TEL 393 Manufacturing Systems Fall 2009
State University College at Oswego
Department of Technology

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Means of Evaluation:

- Class participation, class participation, class participation.
- Skill development attained through activities and exercises in the lab.
- Understanding of principles and concepts through objective tests and application of those principles within the manufacturing enterprise and on performance tests.
- Artifacts documenting research, product development, production, problem solving, writing, reading assignments, team and personal accomplishments.

General Course Evaluation Events:

Each activity, quiz, project, etc. are worth points. The more points acquired the better your final grade. The following criteria will determine your final standing among your peers.

A+ … A-	Upper 1/3 of maximum points Prior notification of any absence No historical profile of tardiness Demonstrated & verifiable class leadership Excellent written material Completion of all activities Successful manufacturing enterprise	College Grade Conversions: A+: 4.0+ = 110 A: 4.00 = 100 A−: 3.67 = 91.75 B+: 3.33 = 83.25 B: 3.00 = 75 B−: 2.67 = 66.75 C+: 2.33 = 58.25 C: 2.00 = 50 C−: 1.67 = 41.75 D+: 1.33 = 33.25 D: 1.00 = 25 D−: 0.67 = 16.75 E: 0.00 = 0
B+ … B-	Middle 1/3 of maximum points Prior notification of any absence No historical profile of tardiness Strong class involvement Few errors in written material Completion of all activities	
C+ … E	Lower 1/3 of maximum points Weak class involvement Attendance weakness Below average written material Completion of all activities	

When people ask me about you I often think about the following three things.

1. Do I believe that you could teach Production Systems effectively in the public schools (or manage production tasks for those pursuing management degrees)?
2. Would I hire you to work in my own manufacturing facility?
3. Would I want you on a team to develop a new product for production?

My answers will be based on watching you and evaluating you in a variety of ways throughout the semester. Will I be able to answer YES to all of the above?

You have 19 significant graded academic tasks that you must complete. Some tasks will be graded using letter grades and others using standard percentages. Some will be a ranking relative to other class members/teams. The first group of tasks are unique individual tasks and each person receives an individual grade. The second group of tasks are team responsibilities and every team member receives the same grade. (19 tasks X weighted averages = 38 grades)

Multiplier (weight)	**Individual Requirements**:	Weighted Average	Due
1	The Night Before Assignment	2.63 %	9/8
1	Concepts Summary of "Joe's Garage"	2.63 %	9/15
1	Review of "Continuous Improvement" 1-6	2.63 %	10/1
1	Mid-Term Exam	2.63 %	10/20
2	Review of "The Goal"	5.26 %	11/3
2	Review of "Continuous Improvement" 7-17	5.26 %	11/24
4	Peer Evaluation	10.53 %	12/8
4	Participation in the Manufacturing Enterprise	10.53 %	everyday
	Team Requirements:		
1	Laboratory care and clean up	2.63 %	everyday
1	Plus/Delta	2.63 %	9/10
1	101 sketches	2.63 %	9/15
1	Presentations	2.63 %	12/8 & others
1	Formal Summary of Customer Feedback	2.63 %	10/20
4	Tooling Development	10.53 %	12/8
3	The Manufactured Product	7.89 %	12/8
4	The Manufacturing Process	10.53 %	everyday
1	Product Package/brochure/instuctions	2.63 %	12/1
3	Enterprise Documentation	7.89 %	12/8
2	Final Exam	5.26 %	12/8, 12/10, 12/15

Note about evaluation events:
Activities, tests, & assignments may be added or deleted as time and/or special circumstances occur. In addition, there will be many tasks that you and/or your team will be required to complete that will be specific to your manufacturing enterprise and/or modified class requirements.

When are activities to be handed in?
On time throughout the semester, see the class calendar for the specific dates.

Class Absences:
Removal from the course with a grade "E" will take effect upon the fourth absence. Three days late will equal one absence. Note that a SUBSTANTIAL portion of your grade results from

participation and evaluation by your peers. Also note that you must COMPLETE all requirements and complete them by the date/time they are due.

