s website (on the policies page) or directly at http://www.njit.edu/academics/provost/docs/Best_Practices_related_to_Academic_Integrity.pdf

During the 2008-2009 academic year, the NJIT Administration worked very closely with the Student Senate to enhance and improve NJIT's Honor Code. The Committee on Academic Affairs and the NJIT Faculty approved the Student Senate’s recommendations developed from the findings of the University's Taskforce on the Honor Code. The approved document, “University Code on Academic Integrity” thus replaced the older Honors Code document. (http://www.njit.edu/academics/pdf/academic-integrity-code.pdf)

All students are responsible for upholding the integrity of NJIT by reporting any violation of academic integrity to the Office of the Dean of Students. (http://www.njit.edu/doss/) The identity of the student filing the report remains anonymous. NJIT will continue to adapt its policies and procedures to make clear that academic dishonesty will not be tolerated at this institution.

PLEASE save the **TREES and be sustainably lean and green**! Please DO *NOT* Print neither this syllabus, nor your homework assignments/ midterms, etc. Keep it all on the web in digital format. Use this web site to read it in this electronic format; it will be updated during the semester. Thank you!

Welcome to IE673 Summer 2013; The On-line Distance Learning / eLearning Class: Total Quality Management within an Analytical Sustainable Green & Lean Six-sigma

Framework

Learn About Total Quality Management, within an Analytical Sustainable Green Lean Six-sigma Framework, based on a set of analytical, quantitative, graphical, statistical and open-source computational methods and tools. Factory / process / system improvement methods and tools using lean six-sigma statistical methods. Our purpose is to help you to improve Total Quality in product, process and service system design, progress towards making your products, processes and service increasingly leaner and sustainably greener, explain Process Analytical Technologies (PAT), Good Automated Manufacturing Practices in pharmaceutical, and in other manufacturing industries, in IT/ IS, and others. Furthermore we also focus on biomedical engineering quality applications, robotics and automation, urban planning and megacity quality, human error prevention / detection, and on various design and service industries; ALL with an engineering management quality focus!

In this course we learn analytical methods and tools, and apply them to solve real-world, practical challenges in industry and in R&D. With the aid of advanced 3D interactive multimedia, digital videos, and our analytical tools, that every student receives within their eLearning Packs we go on a virtual tour and analyze various factories, product, process and service systems and industries in the USA, Europe, Japan, China, and around the world, and then apply our quality-focused methods and tools to improve them; virtually any system, anywhere in the world. The eLearning Packs are customized and updated every semester. Also, there is a social networking component in the course.

High quality, sustainable green engineering is the next huge challenge for all of us! This course will help you to prepare for such challenges! As a result, as an engineering manager you'll lead this crucial change process towards iSEE:Green, intelligent Sustainable Enterprise Engineering with a Green focus! This is not just an excellent professional field of interest, but because of the waste reduction opportunities, also great business.

by

Paul G. Ranky, PhD
Full Tenured Professor
Registered Chartered Professional Engineer
Member of the American Society for Quality (ASQ), Audit Division and Lean Enterprise / Advanced Manufacturing Division.
NJIT ASQ Chapter founding professor at NJIT. (Parent Section 300, New York / New Jersey, USA)
ISO (International Standards Organization) USA voting TAG (Technical Advisory Group) Member and ISO 50001 co-author (this is the NEW international Energy Management Standard!) Also Member of ISPE, International Society of Pharmaceutical Engineers, USA, ASEE, IEEE, IEE, FEANI, SAE, PMI
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You can find out more about **the Professor's past and current research work and background** at
http://www.cimwareukandusa.com/aboutpgr.htm

This course introduces the concept of total quality management, and presents methods, tools, technologies and case studies for product, process and service quality improvement within an extended sustainable green lean six-sigma quality framework. The emphasis is on prevention through quality engineering, design, and implementation. Since we believe in zero defect, and we show methods, tools and technologies how to achieve zero defect, we go beyond traditional statistical process quality control methods and tools, although we integrate these valuable methods into our framework. We are keen advocates of feedback-controlled zero defect policies and methods versus random sampling-oriented open-loop quality control systems and solutions.

We present practical, as well as research-level cases and challenges focusing on system design / product / process / service system design, manufacturing, real-time systems, supplier and logistics management, project management, quality assurance, process control, construction management, pharmaceutical engineering / packaging, automotive assembly, electronic assembly, robotics, urban planning: megacities, large city quality challenges, marine pollution and quality challenges, and many other cases. We include competitor analysis as appropriate and we discuss analytical methods and tools to help this process in virtually any industry, anywhere in the world.

We learn about advanced process modeling, customer requirements analysis, process risk analysis, various statistical methods, TQM graphical methods, GAMP (Good Automated Manufacturing Processes for the Pharmaceutical industries), Six-sigma, quality auditing processes, lean and green sustainable methods, and an in-depth description of the ISO 9001:2008 international quality standard, a must for quality audits and certifications in most industries that want to stay in business for a long time... We also learn about web-page design, web-based knowledge documentation, knowledge management, social networking, and optionally even video conferencing over the web, when you do your quality assessment / data collection / audit briefings on a global basis.

All very new, exciting, and simultaneously analitical as well as practical course focusing on YOU, to help YOU to get a good job, and prosper in the corporate world, anywhere in the world, because quality is VERY important everywhere in the world.

Some novel features of this class, that are going to help you to become a truly 21st century hi-tech professional...

Having worked through this class successfully, every student of mine will be able to:

1. Set up his / her own (virtual) company,
2. Innovate,
3. Collaborate with other companies on a global basis,
4. Design, run and control a simple web site on the open Internet (no restrictions),
5. Learn to read faster than the average,
6. Learn to write executive summaries,
7. Absorb new and relevant information better and faster than the average,
8. Learn new analytical skills and customize quality, statistical and other tools,
9. Learn multi-variable and multi-dimensional systems thinking, and optimization methods and tools,
10. Learn some basic sustainable engineering (i.e. design, manufacturing, quality, and other), lean and green concepts and solutions,
11. Learn to reason and draw conclusions based on facts,
12. Learn to document new knowledge on the web,
13. Improve his / her communication skills,
14. Learn the benefits of social networking,
15. Video conferencing, and
16. Others.

A strong focus on creating "T-shaped people" who not only have a "deep technical education," but are also capable of "innovation, creativity, and entrepreneurial sense."

I am pleased to state, that we have been following this approach for the past 15 years at NJIT with my students... I know, for some of you this is very, very different and unusual, and even difficult to accept, nevertheless PLEASE TRUST ME, that I am trying to help you to become VERY successful; this is why it is essential for all of us to follow these concepts:

The American Society of Engineering Educators Reports: Stanford's Engineering School Looks To Balance Traditional, Creative Approaches. Inside Higher Ed (May 14, 2010, Epstein) reports, "The undergraduate offerings at Stanford University's School of Engineering could be engaged in a tug of war." The program's current "emphasis on current state-of-the-art technical knowledge must be complemented with an openness to change," according to James D. Plummer, the school's dean. "We need to teach our students to be lifelong learners, to be able to keep updating themselves to be the best they can possibly be throughout their careers," he said. But retaining accreditation is important, "so rather than giving up on the bean-counting basics" Plummer has focused on creating "T-shaped people" who not only have a "deep technical education," but are also capable in terms of "innovation, creativity, [and] entrepreneurial sense." The article details Stanford's program, and some of the differing views on it. Inside Higher Ed notes that, overall, curricula have become "more holistic" since ABET began implementing its Engineering Criteria 2000 standards.

Let me share this with you: The 10 Principles Of Learning (ref.: http://www.peloruslearning.com/the-10-principles-of-learning)
1. Learners need to know where they are going and have a sense of progress towards their objectives.
2. The learning environment has to be one of trust, respect, openness and acceptance of differences.
3. Being aware of and owning the responsibility for learning lies with the learner. Others can only give information and support, and provide feedback.
4. Learners need to participate actively in the learning process.
5. Learning should be related to and use the learner’s experience and knowledge.
6. Learning is not only a basic capability but also a group of skills which can be developed and/or learned.
7. Facts, concepts and skills are learned in different ways.
8. Getting ideas wrong can be a valuable aid to developing understanding.
9. For learning to be processed and assimilated, time must be allowed for reflection.
10. Effective learning depends on realistic, objective and constructive feedback

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The *'USA needs more practical engineers...'* says Bertoline, dean and distinguished professor at Purdue University’s College of Technology...

'The keynote topic was what was Gary Bertoline terms a “fatal flaw” in engineering higher education. The U.S. struggles to hire the people needed to fill technical positions. At least part of the problem: The engineering education system in this country has been built around scientifically oriented engineering curricula, producing theoretical engineers who have little knowledge of how to apply skills to real-world engineering jobs.

The problem grew out of a post-WWII mentality in which engineers thought if they didn’t get their hands dirty, they would be

*taken more seriously as professionals like lawyers and doctors. The movement created curricula with a lot of math, a lot of science, and a lot of theoretical representation of how to go about solving problems; unfortunately, not a lot of practical knowledge about how to work in today's manufacturing industries.' More here:*http://www.automationworld.com/operations/addressing-fatal-flaw-engineering-education?&spMailingID=6153877&spUserID=Nzg0Nzk5ODk2MQS2&spJobID=73661974&spReportId=NzM2NjE5NzQS1

(My position on the above is very clear: we need a strong analytical foundation, as well as good practical engineering and management skills. I am pleased to state, that this course offers a good balance between some exciting analytical as well as practical engineering knowledge and skills. (It is interesting to see though, that based on 15 years of student evaluations and feedback on this subject, almost every semester at NJIT, about 5 percent of the students do not want ANY practical engineering knowledge to be taught, or learned, or practiced... and the rest, about 95 percent or so want more and welcome the balance provided...)

IE673 is a simultaneously analytical, as well as practical course loaded with useful knowledge, that you can turn into continuous improvement opportunities in almost any factory, institution, or organization, or system. As much as possible, we all try to create a relaxed and happy learning environment in this class, and I try to teach you several new analytical methods and tools, that you can easily deploy in your REAL world, and prosper! My motto is: 'Happy Learning for REAL!'

As one of my former students, Major Jack Parker, US Army, National Guard Bureau, Training Division, Washington, DC states about the course:

'As I developed the assignments, I really could have spent the rest of the year going through the principles and methods I learned in this course. Your course materials provided a great education for me in TQM. I look forward to applying my new knowledge in the Army in every means I find possible and feasible. Thanks again for your great instruction and materials.'

Other former students write the following about the course:

I found each video to be very informative and want to thank you for the time you put into them because they are a great way to learn about industry.
James McArthur

Professor Ranky,

I fully enjoyed your class. I am using the materials I completed for my yearly review in my job. I have already shown them Assignments 1 and 2 months ago and they were very impressed. They are currently talking about giving me control of the Warranty Department entirely. Part of this is thanks to you and the coursework you provided me.

.... I seemed to have learned more than just TQM in your course.

Thank you again for an amazing text, valuable experience, and lessons beyond the syllabus. Enjoy your holiday and be well.

-Michael

It was really a good course that i took. Thank you for your guidance and informative lectures.

With Regards
Karthigeyan

I'm very happy I took this class, it has help me a lot to understand what is happening in the real world so thank you very much. Enjoy your holiday season.. Henry

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Thank you for a great semester I'm sure the knowledge learned in this course will pay great dividends later on in my career.

Regards,
Chris

My name is Bedwuine. I am a current student of IE 673.I would like to Congratulate you personally for putting this wonderful class together because i was granted a new position as a Quality Engineer on Monday and i saw all the TQM tools are useful

for My new position such as process analysis, C-Chart, P-chart, Cora tools,Risk analysis, Non-Conformance.and i will be dealing with CAPA as well. i was qualified for that position because i updated my resume with the TQM six sigma focus course and it bears fruit...Thanksssssssssssssssssssss a lottttttttttttttttttttttt.....Dr Ranky.....looking forward for concurrent engineering.....

Thank you again for everything Professor Ranky. Wanted to know if its alrite that I stop by next semester from time to time for advice and gudiance. The truth is I don't have a mentor and was contemplating asking you because I didn't want to come off bothersome. Being a 27 yr old living by myself here in the states with 1 sibling , I strongly need to build my network and thank you also for stressing that and being detailed. I would also like to attend the asq dinners that take place. Thank you for your words of advice and happy holidays to you and your family.

Hello Professor

As always thank you very much for your guidance for this course. Your course always helped me professionally in my career. It was pleasure during the IE 673 in 2009 & also in IE 655-2012., it helped me a lot.

Kindest Regards
Tejinder

Respected Prof.,
It was my pleasure to have you as a instructor for the class total quality management.
Through this class I learned something that I never thought of.
I can say that this class will help me in future, is for sure.
Once again, professor, thanks a lot for giving me such an excellent learning experience.

After reading your E-book and going through your comments, I have corrected my mistakes.
Thanks for giving a chance to learn from mistakes.

thanks.
Mayurkumar

Dear Prof. Ranky:
Thank you for your effort and hard work on grading all the
assignments. You are a really nice professor.

Best Regards
Yijun

Dr. Ranky,

I would like to thank you for teaching us the course. I truly enjoyed this class and found the methodologies you taught us to be highly beneficial and useful. I look forward to applying them in the real-world.

Thank you,

Mostafa

Dear professor Ranky,

I really would like to thank you for your effort and dedication to TQM. I have attended all the classes throughout the semester because i didn't want to loose any single opportunity to learn something new. I can not forgot that day of ASQ meeting. It was really nice to meet everybody.

What i like about this subject is to learn something new, something that no one else teaches. Though i am not a computer science student, i learn how to make webpage. And all that with the help of one of my computer science friend in this class. And now i can not believe that i have my own webpage. I have no doubt that this and other several things which i learnt in this subject will be helpful throughout my life. I want to thank you for all of that. I want to thank you for bringing us this course and the way you teach this subject is absolutely unique.

In my whole life, i have never ever seen any professor teaching in way in which i feel excitement and inspiration. Thank you for all of your dedication to quality and its management. I am glad that i can say that i studied under the professor who is co-author

of ISO standards, and he is a quality person and a unique person in real sense.

Well, i just dont want to stop writing as i have so many things to say. But it was all my pleasure to take your class.

Thank you very much for being a part of my education life.

Regards,
Parth

Hello Dr. Ranky

... it was my ULTIMATE pleasure taking your class this semester.
You literally improved and accelerated my work career and for that, I will ALWAYS
be grateful for you.

Really again, I am extremely thankful for you and your class and
really look forward to taking your class again!

Best Regards,
Oladipo

Hello Dr Ranky,

I just wanted to let you know this was an amazing class,
I have truly learned alot and it certainly brought lots of memories
from bachelors as i have taken a class with you in Bachelors too.

FYI, I will also be taking Project Management with you during summer session.

Again, thank you for all your help during the class. It has
truly helped me alot to open and address projects at T. Co.

Regards,
Pratik

Dear Prof Ranky:

Unfortunately, I was unable to catch-up so I had to drop the class.

It is an excellent class and I plan to take it again.

Thank you,

D.

Dr Ranky,

... I would like to thank you for your support and I'm happy for the knowledge
on total quality aspects that I gained through out this course and wish to
receive your valuable suggestions for the rest of my life as your student.

Thank you very much,
Venkata

Dear professor Ranky:

I have finished the assignment 5. I read your eBook and watch videos several times very carefully.

I hope my work could meet your requirement.

And I really want to say Thanks to you, thank you for sharing your knowledge and experience.

I really learned a lot from your class.

Have a great safe summer break.

Best regards,

Ye

Thanks Professor Ranky for everything you did for me.

I really enjoyed your class.

best regards,
Albisher

Hello Prof Ranky,

First of all I would like to express my gratitude for the wonderful learning experience I gained from IE673 fall 2012 live class. In addition to thoughtfully designed course structure this course has provided me a multifaceted exposure. I appreciate the dedication with which you have designed truly amazing eBook. The eBook is quite informative and the best part is the way new technologies have been embraced in designing it. Sir, Your course has really helped me a lot gaining useful total quality management principles. I remember you quoting once in class how important it is even for pharmaceutical companies to adopt total quality management principles. Being a Pharmaceutical Systems Management student I would like to learn more which could help me in real life.

Thanks Regards, S

Let me share with you a recent HAPPY Learning for REAL student email I got from a previous student who just got a job... see how does this work...

(Pls. note, that I have deleted the actual VERY large USA company names from his email)

Professor Ranky,

I would like to take this opportunity to thank you very very much for your effort on TQM. I am pursuing a Masters degree in Biomedical Engineering and I enrolled in your TQM class in the Spring 2009 semester, as an elective. The additions that your class has made to my resume, have helped me land interviews at A Corporation as a Reliability Engineer; and B Corporation as an Industrial Engineer. Even more; when the hiring manager at A Corporation asked me over the phone for a sample of my work, I referred him to the website I created for your class. The next day they invited me for an in-house interview that -for the most part- the printouts of the CORA, CIMpgr & DFRA I created for the class, were the topics of discussion. The same story repeated on my B Corporation interview.
Finally, I am delighted to inform you that A Corporation has extended me a generous offer that I cannot turn down. B Corporation will need 4 weeks to decide.

I am indebted to you and I would like to again thank you very much for your terrific effort and dedication putting together and conducting your TQM class.

Sincerely,

M

Dear Prof. Dr. Ranky:

Thank you very much, for showing something different which I never thought of. Distance learning is definately unique and helpful from different perspectives.

Through out the summer session, its been great to explore and learn from your class. I appreciate all your efforts in commenting all the assignments in detail. I personally learned and improved a lot by reading and understanding them and they just made me to do better everytime.
This knowledge will certainly be helpful through out the journey at my work.

As of today, I still haven't received any emails from the Registrar's office, for course feedback, which we usually receive them at

the end of the semester during the Fall and Spring.
So, I have asked and requested to Registrar's office, for Course Evaluation form or link, which in my opinion, will enhance the course settings, and give some feedback as well.

