# Course Outline

## 1. COURSE INFORMATION

<table>
<thead>
<tr>
<th>Course Code (ie. ENGTECH 1EL3)</th>
<th>GENTECH 4LM3</th>
</tr>
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<tbody>
<tr>
<td>Course Name</td>
<td>Lean Thinking</td>
</tr>
<tr>
<td>Session (ie. Fall 2014)</td>
<td>Winter 2016</td>
</tr>
<tr>
<td>Date(s) and Time(s) of lectures</td>
<td>Saturdays 1pm – 4pm</td>
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<tr>
<td>Program Name</td>
<td>Bachelor Of Technology</td>
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**Calendar Description**: Students will learn about and apply classical lean techniques well beyond the shop floor. Lean methods will enable students to deploy and adapt tools aimed at minimizing waste, removing non-value added activities, and pursuing incremental improvements across organizations.

**Instructor**: Dr. Louie D’Orazio, B.Sc.Eng., M.Sc.Eng., EMBA, MMP, Ph.D., P.Eng.

Phone: 1-905-575-1212
Ext 3650
E-Mail: louie.dorazio@mohawkcollege.ca or dorazio@mcmaster.ca

**Office Hours**: n/a

**Teaching Assistant (TA)**: Name(s): n/a

**Office Hours**: n/a

## 2. COURSE SPECIFICS

### Course Objectives

<table>
<thead>
<tr>
<th>Instruction Type</th>
<th>Code</th>
<th>Type</th>
<th>Total Hours</th>
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<tbody>
<tr>
<td>C</td>
<td>C</td>
<td>Classroom Instruction</td>
<td>36</td>
</tr>
<tr>
<td>L</td>
<td>L</td>
<td>Laboratory, workshop or fieldwork</td>
<td>3</td>
</tr>
<tr>
<td>T</td>
<td>T</td>
<td>Tutorial</td>
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</tr>
<tr>
<td>DE</td>
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<td>Distance Education</td>
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**TOTAL HOURS**: 39

### Resources

<table>
<thead>
<tr>
<th>ISBN</th>
<th>Textbook Title &amp; Edition</th>
<th>Author &amp; Publisher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Supplies</td>
<td>Instructor's Notes/Examples (Published Papers/Case Studies)</td>
<td></td>
</tr>
</tbody>
</table>

**Book Available**: (amazon.ca, amazon.com, etc...)

**Prerequisite(s)**: n/a

**Corequisite(s)**: n/a

**Antirequisite(s)**: GENTECH 4LT3
| Course Specific Policies | Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor. The instructor may also use other software including: e-mail, Avenue, LearnLink, web pages, capa, Moodle, Thinking Cap, etc. Where group work is identified in a course outline, such work is considered mandatory. All projects must be completed as “group” reports. Failure to participate will result in a “0” grade.

Students must pass the final exam to pass the course.

