

LAI LEAN ACADEMY™

Planning an LAI Lean Academy™ Course



Version 3.3
April 2005



Executive Summary

1 What is a LAI Lean Academy™ Course?

- One-week, intensive introductory training for interns, co-ops, or new hires in industry settings, or upper-class undergraduate or graduate students in academic settings
- Covers basic lean enterprise principles, concepts, terminology, applications
- Active, hands-on learning using lectures, simulations, exercises, case study, plant tours, small group discussion, and interviews with lean practitioners

2 Why sponsor one?

- Prepare your young workforce to contribute to your lean implementation
- Build a relationship with faculty in key schools
- Support faculty knowledge development and curriculum diffusion in partner schools
 - Contribute to a well prepared next generation workforce

3 How can I determine if it is useful for my organization?

Time Frame	Value Expected
End of course	Participants ready to contribute to lean efforts Partner school faculty capable of teaching lean concepts
3-6 months	Participants fully understand and can explain lean principles in their areas. Lean knowledge infused into on-campus curriculum in partner schools
12-18 months	Participants becoming skilled in the practice or implementation of lean Continued interaction with faculty in key schools to advance lean

4 What are the resource commitments?

- \$30K cover instructors' stipends, travel, student materials, administrative and course development expenses

Additional support such as:

- Host on-site coordinator at approximately 160 hours over 6 months
- 25-30 students for 40 hours each
- Lean experts to make 3-4 one-hour presentations and 8 one-hour interviews
- Plant tour support: 2-4 tour guides for 1-2 hours for one or two tours
- Facilities: classroom for 5 days, including area for lecture, simulation, break-out discussion, and "war-room" support
- Food: continental breakfast, lunch, and snacks for 5 days, and opening icebreaker
- Evening social event during the week
- Communications/Media Relations for internal/external publicity

5 How will I determine success?

- Your participants will be able to "participate and contribute to" discussion of the 12 lean enterprise knowledge areas covered in the course; in some areas, they will be able to fully "understand and explain" the concepts to others
- Your lean experts will be impressed with student final presentations



Introduction

The intended audience for this document is a Lean Aerospace Initiative (LAI) member organization considering hosting a LAI Lean Academy™ course. The intent of this document is to assure that stakeholder expectations are identified and understood early in the LAI Lean Academy cycle to ensure a successful outcome, and that the process for hosting a LAI Lean Academy course is clear.

To aid this objective, this guide provides the following information

- Executive Summary
- Introduction
- Two page Overview of a LAI Lean Academy course
- Time line for planning a LAI Lean Academy course
- LAI Lean Academy Proposal
- Frequently Asked Questions
- A list of additional available information.

Important persons in planning and executing a LAI Lean Academy course are:

- The **host sponsor** who will champion and provide resources for the course
- The **host on-site coordinator** who will do detailed planning and be the host operations manager for the course
- The **host contact person** who will play an initial role in proposing and organizing the course; this person often is the same as the host on-site coordinator
- The **participants** whom will be the students taking the course
- The **LAI Lean Academy coordinator** at MIT who will work with the host coordinator and/or contact person and the instructor team to assure the course is well planned and executed
- The **instructor team** who will deliver the course

For further information, contact:

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LAI Lean Academy™ Overview

The LAI Lean Academy curriculum consists of three interrelated elements – content, pedagogy and environment – linked together by a coherent set of learning objectives and a self-assessment model to measure student proficiency gained during, and after, taking the course.

The week’s schedule displayed below provides a quick glimpse of the curriculum which covers lean *enterprise* principles, practices and tools. Each module has 3-5 learning objectives linked to the overall LAI Lean Academy learning objectives.

2005 LAI Lean Academy™ Course Schedule v3.3					
	Monday	Tuesday	Wednesday	Thursday	Friday
8:00		Simulation Segment 1	Lean Engineering	Lean Supply Chain Management	Plant Tour
8:30					
9:00	Continental Breakfast			Enterprise View - Company presentation	
9:30	Icebreaker	Break	Break	Break	
10:00		Thinking Lean	People: The Heart of Lean	Implementing Lean	
10:30	Why are we here? Plan for the week				
11:00					
11:30	Lunch with kick-off by company sponsor	Lunch with company presentation ("Shop Floor" example)	Lunch with company presentation ("Office floor" example)	Lunch	Lunch
12:00					
12:30		Value Stream Mapping Exercise	Manzana Insurance Case Study	Interview Set-up	Benefits of Lean
1:00	Plant Tour			Conduct Interviews and Prepare Presentations	Student Outbriefs
1:30		Simulation Segment 2			
2:00			Break		
2:30	Break	Break	Quality Tools		Graduation
3:00	Tour debrief	Enterprise Value Strategy Session			
3:30		Simulation Segment 3			
4:00	Aerospace - 100 and Counting				
4:30		Intro. to Manzana case study	Q & A		
5:00	Icebreaker Social	Case Study Homework	Group Social		

Active learning pedagogy is utilized with simulations, exercises, small group discussions and other techniques liberally infused into the lecture material. These are designed to engage the students and contribute to the learning objectives of the modules. Additional learning opportunities come from factory tours, guest speakers, student interviews of lean practitioners in the hosting organization, and final student presentations.