I will see you in September 2011 for IE 655 distance learning class.
Thank you and Enjoy the rest of the summer

Regards,

Tushar V Patel
MS Ind Eng.

Hello Professor Ranky,

I hope all is going well. I was one of your distance learning students in your IE 673 course last Fall Semester 2009. It was a great course. I had to work hard, and I learned a lot about Total Quality Management. I was fortunate to have received an A grade in the course and I am very grateful to you for that. I was inspired by you and this course to join the American Society for Quality and I am currently a member of this organization.

I have recently graduated from NJIT with a Master of Science in Engineering Management (GPA 3.95/4.00). I have over 20 years of experience in Information Technology and management with major companies most recently with UPS. I am a member of the Project Management Institute (PMI) and will be sitting for the Project Management Professional (PMP) certification exam on May 1st of this year. I am also a member of Tau Beta Pi the engineering honor society.

Best regards and thanks,
Richard

Hello Prof. Ranky,

As far as your class, it would probably be best described as 3-dimensional in comparison to other courses. The explanation here encompasses several aspects. For starters, most courses ask for either technical performance in the form of equations, understanding theory and applying them to similar problems which ultimately yield a definitive answer in the form of numbers or DNE formats. OR they usually require a management approach in terms of heirarchy, understanding different forms of diplomacy, structures and concepts. Most courses use a combination of both technical or mathematical and conceptual or theoritical techniques and applications to emphasize traditional management tools and functions. These courses are 2-dimensional in that there is a correct answer for every question, meaning there is the information(text/lecture) and the questions(exams). In this format, students can either choose to thoroughly learn the material, take the tests and do fine or memorize (short-term) the necessary information to do well and move on. I prefer the former method (in an effort to make the most of money spent) whereas most utilize the latter.

Your class (either intentionally or unintentionally) is designed so that we must learn the material in order to perform the projects. In addition, the concept of developing a new company as well as a new TQM utilizes the course concepts and materials in another dimension. Meaning, rather than the standard format of exams, the utilization of the course material in an open format forces us to fully grasp the material and then go further by applying it to a new idea. The application of the material (4 different partnering companies for EVERY student) keeps the projects different and randomn/unique. Thus the fundamental concepts of your work are thoroughly being taught and absorbed by us (the succesful ones who do not fail) in a real experience rather than just breifly memorizing the behavior and outcome of a theory for the sake of an exam or midterm.

I am not the greatest when it comes to writing or describing my thoughts as this may all sound combined. I am nearly finished with my graduate degree and based on my experience, the course is unique from all courses I have taken thus far. It appears to be intense and extensive and although I am impressed and excited by the dedication apparent throughout the text and videos, I am also very much intimidated and timid in meeting satisfactory requirements as the concepts appear beyond what any of us as students could possibly recreate at this point in our lives let alone a semester.

Ted

Total Quality Management DL
Hetaben Mulani

Respected sir

Myself Hetaben Mulani, I am very much thank you for giving me good grade and learned me good innovative work which is important in the industries.

I also improved my thinking as innovating and i enjoyed all the assignment works.
Thank you

Sincerely,
Hetaben Mulani

DR. Ranky,

I have taken total quality management & concurrent engineering with you.

I had wonderful experience & I have learned a lot in class too.

I can just say that these two courses will help me in future,,,& it just real !! I liked the real learning.

Thanks again Professor & merry christmas!

Thank you,
Pratha Joshi

Good Evening Professor Ranky,

It was alot of fun taking your class and will still stay in touch afterall my home country needs assistance in going GREEN. Thank you very much.

Sincercely,
Adebola Adeyeba

Thank You Professor Ranky.

It is more important to me what i have gained out of this course and i might not be really good in these tools right now but i am planning to keep using them until i get a really good. I really appreciate all your help.

Thank You and have a great vacation.

Hasan Mahmood

Thanks for a great class, I learned a lot and I will continue to absorb the material in the eBook.

Thank you very much.

Carol Sinclair

Professor Ranky,

Thank you for the great course, I'm looking forward to take another course of yours. I learned a lot and will definitely recommend your course to my friends.
Please let me know if i need to make any changes to my course work.

Sincerely,
poshya cherukuri

Dr. Ranky,

This truly was the best assignment I had done so far in this sem. I had so much fun, and I feel like I have learned so much. Thank you professor for all your help throughout the semester.

Thanking you again

Balavignesh Thirumalainambi

Hello professor

thank your for the grades professor. i really enjoyed your class, the course really helped me understand the basic structure of TQM

thank you once again

praveen

Professor Ranky,

My Comments about course - First of all thank you very much for everything. It was a wonderful, unique and most exciting course I have come across. Becuase of this course only I am able to save money for my comapny doing some web designing for them. I completely agree with you not able to answer our emails asking questions which are answered in syllabus. As a matter of solution I would suggest if you can have a TA assisting you in this work would help a lot to you and students as well. I have no doubts that syllabus is designed ver nicely but specially as a DL student I would like to have some sort of easy communication with my professor/TA as email is the only way of communication.

Professor, this was a great class as ever taken.

This semester I have learnt lots about quality aspects need to follow in any industry.
This class taught me about the necessity to follow quality standards and their benefits too.
At the end, as I am thinking, very important class was Quality audit of company. That class guided me to understand more in depth about the standards and procedure need to implement in company.

Most important about this class was, it was totally based on practical teaching approach. In this class, we needed to form our company using given study material, and then needed to implement all quality standard methods and tools to control operations inside the industry.
I enjoyed watching that videos too, that gives me more practical vision to understand importance of quality and international standards.

Professor, this is my last semester at NJIT as I am almost done with my academic courses required to complete degree.
Next week, I am flying back to home country, INDIA forever. We have well going business there. I will join my family business office there.
In India, we do different businesses but our main concentrated sector is Construction. We also run Undergradute Engineering Institutes too.
As a part of our business expansion, this year we also got approval for our own private 250 MW coal-fired Power plant. Soon we will start construction of same.

Professor, thank you very much for giving such an excellent learning experience.

Thank You.

Regards

Shrikant Bhangdiya.

Professor Ranky

Thank You for the great information in this course. I learned a lot of new tools to do my job better. The best thing was that we were able to apply those tools for practice and the course material will always be a great resource. Currently i am trying to use these tools specially CIMpgr model. I will try to introduce remaining tools as i get a chance.

Thank you for you support through out the semester also and have a great holidays.

Hasan Mahmood

Dr Ranky,

1. My Dream Job: To eventually become a senior project manager in the building construction industry.

2. The way in which I hope to get there is to always apply the same methods of organization and enhancement at every level. From beginning of a job, all the way down to final third party commissioning.

3. The most insightful tool I've learned from this course was the way in which I gained a sense of quality enhancement. I am no longer doing tasks by the book, but I am forever trying to apply new methods and more efficient means of getting tasks done. Using feedback from past experiences, I learned how to justify future enhancements.

Thanks,

Peter

Hi Professor,

I wanted to send you an email to answer your questions. I believe at this time my dream job would be to be a quality engineer. Currently, I work as a quality supervisor because I know that the experience will be beneficial and needed to make the transition. Also, I took a project management course in order to understand how a project is managed. With my PM course, I am planning to become certified PM.

Also, I need to learn Visio and Access. Your course definitely exposed me to the tools that quality engineers use to improve processes and control quality systems. It was very helpful in being able to apply the theoretical information that we were learning. Your class really challenged me and caused me to really comprehend what you were talking about. I appreciate that more now.

Thank you for this semester.

Regards,
Stacy

Dr. Ranky,

Hello professor. The course has been really helpful and helped me realize a lot about the industry as i dont have any experience. The CD was really helpful and helped me a lot in getting to know the various procedures and aspects that a product needs to go through. Running my own company felt really fulfilling and satisfying. The videos also helped a lot in getting to know the various standards that are opted by the companies today. Overall this course was a great one and we are really privileged to have you as our professor. Thank you very much for the vast knowledge that u have provided us about TQM. :)

Ayshvar

Dear Professor Ranky,

Below is the web url where I have posted all my assignments for the course IEE 655(Concurrent Engineering) & IE 673(TQM).

In addition to the evaluation form i would like to thank you also for the amount of knowledge you have helped me gain through these courses.

I have been also working at Sanofi Aventis pharma on a Unit Dose Conversion Project.These principles of CORA, PFRA, Cimpgr model etc have been of immense help to me for the projects i have been part of here.The best part is that these tools can be applied in real live projects.

I am finally graduating this semester and am delighted that thse methodologies learnt in TQM and CE courses have a real time application rather than being mere theoretical concepts.

Thank you for all the help Professor.

Wish you a merry christmas and happy new year!!

Thanks !!
Best Regards,
Anup Sudhakaran

Dr Ranky,
Sorry it has taken this long for me to get things wrapped up for the course but all of my struggles are now paying off. I am working at URS Corporation in Paramus NJ in the Paramus Park Mall complex. I am a concrete technician for URS and we oversee all of the concrete work for all of NYC DEP projects.

An example of this is the new water treatment plants that are going to service all of NYC drinking water and all of the miles of piping that go into getting the water there.

The class has been paying off and I find the class to be the best class that I ever took at NJIT. It is extremely rewarding to see in real time all of the management practices that we have learned be put into place.

Thanks you for an eye opening class and I just wish I took it when I was not so stressed out with other things going on around me last semester.

Thanks again for teaching the best class I have ever taken.
Best Regards
Mark A. Bishop

Professor,
Semester is done and I will miss this gorgeous class.

Thanks a lot for your efforts and happy holidays

Happy Learning for REAL

Sincerely
Ahmed Elhenawy

Hello Professor,
My name is Amit Warambhe.Professor i have submitted all my assignments of TQM-IE 673 course. The course was best learning experience to get the knowledge of quality aspects and you shared the course information very well with us through your e-learning pack.Personally i enjoyed doing the course as i have planned to set-up a high quality wine industry in INDIA. The quality tools you taught us and quality management in various industries through your videos in the class will definately help me to prosper my business.I will definately need your help in future.Wish you a merry Christmas and have a prosperous new year.
Thanking You.

Regards.
Amit Warambhe

Prof Ranky

I want to thank you for sharing your incredible knowledge on TQM with me and the rest of the class. The learning opportunity you provide us is excellent. Your course materials provided a great education for me. I admire your way of teaching and most likely I will take the other course (IE655) you offer.

Thanks for all your help and support.

Regards

Pradip (Peter) Basu

Dr. Ranky,

It has been a pleasure working with you, again! The facts that I have picked up throughout the classes you have offered me

has enlightened my interest and knowledge in the field.

Thank you for making all this information and knowledge easily accessible.

Yehya Solima

I have learned a lot form your courses, and would suggest it to my friends.

sincerely

Nandeep Nadella

Professor,

This course introduced a new way of viewing processes and procedures in the workplace and how to recognize breakdowns and failures. Most importantly it taught me how to approach and improve these processes.

I really enjoyed the course and am sorry to see it end. I will definitely recommend this course and any other course you teach to fellow students.

Good luck and be well,
Laszlo Herczku

Dear Professor Ranky:

My name is Amanda Mogro, and I am submitting my final assignment for the semester.

Also, I like to express my gratitude to you because this was one of the most interesting classes I had this semester. The case studies were very help and I am sure, I will be using some of the TQM techniques in the future.

Once again thank you,
Sincerely,
Amanda

Dear Dr. Paul G. Ranky,
Please see the URL to all my assignments for this course. It was nice having you with all the great resources in this class.

Regards,
Moses Bernard

Awesome, I really learned a lot of important things applicable in my job.

Thanks,

Fabian Ferreira
Comake Engineer Frozen for Savory Americas
Unilever Foods A2-086A

Thanks for a great semester, I enjoyed learning all of these new concepts!

Thanks,
Mary Petronis

Dear Professor,

I would like to thank you for your efforts in providing one of the best

distance learning courses at NJIT. Like always, I feel very confident in submitting my coursework.

Best Regards,

Atif Anwar

Hey Professor, It was great working with you, Thank you for sharing all the knowledge.

Pratik Shah

Thanks for a good semester, the course was definitely one of the most interesting and informative courses that I have taken.

Regards,

Steve Karl

IE673
It's been a great time with you this semester.
You did not teach us TQM, rather you educated us in becoming the very best that we can ever be. I now look at stuff in a very new and different way. I gat a new job that I started 3 weeks ago with P & Associates and I did the interview within the early parts of your class and it helped me a lot. I got a 3 step promotion and over $20,000 raise compared to my old job.
Prof., you remember saying that you are teaching us to make our desired and well deserved salaries/wages of $70,000 +? You are so right. Right within the class, I am pushed into that catergory and it feels great.
THANK YOU SO VERY MUCH PROF.
Thanks once again and have a great holidays. Going diving? or skiing?
Best of luck in all you do.
Your student,
James B. Puplampu

Thanks Professor,
A lot of thanks for educating me in TQM(IE673) and CE(IE655). It is very helpful in in my professional development! I was nominated in two categories: "Best Product of the 2006 Year" and " The Best Team" between all Stryker divisions.

Thanks and regards,
Abram

All in all it was a wonderful experience hope to see you in the Concurrent Engg class this spring semester
Thankyou, Ahsan Ali

Thankyou.
This class was a wonderful experience; you are great, Syed Ali

---

Dear Professor: Thank you so much. This has really been quite an experience and I am now so glad I did go forward with it; the journey was good… Diane Bove

---

Thanks for your patience. By the way, I've just purchased an Apple iMac and its great!!!! I will never purchase a PC again.
Crystal

Thank you very much it was a very interesting semester. I have learned a lot in this course. Have a happy and safe holiday. I will see you next semester because I am taking IE655. Brahan Rupan

---

I want to thank you so much for sharing your incredible knowledge of this subject with me and the class. You really made me stretch my capabilities this semester with this class and I have a great sense of accomplishment. So thank you again and I hope you and your family have a great holiday and good luck to you. Thanks again and I hope that the work that I am submitting to you is worth an A, because that would mean a lot come from you. Sincerely, Victor J. McLoughlin

---

*It was an amazing course, I found it is very helpful and very interesting.
Unfortunately I am graduated, otherwise I will definitely be in your next
class. Thanks for your help. I have a suggestion about the course though. I just feel the statistical analysis part might can be extended a little bit, maybe it is because I am from math and my major is Stat.:)
Have a nice weekend and a great holiday. Thanks again. Chunsheng Yang*

Thank you again for a very enlightening semester. Roldan Rivera

---

Thanks for a great class and semester! Regards, Chad Gassert

Thank you for the great learning opportunity. Olukayode Dada

---

*I would like to tank you very much for a very interesting and
important course. I really feel that I learned many things this
semester. Your approach in teaching and conveying your ideas is very
unique. I did not see this being done in any of my other NJIT
classes. Great job and I look forward to taking more classes with
you. Thank you: Kanar Rabah*

---

*I enjoyed your class and I decided to signing up for IE 655 class also.
Regards, Krzysztof Rapciewicz*

I had a pleasant experience in my career at NJIT. Thanks for all the important and vital things you taught me, while i didn't find them useful in the first class since i had not worked for corporate America I most certainly found them useful now. Respectfully, Francis Garcia

---

Dr. Ranky, Thanks for your patience, and helpful suggestions throughout the semester.

*By enrolling in this class and learning the TQM principles proved to be highly
beneficial; learning to build my 1st website was icing on the cake.*

*I certainly got my money's worth. In fact, I will even go as far as saying
that this class was a bargain. The wealth of knowledge that I now have at my
fingertips from your e-textbook is invaluable. The excel and visio templates
were extra treats that helped facilitate our learning - thanks for your effort
in putting all that material together!*

Warmest Regards, See you in IE 655, Bryant R. Jackson - brj2, Electronics Engineer

---

*Thank you for this very nessecary tool to put in our arsenal of
learning. Roldan Rivera*

---

*I just wanted to say that this semester has been very useful and that I
have already started to incorporate the lessons learned, in conjunction
with Lean Six Sigma, at my job to evaluate Processes. Hope that you have a wonderful holidays. David Sabanosh*

Last but not least let me take this opportunity to thank you for the knowledge you passed on in the classroom and I look forward to applying this knowledge in the real world. Thanks for the learning experience, George Authur

---

Being in your class was a learning experience, I now look forward to putting the knowledge gain into work practice. Thank you, John K. Wilson Jr.

Prof Ranky, I just wanted to thank you for inviting Frank Reick to class last Monday.
His discussions were very enjoyable and his frankness, honesty, and
overall genuine qualities make it obvious why he is successful and why
you have made him a friend. Please pass on my thanks to him...
Regards, Charlie Maraldo

Enjoy some pictures of this enjoyable session we had with Frank: Frank-Reick-Pic1, Frank-Reick-Pic2, Frank-Reick-Pic3

' Dear Professor Ranky, This is Eduardo Canales. I had taken IE_673 last semester with you as part of my master degree in EM. I just want to thank you for such a valuable tool you taught us as it is TQM. Right now, I am working on a matrix evaluation and I remember. I had your Ranky Cora excel tool, which I am using.
The fact that it's in a CD and it's on excel make it practical and fast to use. But not only is the Ranky Cora but all other tools that are in the CD.
Again thanks for your teaching and guidance.
Sincerely, Eduardo

Dear Professor Ranky, I would like you know that I truly enjoyed your class yesterday. After graduating from NJIT with a degree in CoE { computer engineering] I was unable to find a job that I liked and would like to make a career in and felt horrible that I went to school for engineering and came out with pretty much nothing. That was when I decided to look for something in the Finance field and fortunately I was able to land a job, and I like dealing with money and control it has on society. Yesterday's class made me realize why I did engineering and I was good to know that I didn't lose the love I had for math, science, inventions... just engineering in general.

I am looking forward to class next week!