Textbooks:

Required: All I Need to Know About Manufacturing I Learned in Joe's Garage (2004) William B. Miller & Vicki L. Schenk.
Bayrock Press, ISBN:09630439-3-5

Required: The Goal (2004) 3rd edition. Eliyahu M. Goldratt.
North River Press, ISBN:0884271781

Required: The New Manufacturing Challenge - Techniques for Continuous Improvement (1987) Kiyoshi Suzaki.
The Free Press, ISBN:002932040-2

Recommended: International Technology Education Association. Technology for All Americans: A Rationale and Structure for the Study of Education. Reston, VA: ITEA, 1996.

Lab Fee:

There is a traditional lab fee for this course as well as a required "at risk" start up investment. You will participate in a manufacturing enterprise in which you will design a product, develop the process and tooling to manufacture that product, and finally produce 99 of them and sell the product. The start up costs will be paid through the sale of stock. You will be required to become a shareholder. Where possible, the manufacturing lab will contribute materials, equipment, and other resources to cover the expenses of the enterprise. The manufacturing lab will own 10% of the enterprise.

The Bottom Line… If you manufacture a product that cannot be sold beyond the break-even point then your lost investment constitutes an additional lab fee. On the other hand, if you manufacture a product that generates a profit, then any profit will be returned to the shareholders.

December Fools Day (December 3)

December Fools Day is the last day of work. NO PRODUCTION WORK WILL CONTINUE BEYOND Thursday, December 3, 2009 FOR TEL393. All production work must be completed by the end of the day! You may continue to sell product beyond this day but all power is off in the lab, and all finished and/or unfinished products should be removed.

Important Dates

Critical due dates, quiz dates, exam dates, etc. will be discussed in class and posted on the **class calendar**. It is your responsibility to prepare for all classes and submit all material on the date due. Obtain a calendar where you can record these important dates. Material is not accepted after the due date. Additionally, no "make-up" tasks are provided.

The last full week of class

No lab work will be done on the last week of the semester. The first class meeting of the week will be devoted to final presentations. On this day, your team will submit your manufacturing documentation, you will give a product to the hall of fame, and you will give a formal presentation about your enterprise. This week will also be devoted to clean-up, peer evaluations, final company close out, stock sales, manufacturing confessions, start of the final exam (manufacturing showdown), etc. and everyone must attend.

The final exam

The final exam is a TEAM ACTIVITY. It is held on the last full week of the semester AND on the regular final exam date and time. Attendance for all parts of the Final Exam is REQUIRED.

Cheating

Cheating, plagiarizing, and vandalizing are strictly forbidden. These offenses will result in a failing grade as well as possible expulsion and other penalties.

Modeling Release:

If you don't like your picture taken, then learn to duck. From time to time, video will be recorded in class – smile! Photos may appear on handouts, brochures, web pages, articles, etc.

Note:

If you have a disabling condition that may interfere with your ability to successfully complete this course, please contact the Disability Services Office (315-312-3358, 183 Compass Center, http://www.oswego.edu/student/services/disabilities/).

Conceptual Framework:

The School of Education has created a conceptual framework that helps all of us think seriously about learning and social justice. There is a framed copy of the conceptual framework hanging at the front of the laboratory. Activities in this course have been crafted to provide truly authentic learning opportunities that include all elements of the framework; social justice, practice, reflection, knowledge, collaboration & leadership. Additional copies of the Conceptual Framework can be obtained from the Department of Technology secretary.

How to Contact Me:

Office Hours:posted in lab and on office door & others by appointment.
PLEASE come to visit or to ask questions.

Office:	161 Wilber Hall (also check in 160 Wilber)	
Telephone:	Office 315.312.2832	Home 315.342.0799
E-mail:	**tryon@oswego.edu**	
Web:	http://tryon.oswego.edu	

Personal Safety:

1. EYE PROTECTION. The department safety policy requires students to own safety classes with side shields and to wear them at all times in the laboratory. Prescription lenses must be tempered or prescription ground safety glasses. No sunglasses are to be worn in the lab.