The environment for the LAI Lean Academy course is on-site, at the location where lean is being implemented. This provides a clear motivation for the students, and an opportunity for first hand observation of lean in action. The host plays an important role in the success of the offering. Host participation in the planning and execution of the course is essential.

The target audience (students or participants) for a LAI Lean Academy course is 25-30 upper class undergraduate interns or co-op students, or recent hires (less than 2 years experience) drawn from



a mix of engineering and management disciplines. No prior lean knowledge is assumed, although some prior exposure to or knowledge of lean is quite acceptable. The course is sized for 30 students, but can be effectively delivered to any number in the range of 15-30. It is not possible to accommodate more than 30 students with the current course design, although typically a few observers (who do not participate in the active learning exercises) can be accommodated.

The LAI Lean Academy instructors are drawn from faculty of the host organization's key schools when possible, and supplemented by other qualified faculty if necessary. Collectively they represent engineering and management backgrounds and include industrial experience. The instructor team is aided by additional facilitators for the day-long Lego simulation on Tuesday.

Student proficiency before and after the course is measured by a VALUE self-assessment model developed by the LAI Lean Academy faculty. The model has six proficiency levels:

0. To have no exposure to or knowledge of
1. To have experienced or been exposed to
2. To be able to participate in and contribute to
3. To be able to understand and explain
4. To be skilled in the practice or implementation of
5. To be able to lead or innovate in

Experience in 2004 showed that an average student started the week with a proficiency between 0 and 1 and ended the week in the 2 to 3 level for the 12 lean enterprise knowledge areas covered by the curriculum:

1. Context for Lean implementation in aerospace
2. Five fundamental principles of Lean Thinking
3. External and internal customers
4. Value principles
5. Basic Lean terminology
6. Quality principles / Six Sigma
7. Lean engineering principles
8. Lean supply chain management principles
9. Role of people and organizations
10. Lean tools
11. Lean implementation strategies
12. Lean enterprise principles

The LAI Lean Academy provides value in multiple ways.

- It directly prepares the students for participation in lean activities in the host organization.
- It develops a cadre of young lean knowledge workers across the host organization.
- It engages and further educates faculty from the host's key schools in their lean efforts.
- It provides a nation-wide opportunity for diffusion of lean knowledge from industry to academia and into the curriculum, thereby helping to educate the future workforce.



Time Line for Organizing a LAI Lean Academy™ Course

6 months or more prior to the LAI Lean Academy date

- Contact the LAI Lean Academy coordinator at MIT to discuss expectations, planning and potential instructors for your LAI Lean Academy course, and to obtain the host support information package.
- Identify and meet with your internal sponsor or champion who will provide financial support and internal leadership to make the offering a success.
- Confirm that the needed resources are approved in your organization's budget.
- Set a tentative date and location for your LAI Lean Academy course.
- Submit a "LAI Lean Academy™ Proposal" included in this guide.
- Communicate to key internal stakeholders the plan to host a LAI Lean Academy course.

3 months or more prior to the LAI Lean Academy date

- Contact your internal sponsor or champion to reaffirm their support. Invite the sponsor to be the Monday lunch keynote speaker, present the Thursday morning "Enterprise View" talk, and attend the Friday afternoon final briefings and graduation ceremony.
- Identify and inform the supervisors of the pool of interns, coops or new hires who will be the LAI Lean Academy students. Discuss with them the expectations for outcomes of the LAI Lean Academy offering, the planned date, and the process for selecting participants.
- Identify and reserve the needed facilities for your LAI Lean Academy course.
- Submit the purchase order for the LAI Lean Academy payment.
- Identify the host on-site coordinator who will work with the LAI Lean Academy coordinator and instructors during the next three months, during the weeklong event, and wrap-up to assure a successful outcome. Work the hand-off (if needed) to your coordinator.
- Set a firm date and location for your LAI Lean Academy course.
- Firm up with the coordinator at LAI
 - The date and location for your LAI Lean Academy course
 - The name and contact information for your host on-site coordinator
 - The expected pool of students who will take the course
 - The expected instructors for your LAI Lean Academy offering
 - The availability of resources
- Work with your instructor team to schedule the pre-event site visit.
- Update internal stakeholders on status of your LAI Lean Academy offering.