Regards,
Alka

[History: Prof Ranky has invited Frank Rick, an inventor and engineer, and holder of 40 (!) US Patents to talk to our class on innovation and quality issues. Note, that if at all possible, in every semester I try to invite an excellent guest speaker in the program]

... I must say that this class has been very interesting so far and I really enjoyed the speaker last week. Having him come to class and talk about Real Life Experiences is a very rewarding experience that no Professor at NJIT has offered to me during my college experience. I hope we can have a few more?

Thank You
Keith Mueller.

Dear professor:

Since I don't have project management experience, I felt difficult to
get into it in the beginning of this course. After I briefly went
through your eBook, I got some sense. When I read the detail of each
chapter, I found that the course is so practicable, useful and very
attractive. The TQM methods are not just useful in project; they could
be used everywhere, even in living activities. Now I like the course
very much, I believe I have been getting the essence of the course; it
must help me in my career. Thank you very much. I am very appreciated.

Thanks again.

Yours truly,

Haiming Sun.

Prof. Ranky,

I've just finished viewing both of the DVD's you provided for the IE673 class (sorry it took me so long to watch them both) and must comment about how close they both struck to my own professional experiences. I currently work as an engineering manager for a lighting company that does about half of it's North American business in automotive supplying such items as dome lights, turn signals, instrument panel lighting, etc to various foreign and domestic carmakers. About two weeks ago I had the opportunity to visit the BMW plant in Spartanburg, SC (BMW owns Mini, right?) because of some components we were supplying to a Tier 1 in the area. What a tremendous operation! As far as automotive in general, I can say one thing about...it's tough!

In my former company, I was a Product Development manager for a precision stamping company. Once used a CMM not unlike the one in the Mini video (a bit smaller though). That company manufactured a number of metal shielding components for computers, cell phones and the like. Interestingly enough, we were working with two big RFID companies, namely Alien and Matrics (now Symbol) to develop a way to stamp the RFID antennae instead of chemically etch or conductive print them. Anyway, wanted to thank you for the opportunity to reminisce about some of my working experiences.

Wayne

Prof,

Thank you very much. I really enjoyed your class and feel disappointed that it is all almost over...
I have a better idea about TQM and I find myself emphasizing the same in my other management classes , at work, and even with my other outside contacts. It definitely made me think twice before I even react myself to the customers and my fellow workers. I highly appreciate the way you have compiled the study materials.

I am sure I am not the only one who is benefiting from this course. Probably many others. I have even recommended this course to my other class mates.

Thanks for all your help and support.

With Best Regards,
Indira Girija

Hi Prof Ranky

I was wondering since it will be the last class next week... Can we see the other FORD ROUGE video that you shot.
and possible other videos that you have shot (e learning) similar to that one you showed us last week,
I would enjoy it very much if we could....

Thanks.

Professor Ranky:

I would like to express that I admire your way of teaching. I have to admit that I learn a lot of interesting topics and subjects during the Summer of 2005 through "Cuncureent Engineering" and this Fall through "Total Quality Management", not to mention that I learned how to create the website and post my assignments on it which I had no clue about it before.

The good thing that I can apply use all of what I learned in my work (in small scale) and even in my day life.
So. thank you very much.
Baher Girgis

Hi Prof. Ranky

Thank You for a really exciting semester. I must say one thing... When I first was going into a masters program I was headed

towards Civil Engineering. I am glad I chose Engineering Management. Your class has really opened up doors and ideas for me that I never knew existed.....

I do appreciate and have enjoyed your approach to getting us to learn this material. It has been very enjoyable.
So I thank you
K. Mueller

I have successfully completed my final semester, with this I complete my Master's in Engineering Mgmt. and all set for the Graduate walk slated for May'06.

I will be joining full time with GE as a Project Application Engineer based at Lombard(IL) by 3rd week of Jan'06. My education and work experience will help me take up this challenging & exciting position.

It has been a great learning experience for me to be associated with you, It would not have been possible for me to contribute without your help and support. I value your contribution in my development as person and professional. Thank You All.

With Best Wishes & Regards,

Rajesh

Professor Ranky,
I am excited to be taking your class again. TQM (Spring 05 was excellent).

David Adwedaa

Good Evening Professor,
Last semester's class was incredible since it is helping me in different areas of my current job. My Director wants to digitize all the documents in our department. I am trying to convince them to put them on a website that is accessible only to the people that should have access.

I thought of that idea after taking your class! I have thought about many ideas that can be implemented thanks to the new concepts that I learned last semester. It was a very hard class!, but well worth it.

Alexis Rodriguez

Thank you for the course. I really enjoyed it and learned a lot. The project was very interessting and challenging too.
Thanks & Regards,
Ashley

Dear Mr. Ranky.

Thank you for your advice and for this past semester. I hope you liked my work. The tools you taught us will be really helpful. Hope to keep in touch and it would be my pleasure if we even do scuba diving together. Thanks again.

By the way I just received an invitation from GAP headquarters to San Francisco for a final interview...

Cengiz Dincer

...Interesting class last night. Sorry for butting in maybe a little too much but I was trying to be helpful - As I am sure Diane was also. I

also feel you need not apologize for your teaching style. Your experiences are relevant and are appropriate for inclusion in the discussion.

Charlie Maraldo

Hope all is well with you, I just wanted to wish you Happy Holidays! I am in California now and will be going tomorrow for a 2-week vacation. I am really enjoying my job at Boeing and I appreciate all the advice you've given us throughout the TQM course. Hope you have a wonderful time!
Warmest Wishes,
Linda

My response to these emails...

I have to admit, that student comments like the ones above make me not just incredibly happy, but also work harder every semester to give you the latest and the best, and to continuously update and improve this course and the learning resources. I know it is popular because we all learn useful methods and tools, as well as see the REAL WORLD via virtual factory tours on videos and the web, and then apply the analytical methods; I am delighted, that you like my 3D eBooks and digital videos too!

Note, that this is a combined **Welcome Letter and Course Outline** for the distance learning class. Please read it carefully. You will find all essential course information here.

Please note, that this document will be updated during the semester. If anything is unclear please contact me. According to NJIT's policies, in this course the NJIT Honor Code will be upheld, and that any violations will be brought to the immediate attention of the Dean of Students. Also, students will be consulted with by the instructor and must agree to any modifications or deviations from the syllabus throughout the course of the semester. As you will see, I fully believe in teamwork, because in a good team 2+2 = 5 (... and we need extra good hands in any project, don't we...).

On the other hand, I do not believe in copy-paste type of problem solving, because it does not add value, therefore nobody gains... therefore PLEASE

1. Read this syllabus carefully,

2. Follow the requirements accurately,

3. Do not copy from each other, or from the web (there are over 10,000 IE673 TQM student assignments on the web, all developed and documented by my students!), because if you do so you will not learn the material presented,

4. Keep the deadlines, and

5. Always do your best. Don't ask me to be your computer that checks what is obvious, or reads the syllabus for you... ask me to help to truly learn and I will always help you!

Also note, that any copy-paste work in any assignments or any work in this course carries zero grade points... I wuld like to encourage you to innovate, and create your own work. I know even large companies copy from each other (and then get caught, and sometimes pay large fines...) nevertheless we must be different; we have to innovate and work hard to prosper.

Some really useful advice about the style of professional communication...

Often I get some truly friendly emails from my students... many of these include SMS-style text messages, 'buddy language', such as 'Hi Paul, how r you doin...', etc.

Whilst I am flattered by your friendly communication style, there is something I must bring to your attention. At NJIT it is not just my job to teach you analytical skills, but also professional courtesy and conduct so that you become successful in the US and in international industry.

For communication (emails) in my courses at NJIT you must observe the following:

- Address professors and staff appropriately (no informal language, or first-name basis)
- Correct grammar (all capital letters are not acceptable, neither SMS abbreviations)
- Correct name, meaning exactly the same name you have given to NJIT

I hereby kindly inform you that these NJIT guidelines must be met in all electronic communication.

There is another important issue here, this is when students change their names during the semester... yes, it happens, and when you'll be an engineering manager you'll face similar issues; and you'll 'love it'... In our NJIT world what happens is that the names in emails, in myofficial NJIT roster, or official grading templates on the secure server, and even in earlier emails from the same student don't match... this is a HUGE problem for me, so PLEASE DO NOT DO THIS! Always stick to the SAME name in every email, that you have given to NJIT (because this is the way I see you in my list).

Every semester I have one or two students, who despite all above, do not use their NJIT known nameand even change their emails a lot. Then if I miss them, or question this, this is their usual respons: 'Oh yes professor, I sometimes use my name this way, and some other times that way...'.

Well, again: PLEASE USE YOUR NJIT KNOWN NAME ONE WAY, THE SAME WAY; DO NOT CHANGE YOUR name, or NJIT email during this course because it causes confusion and delay. Thanks! (When you'll be an engineering manager and your 120+ team members will do this to you you'll understand me better...).

Also, all NJIT rosters, grade sheets, etc. like everywhere elsein the world are sorted by family name first. So again, please use the SAME naming conventions, that YOU have given to NJIT... we are not asking you to change anything, just follow what YOU have given to NJIT earlier... and stick to that... hope this is clear...

Every semester I have 3-4 students who confuse all of us with different name combinations, changed names, nick names, etc. Kindly note, that we will ALL SUFFER because of this; we'll have delayes and other problems...you have been warned, therefore pls. don't be upset if you'll get an incomplete grade and you'll garduate a semester later because of the above... so PLEASE NOTE AGAIN, stick to the rules as above. THANKS!

Regards,
Prof. Ranky

P.S.
Had I phrased my emails in a friendly SMS-style, or all in capital letters to my boss during my first job I would have been fired on the spot...

Contact Information...

Mailing Address: Paul G. Ranky, PhD
Full Tenured Professor
Department of Mechanical and Industrial Engineering
NJIT, University Heights, NJ 07102 -1982

If the NJIT email system works you can email me at NJIT: ranky@njit.edu (Please note, that for reliability reasons I have added another email address: paul.ranky.njit.edu@mac.com. This is very important because sometimes NJIT's email does not work for weeks and then you cannot reach me and I cannot reach you... it happened with the Google email transition in December 2012 at NJIT... Please use this alternative email (running on an ultra reliable Apple server) and send again your email if you don't get an answer from me within **5 to 7 working days**. I can read the paul.ranky.njit.edu@mac.com account over the Internet anywhere where I have Internet access, therefore even if I am away at a conference on NJIT business, or research we can be in touch.)

In case of an emergency, including weekends and holidays, please email me. I look at my emails on my cellphone frequently, unless I am away where my cellphone does not work.

Note, that my **office** is in NJIT ME Building room 310 at NJIT.

My **office hours** for the summer semester will be occasionally available by appointment only. Pls. keep me informed of your progress by email, and I'll be happy to see you as soon as I can if you need help.

Find out more about **the Professor's past and current research work and background** at (don't miss some of my best diving and skiing pictures as well as the 360 degree, gyro enabled interactive panoramas that I have created with my brother...): http://www.cimwareukandusa.com/aboutpgr.htm

Some examples with videos of our related new R&D work we have completed for the LSC (The Liberty Science Center in New Jersey). These are the web sites: http://njit-lsc.njit.edu/pauldesign.html and http://njit-lsc.njit.edu/paulrobot.html

Enjoy!

Academic Calendar

Please look up the NJIT website.

What are Hybrid Courses?

Since some of our classes will be hybrid, you should understand what a hybrid, or blended class is...

hy·brid - noun *- something of mixed origin or composition; something, such as a computer or automobile plant, having two kinds of components that produce the same or similar results.*

Hybrid courses (also known as blended, or mixed mode courses) are courses in which a significant portion of the learning activities have been moved online and time traditionally spent in the classroom is reduced but not eliminated.

The goal of hybrid courses is to pair the best features of face-to-face teaching with the best options of online learning to promote active and independent learning and reduce class seat time.

Using instructional technologies, the hybrid model forces the redesign of some lecture or lab content into new online learning activities, such as case studies, tutorials, self-testing exercises, simulations, and online group collaborations.

This site (ref.: http://media.njit.edu/hybrid/) was created in support of NJIT's Pilot Program in Hybrid Learning and the Weekend University.

"Within five years, you'll see a very significant number of classes that are available in a hybrid fashion," says John R. Bourne, a professor of electrical and computer engineering at Franklin W. Olin College of Engineering who is editor of the Journal of Asynchronous Learning Networks. "I would guess that somewhere in the 80- to 90-percent range of classes could sometime become hybrid."

And he says he expects to see more students choose to take online courses even if they live on campus.
"Hybrid Teaching Seeks to End the Divide Between Traditional and Online Instruction" by Jeffrey R. Young, March 22, 2002, Chronicle of Higher Education

Ref.: http://media.njit.edu/hybrid/

IMPORTANT NOTES TO ALL STUDENTS :

1. Please read this new syllabus carefully. If anything is unclear let me know by email: ranky@njit.edu or: paul.ranky.njit.edu@mac.com
2. Please note, that I try to answer your emails within 1 day, 7 days a week (yes, even on most Saturdays and Sundays and holidays...unless I am away at a conference, or research meeting and have limited access to email) but in case your email is not answered within 5 to 7 working days, depending on the number of students and therefore my workload in the given semester, it means that my response wasn't delivered due to email address / account issues at your end, or perhaps at the NJIT end... Sorry, You have to fix your side, I'll fix my side. If everything fails, pls. call by phone or: paul.ranky.njit.edu@mac.com
3. Also, if you are asking something, that is clearly described in the syllabus, I will probably not have the time to act as your computer and read it for you... therefore, due to my workload I will probably not have the time to respond to such trivial emails. Please note this and please read this syllabus carefully. When you'll be an engineering manager working in industry you'll understand how difficult some of your team members can be: always asking questions, that have been explained earlier... This course is preparing you for real life... THANKS!
4. Naturally my email at NJIT can fail too, as it has in the past. In this case either wait until NJIT resolves this, or use my alternative email: paul.ranky.njit.edu@mac.com, or call if urgent (you have my home telephone number above, in case of an emergency). Please note, that often I am away on research, in particular in the summer sessions, therefore email is still the best option.
5. Last year's statistics shows that over 80 percent of the questions asked by students about this course were actually answered in the combined Welcome Note/ Course Syllabus... therefore PLEASE READ it ... it saves time for all of us, most importantly for you!
6. Due to the fact that I teach and supervise typically over 120-130 graduate students every semester, I cannot confirm the receipt of your homework assignments, but when you get my comments and the grade you'll see that I am working on your assignments too. It is important that you prepare them as well as you can, on time. PLEASE note, that I will only tolerate lateness if there is a professional reason for it. You have to email me this professional reason BEFORE the deadline. As you can imagine, these non-standard situations create extra load on any manager, including myself, therefore please try to complete all work as requested by the syllabus.
7. About improving and resubmitting assignments: Please note, that each assignment must be submitted on time. There is only one resubmission option and that is within the framework of the last assignment, that is the 5th assignment, at the end of the course when you have to submit all your assignments again (see later). Note, that if you are late submitting your assignment, then you loose the option of resubmitting a reworked version for a perhaps better grade. Every semester I have several students who try to overwrite this rule: submit their work 2-3 weeks late and then send me

several emails claiming that I am late grading them... pls. do not work like this; when you'll be an engineering manager you'll understand my side better... I am keen to help, but please do not abuse the system. Thanks!

8. **PLEASE set up your own web page including your photo in the webpage,** use NJIT's FREE web server, or your company's, or your own, or other solutions that work... it is your choice what software you use, which service provider you chose, etc... **PLEASE submit ALL your assignments electronically.** Since I deal with typically over 1200 assignments every semester **ALL YOUR ASSIGNMENTS MUST BE** submitted electronically, meaning a URL in an email, pointing to a web page. If you do this over the web, it becomes very easy after Assignment 0... you may email me assignment 0 as an attached Word file, or PDF file, nevertheless you should put it onto your web site as soon as you have learned how to create a website. (I'll teach you how to design a webpage in the life class, else please rely on NJIT's IT web pages, or others. You chose the software and web services... just make sure, that the service can handle links, including links to .XLS (i.e. Excel) files (NOT embedded into PDFs pls.), since your spreadsheets will be in this format... NJIT's free server option has this, many others do NOT allow this. Every semester this creates trouble for some students, therefore pls. note this and make sure that all works fine!) Note, that some students create a simple content list and then attach every assignment in PDF, or MS Word... this is wrong practice. Please put the text into .HTML, the images into .JPG files and the spreadsheets into .XLS files. These are useful instructions in PDF, on how to set up a simple web page for this class. (Please note, that since the web changes all the time, some of the screen prints in this document might look different at the time you read it.)
9. IF your web page does not link due to a link error you get an automatic 0 grade for the assignment. Sorry, this is tough I know, but teaches you on how to pay attention to detail and the importance of testing your work before submitting it to me... pls. ask a colleague, classmate to test your page. IF you ask me to sign in with a password then that is zero grade too. Sorry, I do not do that. This still means that you can rework this assignment and submit it again with the 5th assignment together for a better than zero grade, assuming you have submitted the first time around on time...
10. **PLEASE do NOT use MS-Publisher as a web authoring tool**, since it has linking problems even within an entirely MS 'industry standard' (or non-standard?) environment... not to mention the internationally accepted Internet community... 'If they cannot see your web pages then why to bother at all...' therefore make sure that your web pages are being used for knowledge collection and knowledge management and therefore are accessible from anywhere in the world!
11. Please make sure that your URL works before you send me an email with a full length URL in it so that I can click on it and directly link to your assignment(s). Every semester I get 3-4 submissions that have link errors or even passworded sites... in such a case you get zero grade for the assignment and you can resubmit it with the LAST assignment in the entire course (not the last time submitted assignment as many students interpreted this rule in the past...). The best approach is to set up your own web page, and then copy-paste the requirements from this syllabus and then add every assignment to this URL as you develop your assignments. This way you won't miss any aspect of any assignment. Also, this will be an extremely valuable knowledge documentation method to learn and resource when you apply for a job! If you don't know how to set up a webpage pls. read these useful instructions in PDF, on how to set up a simple web page for this class.
12. When you are done, you trigger my grading process by sending me an email with your URL in it. Again, **submit it on due date**, NOT earlier, NOT later pls. and therefore your email triggers my grading process. This helps my system a LOT! Thanks!
13. In the SUBJECT SECTION of your email pls. specify your class code (e.g. IE673 eLearning); this helps me too. THANKS!
14. As you post a new assignment PLEASE email me about this with the proper link (the full URL in the email, like this http//www.thisismywebpage.com, so that I can just click on it and I am at your webpage). Please do not put any passwords on your web site. Passwords are not safe anyway and it makes my life very difficult... and I will NOT look at your passworded assignment, and that means zero grade for the assignment... sorry. Often, students don't read this section of the syllabus, and despite all my requests password their sites. Then they send me emails about why they haven't received a grade yet, or why they got zero grade... kindly ask you again not to password your site; you'll understand all of these things better when you'll be an engineering manager looking after 120+ team members every semester... I would like to treat you as professionals... please treat me the same way too, and help me with the above basics... Thanks!
15. In your emails, please use EXACTLY the same name you are known to NJIT at the time of registration. My roster goes by the FAMILY name (e.g. RANKY), NOT by the first name (e.g. Paul, and yes, I am therefore NOT Professor Paul, as many students email me, I am Professor Ranky...). Often I see long names with nick names in emails, that are not in my roster, therefore takes me a long time to find you... and the more time I have to waste on stupid searches like this, the less time I have to teach you valuable things... I very much respect different cultures, family names, etc. but again, PLEASE use the name that NJIT uses in the academic roster... please do not use your nick name in your emails! Thanks!
16. ***We plan to use the* Highlander Google email-to-class system offered by NJIT, therefore pls. READ the email address you have offered to NJIT, ELSE I CANNOT BE IN TOUCH WITH YOU BY EMAIL; since this is the ONLY email my NJIT system knows about you (even if you have 6 others... hope all challenges are clear...) Please note, that via Highlander you can network to your entire class too and social network.**
17. The NJIT Honor Code will be upheld, and any violations will be brought to the immediate attention of the Dean of Students. Students will be made aware of any modifications or deviations from the syllabus throughout the course of the semester. IF you copy versus develop your novel assignments then you'll get zero garde points for copying... sorry, copying others' work (including mine) will not get you anywhere in our global competitive world... just see all those legal IP cases when companies copy servers, software, iPhones, products, procedures, T shirt designs, watches, music, cars, and eventually your own designs too... it will REALLY HURT then, trust me I have been through this... Trust me you DO NOT