Late submissions will be penalized based on the Instructor’s discretion but fair to all students. |
| --- | --- |
| Departmental Policies | - Students must maintain a 3.5/12 GPA to continue in the program.  
- In order to achieve the required learning objectives, on average, B.Tech. students can expect to do at least 3 hours of “out-of-class” work for every scheduled hour in class. “Out-of-class” work includes reading, research, assignments and preparation for tests and examinations.  
- The use of cell phones, iPods, laptops and other personal electronic devices are prohibited from the classroom during the class time, unless the instructor makes an explicit exception.  
- Announcements made in class or placed on Avenue are considered to have been communicated to all students including those individuals that are not in class.  
- Instructor has the right to submit work to software to identify plagiarism.  
- Instructor is permitted to enforce a preference to shut off all electronic devices during class. |
| 3. SUB TOPIC(S) | Lean Introduction (Innovative Manufacturing)  
- Develop an understanding of the importance of LEAN SYSTEMS based on the optimization techniques demonstrated in the DVD.  
DVD: “Lean Thinking Series (Ferrari)” |
| Week 1 | Lean Strategies - Optimizing the Manufacturing Environment through Problem Solving Techniques  
- Develop an understanding for the available problem solving techniques and choose the right tool for particular applications.  
Chapter 1: The Big Picture  
PowerPoint Slides |
| Week 2 | Lean Strategies – Optimization utilizing 5S, SMED, Standard Work, (Project Introduction)  
- Integrate 5S technologies into the current environment  
- Differentiate between a SMED analysis and traditional change-over methodologies  
- Plan standard work (work instructions)  
- Decide on Project Topics  
Chapter 2: Identifying The Value Stream  
PowerPoint Slides |
| Week 4 | Lean Strategies - Optimization utilizing JIT, Pull, Poke-Yoke, (Establishing Project Teams)  
- Distinguish between JIT and standard Mistake-Proofing methodologies  
- Design a Pull system as opposed to a Push system  
- Choose and decide on the Project Teams | Chapter 3: Collecting Basic Information About The Current State  
Chapter 4: Documenting Manufacturing Process Flow  
PowerPoint Slides |
|---|---|
| Week 5 | Lean Strategies - Optimization utilizing Cellular manufacturing & understanding the effects of Human Factors  
- Develop a plan or approach to maximize the effects of Human Factors within the system (cell layouts) | Chapter 7: Interpreting & Understanding Basic Product Flow  
PowerPoint Slides |
| Week 6 | Lean Strategies - Optimization utilizing Value Stream Mapping & Lean Six Sigma  
- Evaluate VA (value-added), NVA (non-value added) and R-NVA (required value added) activities  
- Develop an understanding for the available Six Sigma techniques and choose the right application for particular Lean applications. | Chapter 8: Utilizing Data In Manufacturing  
PowerPoint Slides |
| Week 7 | Mid-Term Break | Mid-Term Recess |
| Week 8 | Project Updates  
- Appraise all of the project updates in terms of Current Value Stream Mapping  
- Make changes as noted to the Current Value Stream Mapping |  |
| Week 9 | Lean Strategies - Optimization utilizing Failure Mode Effects Analysis (FMEA)  
- Integrate FMEA (Failure Mode Effect Analysis) and RCA (Root Cause Analysis) into existing processes  
- Distinguish the difference between traditional failure analysis and Lean Thinking methodologies | Case Study/In Class Assessment |
| Week 10 | Continuation of Week 9: Lean Strategies - Optimization utilizing Failure Mode Effects Analysis (FMEA)  
- Integrate FMEA (Failure Mode Effect Analysis) and RCA (Root Cause Analysis) into existing processes  
- Distinguish the difference between traditional failure analysis and Lean Thinking methodologies | Case Study/In Class Assessment |
| Week 11 | Lean Strategy Presentations (Group Presentations)  
- Create The Value Stream  
- Assess the waste  
- Construct The Value Stream Maps (before and after)  
- Conclude and Argue all of the constraints. |  |
Week 12
Lean Strategy Presentations (Group Presentations)
- Create The Value Stream
- Assess the waste
- Construct The Value Stream Maps (before and after)
- Conclude and Argue all of the constraints.

Week 13
Lean Strategy Presentations (Group Presentations)
- Create The Value Stream
- Assess the waste
- Construct The Value Stream Maps (before and after)
- Conclude and Argue all of the constraints.

All Projects Due

Final Examination - Scheduled during the regular University Final Examination period established by the Registrar’s Office.

FINAL EXAMINATIONS will be scheduled, conducted and invigilated by the Office of the Registrar. All students entering the examination room must produce a McMaster photo identification card. No other identification will be accepted. In addition, for classes that allow you to use a calculator, you must use the McMaster standard calculator. For details, please consult your Instructor.

Note: this structure represents a plan and is subject to adjustment term by term. The instructor and the university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes.

4. ASSESSMENT OF LEARNING *including dates*

<table>
<thead>
<tr>
<th>Activity</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>10</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>n/a</td>
</tr>
<tr>
<td>Project</td>
<td>40</td>
</tr>
<tr>
<td>Final Exam</td>
<td>50</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
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Percentage grades will be converted to letter grades and grade points per the University calendar.

5. LEARNING OUTCOMES

1. By the end of this course, the students will be able to integrate the basic lean strategies and demonstrate how they integrate to manufacturing/service processes, including:
   - types of waste
   - 5S & Visual Control
   - Kaizen, Mistake Proofing
   - J.I.T. (Just In Time)
   - KANBAN,

2. By the end of this course, the students will be able to prove the Value Stream Mapping Technique in the evaluation of the flow of materials and information currently required to bring a product or service to a consumer; ie. create a current state process and design a process map of the future state.

3. By the end of this course, the students will be able to prioritize improvement actions that address non-value-added activity and waste.

4. By the end of this course, the students will be able to evaluate various business processes utilizing Failure Modes & Effects Analysis (FMEA) and other established problem solving methods.

5. By the end of this course, the students will be able to develop & demonstrate Team Skills, Presentation Skills, and Report Writing Skills.

