OM5093 Special Topics
Lean Production Kaizen Projects

Objectives and Description: This Special Topics class, delivered in field-study format, is designed to teach participants a version of the Toyota Production System (TPS or Lean) using a learn-by-doing protocol. The course will cover TPS principles and its philosophical, managerial, and technical approaches to improvement—continuously striving to find better ways of doing things. One vehicle for learning will be team-based Process Improvement (PI) or Kaizen projects with local firms.

This course is motivated by collaborations with TSSC (Toyota Production System Support Center, http://www.tssc.com), a not-for-profit arm of Toyota Motor Engineering & Manufacturing North America, Inc. Note that all usage of the term Toyota / Lean Production System and TPS is generic and refers to public domain knowledge; it is not intended to reveal Toyota’s proprietary system. The academic basis of this course is the TPS / Lean framework, its application in manufacturing and service environments, and the theoretical frameworks for operations strategy and change management.

Upon successful completion of this course, participants should be able to:

1. Explain the linkage between customer satisfaction and waste in the workplace,
2. Apply the TPS Lean analysis approach to any business setting, including not-for-profit / service firms,
3. Select and use the correct TPS Lean tools in a business setting,
4. Analyze processes to identify problems and performance metrics, and to propose, develop, and test solutions to improve performance,
5. Work through a specific Process Improvement problem from problem definition through recommendations using a well-structured problem solving (e.g. 8-step) process,
6. Design and manage a multi-disciplinary team for performance improvement.

The course contains two set of learning opportunities: A) Interactive class lectures / discussion / readings / assignments / exercises / plant tours on TPS / Lean / Six-sigma topics and tools. [While the course focuses on TPS Lean terminology, some parallels with related six-sigma quality improvement approaches such as PDCA / DMAIC will be discussed.] B) Learn-by-doing project and site visits by student teams to go-and-see the Gemba (kaizen work environment where value-add happens), identify background / problems, current situation, set goals, analysis of root causes, proposed countermeasures, implementation, potential results (8-step problem-solving approach).

This course structure combines TPS topics and tools with hands on project work and necessitates independent learning on-demand, team coordination, focus on excellence, and some flexibility / initiative / dynamism in the course schedule and project work (expect changes to the schedule and expect project work to be dictated by the site, so be prepared – e.g., workload may not be spread out evenly over the semester; site visits may not be of short duration, e.g. 3:30 – 4:50 PM).
Initial TPS topics will cover a historical overview, foundational elements to bring stability to a process, then discuss ways of identifying non-value-added waste and taking steps to achieve higher levels of productivity, profitability, and professionalism of the workforce. Useful tools such as value stream mapping (a.k.a. material and information flow chart at Toyota), 8-step lean A3-sheet methodology, will also be highlighted, along with illustrative examples and references.

Once the team-based projects start for many teams, one class each week will be devoted to covering TPS course materials: concept and implementation, cases, and for sharing ideas / lessons. The second class is a placeholder for on-site visits, team project work, meetings with the instructor / teaching assistant, and project milestone / progress presentations (which also will provide opportunities for all teams to learn from, and contribute to, the efforts of other teams thru’ periodic information exchange). Teams will be expected to schedule regular site visits either during one of the weekly class-time slots or during an alternative time that is convenient for the team and the project site. Visits every other week are also acceptable as long as the team continues to make progress on its project work and / or communicates with the site sponsors. It is important for members of each team to either have roughly the same schedule or a flexible schedule so they can arrange a common site visit time slot or have extra members so a subset can participate in site visits while they document each site visit for the team. Once you form your team, you should determine the team’s availability to work on the site project. In addition to the 3 hours of class time per week, you should expect to devote an average of at least 6 hours each week on class or project work outside of class time. Part of this time may be used to meet with the instructor / teaching assistant who, along with the site coach will play the role of project mentor / facilitator, help resolve problem issues, and guide the team to continue to make progress on their project charter.

Other notes on team field studies projects include:
- Projects with local organizations involve an inherent element of lack-of-structure, uncertainty, and diversity across projects and time. Teams will need leaders to take charge of monitoring progress.
- Make your recommendations for Process Improvement (PI) with sensitivity to the cultural context
- Understand that any PI initiative is a complex exercise in change management
- While we plan to implement changes and measure outcomes, this may only be possible for some projects and not for others. The key idea is to share experiences of different teams as a mechanism to learn more about the Toyota way of operation and the varied elements that help a TPS lean organization excel.