want to go that way... dead end for loosers... you want to be ahead of the curve, win, drive the future, innovate and you CAN! (As an example, in Assignments I offer you templates. Please customize these templates, change them, make them better, make them your own... DO NOT copy them... you don't learn anything by copying anybody's material, anytime, anywhere! Since I have over 40 years experience in this field I can spot copies quickly (although not always...) In cases like that I ask students to join me in my office for a one hour long detailed technical Q/A discussion; in such cases if I find out that the student does not understand what he or she has documented (even if the documentation is correct) your grade will suffer greatly. Again, as you know already, my interest is to teach you as best as I can to become a creative engineer, not a copy machine... this is your interest too, even if you might not see it yet... luckily MOST students are positive, diligent, innovative hard workers in my classes, nevertheless there are always a few who copy-paste... I usually can help them to change their attitudes... but it creates a lot of stress for both of us...

18. **SOCIAL NETWORKING and Video Conferencing:** 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 read these articles and then discuss them with at least one more member in your class (live or DL), 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 15 to 20 short and very current articles to read. Through my editorial work with major journals I get hundreds of *just published* articles that I can choose from... I am looking for your summaries of the discussions you have done with one or more of your classmates on these articles via email, and/or video conferencing. These activities are all part of each assignment now and therefore should be documented in your web page, just as the rest of your assignments are. (All in one; nice object-oriented principle; not zillions of separate files please!)
19. **IN case of an INCOMPLETE:** In the case you file for an 'I' incomplete at the end or during this course, due to a professional reason (pls. see the NJIT regulations an definitions what professional reasons can be), and in case you don't want that 'I' to automatically turn into an 'F', as the NJIT computer does this, PLEASE submit all your work at least 30 days BEFORE the end of the following semester. (Note, that summer semesters don't count here as the 'following semester'.)This gives me enough time to evaluate your work, grade you, and also NJIT to deal with all necessary paperwork to change your grade. AGAIN, pls. do it as above, else I might not be able to do it before the NJIT deadlines... it is better to plan this properly than be upset when it is too late... Again, to manage this is YOUR responsibility; you must be pro-active... I will not warn you; sorry. Thanks!
20. **These are the steps my students suggested in the past to follow when uploading webpages to the NJIT server** (Note: I use professional servers and professional software tools; I do not use the NJIT server, therefore if you need help in terms of VPN (Virtual Private Network) links, or how to download software from the NJIT website, or why your webpage does not work with the FTP (File Transfer Protocol Program NJIT offers) PLEASE contact the NJIT computing helpdesk, NOT me. Also suggest, that you network with other students in the class, or via chatgroups (instant messaging systems); I will help in this as much as I can by emailing these important links to everybody during the first week of class, as soon as I get the class roster from NJIT's Registrar.

    As an NJIT undergraduate, graduate, live and/ or Distance learning, or in other words eLearning Student, or hybrid course student you are **entitled to benefit of significant FREE computing resources**, meaning hardware, lots of free software, as well as on-line email, web-site storage space, and related Internet and NJIT intranet server services. The steps below intend to help you on how to set up a web page for documenting your assignments for this course. Please read and follow each step. Obviously if you already have a web page, either through work, or business, or otherwise, please feel free to use that, or the one you prefer. (All we want is for you to learn the method, and then put all your assignments on the web, learn how to manage your knowledge over the web, and then email your URL with your assignments to the instructor for grading). Note, that you can use any suitable web authoring software. NJIT has a few too.

    These are the steps to follow (as provided by NJIT's IT and Computing Services):

    Hopefully all works... I'd like to see your beautiful webpages! Simple and working fine.

    1. Visit: http://csd.njit.edu/resources/webservices.php and read the instructions for Home page Setup. If you don't understand the details offered, please contact NJIT Academic Computing at Tel: (973)-596-2900, and they'll take you through. (Note, that lines can be busy during peak times, such as at the beginning of the semester, or towards the end of the semester, therefore to sort this out the earlier the better!)
    2. You should have an index.html file as your 'title page', because search engines will find you via the index.html file, and your hyper links to other files should be programmed passing through this index.html file.
    3. Please make sure, that you create your index.html file in your public_html directory and have all your other .html, .jpg, .xlx, .mov, etc. files in the same directory, else you will have a 'path error', meaning that your files will not link when viewed by others over the Internet.
    4. Last, but not least: **ALWAYS test your uploaded assignment** using your own, as well as somebody else's computer, to make sure, that everything works fine. (If you don't have a second, independent computer on the web, ask one of your classmates, or friends to check it for you, by sending him/her an email with a full URL in it, like this: http://www.mycoursewebpage.edu). Also note, that besides the class discussions (live class), the eLearning pack CDs have several examples on the architecture of simple and complex web-pages. All of these are in open source, please study them! We'll discuss some of this in class too!

21. One of my students offered this explanation on how to upload webpages to the NJIT server: (might have changed...I do not use this system, sorry... I use only professional servers...) Click to see it in .html

    Also, another student of mine suggests to use Netscape for free webpage design. This is the link: Netscape 7.2 is free for download for both PC and Mac at the following URL:

    http://browser.netscape.com/ns8/download/archive72x.jsp

    Last, but not least: **ALWAYS test your uploaded assignment** using your own, as well as somebody else's computer, to make sure that everything works fine. (Also, ask one of your classmates, or friends to check it for you, by sending him/her an email with a full URL in it, like this: http://www.mycoursewebpage.edu. Always include the full URL into the email, else it won't link directly).

    Also note, that besides the class discussions (live class), the eLearning pack eBooks have several examples on the architecture of simple and complex web-pages. All of these are in open source, please study them! (Note, that open-source does not mean that you can upload an entire eBook of mine, or video onto a server on the web. This would be a major copyright violation!!!! Try to stay out of legal trouble, USA lawyers are the best... PLEASE!)

22. The 21st Century Engineer must be a professional information searcher, information and NEW knowledge creator, as well as somebody who can reason over several different sets of information and then select the best possible solution path under constraints... You should be able to question, interrogate and take optimal decisions... not an easy task. In order to help this process, in this course we'll visit NJIT's wast and advanced electronic library, see some of the typical information searches and how the results can be evaluated. For our purposes, we'll use NJIT's SCOPUS electronic database. You can reach it via: http://www.scopus.com.libdb.njit.edu:8888/scopus/home.url, all you need is your UCID and password (as offered by NJIT to every NJIT student) to access this site

As always,

Happy Learning for REAL,

Professor Paul G. Ranky, PhD

Contents (IE673)

prevention. **Deadline: July 14, 11.59 pm. Please email me your Midterm link on this day. NOT earlier and NOT later. Note, that the Midterm, Assignments 3 and 4 are graded together for academic reasosns. If you are late, you are loosing the rework option.**

- Class 10 **Assignment No.3:** Process Improvement and Process Control Analysis...click and see below more on this assignment... (Max. 10%) **Note: deadlines are strict! Deadline: July 21, 11.59 pm. Please email me your assignment link on this day. NOT earlier and NOT later. If you are late, you are loosing the rework option.**
- Classes 11 and 12 **Assignment No.4:** Process Failure Risk Analysis... click and see below more on this assignment... (Max. 10%) **Note: deadlines are strict! Deadline: July 28, 11.59 pm.**
- Class 14-15 **Assignment No. 5:** (max. 30%) Resubmit the improved versions of Assignments 1 to 4, as well as the Midterm, perform a TQM Audit and integrate RFID into your assignments... click and see below more on this assignment... **Note: deadlines are strict! FINAL deadline: August 8, 11.59 pm. Please email me your assignment link on this day. NOT earlier and NOT later. Please note, that you'll be graded on what I have on August 8, 11.59 pm.**

For ALL assignments: Please note, that if you are late with the submission of an assignment, then you can only submit it together with the last, i.e. the 5th Assignment. In other words if you are late with an assignment, you are missing a rework opportunity based on my comments. You can resubmit the improved version of each assignment once, assuming you have submitted each of them on time, i.e. on due date (as above).

NJIT IE 673

Welcome to IE673, one of the most useful TQM courses you'll ever take! Please read these notes. If anything is unclear please call me or email me. I am here to help you! Prerequisite: instructor's approval.

Narrative Description of the Course: Total quality management is an approach to business involvement led by the theme of quality. It involves the continual satisfaction of customer requirements at the lowest cost by harnessing the efforts of everybody in the company. Quality assurance means **sustaining a system which prevents defects**. This includes quality control and quality engineering. Quality control means establishing and maintaining specified quality standards of products / processes / or a service; quality engineering is the establishment and execution of tests to measure product quality and adherence to acceptance criteria.

This course explains the importance of sustainable, lean six-sigma, reducing variation for the purpose of implementing total quality in every process (at every level) of the enterprise. Furthermore, IE673 represents a sustainable, lean, modular product, process, service design, implementation and management approach to the introduction of various TQM methods, tools, technologies and their engineering project management issues within a variety of small, medium and large enterprises.

So, is this marketable knowledge for graduates? And what are the job opportunities in lean six-sigma quality and in project management? (These are two important areas, that rely on fundamental subjects discussed in this course.) The answer is: ALL GOOD!

As examples, USA executive on-line education programs claim (May, 2010), that six-sigma quality knowledge with good communication skills, leadership skills, analytical and risk analysis skills, as well as good project management skills claim a potential of a $140,000.00 (USD) annual salary!

As often defined "quality is the overall level of product /process / service excellence". It is also quite obvious that without similarly "excellent people, equipment and software" , or in other words, resources, one cannot provide the desired level of quality at the predefined cost. According to Jaguar Cars, "Quality is making money out of satisfying customers. Quality comes first". John F. Akers, former CEO of IBM, defines quality as follows: "Quality is everyone's job. Quality is essential merely to stay in the race". Others claim that: "Quality means putting the customers first every time".

Dr. Akimasa Kurimoto, Yamazaki Machinery (Japan) states that: "The success or failure of the new business strategies is, in general, attributed to the capability of the company to create its culture in ways that would make the new business strategy work. Quality is a fundamental management philosophy, causing cultural change of mind and attitude. Total quality management is the prime corporate business strategy to facilitate the best blend of management and working practice".

Lucas Engineering & Systems (UK and USA), defines Total Quality as follows: "The term Total Quality of Performance relates not just to the technical quality of products but rather to the quality of performance of every function in an organization. This is in recognition of the fact that the quality and cost of a product depend upon its design, the lead times and the reliability of the processes operated by many contributory departments (both manufacturing and administrative), the choice of materials and the effectiveness of supporting structures".

Mike Robson, international (US-based) quality expert, claims that: "We all want quality and excellence. Excellence is a journey, not a destination. There is no magic to quality". The conclusion is that every manufacturing (and other) enterprise needs a Total Quality system which is:

- Understood by everyone,
- Communicated to everyone,
- Powerful enough to guide, measure and quantify.

The main problems when applying traditional quality management philosophy include the following:

- It focuses on **correcting mistakes after they have been made, rather than preventing them in the first place. (Consider, that this mentality can be fatal for humans at the workplace; hence our Midterm topic!)**
- **It accepts statistically justifyable level of failures, versus zero defect. (So, do we really accept some fatalities at the workplace, or we would like to see zero injuries?)**
- **The traditional quality philosophy allows mistakes to be made.** It actually builds them into every aspect of the system, typically costing around 20% of the turnover.
- **Accepts, that quality has to be sacrificed as the volume and the productivity goes up.**
- **As viewed by accountants, it is an expensive add on item** of the value chain. Is quality an expense, or a MUST to survive? Absolutely yes, quality MUST be high, preferably 6-sigma or even better, zero defect, to survive and prosper!

On the contrary, in this class we follow a modern, progressive, and simultaneously preventive thinking; and even more, a sustainable green approach: this is because Total Quality Management involves every person, aspect and machine (i.e. product, process, control and resource) of the organization, it requires a total commitment. It is not a quick "test and fix" approach. It is a preventive system designed into every aspect of the World Class Design, Manufacturing and Service enterprise, including product design, manufacture, management, administration and others. In accounting terms modern TQM is costing less than conventional quality systems do, because they can and do prevent failures! (No more recalls? Is this really possible? ... and how much less expensive is that?)

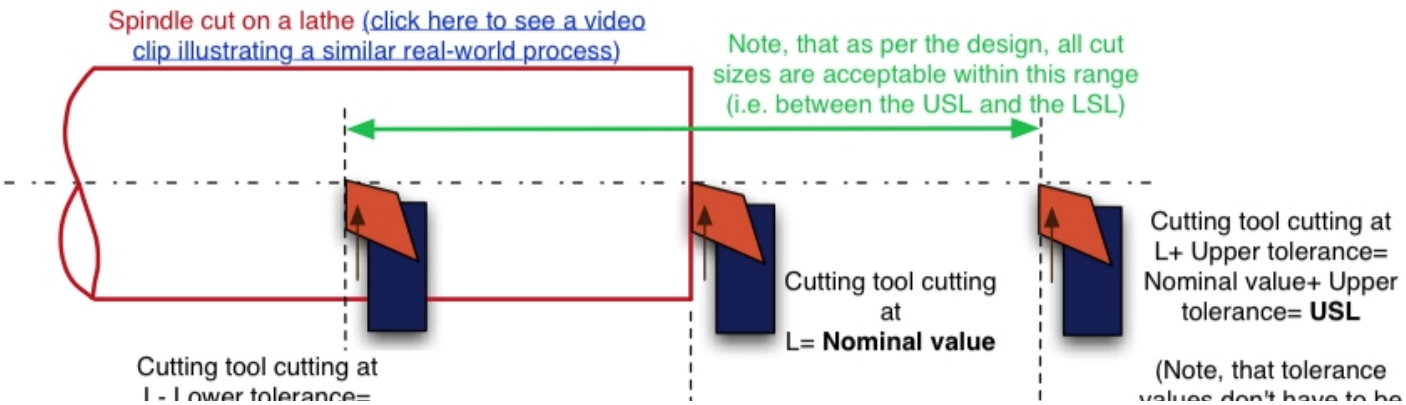
In order to learn the above outlined principles, methods, tools and technologies, the course is supported by a comprehensive eLearning package (for both live, hybrid and distance learning students these packs are the same in structure and content). An eLearning pack typically contains a comprehensive 600+ page long browser readable, digital eTextbook, we call it the digital and interactive multimedia 3D eBook, some printed material, and other web-browser readable, open source 3D interactive multimedia, digital videos, magazines, DVDs, CDs, USB sticks, and others. (These represent the collaborative companies; pls. see Assignment 0 for more on this topics.)

The eLearning Packs contain real-world research and industrial case studies, as well as open source, professional active code and spreadsheets, that the students can customize when developing their assignments with their own data. (PLease note, that open source does NOT mean, that you can break the USA / international copyright law and put an entire 3D eBook DVD, or a video on the web !... even if it is going to be on your own server!!!!!) You may of course customize the speardsheets and submit them as your assignments on your webpages with proper credits given. That is great, because you can design and solve your own problems in every assignment! (Freedom?)

The fundamental goal of TQM and TQC (Total Quality Management and Control) is to program, measure and keep process variability under control. During our studies in this course we discuss several methods, tools and technologies to achieve this goal. One of these methods is identified as **six-sigma**. In order to give an introductory-level example of our approach, the figure below illustrates the mathematical versus the industrial interpretation of six-sigma.