2. HAIR PROTECTION. Safety caps may be required for long-haired students. Long hair will be determined by the instructor. The ease with which a strand of hair can be caught upon revolving machinery presents a serious hazard to students.

3. BODY PROTECTION. Wearing apparel, both general and special, have been designed to protect the worker. Trousers and short-sleeved shirts are ideal for most operations in the Manufacturing lab. No headphones/earbuds are permitted.

4. FOOT PROTECTION. Wearing full foot covering is required. Leather shoes are preferred over canvas. Sandals or other open-toed or heeled shoes are prohibited.

5. GENERAL PROTECTION. The instructor may add and/or modify laboratory safety procedures as necessary to maintain a safe and organized working and learning environment.

6. EQUIPMENT OPERATION. You are not to use any equipment that an Oswego Technology Department faculty member has yet to train you to use. The instructor is available to train you to use any equipment in the laboratory. Do no operate any equipment unless you are completely familiar with the Oswego and Manufacturer's operating procedures.

Course Assignment Details:

"The Night Before" – Dual Product Presentations & Sales Pitches

Each student will develop two quality product concepts with marketing appeal to a target community. These are products that we will manufacture as a class and sell. We will attempt to sell 99 units. **FOR EACH PRODUCT you will submit 2 black on white copies and one black on transparency copy of a single sided document on 8.5" x 11" paper that includes the following information**. Your 1 minute presentation (evaluation criteria can be found at my website) to the class should cover all of these same issues.

1. Document – one copy on transparency for you to use for your presentation, one paper copy to hang up on your class cabinet, and one paper copy for the instructor.

a. Effective drawing or sketch (high quality pictorial please)
b. Your name and the Product name
c. Introductory statement about the product – What does it do and why would people want one.
d. Competition: What else is there and why is this going to be better.
e. Production challenges: Can we do this? What don't we have?
f. Estimated cost to produce, cost of production set-up, cost to produce 100, cost each to produce. This must be based on REAL costs that YOU FIND FROM VENDORS! List vendors in your document.
g. Sales forecast: Where could we sell this, to who, for how much, total possible sales,

possible profit per unit, percent return on investment.

2. The product should have socially redeeming value.
3. You may also utilize a prototype or the actual object in addition to your written document.
4. Prior to your presentation you will provide the instructor with one copy of your product document.
5. You will be graded on the quality of your presentation. Look sharp, know your facts, and be ready for questions. Presentations will be limited to ONE MINUTE per product!
6. This assignment may be repeated as needed to identify appropriate production products.

A	B	C	D	E
Looks good, sounds good, two products with accurate details and all requirements.	A few details or numbers not correct but presented both products well	Documents contained hasty mistakes. Presentation weak.	Only one product or presentation lacked detail. Not at 393 level	Wasted our time due to lack of planning. Did not meet all requirements.

Attendance

Attendance at all class functions is mandatory. In addition to enforcing the Department of Technology attendance policies, this course utilizes attendance records and/or performance contributions to establish your academic grade. You are allowed three absences (being late for class or leaving early three times = one absence). We need enthusiastic, above-average participation from all class members. Blend into the scenery somewhere else! In this class, ambitious participation is encouraged and rewarded.

A	B	C	D	E
Dependable	Very few late/absent days	A few late/absent days	Team members grumble about your attendance	Can't rely on you.

Submitting Assignments Electronically

The four assignments that follow are to be submitted on paper on the due date and also electronically via email. You can paste plain text into your email message or you can attach a Microsoft Word document or a plain text document to your email message. When submitting a document electronically use the following: Send to tryon@oswego.edu ***The subject line must contain your name and the assignment***. example; SUBJECT: Jane Doe The Goal Book Review. ALL ELECTRONIC ASSIGNMENTS ARE DIGITALLY COMPARED WITH ALL KNOWN SOURCES OF SIMILAR DOCUMENTS. PLAGIARISM WILL RESULT IN SIGNIFICANT PENALTIES.