2 months or more prior to the LAI Lean Academy date

- Identify by name the participants and alternates to attend the LAI Lean Academy course. Send letters of invitation to them and their supervisors.
- Assure the LAI Lean Academy payment is enroute to LAI.



- In consultation with your lead instructor, identify candidate factory tours.
- Develop plans for the social function.
- Update planning status with LAI Lean Academy coordinator and lead instructor.

1 month or more prior to the LAI Lean Academy date

- Host the site visit for instructors and firm up all details for the week event, including personnel who will help with logistics and/or help with the Tuesday Lego simulation
- Assure the LAI Lean Academy payment has arrived at LAI.
- Schedule tours, luncheon speakers, interviewees and any other participating personnel.
- Send list of participating students and alternates, with shirt sizes, to LAI Lean Academy coordinator and lead instructor.
- Send shipping address to LAI Lean Academy coordinator
- Start weekly update of planning status with LAI Lean Academy coordinator and lead instructor.
- Arrange for internal PR.
- Update internal stakeholders on status of your LAI Lean Academy event

1 week prior to the LAI Lean Academy date

- Reconfirm all scheduled speakers, tours, interviewee and participants' availability
- Send read-ahead package and VALUE proficiency model to students.
- Receive shipment of supplies and Lego simulation materials from LAI.
- Review status of all on-site logistics: facilities, AV, catering, transportation
- Update lead instructor of readiness

Week of the LAI Lean Academy

- Be the operations manager for the course, working with the course team for a smooth execution
- Participate in morning readiness and afternoon wrap-up session with the instructors
- Interact with the students to help them as needed and share in their experience
- Ship Lego simulation material to next destination, if needed
- With the instructors, recognize the help of organization employees who participated
- Enjoy the fulfilling experience of an exciting and energizing week.

Wrap-up Activities

- Ship any materials back to LAI, as needed.
- Respond to student participant questions for information
- Provide a “lessons learned” report to the LAI Lean Academy coordinator
- Review the summary report prepared by the instructor team
- Send thank you letters to speakers, interviewees, tour guides as appropriate
- Prepare a report to your company sponsor and other stakeholders.
- Follow up on any internal PR



LAI Lean Academy™ Proposal

Organization Name _____

Organization Site _____

Organization Contact Person (if different from On-site Coordinator) _____

Organization Sponsor _____

Organization On-site Coordinator _____

Desired Date(s) of LAI Lean Academy _____

Location of LAI Lean Academy _____

Expected Audience (interns, coops, new hires*) _____

Comments or other information _____

*It is expected that “new hires” have less than 2 years experience.

I have read the “Guide for Hosting a LAI Lean Academy™” and understand that our organization will need to provide \$30,000 to LAI to support instructor fees and travel, student supplies and administrative expenses. I also understand that our organization will need to provide internal support and coordination with the LAI Lean Academy instructors and coordinators as listed in the Guide.

Name: _____

Signature _____

Date _____

Please mail, fax or e-mail this to
LAI Lean Academy Coordinator
77 Massachusetts Ave., 41-205
Cambridge, MA 02139
fax: (617) 258-7845
email: ednet@mit.edu



Frequently Asked Questions

1. Is a LAI Lean Academy™ the right offering for my intended audience?

The LAI Lean Academy curriculum is targeted at a student in any discipline (engineering, management, or other) who is a current undergraduate or recent graduate with little or no work experience or exposure to lean practices and principles. It has been delivered five times to 117 students and has been effective in addressing this particular audience. It is suitable for undergraduate summer intern students, coop students, or recent hires. It is expected that the students will represent a mix of functional areas. This reinforces the message that lean applies across the enterprise and provides opportunities for cross learning and networking. Some past students have had prior lean knowledge in some areas (e.g. majors in supply chain management or industrial engineering). They have benefited from learning the total enterprise approach (engineering, manufacturing, finance, etc.).

The objective of the course is to introduce fundamental concepts and tools (e.g. value stream mapping, statistical process control) to provide a knowledge base that the student can build upon. Think of this course as your college level “Lean 101” rather than a training, or “how-to” course. The curriculum is not targeted to someone who is about to launch a lean improvement initiative and is seeking step-by-step approaches and a toolkit to put to immediate use. Students with considerable work experience might not find this type of course meets their needs.