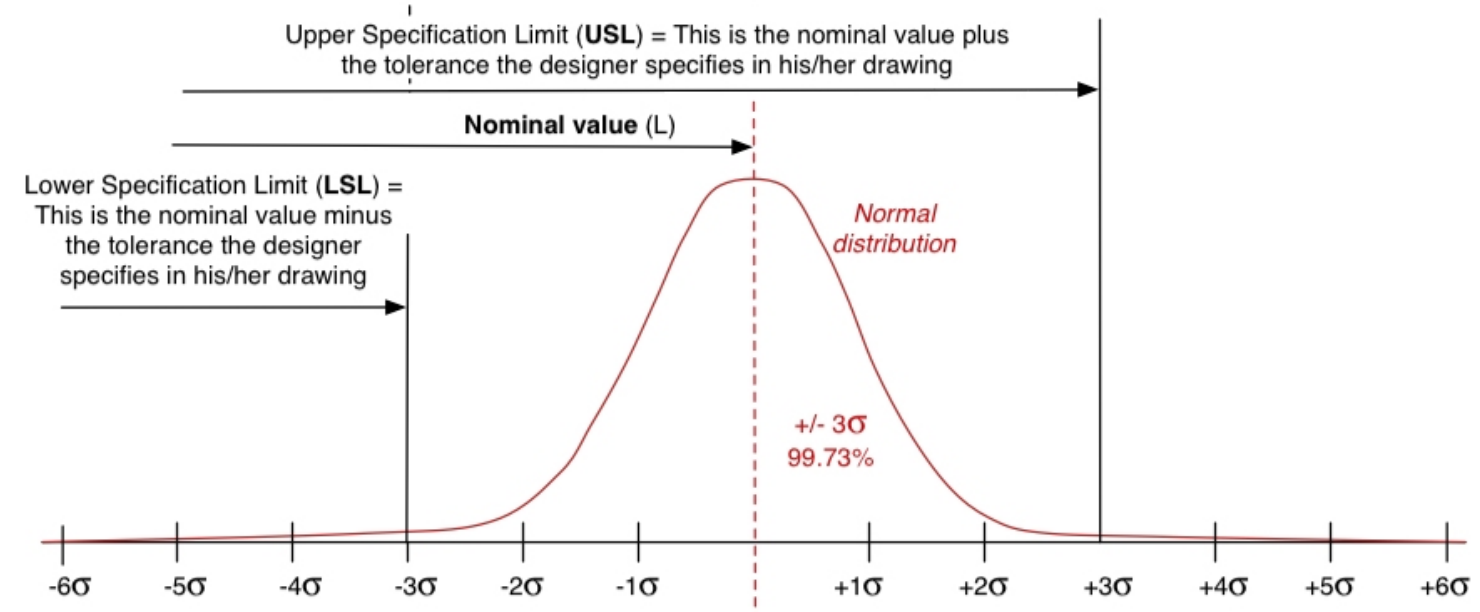
(When reviewing this figure don't forget to play our short sample video, hot-linked to this figure. This is only a short, small size video, because it is run from the server over the Internet. In the eLearning Pack you'll find several resources with pro-quality, full length video and multimedia content, including 3D videos and animations!)

The mathematical and the Motorola six-sigma concept explained with a simple engineering example (© Copyright by Paul G. Ranky)



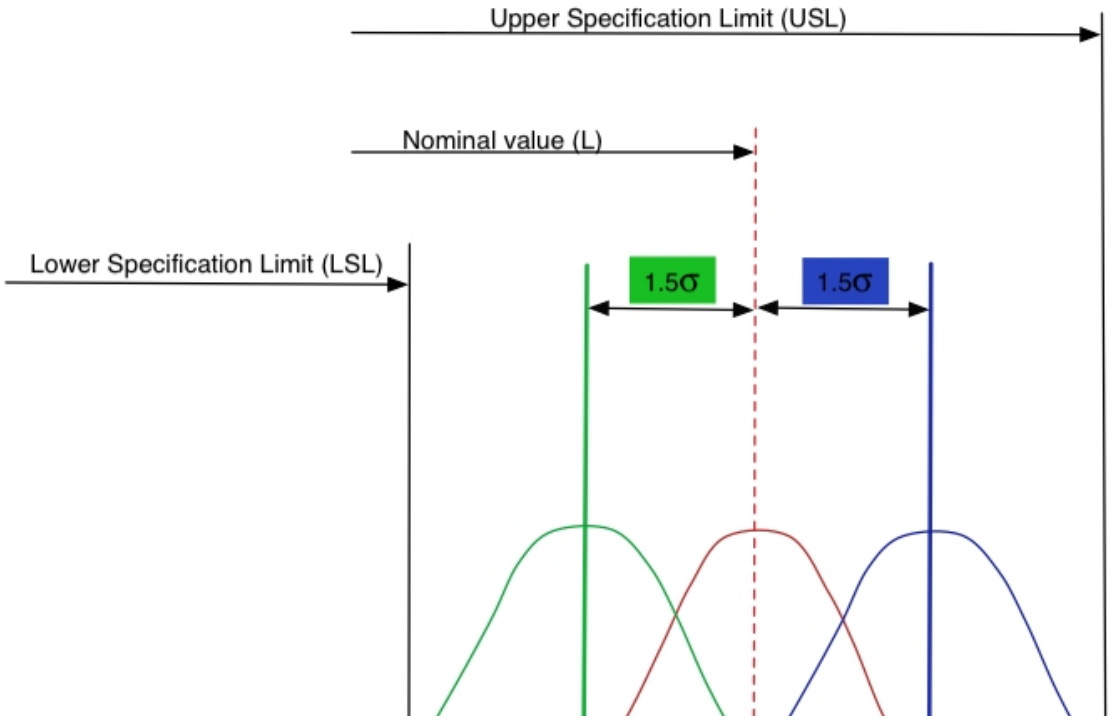
Nominal value- Lower tolerance= **LSL**

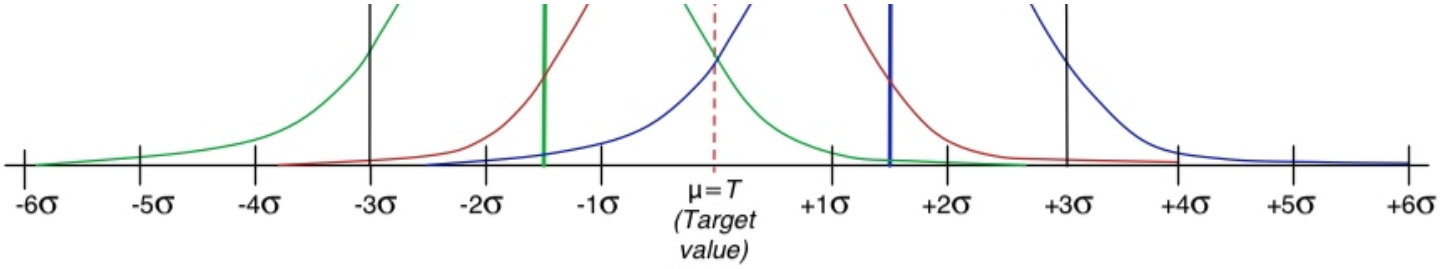
symmetrical; in this example for simplicity they are)



The strict mathematical definition of six-sigma accepts max. 0.002 parts per million to be defective parts. (This is an extremely tight specification!)

μ=*T (Normal distribution centered at the Target value = Nominal value)*





Motorola's, and most industry's interpretation of the six-sigma concept accepts max. 3.4 parts per million to be defective parts, because (as illustrated above), it allows the mean to shift +/- 1.5 σ around.
(Furthermore note, that this assumes that the process is stable. In the real-world most processes are often not stable, therefore the shift in reality can be even bigger than +/- 1.5 σ). I terms of a company-wide TQM / TQC / Six-sigma project plan it is vital to be able to collect, analyze and evaluate such data.)

To summarize, the methods taught in this course are relevant not just to TQM as applied to design, manufacture, test of products, but to a large variety of services too, because **they reduce development costs, improve working capital management, and increase customer satisfaction** by offering powerful methods and even software tools.

Fundamentally this means waste reduction, and optimization, therefore lean. If coupled with sustainable green methods, then we can be truly pleased with the results because th eimprovements will last for a long time.

Advanced, sustainable green, high quality design and manufacturing is used in all areas of manufacturing, including product and process design, control, fabrication, test, assembly, disassembly, and remanufacturing / recycling. (Note, that manufacturing here also means pharmaceutical packaging, electronic assembly, and other manufacturing, fabrication, production processes.)

In terms of green design and manufacturing sustainability we consider an eco-friendly state, or process that can be maintained over time, for a very long time.

Also, the ability of an ecosystem to maintain ecological advanced manufacturing processes and functions, biological diversity, and productivity over time. Furthermore, it encompasses the concept of meeting 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 coexist with another system indefinitely, without either system being damaged by toxic waste or any other process. Sustainable green manufacturing also emphasizes that the creation of wealth within the community considers the wellbeing of both the human as well as natural environments, and is focused on the more complex processes of development rather than on simple growth or accumulation only.

Upon completing this program of study the candidates will be able to understand and apply TQM Engineering, and related management methods and tools with a strong sustainable six-sigma and green engineering focus.

Why is the course needed?
There are many methods and solutions to innovate and develop new products and processes, to cut down waste, to green, and to improve an organization, a design office, a manufacturing enterprise, a product, or a process. One major discipline is Lean Six-sigma Total Quality Management.

There is no doubt that modern Total Quality Management sounds impressive, but it is also expensive, because it aims at perfection in every aspect of the organization. On the contrary, many large and small companies claim that lean six-sigma total quality is a business strategy. It is "a matter of life or death"... and if you consider the importance of the environment, then even more so... According to Harold Geneen, of ITT, USA, "Quality is not only free, it's our most profitable product line".

But how can this be true ? As a simple and quick justification process, think for a moment of the fact that following the traditional quality management philosophy, the fewer the faults, the higher the cost, whereas applying our progressive total quality approach, **the fewer the faults, the lower the cost (not to mention the possibility of the cost of a major recall!)**

In other words, modern Total Quality Management means:

- **Meeting the agreed requirements of the customer** now, rather than in the future, in a precise, measurable manner.

(According to Philip Crosby, traditionally companies measure quality by indices, which only the Quality Department understands. However if quality can be measured in financial terms, such as folks, '...we have saved $1.42 million', the message can be conveyed more effectively.)

- The customer needing to be satisfied is both internal as well as external, and is part of the internal, and external often **global supply chain**. (This way everybody in the organization becomes a "service provider" and wants to get the job done right the first time.)
- **Zero defects** must be the aim for every human and machine, in everything I / we / they do. It is something we can gradually achieve, not instantly. It is a journey, not a fixed distance destination... and it is very hard, but rewarding!

It is essential to understand that none of the progressive TQM methods we teach in this class work in practice unless they are applied to all levels of the enterprise, including all processes, the internal, as well as external supply chains. A modern company today is part of a global supply chain. As many examples have shown if just one segment of this supply chain breaks down because of poor quality, the entire system collapses (e.g. Chinese led paint, Chinese milk poisioning, Toyota recalls).

TQM methods and the **quality culture** has to be introduced gradually and should be managed by people who understand and support the principles, know how to communicate on an international basis, how to deal with co-workers, and know the methods / tools too. It is a complex process, and a major implementation challenge!

TQM has its best chance if implemented in a modern, digital factory, in which every major process is monitored, based on analytical, quantitative and computational methods... (you can read more on this interesting topic...)

The table below kindly offered by Peter Rayson, TIC, University of Birmingham, UK, illustrates the way enterprises must develop into **international market facing systems**, employing **knowledgeable and empowered professionals**, who are capable of creating and managing new knowledge for the enterprise; exactly the kind of workforce this course is developing.

Market Facing Systems

Extended Enterprise	Customer & Supplier Transactions	Marketing Communications	Ecosystem Development	**Market-Facing Systems**
Integrated Enterprise	Enterprise Data Systems & Apps	Enterprise wide Communication	**Enterprise Knowledge Management**	Enterprise Process Innovation
Automated workgroup	WorkGroup Data Systems & Apps	**WorkGroup Communication**	WorkGroup Collaboration	WorkGroup Process Innovation
Empowered Individual	**Data creation access & usage**	Information Access & Authoring	Training, Education & Expertise	Workflow Integration
	(Structured) Data	(Unstructured) Information	(Unstructured) Knowledge	(Semi-structured) Work

Source: enterprise.com,
Jeff Papows, President and CEO, Lotus

tic technology innovation centre

UCE Birmingham

To summarize, modern TQM addresses the whole enterprise, including products, processes, controls and resources, or in

another domain humans and machines, the business systems, product design, process planning, manufacturing planning, the shop floor, packaging, maintenance, and service, including multiple life-cycles, via the internal, as well as the external supply chains.. yes all of it!

For Whom is the Course Intended?
I have designed this course for Graduate / Master of Science programs in IE (Industrial Engineering), in EM (Engineering Management), in Mechanical Engineering, MnE (Manufacturing Systems Engineering), Pharmaceutical Management, Project Management, as well as an elective course for Graduate Mechanical Engineering, Graduate Computing Science and Graduate Environmental Engineering students. Note, that we follow a modular, object - oriented (OO) approach that makes the topic very adaptable to a variety of different environments. This approach has been successfully tested and run for several years at NJIT as well as on a consulting basis at large companies, such as IBM, Ford Motor Company, Jaguar Cars, GM/EDS, Boeing, Raytheon, and others.

Furthermore, the course is aimed at graduate research students, professional engineers and managers working in industry, wishing to learn about new, TQM methods, tools and technologies and management methods, for the purpose of improving products, processes and services.

Live, Hybrid and Distance Learning Students purchase their educationally priced **eLearning Packs from the NJIT Bookstore (pls. contact Frank, at the NJIT Bookstore over the web)**. PLEASE NOTE, that all of the eLearning Pack materials are **copyrighted** and therefore are for individual student use only. (As an example, it is illegal for you to purchase the educationally priced package from the NJIT bookstore as an NJIT student, and then send it to your father's business in India for professional / commercial consulting purposes to improve his factory... as it happened in the past...)

On the other hand, you can put selected objects (e.g. images, or video clips, or others up-to-10% of the total content) with proper references to the original material (in the usual format: 'Courtesy of xyz, published by ABC...) into your assignments and post them onto your website, but it is **ILLEGAL for you to put an entire eBook,or en entire video (as an example) onto your webpage, or server.** I mention this here because some students break the USA copyright law and therefore can get into major legal trouble with publishers; something I do not want you to experience, because it is expensive and nasty... the USA legal system is one of the best in the world...

Every eLearning Pack architecture is the same, but in terms of actual content is different, because it is customized and updated every semester. This is what you'll find in an eLearning Pack for this course, this semester:

- **DVD-ROM with a 'B' on it: The main eTextbook of the course** (updated every semester and extended with new material). **Open this 3D eBook-textbook from your DVD: note, you'll need a PC or Mac with a DVD reader, not a CD player... When you have opened the eBook folder (directory) you'll see the** *a_StartCase.html filename*, **using a web browser, open this file, and you are in my world..**. If you can click with the mouse, you'll be able to work with this interactive program... This multimedia eBook covers all aspects of the course, explained and illustrated with text, 2D and 3D images, animation, videos, 3D virtual reality objects and 3D virtual facility tours, including 360 degree interactive panoramas, and the following: Introduction and overview of TQM; Why do we need TQM, and what are the main drivers? TQM in a traditional and in a modern design and manufacturing, and service -oriented enterprise; US and international quality standards; TQM process modeling methods and tools; TQM requirements analysis (QFD), and risk analysis methods and tools; The integration of quality into every process; An overview of TQM methods, graphical and statistical tools; Lean six sigma, JIT and Kanban methods; Networked TQM and TQC in collaborating digital enterprises, and the role of modeling and simulation; Quality leadership, strategic management, and customer satisfaction issues; Globalization, and quality culture issues; Quality Auditing; Teamwork and how to build great quality teams; The Importance of communication skills, education, training and TQM knowledge documentation and knowledge management methods and tools; Quality Ethics, TQM culture, benchmarking and globalization; Continuous improvement; Quality Audit. A comprehensive glossary of quality and related terms; Active code for students to experiment with their own data; Exercises and problems / challenges to solve). ***(You keep.) Start this eBook program by opening the aStartCase.html file in a browser!***
- **On a separate DVD, with a 'V' on it, you'll find several more full length digital videos. PLEASE NOTE,** that most of these videos are encoded using the latest and best quality MPEG4 codec by Apple and an International Consortium of professional companies. They play very well on any PC or Mac, the quality is in most cases is as good as a standard definition DVD, or better, BUT the file size is about 1/5 th of the standard DVD MPEG2 file sizes we are used to... this is a HUGE advantage. Therefore, as long as you have a DVD player in the computer, and Apple's cross platfrom QuickTime, it will play. You might need to download the latest version of Apple's QT (ver. 7, or later) FREE from: http://www.apple.com and then click on 'Downloads' at the top... (It is a dynamic web page, therefore if you look it up from a PC it will offer the Win compatible download, and from a Mac the Mac version; nice!) At the time of writing the MS Media Player cannot play this modern format. Also as far as I know, most TV-linked, standalone (i.e. not PC/Mac integrated) DVD players still cannot play MPEG4 files...
- Also note, that you must have a drive in your computer, that can read DVDs, not just the old CDs. (All machines produced during the past 6 to 8 years should have such combo-drives...)
- ***You can keep all above as a valuabe resource!***

PLEASE note, that all above is for your personal educational non-profit use only, not to be put on the Internet or any servers, or make copies, else you might get into serious trouble with the USA copyright law... THANKS!

The eLearning Packs will give us a great opportunity to work on projects in collaboration with the **Four Selected Companies** (also in your eLearning Pack). **PLEASE NOTE, that each eLearning pack is different**, nevertheless the methods we use are the same. Each student should therefore use one customized eLearning Pack.