Concepts Summary of "Joe's Garage"

You will read "All I Need to Know About Manufacturing I Learned in Joe's Garage". You will summarize the key concepts and briefly describe three things you would do differently if you were organizing the project. You will submit your single page document ELECTRONICALLY via email as **plain text AND** printed out as hard copy.

Book Review of "The Goal"

You will submit a 3-4 page review of The Goal. Your review should summarize the key concepts, identify the "goal", and discuss your impressions of the book. You must also relate key concepts from the book with what is going on in the class manufacturing enterprise(s). You will submit your review ELECTRONICALLY via email as **plain text AND** printed out as hard copy.

Concepts Summary of "Continuous Improvement" chapters 1-6

You will read chapters 1-6 of "The New Manufacturing Challenge - Techniques for Continuous Improvement". You will summarize the key concepts (or simple truths if you like). You will submit your document ELECTRONICALLY via email as **plain text AND** printed out as hard copy.

Concepts Summary of "Continuous Improvement" chapters 7-17

You will read chapters 7-17 of "The New Manufacturing Challenge - Techniques for Continuous Improvement". You will summarize the key concepts (or simple truths if you like). You will submit your document ELECTRONICALLY via email as **plain text AND** printed out as hard copy.

Class Participation

This is an upper division course that relies on significant efforts from all class members. Just as in teaching and in industry, mediocre participation and involvement is not acceptable. If you want to impress your instructor and your fellow team members, then do impressive work – be *average* somewhere else.

Mid Term Exam

This extended response exam (and possibly performance exam) will be given near the mid point of the semester and may have a take-home portion and a class portion. The mid term exam will probably focus on: product design, tooling, production styles, ITEA production standards, The Goal, production documentation, other class topics.

Customer Feedback

As you near the end of your prototype you are required to obtain feedback from potential customers. You may begin collecting feedback using a high quality marker drawing, which should be created from your final design sketches. Appearance prototypes, models, and a true prototype may also be used to show potential customers. You may wish to interview people or ask them to complete a written survey. In either case, you must record, document, and summarize all of the reactions, comments, and suggestions obtained. This feedback should be analyzed and incorporated, where appropriate, in your product.

A	B	C	D	E
Sampled a large population with accurate product representations and summarized accurately	Sample size a bit small or product not accurately represented	Too little, too late and/or product not represented accurately and/or feedback not analyzed.	Weak attempt to collect feedback and/or weak analysis.	Did not collect feedback or collected feedback too late to impact product.

Tooling Development

Working in a small group you will develop at least one piece of tooling that will be used throughout the semester to produce widgets (or some class designed product). The tooling must be capable of producing hundreds of identical parts. Tooling must be effective when used by untrained high school students. Your group will document the tooling as well as the process that utilizes it. Minimum requirements will be provided by your instructor. Tooling evaluation criteria is available at my website. Tooling must be idiot proof!

A	B	C	D	E
Graded using the tooling evaluation forms.				

Manufacturing Enterprise

The class will form a company (or companies) to produce a product(s) selected from the "Night Before" presentations or assigned by the instructor. Each class member will become a company employee and stockholder. The manufacturing lab will retain a 10% ownership position (or other amount as specified by the instructor). All prototypes developed and one or more high quality finished products are to remain in the manufacturing lab at the end of the semester. Evaluation criteria for this event will consist of:

1. Record of accomplishments/participation
2. Effectiveness on work teams
3. Peer evaluation
4. Instructor evaluation
5. Quantity produced and sold
6. Stock valuation
7. Quality of finished products
8. Low/no inventory, pull production

Enterprise Deadlines

There are a few deadlines throughout the semester that your team must meet. These dates are posted on the class calendar. Failing to meet the deadlines will reflect poorly on your team and may result in you being dropped from the course. Deadlines include (but are not limited to) initial sketches, organization identity, prototype, customer feedback, tooling, financing, product documentation, package, first product, final product, class enterprise documentation.

