



ISE 560: Product Lifecycle Management

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- ▶ Patrick Hillberg has 30 years experience developing Product Lifecycle Management (PLM), Digital Manufacturing, Process Planning, Robotics and Machine Vision applications in a multitude of industries.
- ▶ Outreach:
 - ▶ Past Chair of the MAT2 Technical Product Design Steering Committee,
 - ▶ Advisory Board member to the Oakland University Department of Industrial & Systems Engineering
 - ▶ An adjunct professor in this department,
 - ▶ Past member of the Automation Alley Technology Center Leadership Committee.
 - ▶ A curricula advisor to Macomb, Mott and Washtenaw Community Colleges



- ▶ Education:
 - ▶ B.S. in Computer Science from Michigan Technological University,
 - ▶ M.S.E. in Industrial & Systems Engineering from the University of Michigan,
 - ▶ Ph.D. in Systems Engineering from Oakland University.
 - ▶ Co-authored journal articles for Frontiers in Education and the International Journal for Industrial Engineering, among others.
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Course Objectives:

ISE 560 Product Lifecycle Management

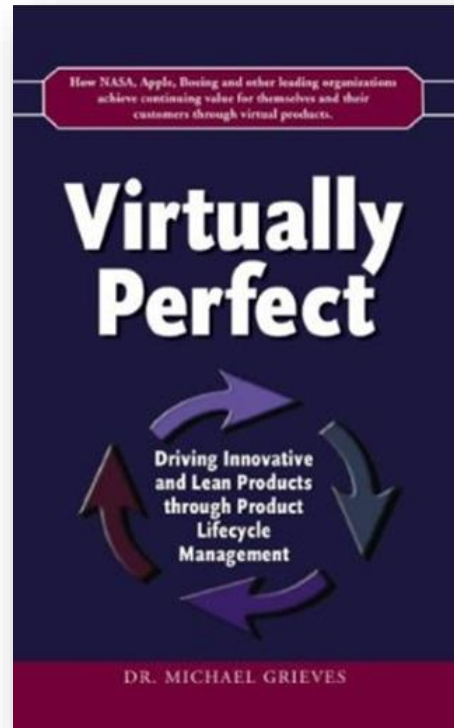
To complete this course, a student is expected to demonstrate competency in their understanding of the following objectives:

- ▶ Define the **phases, influences, characteristics** and applicability of PLM as a business methodology.
 - ▶ Define **Digitalization** and **Digital Twins**.
 - ▶ Describe how **customers perceive value from products**
 - ▶ Describe the various data models used to manage information through the product lifecycle, such as **Requirements, As-Builts, EBoms, MBoms**
 - ▶ Describe the **impact of Innovation on an Organization's culture**
 - ▶ Construct solutions using PLM to specified challenges posed by **Lean**
 - ▶ Make one or more individual presentations on a specified technical topic
 - ▶ Deliver a **team-based presentation** showing how various documented problems at manufacturing facilities can be addressed using PLM techniques
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Whole-Class Reading (Instructor-led preso)

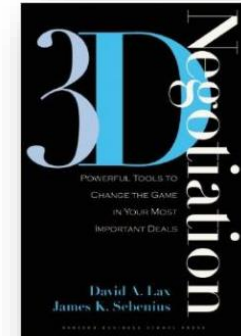
- ▶ *Virtually Perfect* by Mike Grieves

- ▶ Core PLM Reading (10 Chapters)