Also note, that you will need a multimedia PC (approx. 900 MHz, with a DVD drive and 800x600 resolution screen min., 1024x768 or better screen preferred), a link to the Internet and email, as well as a not older than yr. 1998 version of MS-Excel in your machine. PLEASE NOTE, that as a student at NJIT, you are entitled to huge educational software and hardware discounts, FREE software licenses, therefore make sure that you take advantage of the huge educational discounts offered. (See the NJIT's bookstore, as well as contact NJIT's computing help desks at http://njit.edu for further details).

Reading for a degree... A few words about 'reading for a degree'... for hundreds of years, academics and other professionals all over the world emphasized the importance of reading for a degree. Here is a short list of excellent resources that will help you to deepen your understanding in the subject area of this course. Please read more on the subject if you can:

- Goetsch, D.L. and Davis, S.B.: Quality Management. Introduction to Total Quality Management for Production, Processing, and Services, 3rd. ed., Prentice Hall, ISBN 0-13-011638-6, 778 p.
- Ehrlich, B. H.: Transactional Six Sigma and Lean Servicing. Leveraging Manufacturing Concepts to Achieve World-class Service, St. Lucie Press, ISBN 1-57444-325-9, 270 p.
- Gryna, F. M.: Quality Planning and Analysis from Product development Through Use, McGraw Hill, ISBN 0-07-039368-0, 730 p.
- Hoyle, D.: QS-9000, Quality Systems Handbook, SAE International, ISBN 1-56091-925-6, 562 p.
- Jeffrey K. Liker: The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer, McGraw Hill, ISBN 0 - 07-139231-9, 2005, and many others, like the NJIT library, where you can find literally hundreds of excellent books and references and FREE access to many professional Journals (!), the Internet, Barnes, etc.
- Useful links: http://www.asq.org
- Also excellent links offered by my best students include the regulation in the food industry. Here are some links from the FDA Website: The first two related to food and the latter related to drugs. Thank you Yvins Dezan and happy learning!
  1. http://www.cfsan.fda.gov/~lrd/haccp.html
  2. http://www.cfsan.fda.gov/~lrd/inspect.html
  3. http://www.fda.gov

Schedule: A semester at NJIT is typically 15 weeks long. (Note, that Summer semesters are streched longer; pls. see the NJIT web site for accurate dates in each semester.) You have to complete and submit 6 assignments on time (see them below in detail). There is no final examination, the course is assessed based on the 6 assignments (0 to 5 and an open book Midterm; see below in detail). Since each eLearning Pack is different in content, each of you work with me on different assignments, nevertheless everybody will bel using the same methods base (explained in detail in the eTextbook, a.k.a the eBook).

All assignments should be in electronic format (i.e. email me a full URL within an email). If there is something not clear, please email, or make an appointment and see me. I am keen to help, but please do not ask me to act as a computer and read the syllabus for you... THANKS! Note, that in the summer session it is important to leave enough time to arrange a face-to-face meeting if necessary. Obviously I answer emails 7 days a week, including vacation days, unless I am away and have limited or no access to the Internet.

Class 1/ NJIT Week 1: (Note that class numbers correspond to the semester week numbers at NJIT and this is just a relative scale for planning purposes. The due dates are calendar day accurate and should be followed. In the summer session you can plan for a double length period, therefore each week becomes two weeks... this gives you more time to study...) Topics covered; pls. read the eBook and watch the videos in the eLearning Pack. Introduction and overview of the entire course as well as the subject: What is TQM? Why do we need TQM, and what are the main drivers? TQM in a traditional and in a modern design and manufacturing, and service - oriented enterprise. An overview of the course, the eLearning Pack, and student requirements analysis (i.e. what students would like to learn whilst studying in this course). Part 1: TQM in a traditional and in a modern design and manufacturing, and service -oriented enterprise. An overview of US and international TQM standards. TQM process and enterprise models. Engineering management focus on how to find and reduce quality-related waste, and how to create TQM models, that are analytical, quantitative and computational, as well as have a chance of getting implemented in an enterprise. An overview of modern TQM knowledge documentation and knowledge management methods and issues; An overview of the assignments in this course, and a discussion on what the students have to accomplish to pass this course with a high grade. What is green and what is sustainable lean and green?

Student Activities (this is what you should do to get an 'A' in this class, and most importantly learn the subject):

1. Read this syllabus. Know your deadlines, what is needed and by when. You'll have lots of freedom to innovate in this class. Enjoy this, work hard and do not abuse this freedom I give you to learn and explore. This will make you a better innovator!
2. Review your eLearning Pack companies. Who are they? What are they doing? How can they help you with your new

quality focused product / process innovation? You must work with them... the boss says so... ethical global collaboration is a MUST for all of us!.. this helps to learn this process. You MUST have a quality focus.
3. Review all other resources in your eLearning Pack. See what you have and how do the resources relate to the study program in this class. There are CDs /DVDs supporting your learning process. Look at them and see what they cover. Each eLearning Pack is different!
4. Start to read the 3DeBook offered in the eLearning Pack. Most assignments are supported by individual, or multiple Chapters in the eBook: **IntroTQM eBook (see label 'B' on a DVD in the eLearning Pack)**. Look at it as a useful resource helping you with assignments, methods and tools.
5. To prepare for the first assignment (Assignment 0, since this is the zero stage) invent a new TQM - focused company that you will develop (virtually) with the collaborative companies (the 4 companies in your eLearning Pack). Your company should develop sustainable, green TQM - focused products, processes, and/or services; something that you are already familiar with. There are plenty of opportunities! Just think and invent. You can think BIG, don't have to implement it all!
6. **New feature of this course: grade your own assignment and let me know why you have given yourself the particular grade.** The reason why I am asking you to do this is because unfortunately some of you miss a lot in every assignment... by having to grade yourself, hopefully you'll recognize this issues, follow the syllabus and submit a proper assignment... (In TQM this is called: 'Learn to follow a checklist'.)

Class 2 / NJIT Week 2 Part 2: TQM in a traditional and in a modern design and manufacturing, and service - oriented enterprise. International TQM standards. An overview of TQM methods, graphical, statistical and simulation tools and some technologies supporting design, manufacturing and service quality. Object - oriented (OO) TQM process and enterprise models are introduced. Engineering management focus on how to find and reduce quality-related waste; and how to create TQM models, that are analytical, quantitative and computational, as well as have a chance of getting implemented in an enterprise. **Read Chapters 1 and 2** in the eBook.

Students present their TQM Project Plans:

Assignment 0: Submit by email as an attached Word file (one file please), or PDF, or even better: on the web: Both live and DL students email their assignments to the instructor **describing the way their own virtual company (i.e. the 5th company) will collaborate with the 4 companies (to be found in your customized eLearning Pack, represented by either CDs, DVDs, printed material, or USB sticks, brochures, journals, or others), and develop TOGETHER a new** quality product, process, or service, that is **Sustainable and Green**. You can find useful info on what this means here:

http://www.cimwareukandusa.com/All-Green/Ranky-GreenEngineering.html

Note: Your product / process, or service you plan to develop **MUST be TQM-oriented and you have to spell out the TQM aspects, as well as the Sustainable and Green aspects explicitly, item-by-item, clearly!** (This is also a good time to start to set up your own webpage... you can use any server / software you like; NJIT offers you FREE webhosting. NJIT's solution will also enable you later to add .xls files, and active code (much better than some free commercial solutions...). As an alternative, you might want to get a pro. service and pay for it, or try something FREE from the web, like www.tripod.com (my students tell me it is OK, I am not sure, I have NOT tested it myself).

Include your

1. Project Title,
2. Author (Your Name and ...
3. ***Your* PHOTO [this is optional but useful]**,
4. your Class code: IE673 live of DL,
5. Date,
6. your eLearning Pack ID / serial number (a MUST else you'll get a zero grade for this assignment!), and the
7. collaborative companies you have (a MUST!).

To help you even more, these are the detailed steps you should take to complete Assignment 0. PLEASE address EACH point, else you'll loose grade points:

1. Imagine, that you are setting up your own company, the 5th company. Document in about 1 page the following: What is the new green quality-focused product / process / service your company plans to develop?
2. Document in a few (8-10) sentences: What will your company work on, and how will it collaborate with the other 4 companies (in the eLearning Pack)?
3. Describe all above with a TQM and a **Sustainable Green** focus. You can find good ideas for these if you read the first two Chapters of the TQM eBook. There is a section on the dimensions / attributes of quality. Try to address the dimensions of quality in your collaborative 4+1 company network.
4. Also address each of the eight ISO9001:2008 quality principles. These can trigger good ideas to innovate! You can read about all this in the TQM eBook. Take each principle from the eBook Chapter and address it explicitely how you will deal with it in your (i.e. in the 5th) company? Pls. don't try to write a novel. This is a technical document. Please follow this

structure I give you in the syllabus. It makes it easier for everybody. Address each important aspect point-by-point. Don't forget the TQM focus! You have to spell out the TQM focus and **Sustainable Green Quality** aspects of your company! (Many students forget this !) More on **Green Engineering**: http://www.cimwareukandusa.com/All-Green/Ranky-GreenEngineering.html

5. Besides the business plan in this assignment, please see the videos in your eLearning Pack and write a short **200-250 word**, **or so long summary on each of** the videos (in the 'V' marked DVD in your eLearning Packs), focusing on TQM and **Sustainable Green** aspects: For each video you should furthermore answer the following two questions in 3-4 sentences each: What TQM lessons have I learned from the video, that I could implement in my 5th company? and What **Sustainable and Green Quality** aspects did I find useful for my 5th company?
6. **Last, but not least do not forget your social networking content at the end of this assignment, as part of it.** (In every assignment this is an executive summary, with a hyperlink to the rest of the material you have documented, based on discussions with your classmates on articles I have sent you by email, all on your web site, NOT in a separate file attached to an email! This part of the assignment reflects your active participation in the class based on discussions of the articles I am emailing you every week or so...)
7. Please note, that if anything is missing of the above, I cannot accept it. As stated earlier, to make sure, that you won't miss anything, just copy and paste the above listed requirements into your assignment answer section and start to work on each aspect... really easy... like a checklist in TQM... **Since this is your own project plan, you cannot submit any other assignments until you don't have a grade for Assignment 0.** This might delay other assignments, and therefore you'll loose the rework option... Therefore PLEASE follow the above list carefully and contribute to each section as well as you can.

New feature of this course: grade your own assignment and let me know why you have given yourself the particular grade. The reason why I am asking you to do this is because unfortunately some of you miss a lot in every assignment... by having to grade yourself, hopefully you'll recognize this issues, follow the syllabus and submit a proper assignment... In Assignment 0 it is a go/no go!

Typical Mistakes: Many bits are missing from the above list; incomplete submission. Please note, that I won't be able to act as your computer and read word-by-word what is required of the above list... sorry, this is a grad. course... we are over that age... (Note, that this statement applies to ALL assignments and I won't repeat it again...) In TQM you must pay attention to detail... important!

- The TQM focus is missing
- Several parts are missing / not addressed as required above
- The green aspects are missing
- The TQM dimensions of quality are not addressed clearly
- The ISO 8 quality principles are not addressed
- The video reviews are shorter than the specified length
- Several separate files are submitted
- The webpage is created but does not link
- The webpage is passworded
- The webpage does not work; cannot be assessed (if cannot be assesed unfortunately you'll get zero for the assignment. This is why I suggest to test your web pages as early as you can by asking others to look at them before you are submitting the URL to me. If it works on your own machine it does not mean, that it will always work on an other machine too.)

Classes 3, and 4 / NJIT Week 3 and / NJIT Week 4 US and international TQM standards (goals, architecture, pitfalls, practical implementation issues and rules). Object oriented TQM information system models and process modeling following the ISO 9001:2008 international standard, (CIMpgr, object oriented TQM process modeling is explained and discussed through exercises and examples). There are some good articles on CIMpgr over the web at http://www.cimwareukandusa.com in the ADAM with IT magazine.

Read the case study oriented (CIMpgr) articles and see the OO process model examples. (There is a good overview in the 3D eBook, plus there are several templates you can use). You'll grasp it quickly. You can draw these diagrams with any simple 2D drawing tool, on PCs maybe best with VISIO, or CORAL Draw, or PowerPoint, or ADOBE Illustrator, and OmniGraffle on the Mac, or others. Please note, that the templates in the eBook are in the latest Visio version. Visio is available FREE from the MS website for a limited time, or FREE from NJIT for longer. **Read Chapters 3, 4 and 5** in the TQM eBook.

PLEASE do NOT send me Visio source files. Treat me as a global collaborator. I have the web and Excel... and Office... Email me a webpage URL with your assignment in that web page, as described above. The process models (i.e. the diagrams) should be hyperlinked to the web page. During the last few semesters I have seen a new disturbing trend in that some students did not draw any new process steps using my templates; they have simply kept my templates EXACTLY as they are in the eBook, WITHOUT ANY additional info. or innovation... Kindly note, that you must add your own work to the templates. Copy-paste carries zero grade points!. Sorry, I am really strickt on this because I would like to make sure, that you learn something

really useful in this class.

Submit by Assignment No. 1: A TQM Process / System Modeling Method (as Part of the Internal and External Supply Chain) (After having submitted this to me I'll make comments on it that you suppose to consider and then rework your assignment).

Please note, that the best assignments show evidence that the student has worked through the learning material provided in the eLearningPack. Therefore feel free to incorporate digital images, text and even video clips or 3D VR objects provided into your assignment; nevertheless never forget to credit the source of such objects in the bibliography, as well as always add your own too. Make it truly your own assignment. (Obviously it is illegal for you to put the entire eBook or video on the web, because that would violate international copyright laws.)

Also note, that as of 2008 this assignment became very important for pharmaceutical engineers and management too. Process modeling was always crucially important in hi-tech industries producing digital computers, cameras, aerospace parts, automobiles, etc. The pharma. industry has recently realized, that they should catch up and deploy Process Analytical Technologies (PAT). To do this you need advanced process modeling. (This is because of the huge quality improvement, as well as saving opportunities... In my view they are still many years behind but we want them to catch up and learn new ideas and methods!)

Process analytical technology (PAT) is the wave of the future for the pharmaceutical industry.

As defined by the FDA, PAT is *"A system for designing, analyzing, and controlling manufacturing through timely measurements (i.e., during processing) of critical quality and performance attributes of raw and in-process materials and processes with the goal of ensuring final product quality." As a scientific, risk-based framework, PAT is intended to support innovation and efficiency in pharmaceutical development, manufacturing, and quality assurance. The framework is founded on process understanding to facilitate innovation and risk-based regulatory decisions by industry and the Agency.'*

The good news, is that in this course we discuss all of these methods, supported by powerful tools, including process modeling with CIMpgr, innovation by means of customer requirements analysis (CORA), risk-based design (PFRA), and process quality improvements by means of statistical methods. We even focus on quality auditing (Assignment 5), a key component here.

In terms of assignment content please read Chapters 3, 4 and 5 of the 3D eBook; as for the documentation method, please follow the Appendix of the TQM 3DeBook in your Learning Pack. Note, that my CIMpgr process modeling method is now part of the International Standard! It is a big plus of the new ISO 9001:2008 standard. This is something we have been doing for over 20 years now... the standard has finally caught up with me / us, nevertheless our OO (object oriented) process modeling method is still better, than some parts of the latest ISO standard...

Please follow this structure for your assignment:

- Title, Author's Name, Class, Date, eLearning Pack serial number (a MUST!)
- Statement on who has done the work **EACH individual, and this is true for all assignments, must submit an assignment by himself/ herself!**
- Contents
- Introduction and Objectives of the Project
- A brief description of the methodologies applied.
- **The Main Body of the project:**
  - **1. PROCESS MODEL:** Develop your own company's modular, object-oriented TQM system model/ process model in CIMpgr. (Read the The main eTextbook of the course by Ranky, Paul, G.: An Introduction to Total Quality Management & Control and ... Use the process model templates in the eBook with your content and designs too; don't copy-paste only.... read the web article specified below). Visio 2003 version is compatible with the templates, and is available FREE from NJIT (as a free download for students), or for some days free from Microsoft over the web. Obviously you can use any other good 2D drawing tool too. (I use the best, OmniGraffle, but it works only on the Mac; sorry no MS version.)
  - **2. PROCESS MODEL: MAIN PROCESSES:** Create and show your main processes that relate to total quality.
  - **3. COLLABORATION:** Also show how your (real or made up) company can collaborate in terms of designing quality and **Green Engineering** into every product/ process / service. More on **Green Engineering here**: http://www.cimwareukandusa.com/All-Green/Ranky-GreenEngineering.html
  - **4. MORE COLLABORATION:** Collaborate with companies given to you in your eLearning Pack (there are 4 companies you have to collaborate with; explain HOW you are planning to do this together with THEM. YOU MUST WORK WITH THEM; THEY should be able to help you... sorry; the boss insists...).
  - Note, that system models in all cases should include the **CIMpgr diagrams**, 3 layers of object classes min. (e.g. A0, A1...Ai, and A1.1...A1.j), the
  - **5. PD: Process Descriptions (PDs)** and the
  - **6. DD: Data Dictionaries (DDs);** The new eBook version has a lot on DDs and PDs, please incorporate at least one of the listed methods and show me that you have read it... also, as further examples see the ADAM with IT

Electronic Journal research articles with examples on the web for a good overview at http://www.cimwareukandusa.com/CIMpgr1.html. Please note, that if you just use plain English for PD and DD instead of the more structured and formal methods described in the eBook you'll loose a lot of grade points (at least 50%) in this assignment!
    - **7. PANORAMA NAVIGATION MAP:** In the new TQM eBook please find the panoramic navigation map of a small USA town with 360 degree panoramas (very cool new technology I have created and programmed with my brother). Find this panorama set in the TQM eBook, review it and explain how you could use this technology for understanding processes, for modeling processes, and for improving processes. Write about 250 words on this after having reviewed the panoramic navigation objects, as well as the related links with more pictures, videos and other objects. Please do not ask me to find it for you in the eBook; IF you read it, you'll find it... but you have to read it...
    - **8. INVENT & MANAGE:** Note, that this is an opportunity for you to INVENT a NEW TQM Process and then MANAGE this change, and show us how you would do this, by documenting this change process using our process modeling method, based on the formalism and spirit of international quality standards.
    - **9. Last, but not least do not forget your social networking content at the end of this assignment, as part of it.** (In every assignment this is an executive summary, with a hyperlink to the rest of the material you have documented, based on discussions with your classmates on articles I have sent you by email, all on your web site, NOT in a separate file attached to an email! This part of the assignment reflects your active participation in the class based on discussions of the articles I am emailing you every week or so...)
- Summary (i.e. what has been achieved)
- Further work needed / proposed
- References and Bibliography (including the CDs, Internet as a main source of information)
- Appendix (- if necessary, e.g. drawings, diagrams)

New feature of this course: grade your own assignment and let me know why you have given yourself the particular grade. The reason why I am asking you to do this is because unfortunately some of you miss a lot in every assignment... by having to grade yourself, hopefully you'll recognize this issues, follow the syllabus and submit a proper assignment...