Course Materials: (i) This is a relatively new course being piloted, (ii) the instructor is still learning TPS, and (iii) there are no great “textbooks” on Lean as TPS is learned by doing with a coach / mentor So, over the semester, materials for this course will be added to Blackboard, https://canopy.uc.edu, especially over the first few weeks. Some information on TPS Lean can be obtained from the web (a list of links will be provided on Blackboard via a Google doc and students are invited to add to these links, especially for sources specific to certain sectors such as healthcare, service, IT, or not-for-profit). Good general references on TPS / Lean include the following:

2. Learning to See – Value Stream Mapping to create value and eliminate muda, 1999, Lean Enterprise Institute, Mike Rother and John Shook.
   Follow-up Books: (An Exec Summary of the 14 principles will be posted on Blackboard.)
   Toyota Kata – Managing People for Improvement, Adaptiveness, and Superior Results, 2010, McGraw Hill, Mike Roth
3. Lean Websites: e.g., Lean Enterprise Institute: https://www.lean.org; Continuous Improvement and Six-sigma: https://www.moresteam.com/index.cfm (e.g., see their resources at https://www.moresteam.com/resources.cfm, in particular the DMAIC toolbox).

More reference books will be provided separately as a readings list. In the spirit of collective and on-demand learning (as opposed to a push model where the instructor provides all lecture notes), it is likely that teams of two students each will be asked to pick a TPS-related book to read and summarize to / for the class. This can add to our collective knowledge base on TPS Lean.

Course Standards / Assessment: The tentative scheme is as follows (this scheme can be changed by mutual agreement between student and instructor):

5% Initial / Basic Lean Assessment: Read material at http://www.toyota-global.com/company/vision_philosophy/toyota_production_system/ (click & read thru’ the sub-items on the right under Toyota Production System including JIT, Jidoka, Origins of TPS, TPS Illustration). Take quiz at http://www.toyota-global.com/company/vision_philosophy/toyota_production_system/quiz_on_the_toyota_production_system.html (needs Flash Player). Retake quiz if previous score was below 70%. Note your individual score (store a pdf or other image for your records).

15% Learning: Book report or other executive summary deliverable to the class on TPS Lean.

65% Project: Once a project site is identified, the hands-on Kaizen project is to be worked on regularly. Teams are encouraged to meet with the instructor or teaching assistant each week to discuss past progress on project work or future plans or get help on resolving any problems. Meetings may be replaced by a periodic project update document, if the project is making sufficient / satisfactory progress. Note that good progress is measured by how much you will exceed the project client’s expectations and enhance your team (and the class’) experience of TPS / Lean. There will be three project milestones requiring submission or presentation:

1. Project Charter – due a week or so after your first site visit.

10% Initial Engagement Contract / Project Charter

20% Mid-semester Project Presentation – include any TPS tools used such as VSM / A3.

30% Final Project Presentation

5% Professionalism, Teamwork (Peer & Mentor Evaluations)

10% Individual Course Reflection / Lessons Learned / Kaizen the Course (or exit quiz, if any)

5% Class Participation

Assessment Notes: Teamwork is an important determinant of success in this course: If any problems crop up in team work, please contact the instructor or teaching assistant ASAP so they may be addressed early. At the end of the course all course participants, mentors and facilitators (instructor/TA) will be required to evaluate the participation and contributions of all team members that they worked with. Your team’s performance in the Final Presentation and your individual performance in Peer, Mentor, and Instructor Evaluations will impact your overall course score. Instructor reserves the right to change the above assessment with advance notice. E.g., an exit knowledge review / quiz or specific assignments may be added, if project work does not progress as anticipated. Although, we are seeking projects to accommodate all students, in the event that we are unable to place all teams in a local organization, this Special Topics class will be converted for some teams into a detailed research paper on TPS Lean focusing on topics selected by the Instructor and the team. Finally, if groups of students do brief in-class presentations, these presentations will be factored into the student’s course score.