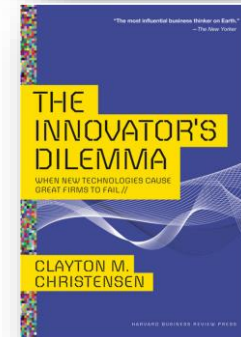


- ▶ Individual Chapters

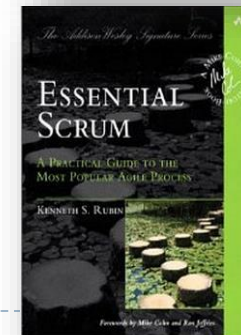
Negotiation as Problem Solving



Cultural Inhibitors to Innovation

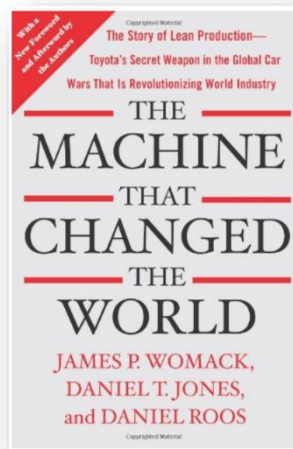


Innovative Development Processes

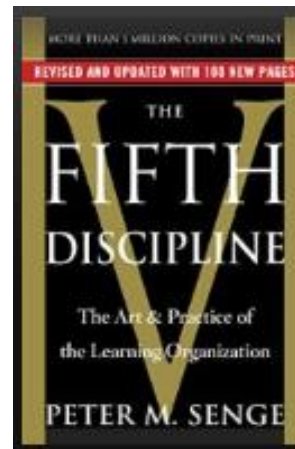


Student-Led Reading

Class teams will present chapters from the following. (2nd half of semester)



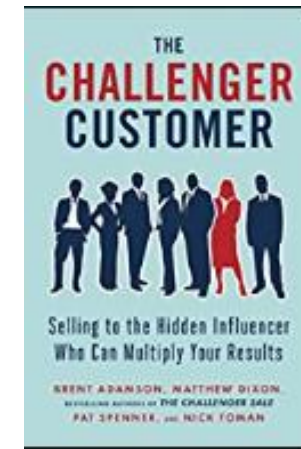
6 Chapters
Lean Methodology



5 Chapters
Systemic Thinking
and Mental Models

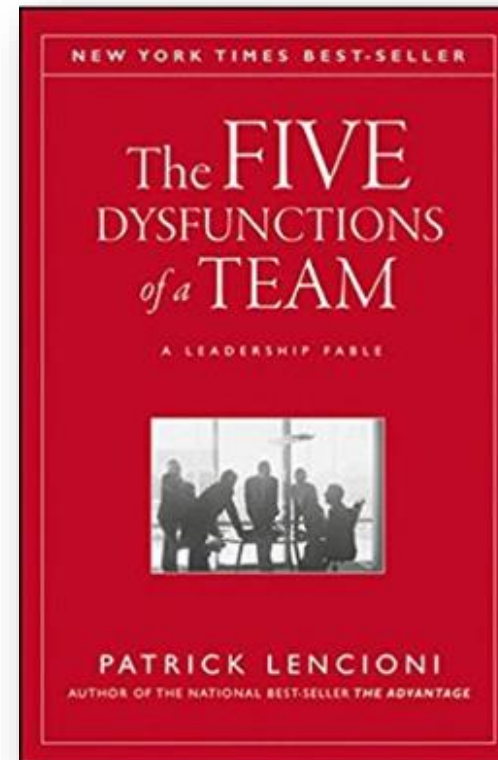
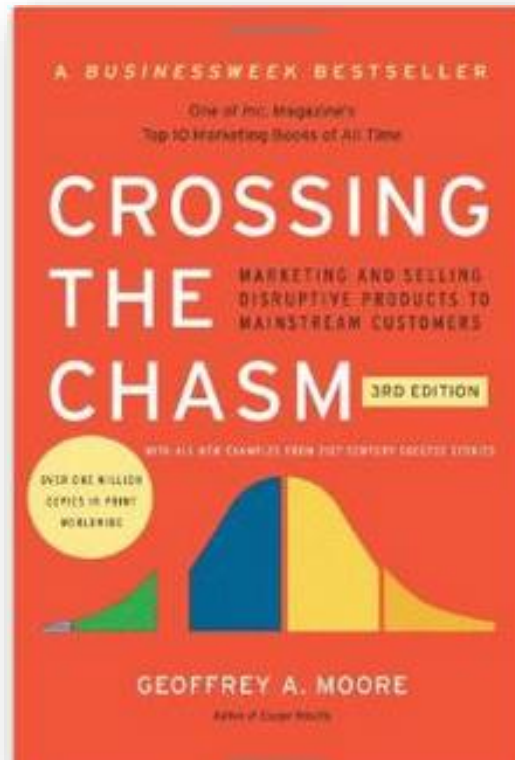