Typical Mistakes: Why am I loosing grade points in this assignment?

- The assignment's administrative section is missing, and/or is incomplete...
- The above outline is NOT followed, some aspects are missing
- The models / solutions are copied from the samples offered; Sorry, you must innovate and create your OWN designs, and models.
- The collaborative companies are not included and discussed properly. We do not understand how do they help you with your TQM efforts... Sorry, you MUST collaborate with them, and we want to see this documented!
- The system model in CIMpgr has notational (syntax) and / or logical (semantic) mistakes, and/or is incomplete. Note, that both syntax and semantics are important and reduce large number of points. You must understand my models first to avoid such mistakes. CIMpgr is a graphical language; like speaking with graphics versus words! Everything you draw has a meaning! (Like traffic signs when you drive... I hope this is clear.)
- The Process Descriptions (PD) are missing or very poorly described; the student doesn't even know what PD is standing for...
- The Data Dictionary (DD) is missing or very poorly described, does not foollow the methods explained in the eBook; the student doesn't even know what DD is standing for...
- The panorama process modeling / navigation is NOT addressed and discussed as required above
- CIMpgr diagrams are not annotated with text as shown in http://www.cimwareukandusa.com/CIMpgr1.html , but a look-up table is offered with parametric data (e.g. I1A0). (Note, that this is bad practice, since it kills team comms. opportunities)
- We don't see the TQM approach... with green focus.
- Social networking and discussions on the papers are missing...

Classes 5 and 6 / NJIT Week 5 and 6

QFD (Quality Function Deployment); TQM Requirements Analysis is discussed with 3D Virtual Reality examples as an integrated Total Quality Management methodology. **Read Chapters 6, 7 and 8** in the eBook: **Intro to TQM eBook**. **Also watch the Videos again in your eLearning Pack.**

Student Activities:

1. Carry on reading the eBook offered in the eLearning Pack.
2. **Based on the CORA chapter in the TQM eBook:** CORA educates a requirements analysis (i.e. an extended QFD) method and offers examples and solutions, as well as active code-tools for you to execute (in the form of MS Excel templates).

    - You should understand this and based on the MS-Excel Template, develop your own Requirements Analysis solution for the TQM product / process / service you are developing, with the 4 collaborative companies.
    - You can choose any well engineered product / process, or service. It is YOUR product / process, or Service! (You

can also use any of the 3D objects for new, or improved product ideas in the eBook).
- Study the QFD / Requirements Analysis method and the 3D objects. Consider the requirements analysis aspects when designing the TQM system for/with them.
- Also: focus on eco-friendly, sustainable green aspects... How can you improve this? (Hint: this is a good business opportunity... your boss will like this too...)

Class 7/ NJIT Week 7

QFD (Quality Function Deployment) / Requirements analysis is discussed with 3D Virtual Reality examples as part of the lean six-sigma customer focused requirements analysis and also as a Concurrent Engineering methodology. Also, start to prepare for next week: Process Improvement and Process Control Analysis, and a Quantitative, Computational Solution: Control Charts for Variables and Attributes. Mathematical modeling with examples. Design of experiments and the extended Ranky/Taguchi method. (You can find this TQM methodology including examples in the TQM 3DeBook DVD-ROM in your eLearning Pack).

Submit by (see above) Assignment No. 2: QFD (Quality Function Deployment; Component Oriented TQM Process Related Customer Requirements Analysis).

Read the main 3DeBook of the course, in particular Chapters 6, 7 and 8.

When developing the QFD1 matrix for a TQM product / process, or service try to put down all

- customer requirements for the WHAT's side,
- prioritize them, then
- create the HOW's, this is the "engineers' voice", then the
- HOW MUCH's, which will give you the parameter ranges for satisfactory data, and then
- develop the rest of the correlation and the comparative quality models on the right hand side of the matrix.
- The crucial thing is that in the report you should explain what have you done and why?

Please note, that the best assignments show evidence that the student has worked through the learning material provided in the eLearning Pack, therefore feel free to incorporate digital images, text and even video clips or 3D VR objects provided in the eBook into your assignment; nevertheless never forget to credit the source of such objects in the bibliography.

1. In terms of assignment documentation method, please follow the Appendix of the TQM eTextbook CD-ROM in your Learning Pack.
2. Title, Author (Name, Class, Date, eLearning Pack serial number (a MUST!)
3. Statement on who has done the work **EACH individual, and this is true for all assignments, must submit an assignment by himself/ herself!**
4. Contents
5. Introduction and Objectives of the Project
6. A brief description of the methodologies applied.
7. **The Main Body of the project:** Based on the TQM process model in Assignment 1 (above) (Note: The DVD videos in your eLearning Pack offer excellent process examples with requirements analysis opportunities !)
    1. **CRITICAL REQUIREMENTS:** Identify critical requirements, as they related to TQM, and greening, and
    2. **CORA:** Develop your own company's CORA sustainable green TQM requirements model using the CORA Excel Template in the TQM 3DeBook. You can use this template as is, nevertheless populate it with your own data. Add at least 15 customer requirements and engineering solutions.
    3. **MAIN TQM REQUIREMENTS:** Show your main TQM requirements, and solution processes in this spreadsheet, that you have to customize, based on the CORA template spreadsheet and the examples given in the eBook. Focus on explaining the results in detail:
    4. **ANALYSIS OF THE CORA RESULTS: Answer these questions:** What do you do with the calculated AIR numbers in the CORA spreadsheet and why? Please explain these in detail. Point out and explain in detail how you interpret the correlation values, the engineering solutions and the customer ratings for the top 3 AIR values (pls. read the eBook it is explained there in detail.). Note, that if you do not analyse the results professionally you'll be loosing many grade points (typically as much as 50%! Again this is IMPORTANT).
    5. **YOUR EM DECISIONS:** What are your decisions as an Engineering Manager and why? Again, explain these with a few sentences pls. Just developing the CORA spreadsheet is NOT the ANALYSIS of the results. You should be able to explain the results to your team. I need to see evidence of this process. AGAIN: this analysis of the results is VERY important! Just creating a CORA spreadsheet is NOT the analysis... sorry. You must spell out for the top three AIR results as follows: what do these results mean and what will your instructions be to your engineering management team? (Unfortunately you won't be able to avoid to read Chapters 6, 7 and 8 to get a good grade for this assignment...)
    6. **COLLABORATION:** Also show how your (real, or made up) company can collaborate in designing TQM into every product, process, service with the collaborative companies given you in your eLearning Pack (there are 4 companies you have to collaborate with; explain HOW you are planning to do this together with THEM. YOU MUST WORK WITH THEM; sorry; the boss says so...).

7. **PANORAMA NAVIGATION MAP:** In the new TQM eBook please find the panoramic navigation map of a small USA town with 360 degree panoramas (very cool new technology I have created and programmed with my brother). Find this panorama set in the TQM eBook, review it and explain how you could use this technology for understanding customer needs / requirements and related processes. Write about 250 words on this after having reviewed the panoramic navigation objects, as well as the related links with more pictures, videos and other objects. Please do not ask me to find it for you in the eBook; IF you read it, you'll find it... but you have to read it...
8. **Last, but not least do not forget your social networking content at the end of this assignment, as part of it.** (In every assignment this is an executive summary, with a hyperlink to the rest of the material you have documented, based on discussions with your classmates on articles I have sent you by email, all on your web site, NOT in a separate file attached to an email! This part of the assignment reflects your active participation in the class based on discussions of the articles I am emailing you every week or so...)

8. Summary (i.e. what has been achieved)
9. Further work needed / proposed
10. References and Bibliography (including the CDs, Internet as a main source of information)
11. Appendix (- if necessary, e.g. drawings, diagrams)
12. **New feature of this course: grade your own assignment and let me know why you have given yourself the particular grade.** The reason why I am asking you to do this is because unfortunately some of you miss a lot in every assignment... by having to grade yourself, hopefully you'll recognize this issues, follow the syllabus and submit a proper assignment...

Typical Mistakes: Why am I loosing grade points in this assignment?

- The assignment's administrative section is missing, and/or incomplete...
- The above outline is NOT followed, several aspects are missing
- The models / solutions are copied from the samples offered; Sorry, you must innovate and create your OWN designs, and models.
- The analysis of the results is missing or very thin... you should show me what decisions you'll take having done the CORA calculations and WHY? (This is a VERY typical mistake...typically 50% of the grade points are lost this way)
- The sustainable green aspects and focus is missing
- The collaborative companies are not included properly. Sorry, you MUST collaborate!
- The CORA model is incomplete, or inaccurate. Decisions are not explained.
- The Panorama navigation map is not discussed.
- Social networking / discussing the articles is missing

Class 8 / NJIT Week 8

The integration of quality into every process; An overview of TQM methods, graphical and statistical tools. **Read Chapters 10, 11 and 12** in the **Intro to TQM eBook**.

Submit by Assignment (No.3): Process Improvement and Process Control Analysis, and a Quantitative, Computational Solution: Control Charts for Variables and Attributes

Select an area in your company, the 5th company, that needs to be improved by employing Process Control methods. Show how a quantitative, computational solution can help. Treat our library (in the DVD 3DeBook) as a sustainability statistical toolset.

Use the Control Charts for Variables and Attributes in our new 'Ranky-Stat_Library' linked to the eBook. Simulate and make up the missing input data, if necessary.

As industrial examples, watch the Industrial videos again, as well as study your collaborating 4 companies. Try to identify areas, that are measurable and statistically controllable. Make up missing data; we are keen on learning the methods with realistic data sets!

Please note, that all above are still Beta versions... If you find a bug, you'll get extra 10% to your full semester TQM grade! Also, we welcome any suggestions. As an alternative, you can use any pro-tool: such as MINITAB, or others. The benefit of our simple toolset is that you get the source code and see a step-by-step mathematical explanation to what our thinking process is... Enjoy!

1. In terms of assignment documentation method, please follow the Appendix of the eBook in your eLearning Pack.
2. Title, Author (Name, Class, Date, eLearning Pack serial number (a MUST!)
3. Statement on who has done the work **EACH individual, and this is true for all assignments, must submit an assignment by himself/ herself!**
4. Contents
5. Introduction and Objectives of the Project.
6. A brief description of the methodologies applied.
7. **The Main Body of the project:** select a critical / appropriate process that you feel you should analyze statistically and

then develop your own. To find a good candidate process you can refer to your CIMpgr process model.

1. We offer you several Process Control Charts. For this assignment you need **one for Variables** and **one for Attributes** (pls. make up missing data: I am keen to see, that you understand the methods well, therefore please make sure, tahat **one of the processes** is initially out-of-control, and then explain to me how you fixed it to put it back in-control! (Note, that if a process is out-of-control, it is NOT sustainable!) This means, that you'll have one control chart for variables out-of-control and then in-control, and then another one for variables, also out-of-control and then in-control (4 control charts in total!).
2. Show your main process limitations; based on the offered templates create / populate with your own data your own control charts for variables and attributes, and
3. Document a TQM improvement solution processes with your own data that you have customized.
4. Also, show how your (real or made up) company can collaborate in designing green and sustainable TQM processes with the four companies given you in your Learning Pack. Explain HOW you are planning to do this together with THEM. YOU MUST WORK WITH THEM; the boss says so...). Note, that if a process is out-of-control, it is NOT sustainable!
5. Please make up missing data: we want you to focus on the methods, and then make sure that you understand the entire process of collecting, analyzing, computing and then applying your data within the TQM context.
6. Explain the results: analyse what you have calculated and explain your actions, based on the results!
7. **Last, but not least do not forget your social networking content at the end of this assignment, as part of it.** (In every assignment this is an executive summary, with a hyperlink to the rest of the material you have documented, based on discussions with your classmates on articles I have sent you by email, all on your web site, NOT in a separate file attached to an email! This part of the assignment reflects your active participation in the class based on discussions of the articles I am emailing you every week or so...)

8. Summary (i.e. what has been achieved)
9. Further work needed/proposed
10. References and Bibliography (including the CDs, Internet as a main source of information)
11. Appendix (- if necessary, e.g. drawings, diagrams)
12. **New feature of this course: grade your own assignment and let me know why you have given yourself the particular grade.** The reason why I am asking you to do this is because unfortunately some of you miss a lot in every assignment... by having to grade yourself, hopefully you'll recognize this issues, follow the syllabus and submit a proper assignment...

Typical Mistakes: Why am I loosing grade points in this assignment?

- The assignment's administrative section is missing, and/or incomplete...
- The above outline is NOT followed, some bits are missing
- The analysis of the results is missing or very thin... you have to explain to me (your team) what the actions are based on the calculations..
- The control charts are wrong.
- The models / solutions are copied from the samples offered; Sorry, you must innovate and create your OWN designs, and models.
- The green quality aspects are missing
- The collaborative companies are not included properly. Sorry, you MUST collaborate!
- The spreadsheet models you have created are incomplete, and/or inaccurate. No explanation is offered as to how you would apply the calculated results (i.e. the analysis of the results is thin or is missing).
- The social networking part as in the previous assignments is missing

Class 9 / NJIT Week 9

The Lean Six Sigma Methodology for TQM in Design, Manufacturing, Assembly and Service. An overview of Design For Quality, Assembly, Disassembly, the role of Quality Standards and Quality Circles, and other TQM methods, with 3D Virtual Reality examples and classroom exercises. **Read Chapters up to 13** in the **Intro to TQM eBook**.

Class 10 / NJIT Week 10

JIT and Kanban (Lean) production control methods for design, manufacturing, assembly and service quality Improvement. TQM tools. Networked TQM and TQC in collaborating digital enterprises, and the role of modeling and simulation; Quality leadership, strategic management, and customer satisfaction issues; Globalization, and quality culture issues; Teamwork and how to build great quality teams;

Classes 11 and 12 / NJIT Week 11 and Week 12

The Importance of quality in management, in service industries. Quality communication skills, education, training and TQM knowledge documentation and knowledge management methods and tools; Quality Ethics, TQM culture, benchmarking and globalization; Continuous quality improvement methods and examples.

Submit by Assignment No. 4: The focus of this assignment is: Process Failure Risk Analysis, as Part of our lean six-sigma

toolset; In this assignment use our PFRA/DFRA (Process Failure Risk / Disassembly Failure Risk Analysis) Method and Tool; meaning the same **Read Chapter 9** in the **Intro to TQM eBook**.

To see an Industrial example, watch the **Videos** in your eLearning Pack.

1. In terms of assignment documentation method, please follow the Appendix of the eTextbook in your Learning Pack.
2. Title, Author (Name, Class, Date, eLearning Pack serial number (a MUST!)
3. Statement on who has done the work **EACH individual, and this is true for all assignments, must submit an assignment by himself/ herself!**
4. Contents
5. Introduction and Objectives of the Project
6. A brief description of the methodologies applied
7. **The Main Body of the project:**
    1. Choose one of your collaborative companies, or your own company (i.e. the 5th company) and address how and why you would apply the learned TQM methods and tools to improve it in terms of reducing risky processes. Let me suggest, that you identify a potentially toxic process, that must be greened... this would be a good start...
    2. Based on what you have seen, identify a risky process, and analyze it using the PFRA spreadsheet template (in the TQM eBook). Make up missing data. (I am keen to see that you understand the method, even if the actual data is not quite accurate.) You can use the PFRA / DFRA template as is, nevertheless must be able to populate it with your own data. In order to see a realistic picture I am expecting you to enter at least 12 risky process steps in the first column of the spreadsheet. (Some students in the past entered only 2 or 3 risky process steps into the template, to save time, and therefore didn't see any meaningful results...). Please keep in mind, that the idea about this course is to learn some really useful methods, that you can immediately apply at work!
    3. At this point you have seen what is happening in the company, what the challenges are, and also used our analytical tool, the PFRA spreadsheet, to identify a risky process. At this stage you need help from your collaborating companies... therefore...
    4. Show how you could collaborate in performing the above identified TQM improvement processes (to reduce the risks, as analysed in your PFRA) with the collaborating 4 companies given you in your Learning Pack
    5. One more twist, that you should consider... also make sure, that you identify and explain how sustainable greening could benefit your company.
    6. Point out and document in 4-5 sentences 2 risky, not sustainable processes in each of the **FULL LENGTH videos** in your eLearn Pack.
    7. **PANORAMA NAVIGATION MAP:** In the new TQM eBook please find the panoramic navigation map of a small USA town with 360 degree panoramas (very cool new technology I have created and programmed with my brother). Find this panorama set in the TQM eBook, review it and explain how you could use this technology for understanding risky processes, for risk modeling processes, and for reducing risk. Write about 250 words on this after having reviewed the panoramic navigation objects, as well as the related links with more pictures, videos and other objects. Please do not ask me to find it for you in the eBook; IF you read it, you'll find it... but you have to read it...
    8. **Last, but not least do not forget your social networking content.** (This is an executive summary, with a hyperlink to the rest of the material you have documented, based on discussions with your classmates on articles I have sent you by email, all on your web site, NOT in a separate file attached to an email! This part of the assignment reflects your active participation in the class based on discussions of the articles I am emailing you every week...)
8. Summary (i.e. what has been achieved)
9. Further work needed/proposed
10. References and Bibliography (including the CDs, DVDs, Internet as a main source of information)
11. Appendix (- if necessary, e.g. drawings, diagrams)
12. **New feature of this course: grade your own assignment and let me know why you have given yourself the particular grade.** The reason why I am asking you to do this is because unfortunately some of you miss a lot in every assignment... by having to grade yourself, hopefully you'll recognize this issues, follow the syllabus and submit a proper assignment...