Laboratory Safety

You are required to work in a safe manor to protect yourself and your classmates from injury. If you have not been trained on a piece of equipment then DO NOT USE IT! Laboratory safety is YOUR RESPONSIBILITY. The instructor will provide class and/or individual safety and operation training on necessary lab equipment. You are required to wear safety glasses. You are required to wear closed toe shoes.

A	B	C	D	E
Consistently demonstrates that safety is critical.	Consistent but not a role model for safe procedures and/or practices.	Demonstrates safe procedures most of the time.	Needs to be reminded about safe procedures and safety equipment	Safety glasses? "Don't need them much".

Laboratory Treatment and Cleaning

You will be using 160 Wilber Hall for the majority of your activities. You will demonstrate the highest degree of respect for the lab, its furniture and equipment. You and your team are expected to clean up after yourselves and participate in class clean up activities. Floors and surfaces are often slick. Move cautiously, wear appropriate clothing, and be alert to potential hazards that may arise.

A	B	C	D	E
Nobody needs to clean up after you, tools always returned, space and equipment always better than you found it.	Cleans up completely, returns all tools, leaves space as good as you found it.	Cleans up after yourself, returns tools. Space almost as nice as you found it.	You think that Mr. Tryon will clean up your stuff.	You think that your mom will clean up your stuff.

Model Release and Process Agreement

You must agree to and sign a course process agreement that specifies your responsibilities for this course experience as well as allows your instructor to use pictures, movies, and samples of your work in promotion and publication artifacts. Your instructor has several cameras and is not afraid to use them!

Class Videos and Activities

Several videos and simulations/activities have been selected to introduce the complex world of manufacturing systems. It is important to be present for the entire presentation.

Manufacturing Confessions

At some point(s) in the semester the instructor will ask you to be videotaped describing lessons learned in this course. The video may be edited and packaged on the manufacturing DVD and shown to future students.

Creative Laboratory Supplies Acquisition

Several times throughout the semester you will be asked to locate suppliers for the various materials we will consume for this course. Given our extremely limited resources, we are always looking for excellent deals on materials consumed regularly as well as sources for surplus, discarded, and other free materials. Your instructor routinely acquires class supplies from scrounging and dumpster diving activities. You will be asked to join in the fun!

Documenting the Class Manufacturing Enterprise

All aspects of the manufacturing enterprise will be documented through drawings, photographs, documents, movies, etc. The documentation will illustrate all aspects of the product development, production, and sales. This document will include sections aligned with the content outline provided by the instructor. The documentation will be submitted electronically on a CD/DVD and bound in a three ring notebook.

The Manufactured Product: 99 or Bust!

The product your team manufactures will be evaluated by the instructor (as well as evaluated by customers). Criteria include: Quantity produced, Functionality, Overall quality, Overall appeal, Product documentation, Packaging, Product value.

A	B	C	D	E
Mr. Bush, Mr. Simmonds, Dr. Hardy, Mr. Belt, and Mrs. Belt all think you have a great product and some of them buy one.	Mr. Bush, Mr. Simmonds, Dr. Hardy, Mr. Belt, and Mrs. Belt all think you have a great product.	Some faculty like your product and complement you on it's quality.	Only your relatives and a few strangers are interested in your product.	Only your mom likes your product.

Final Presentation

Your enterprise team will give a formal presentation on the first day of the last week of class. This is a formal presentation given to classmates, guests, and members of the faculty. This presentation may be video recorded for use in other classes. The final presentation should summarize your manufacturing enterprise. You will describe what went well and what did not. You will provide a full financial summary, customer feedback, and detail the milestones from the semester. You will answer questions from the audience. You will also donate a high quality product from your production run to the laboratory hall of fame.

Final Exam – Biannual Manufacturing Systems Showdown!

The final exam is a team performance event. The performance exam will be given in two parts. The first part is held on the last week of the semester. The second part is held on the date and time of the final exam as specified in the Undergraduate Course Bulletin. Attendance is mandatory for both parts. **The Manufacturing Showdown will be your opportunity to work as a team to design, create, document, and implement a competitive continuous pull production system**. Class summations, instructor evaluations, company dissolution, lab cleaning, distribution of final exam grades and/or prizes, and other course-end tasks will also be completed at the scheduled final exam time.