6. POLICIES

Anti-Discrimination
The Faculty of Engineering is concerned with ensuring an environment that is free of all discrimination. If there is a problem, individuals are reminded that they should contact the Department Chair, the Sexual Harassment Officer or the Human Rights Consultant, as soon as possible.

**Academic Integrity**

Attention is drawn to the Statement on Academic Ethics and the Senate Resolutions on Academic Dishonesty as found in the Senate Policy Statements distributed at registration and available in the Senate Office. Any student who infringes one of these resolutions will be treated according to the published policy. Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university. It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, specifically Appendix 3, located at: http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf

**Requests for Relief for Missed Academic Term Work (Assignments, Mid-Terms, etc.)**

The McMaster Student Absence Form is a self reporting tool for Undergraduate Students to report absences that last up to 5 days and provides the ability to request accommodation for any missed academic work. Please note, this tool cannot be used during any final examination period.

You may submit a maximum of 1 Academic Work Missed requests per term. It is YOUR responsibility to follow up with your Instructor immediately regarding the nature of the accommodation.

If you are absent more than 5 days or exceed 1 request per term you MUST visit your Associate Dean’s Office (Faculty Office). You may be required to provide supporting documentation.

This form should be filled out immediately when you are about to return to class after your absence.

http://www.mcmaster.ca/msaf/

**E-Learning Policy**

Consistent with the Bachelor of Technology’s policy to utilize e-learning as a complement to traditional classroom instruction, students are expected to obtain appropriate passwords and accounts to access Avenue To Learn for this course. Materials will be posted by class for student download. It is expected that students will avail themselves of these materials prior to class. Avenue can be accessed via http://avenue.mcmaster.ca

**Communications**

It is the student’s responsibility to:

- Maintain current contact information with the University, including address, phone numbers, and emergency contact information.
- Use the university provided e-mail address or maintain a valid forwarding e-mail address.
- Regularly check the official University communications channels. Official University communications are considered received if sent by postal mail, by fax, or by e-mail to the student’s designated primary e-mail account via their @mcmaster.ca alias.
- Accept that forwarded e-mails may be lost and that e-mail is considered received if sent via the student’s @mcmaster.ca alias.
- To check their McMaster/Avenue email and course websites on a regular basis during the term.

**Turnitin (Optional)**

This course will be using a web-based service (Turnitin.com) to reveal plagiarism. Students will be expected to submit their work electronically to Turnitin.com and in hard copy so that it can be checked for academic dishonesty. Students who do not wish to submit their work to Turnitin.com must still submit a copy to the instructor. No penalty will be assigned to a student who does not submit work to Turnitin.com. All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, etc.). To see the Turnitin.com Policy, please go to http://www.mcmaster.ca/academicintegrity/turnitin/students/index.html

**Protection of Privacy Act (FIPPA)**

The Freedom of Privacy of Information and Protection of Privacy Act (FIPPA) applies to universities. Instructors should take care to protect student names, student numbers, grades and all other personal information at all times. For example, the submission and return of assignments and posting of grades must be done in a manner that ensures confidentiality.

http://www.mcmaster.ca/univsec/fippa/fippa.cfm

**Academic Accommodation of Students with Disabilities Policy**

Students who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Academic accommodations must be arranged for each term of study. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information, consult McMaster University’s policy for Academic Accommodation of Students with Disabilities (http://sas.mcmaster.ca).
The Student Code of Conduct (SCC) exists to promote the safety and security of all the students in the McMaster community and to encourage respect for others, their property and the laws of the land. McMaster University is a community which values mutual respect for the rights, responsibilities, dignity and well-being of others. The purpose of the Student Code of Conduct is to outline accepted standards of behavior that are harmonious with the goals and the well-being of the University community, and to define the procedures to be followed when students fail to meet the accepted standards of behavior. All students have the responsibility to familiarize themselves with the University regulations and the conduct expected of them while studying at McMaster University.

http://studentconduct.mcmaster.ca/pdf/SCC.pdf

McMaster University Grading Scale

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<tr>
<th>Grade</th>
<th>Equivalent Grade Point</th>
<th>Equivalent Percentages</th>
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<tbody>
<tr>
<td>A+</td>
<td>12</td>
<td>90-100</td>
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<tr>
<td>A</td>
<td>11</td>
<td>85-89</td>
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<tr>
<td>A-</td>
<td>10</td>
<td>80-84</td>
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<tr>
<td>B+</td>
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<tr>
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<td>8</td>
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<tr>
<td>B-</td>
<td>7</td>
<td>70-72</td>
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<tr>
<td>C+</td>
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<td>67-69</td>
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<tr>
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