Typical Mistakes: Why am I loosing grade points in this assignment?

- The assignment's administrative section is missing, and/or incomplete...
- The above outline is NOT followed; several bits are missing
- The models / solutions are copied from the samples offered; Sorry, you must innovate and create your OWN designs, and models.
- The PFRA spreadsheet template is not filled in properly.
- The analysis of the results is missing or very thin...
- The collaborative companies are not included properly. Sorry, you MUST collaborate!
- The TQM model /strategy developed for the company is incomplete.
- You did not address the learned TQM and risk analysis methods.
- The results obtained from the PFRA spreadsheet is not analyzed and discussed.

- The panorama navigation map is not addressed in terms of risk analysis / risk reduction
- Your social networking part is missing

Class (It's almost over... just a few days left...) MIDTERM: This is a take home exam: Based on your OWN experiences (NOT the web or other sources, but your OWN!) write 12 human error detection and prevention cases. This means a total of 12 cases, and for each human error case you should discuss the detection as well as the prevention aspects.

If you can pls. illustrate each case with a photo, or a video clip. (Most of you have smart phones, this is really easy now...) You can use ANY resources for both, but it should have YOUR ideas, YOUR facts, YOUR experiences versus copy paste from the web! ... or from each other... that has no value..Each human error detection & prevention case should be documented in about 250 words total.

Pls. focus on the quality process aspect of any human error, such as process, procedure relate errors, quality issues, service quality issues, lack of understanding, education related errors, lack of quality procedure related to human errors, poor use of technology errors, and similar. I am keen to see the method; the analytical approach. The examples must be yours, but the methods can be explained as existing methods as applied to human error detection and prevention.

Class 14 / NJIT Week 14: Continuous TQ improvement methods. TQM graphical methods. TQM audit. Course summary and overview: How the learned methods and tools fit together, and how we can integrate them for specific applications. TQM Audit and How to Improve a Selected, Industrial System: TQM in a Global, Distributed, Just-in-time, Digital Economy using the learned methods and technologies, including RFID. Read the remaining **Chapters, i.e. 14 to 20** in the eBook.

Please note again, that you can resubmit the improved version of each assignment, assuming you have submitted each of them on due date (as above) as part of the LAST assignment, i.e. Assignment 5. Please email me the improved version of your assignments, if applicable, with the last assignment together, NOT earlier than that. Thanks!

Submit by Assignment No. 5: This is a critically important assignment because you have to show me what you have learned in this semester in my class... Are you an 'A' or a 'B' or a '?'... student? TQM Audit and How to Improve a Selected, Industrial System using RFID / TQM methods to create a sustainable green product, process or service: TQM in a Global, Distributed, Just-in-time, Digital Economy.

Also, write a quality-focused press release to market your company. Please follow the already discussed eight ISO 9001:2008 quality principles and the guidelines below:

1. In terms of assignment documentation method, please follow the Appendix of the eTextbook DVD-ROM in your Learning Pack.
2. Title, Author (Name, Class, Date, eLearning Pack serial number (a MUST!)
3. Statement on who has done the work **EACH individual, and this is true for all assignments, must submit an assignment by himself/ herself!**
4. Contents
5. Introduction and Objectives of the Project
6. A brief description of the methodologies applied
7. **The Main Body of the project (be warned: this will be the most rewarding assignment of all above!):**
8. **Part 0 of this assignment is to resubmit all reworked assignments** with detailed explanations on what you have improve based on my comments. Note, that statements, such as: 'based on the professors comments I have improved Assignment i, please find it linked here...' are not acceptable, since you haven't specified exactly what my comments were and what you did to improve your assignment. The reworked assignments must be hyperlinked here with a single URL link for each assignment you have reworked, so that I can find them easily. Please note, that at this stage of the course I have a lot to grade, therefore if you don't follow my instructions and structure, send me several emails with several files, still have no webpage (!!!) I might miss some of your valuable work... so, please help me, so that I can help you and give you the best, well earned grade. As I go through your reworked assignments, I'll change the grade if you deserve it and then I'll add this to the total number of points you have earned in this semester in this class. Then, I start to grade your Assignment 5. This is my process and it is more than fair, since most profs. do not allow reworks at all... BTW none of mine did...
9. **Part 1 of Assignment 5 (max. 10% of 30%) is RFID:** View and work through the short **web-streamed videos:** RFID-Clip1w.mov (about 19 Mbytes, high quality, but need a cable modem), and RFID-Clip2w.mov (about 32 Mbytes). More RFID clips: EMS-RFID-Clip1, EMS-RFID-Clip2. Note, you will need QuickTime 7 or later, a multi-platform, high quality video player from Apple to play these files on your computer (PC, or Mac works fine). The player is a FREE download from: http://www.apple.com/quicktime/mac.html
10. It is very important to be aware and understand the huge potentials RFID technology can offer when combined with the methods and toolsets we learn in this class. You can truly change the world... high level of traceability can be established with RFID!
11. **Add RFID tags** and RFID processing power to your operations in order to increase traceability in TQM terms. Show at least some of this effort in your reworked process models in CIMpgr. (Note, that I am keen to see the reworked set of assignments, and that you can apply the learned methods, in INTEGRATION. This means, that you should explain how

you'll be using RFID technologies in your processes. Show this in your CIMpgr models. You do not need to create new models, just edit your excisting models and RFID as a resource, and then explain...

12. I am also keen to see, that the results benefit your company in that you are learning by doing all this work in collaboration with your 4 collab. companies in the eLearning Pack. You have to 'sell' me this; sorry I am representing the Board of Directors.... the boss, the sponsor...)
13. Also, show the RFID application in your CORA requirements analysis, as well as in your
14. PFRA risk analysis. Ideally, what we should see, is that RFID is required by the customer because one or more processes need it (show in CIMpgr, and the requirements in CORA), and because it will reduce risk (show this in PFRA). (You could even calculate some of this using our already covered TQM statistical analysis methods and tools !) What a beautiful assignment to work on, and truly useful in industry too! Have fun!
15. **Part 2 of Assignment 5 (max. 10% of 30%) is the Quality Audit:** Having completed the RFID study, review all your previous assignments to see the BIG picture again, as part of a **TQM audit**. This is the core of the assignment (answer this question): **How could you apply the learned methods and tools in this course to improve your own company** (i.e. the 5th company) ?
16. Also address all quality **audit issues as discussed in** Chapter 20 in the eBook. **Read Chapter 20 in the TQM eBook. ANSWER and ADDRESS each of the AUDIT issues discussed in this chapter for your, i.e. the 5th company.**
    1. Some good links, that will definitely help: http://en.wikipedia.org/wiki/Quality_audit,
    2. http://www.epmbook.com/qualityaudit.htm.
    3. **PANORAMA NAVIGATION MAP:** In the new TQM eBook please find the panoramic navigation map of a small USA town with 360 degree panoramas (very cool new technology I have created and programmed with my brother). Find this panorama set in the TQM eBook, review it and explain how you could use this technology for auditing environments, understanding processes, for modeling processes, and for improving processes, after an audit. Write about 250 words on this after having reviewed the panoramic navigation objects, as well as the related links with more pictures, videos and other objects. Please do not ask me to find it for you in the eBook; IF you read it, you'll find it... but you have to read it...
17. **Part 3: (10% of 30%) conduct a Video Conferencing (VC) session using SKYPE, Apple Facetime, or whatever other software you wish to use** (free over the web) VC with one of your classmates and discuss each others' designs. Try to create a collaborative sustainable green quality audit team spirit and document your findings...
18. This is what you should document professionally (pls. note, that if you don't document this session as below, then I cannot give you the extra grade points; sorry):
    1. What was the purpose of the video-conferencing session?
    2. What software did you use for VC and how? (Must include 3-4 screen prints of the VC session as a proof.)
    3. What did you discuss and achieve during the VC session? (Offer a script of your discussions in professional English, not in *'hej dude whatsup'* language...)
    4. How do you like this video-conferencing approach for collaborative problem solving?
    5. What were the main challenges?
    6. What worked well, and what did not, and why?
    7. In comparison to a face-to-face visit, versus VC, what is the estimated carbon footprint saving to the environment? How did you calculate this result? (Hint: search the web, there are some really useful carbon footprint calculators for free!)
    8. What are **Green Engineering** benefits of using VC? More on **Green Engineering**: http://www.cimwareukandusa.com/All-Green/Ranky-GreenEngineering.html
19. **SOCIAL NETWORKING. Last, but not least do not forget your social networking content.** (This is an executive summary, with a hyperlink to the rest of the material you have documented, based on discussions with your classmates on articles I have sent you by email, all on your web site, NOT in a separate file attached to an email! This part of the assignment reflects your active participation in the class based on discussions of the articles I am emailing you every week...)
20. Summary
21. Further work needed/proposed
22. References and Bibliography (including the CDs, DVDs, the Internet as a main source of information)
23. Appendix (- if necessary, e.g. drawings, diagrams)
24. **New feature of this course: grade your own assignment and let me know why you have given yourself the particular grade.** The reason why I am asking you to do this is because unfortunately some of you miss a lot in every assignment... by having to grade yourself, hopefully you'll recognize this issues, follow the syllabus and submit a proper assignment...

Class 15: LAST CLASS!!!! Assignment Reviews / Discussions over the web this Week! We'll discuss any questions you have.

August 8, 11.59 pm = ABSOLUTELY THE LAST DAY TO SUBMIT any assignments! All submissions MUST be electronic = by email / with a web URL in it; NOT several separate files please; I cannot accept several separate files,

sorry, this is the 21st Century... we live in a digital age...

Schedule and due dates: As above. The total course duration is 15 weeks. We don't have a Midterm exam. All assessments are based on assignments and student activities described in this syllabus.

We will have a one or two hybrid classes when you don't have to come to school (live students). Students will be required to complete each assignment. Assignments totaling 100% max.

Grade "A" for this class requires min. 90% total. Thank you for helping me to be able to help you! Your success is my success too!

One more time, the NJIT Grade Scale:

90-100 = A
85-89 = B+
80-84 = B
75-79 = C+
70-74 = C
60-69 = D
0-59 = F

The Results of the Anonymous Total Quality Feedback Form: IE673 (December, 2006)

Laboratory Development Review for Grad. Classes (Ranky, December 2006)

I would like to introduce several laboratory activities to my graduate classes, and therefore I am asking you the following: (Please rate 0 to 10, 10 being the most important / agree, AND please comment if you can! THANKS!)

Q1. Would you like to have our classes in a lab-setting? (i.e. the class and the lab is one integrated whole, as in a studio, with computers, equipment, demos, nice chairs and tables all in one, in a large room)?

100% stated: yes, absolutely no question about that...

Q2: Do you think automated inspection methods and tools are important? (e.g. machine vision, sensors, etc.)

Over 95% stated yes, and rated 10

Q3: Do you think rapid prototyping and rapid manufacturing to achieve quality products and processes is important?

Over 80% stated yes, and rated 10

Q4: Do you think digital design and digital manufacturing (PLM, Product Lifecycle Management) in the TQM context is important?

Over 80% stated yes, and rated 10

Q5: Do you think automation, sensors, robots, in-process inspection to secure zero defect production is important?

Over 95% stated yes, and rated 10

Q6: Do you think medical engineering / pharma. quality process demos are important?

Over 80% stated yes, and rated 10

Q7: Do you think design for quality, design for safety, illustrated with real-world labs. is important?

Over 95% stated yes, and rated 10

Q8: Do you think lean design, manufacture, service, enterprise... is important?

Over 95% stated yes, and rated 10

Informal Quality Feedback Form (Ranky, December, 2006)

Please review the following topics for this class by rating each topic between 0 to 10 (0 = meaning not important / poor quality and 10 = extremely important / excellent!). This feedback form will help your instructor to maximize quality satisfaction.

1. Web-based syllabus (... OK it is long, but is it helpful? Did you read it?):

Over 95% stated yes, and rated 10 ('Typical response: ... it is long, but has all the detail...')

2. eLearning Pack with DVDs and 3D interactive eBooks. (Do you prefer interactive, full color learning resources, or static, black & white traditional printed books?:

100% stated yes, prefer the interactive eBooks versus the traditional printed textbook. Some asked for a printed version too (pls. note, that every eBook can be printed from a browser if you have the money for the ink... some are over 800 pages long...obviously interactive active code, videos, spreadsheet cannot be enjoyed on paper...)

3. Engineering management focus on how to find and reduce quality-related waste:

Over 95% stated yes, and rated 10

4. Object-oriented TQM information system models and process modeling

Over 95% stated yes, and rated 10

5. CORA: QFD (Quality Function Deployment); Requirements Analysis

Over 90% stated yes, and rated 10

6. Process improvement and process control analysis: quantitative methods: control charts for variables and attributes

Over 80% stated yes, and rated 10

7. A real-world challenges and examples on DVDs, based on virtual tours

Over 90% stated yes, and rated 10

8. TQM -oriented risk analysis: PFRA: Process risk analysis

Over 90% stated yes, and rated 10

9. How the learned methods and tools fit together, and how we can integrate them for specific applications

Over 90% stated yes, and rated 10

10. TQM globalization issues

Over 95% stated yes, and rated 10

11. TQM continuous improvement methods and tools illustrated by industrial and R&D case studies

Over 95% stated yes, and rated 10

12. Any other 'Hot TQM / Engineering Management' topics we should cover? Please list and explain.

RFID is a hot topic; also six-sigma challenges in industry; more virtual factory tours on DVD; any realistic issues in the real-world; practical solutions;

==========The Results of the Anonymous Total Quality Feedback Form: IE673 (January 23, 2003) ==========

Please rate the following topics planned to be covered in this class by rating each topic between 0 (not important / poor) and 10 (extremely important / excellent!) on the right hand side of the sheet please!

This feedback form will help your instructor to dynamically adjust the breath and the depth of the topics to be covered in this semester in this class to maximize your level of quality satisfaction.

Topics (as per the web-based syllabus) Your rating (0 -> 10)

Web-based syllabus (TQM improvement opportunity: most students haven't seen the syllabus at the time we have started the class... Solution: NJIT should put the live course syllabi (prepared by faculty) with a hot link to the course registration page on the web too... the DL course syllabi are already hotlinked to the web, and this system works reasonably well)

eLearning Pack (Because of the above, the students did not know about the eLearning Packs)

What is TQM? Why do we need TQM, and what are the main drivers? TQM in a traditional and in a modern design and manufacturing, and service -oriented enterprise. (Rated: Very High)

TQM in a traditional and in a modern design and manufacturing, and service -oriented enterprise. (Rated: Very High).

An overview of US and international TQM standards (Rated: High).

TQM process and enterprise models. (Rated: High).

Engineering management focus on how to find and reduce quality-related waste, and how to create TQM models, that are analytical, quantitative and computational, as well as have a chance of getting implemented in an enterprise. (Rated: Very High).

An overview of modern TQM knowledge documentation and knowledge management methods and issues. (Rated: Medium)

An overview of the assignments in this course, and a discussion on what the students have to accomplish to pass this course with a high grade. (Rated: Medium).

Object oriented TQM information system models and process modeling. (Rated: Medium)

QFD (Quality Function Deployment); TQM Requirements Analysis is discussed with 3D Virtual Reality examples as an integrated Total Quality Management methodology. (Rated: High).

Process Improvement and Process Control Analysis, and a Quantitative, Computational Solution: Control Charts for Variables and Attributes. Mathematical modeling with examples. (Rated: High).

The Lean Six Sigma Methodology for TQM in Design, Manufacturing, Assembly and Service. (Rated: High).

The Five 'S's explained with examples (i.e. Sort, Set, Shine, Standardize, Sustain). (Rated: High).

An overview of Design For Quality, Assembly, Disassembly, KANRI, KAISEN, MUDA, MURA, MURI, POKA-YOKE. (Rated: Medium; nevertheless many students did not know what this meant, so we'll discuss these methods)

The role of Quality Standards and Quality Circles. (Rated: High)

A real-world TQM challenge, based on a virtual tour of an existing facility. (Rated: High)

JIT and Kanban (Lean) production control methods for design, manufacturing, assembly and service quality Improvement. (Rated: High)

TQM tools. (Rated: Very High)

How the learned methods and tools fit together, and how we can integrate them for specific applications. (Rated: Very High)

TQM team management methods and issues. TQM in the automotive, aerospace, food, service, medical, and other TQM standards re-visited. (Rated: High).

Quality ethics. Enterprise -wide quality leadership, implementation and management methods. (Rated: Very High).

Globalization issues. (Rated: Medium)

TQM cultural issues; Conflict in the workplace, and how TQM methods and principles can help to avoid them. (Rated: High)

Continuous improvement methods and cases. (Rated: Very High)

TQM project presentation skills. (Rated: High).

Industrial and R&D Case studies for every topic (as listed above). (Two groups have emerged: one rated Very High, the other one Medium)

Any other topic you would like to cover? Please explain. (Received none, meaning, that the class is happy with the offered topics)

It is over! **Congratulations!** **You can now analyze and improve many products and services!**

PLEASE **VIRUS CHECK** EVERY SUBMITTED FILE!

PLEASE save the **TREES**! Please DO NOT Print this syllabus. Use this web site to read it in this electronic format; it will be updated during the semester. Thank you!