The course is sized for 30 students, but can be effectively offered to as few as 15. Since the course includes many simulations and exercises with considerable instructor interaction, it is not possible to accommodate more than 30 students, although typically a few observers (who do not participate in the active learning exercises) can be accommodated.

2. What outcomes can I expect from my LAI Lean Academy?

You can expect the graduates to be energized, excited, and confident about their newly gained lean knowledge. You can also expect they will be looking for ways to apply lean principles and practices to their current work assignments. They will want to talk to their supervisor about what they have learned and what they can do to help their organizational unit. They may also want further education or training.

A self-assessment VALUE¹ model has been developed to measure the proficiency of LAI Lean Academy graduates in the 12 lean enterprise knowledge areas listed below. You can expect for each of these knowledge areas, students should be able to at least “participate and contribute to” and maybe could “understand and explain” them at the end of the week.

¹ Virtual Assessment of Lean User Experience



- Context for Lean application in aerospace
- Five fundamental principles of Lean Thinking
- External and internal customers
- Value principles
- Basic Lean terminology
- Quality principles / Six Sigma
- Lean engineering principles
- Lean supply chain management principles
- Role of people and organizations
- Lean tools
- Lean implementation strategies
- Lean enterprise principles

You can expect that the students' supervisors and company lean experts will find the students' final presentations to be informative and a good indicator of their newly found enthusiasm and confidence.

You can also expect the faculty from your key schools who participated as instructors will want to continue working with you to gain more lean knowledge and apply it to their on-campus curriculum and research.

3. Who should be my LAI Lean Academy champion or sponsor?

Your LAI Lean Academy sponsor should be an executive level member of your organization who can advocate and champion your LAI Lean Academy. The sponsor should be a lean enthusiast who sees both near term and long term benefit from educating your young workforce (either newly hired or potential hires as interns) and faculty from your key schools.

The sponsor will need to garner the resources and articulate the benefits to senior management. The choice of your LAI Lean Academy sponsor will have a major impact on its success.

4. What resource commitments will the sponsor be making?

\$30K direct cost to support the LAI Lean Academy instructor team (stipends plus travel), costs for student supplies (notebooks, LAI Lean Academy shirt, book), and administrative expenses.

Host coordinator, facilities, food and beverage, lean experts to support course modules. See the executive summary for quantitative estimates of labor hours needed.

Support for the 30 students who will spend 40 hours preparing for and taking the LAI Lean Academy course.



5. Who will be my LAI Lean Academy on-site coordinator?

Your on-site coordinator should be a person who can spend approximately 160 hours extending over a 6 month period before, during, and after the course doing internal coordination and coordinating with the LAI Lean Academy staff to assure a successful outcome. S/he should have familiarity with lean knowledge, but does not have to be a lean expert.

The coordinator should be well organized and effective at working with many internal interfaces, such as:

- Your LAI Lean Academy sponsor
- Supervisors who will send 30 students to the course
- The students who will have questions and needs before, during, and after the course
- Lean experts who will give lunchtime talks and be interviewees for the culminating student exercise.
- The sponsor or others who will give a “kick-off” talk and an “Enterprise View” talk on Thursday
- Table facilitators and suppliers for Lego simulation on the second day
- Factory tours and tour guides
- Facilities and catering staff

Your on-site coordinator will also interface with the LAI Lean Academy coordinator at MIT and with the instructor team, principally the lead instructor.

Together with your sponsor, the on-site coordinator is an important person to assure a successful outcome. *Both* must be enthusiastic about and committed to the undertaking.

6. What will be the composition of the LAI Lean Academy instructor team?

Instructors are drawn from the LAI Educational Network – a collaboration of 20+ schools with interest in developing and deploying lean curriculum. The composition of the instructor team will depend upon availability of qualified personnel, but nominally it will include an engineering faculty member, a business or management faculty member, and a retired industry or government practitioner. One of these will be a lead instructor responsible for assuring that the LAI Lean Academy is well planned and executed. The instructors may be helped for the Lego simulation on the second day by additional table facilitators, and (depending on the exact number of students and simulation set-up decided upon) a few extra people may be needed to round out the simulation, (for example, acting as suppliers).

Every attempt will be made to have your key schools represented on your instructor team. One of the explicit goals of the LAI Lean Academy is to build linkages with key school faculty to increase their proficiency in the subject area. A long term goal is to have this knowledge embedded in on-campus curriculum.



7. Will the LAI Lean Academy instructors be well prepared?

There are two types of preparation required; proficiency in teaching the LAI Lean Academy curriculum, and preparation for your LAI Lean Academy offering.