Tentative Course Syllabus / Timetable:
<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Readings / Deliverables</th>
</tr>
</thead>
</table>
| Week 1: Jan 19, 11 | Course & Projects Intro; TPS Overview – History, Philosophy, Basic Thinking, Lean Principles Tools: PDCA / DMAIC / 7-step | *Form Teams; Take Toyota Global Initial Lean Quiz*  
Read Toyota Way: 14 Principles Exec Summary (Bboard) |
| Week 2: Jan 16, 18 | Stability, Jidoka, Continuous Flow, Project Details – Clarify the Business Need / Problem, Tools: 8-step / A3 Report | *Match Teams with Projects*  
Read *Toyota’s Secret: The A3 Report*, SMR 2009  
See Web / Bboard for 8-steps |
| Week 3: Jan 23, 25 | Visual Control, 5S, Standardized Work, Pull System, Heijunka          | *Initial Project Site Visit*  
Youtube Basic Technical Tools by Jacob Isaac-Lowry, e.g., [https://www.youtube.com/watch?v=KP6wLw1jhzA](https://www.youtube.com/watch?v=KP6wLw1jhzA)  
See Web / Bboard for 8-steps |
| Week 4: Jan 30, Feb 1 | Project – Break down the Problem; Stability, Waste / Value Stream Map | *Determine Project Charter* |
| Week 5: Feb 6, 8  | Metrics, Target Setting & Root Cause Analysis – 5 Whys                | TBD                                                                                   |
| Week 6: Feb 13, 15 | Brainstorming Countermeasures using Standardized Work, Jidoka        | TBD                                                                                   |
| Week 7: Feb 20, 22 | Change time-frame; People Development; Managerial Practice & Soft-side of TPS | *Draft Mid-sem Presentations* |
| Week 8: Feb 27, Mar 1 | Mid-semester Project Presentations                                    |                                                                                        |
| Week 9: Mar 6, 8  | Implementing Countermeasures; Advanced Problem Solving                | TBD                                                                                   |
| Week 0: Mar 13, 15 | Spring Break                                                          | Spring Break                                                                        |
| Week 10: Mar 20, 22 | Monitor Results & Processes                                           | TBD                                                                                   |
| Week 11: Mar 27, 29 | Transformation: Sustaining and Improving TPS Culture of Change       | TBD                                                                                   |
| Week 12: Apr 3, 5  | Focus Exclusively on Project Work – meet with instructor / TA / mentors|                                                                                        |
| Week 13: Apr 10, 12 | Discussion of Key TPS Lessons                                         | *Draft Final Presentations*                                                           |
| Week 14: Apr 17, 19 |                                                                         |                                                                                        |
| Week 15: Apr 24, 26 |                                                                         | *Final Project Presentations*                                                         |

This timetable may be modified as the course progresses to possibly include a Toyota Plant Tour; guest speakers. The TBD in the table above is an experiment in Blended Learning. Groups of students could use some of the class time to do a short in-class presentation on the topic of the day as a means to provide an independent perspective on TPS lean course materials. For instance, if during your project work or because of your own personal interest you find a good reference on, say, Root Cause Analysis and 5 Whys, you could provide this information to the instructor / make it available to the rest of the class. This way the class shares knowledge from different projects and can seek to apply it to their project as appropriate.

List of Project Sites (details TBD):
1. EasterSeals Project, thanks to Amend Consulting, LLC, site lead Mr. David Dreith or Mr. Clark Earick.
2. Project Provided by Sweet Cheeks Diaper Bank, site lead Ms. Megan Fischer.
3. Valeo Climate Control, TBD (Valeo HR is working thru’ some relevant issues)
4. Mitsubishi Electric, TBD.
5. A few other project options are in the process of being set up...

Students are requested to meet with the instructor to coordinate connecting with people they may know thru’ internships and other experiences to solicit new project sites. [This is another potential learning opportunity / activity for this course.]

**Academic Integrity:** Active participation in class is essential. Submit only your own work done specifically for this course, provide sources of information where appropriate; follow student code of conduct, [http://www.uc.edu/conduct/Code_of_Conduct.html](http://www.uc.edu/conduct/Code_of_Conduct.html) and its LCB “Academic Integrity” version, [http://business.uc.edu/student-resources/academic-resources/advising/resources.html](http://business.uc.edu/student-resources/academic-resources/advising/resources.html).

**Special Needs, Religious, and other Accommodations:** Please meet with the instructor to arrange for reasonable provisions to ensure an equitable opportunity to meet all the requirements of this course.