Peer Evaluations

At the end of the semester (and possibly at other times as well) you will evaluate your team members and they will evaluate you. These opportunities to evaluate how you are contributing to the team will be used by the instructor in determining your academic grade. The actual evaluation form is attached.

Peer Evaluation Form

Student's/Employee's Name: _____

Minimum = 1 Average = 3 Maximum = 5

44-50 = A 38-43 = B 32-37 = C 26-31 = D 0-25 = E

Quality of Work	Helps out Others	Completes Assigned Work	Contributes Equal Time to tasks	Professional	Observes Safety Regulations	Care with materials and tools	Readiness to Work	Positive Attitude	Team Player	TOTAL	If your family owned a manufacturing company, would you hire this person? (yes or no)	Letter Grade (A - E)	Team Members

Comments:

TEL 393/560 Manufacturing Systems 2009 Fall Semester Timeline

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Wk.	Day	Date	What's happening	What is DUE This Day	Notes
1	1	9/1/09	Intro, photos, course materials		
	2	9/3/09	Hall of Shame, Reinvention		
2	3	9/8/09	You will present - FAST	Night Before Assignment	
	4	9/10//09		Plus/Delta	
3	5	9/15/09		101 Sketches, Joe's Garage	Time to develop a process agreement with your team.
	6	9/17/09		Team Photo	
4	7	9/22/09		Team Name & Logo	Are you going to keep track of tasks/contributions by each team member?
	8	9/24/09			
5		9/29/09	NO CLASS: Monday Schedule	Marker Drawing	
	9	10/1/09		Continuous Improvement 1-6	
6	10	10/6/09			How will you keep track of money?
	11	10/8/09			
7	12	10/13/09		Final Prototype Should be Done	
	13	10/15/09			
8	14	10/20/09		Customer Feedback Mid Term Exam	Prototype by MidTerm = GOOD.
	15	10/22/09		Process Map	
9	16	10/27/09			
		10/29/09	NO CLASS: Fall Conference		
10	17	11/3/09		The Goal Book Review	Better get your materials ordered.
	18	11/5/09			
11	19	11/10/09			
	20	11/12/09		Manufacturing Process should be in full swing.	
12	21	11/17/09			What kind of package will you develop?
	22	11/19/09			
13	23	11/24/09		Continuous Improvement 7-17	
		11/26/09	NO CLASS: Thanksgiving		
14	24	12/1/09		Product Packaging should be done.	
	25	12/3/09		Last Day to Work in Lab	The Final Exam is Pull, Kanban, & no Inventory. Are you ready?
15	26	12/8/09	Final Team Presentations, Peer Evaluations	Enterprise Documentation, Finished Product, Tooling	
	27	12/10/09	Final Exam: part one		

FINAL EXAM - Manufacturing Showdown Tuesday, December 15, 2:00 pm - 4:00 pm

(Schedule Subject to Changes by Professor and University)

TEL393: Manufacturing Systems **Tooling Evaluation**

Tooling: _____ Designer: _____

You will not be penalized if a principle does not apply. For example, a tracing template may not have any adjustment nor will it allow for variation of parts.

Does not violate safe machine operation	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Does not damage part/product	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Rapid installation to machine	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Registering to the machine	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Tooling adjustment	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Chip clearance	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Shear points	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Clamping, clamp pressure & non-skid surfaces	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Durability	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Labels	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Reference to critical dimensions	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Allowance for variation of parts	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Speed of use	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Cost - reasonable use of appropriate materials	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Poka-yoke - foolproof mechanisms	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Functions accurately - does the tooling produce parts centered within tolerance	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Functions consistently - does the tooling produce parts consistently over time	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	
Additionally, is there tooling that you *should have* but do not to support this operation? Comments & Total	0 - 1 - 2 - 3 - 4 - 5 - N/A(5)	