LAI Lean Academy instructors purposely have varying backgrounds and exposure to lean practices and principles. In terms of the LAI Lean Academy curriculum, their minimum qualification is that they have taken the course themselves. Beyond that they may have taught one or more LAI Lean Academy offerings and also actively contributed to the building of the curriculum. The lead instructor will have considerable experience with the LAI Lean Academy activity. Each instructor team has two or more instructors who can teach all of the modules. There are four levels of instructors, 1 being the most junior and 4 being the most senior. You should expect at least two level 4 instructors on your team.

Equally important to proficiency in the course material, instructors must be fully prepared for your LAI Lean Academy offering. We require a one-day site visit of the instructor team within the month before the course week. During this site visit, all details will be thoroughly reviewed with the host on-site coordinator. This includes “walking” through all logistics and the day-by-day plan to be sure every detail is addressed and all responsibilities are clear. The background of the students should also be reviewed at this time. Guides for this meeting are available as part of the LAI Lean Academy support material.

8. Will the LAI Lean Academy event be fully supported by LAI@MIT?

The LAI Lean Academy coordinator at LAI is tasked with organizing and supporting the LAI Lean Academy courses and curriculum. S/he is backed up by the LAI staff and faculty lead. Over the first two years, processes have been standardized and supporting material developed for hosts. The LAI Lean Academy coordinator is enthusiastic, but realistic, about the workload to support your event. Care is given in making commitments for a LAI Lean Academy offering, as every one must be successful. If the LAI Lean Academy coordinator turns down your request to offer a course, it would be either because the instructor team and support at LAI is not available to do a good job, or your site is not yet ready to host the course. The LAI Lean Academy coordinator will work to remedy either deficiency to proceed with your hosting a LAI Lean Academy as soon as possible.

9. Why is a “TM” symbol attached to the LAI Lean Academy name?

The developers of the LAI Lean Academy seek to brand the name to protect the integrity and quality of the course content. They feel that it is in the best interest of the students and industry to have a clear recognition of the knowledge and experience gained by a LAI Lean Academy graduate. Just as someone who has completed green belt or black belt training has achieved a certain level of proficiency, so will graduates of a LAI Lean Academy.



10. Can I offer a LAI Lean Academy™ on my own, without the coordination of LAI@MIT?

Currently all LAI Lean Academy courses must be coordinated by the LAI Lean Academy coordinator. This is to assure that they are well organized, adequately staffed with instructors, have the most up-to-date curriculum and supporting materials, and that knowledge and lessons learned from each offering contribute to the growth and evolution of the body of knowledge supporting the LAI Lean Academy activity. Each LAI Lean Academy course both benefits from and contributes to the entire LAI Lean Academy offering. At this stage, central coordination is needed to maintain the integrity and quality that is desired to be associated with the LAI Lean Academy brand name. LAI is, however, starting to explore alternate dissemination paths with its more experienced LAI Lean Academy sites; once you have hosted several LAI Lean Academy courses you may wish to join this exploration.

11. Can I use the LAI Lean Academy™ curriculum materials for in-house training or other purposes.

The LAI Lean Academy curriculum is LAI intellectual property and follows the same distribution protocols as other LAI created copyright material. It may be used by LAI members for internal, non-commercial purposes. Please refer to your LAI Consortium agreement for details.



Additional Information for LAI Lean Academy™ Hosts

The following information is available from the LAI Lean Academy coordinator. These are helpful for gaining a deeper understanding of the content of a LAI Lean Academy as well as communicating with company stakeholders.

The Lean Academy™: Report on Pilot Offerings

A ten page paper presented at the 2003 New England Section Meeting of the American Society of Engineering Education summarizing the origins, goals and early experiences of the LAI Lean Academy.

Rolls Royce Lean Academy Video

A MPEG video summarizing the first offering of a LAI Lean Academy at Rolls Royce Indianapolis in June 2003. This video is helpful at conveying the content, approach and student reaction for a LAI Lean Academy offering to an audience that has not been exposed to the course.

2004 LAI Lean Academy Student Notebook (hardcopy only)

This displays the curriculum delivered to four LAI Lean Academies in June 2004. It consists of about 300 Powerpoint slides, plus supporting material. The curriculum is being revised for the 2005 offerings. Each student will receive an updated notebook as a take-home from the course.

VALUE Proficiency Model

This document presents the VALUE proficiency model and worksheets used by students to measure their level of proficiency in 12 Lean Enterprise areas before and after the course.

LAI Lean Academy™ Handbook

This document provides detailed expectations for the on-site coordinator, instructors, and facilitators. It explains in detail the preparation and support requirements for executing a successful LAI Lean Academy course.