1 Chapter
Impact of
Mental Models



2 Chapters
Team Dysfunction

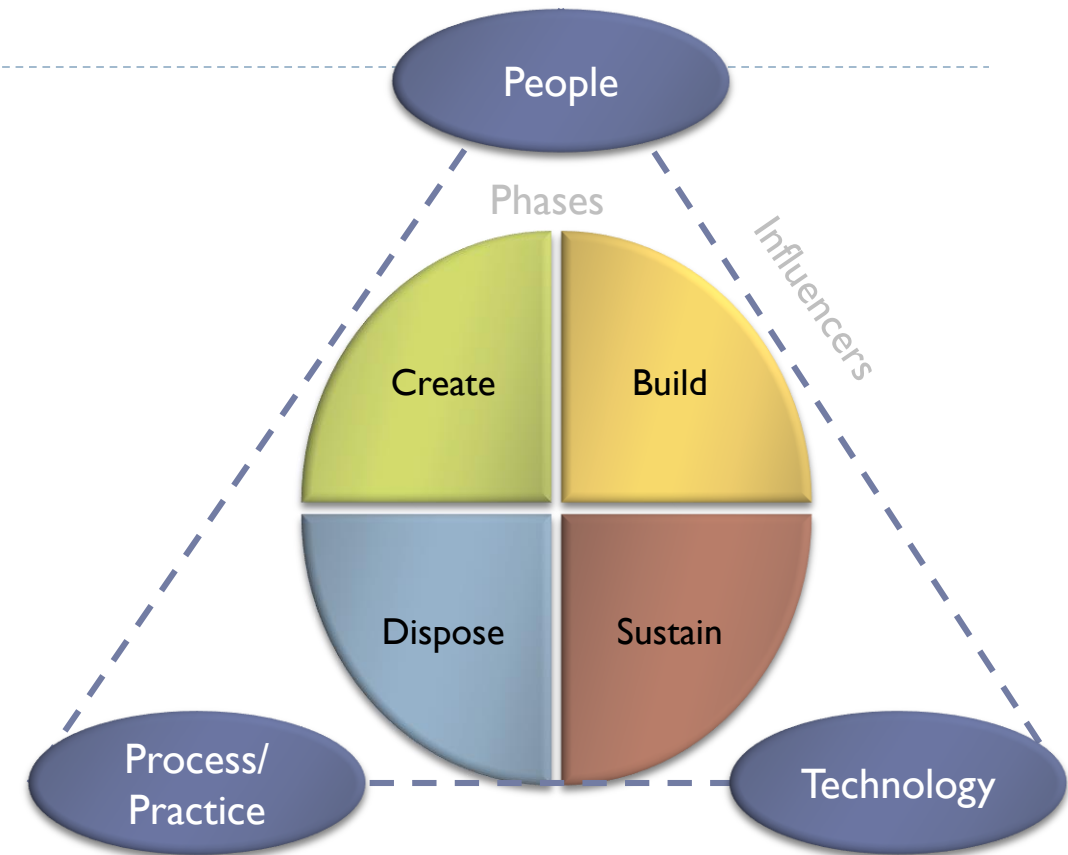
Excellent Additional Reading



Phases and Influences on PLM

▶ Phases

- ▶ **Create:**
 - ▶ First attempt to understand what is needed, and collects the information on how to provide it
- ▶ **Build:**
 - ▶ The product is converted from the information (bits) developed in the Create phase, into the physical product that provides true customer value (atoms).
- ▶ **Sustain:**
 - ▶ The long-term useful life of the product. This is where the customer is most involved in the life of the product, though the producer plays a role in maintaining the product for the customer's use.
- ▶ **Dispose:**
 - ▶ the point at which the product is no longer useful to the customer, and must be either recycled or reused.



▶ Influencers:

- ▶ People, Process/Practice and Technology

Cultural Resistance to Change

- ▶ **Change is Pain (Literally).**
 - ▶ Triggers the pain centers in your brain
- ▶ **The Status Quo is Energy Efficient**
 - ▶ It takes energy to burn new neurons.
 - ▶ Think of the phrase “mentally exhausted”
- ▶ **Technology changes culture; but cultures resist change**
 - ▶ Power centers develop around existing Technology.
 - ▶ Thus, Innovation Challenges Power



3-Bullet Presos (15)

▶ Assignment

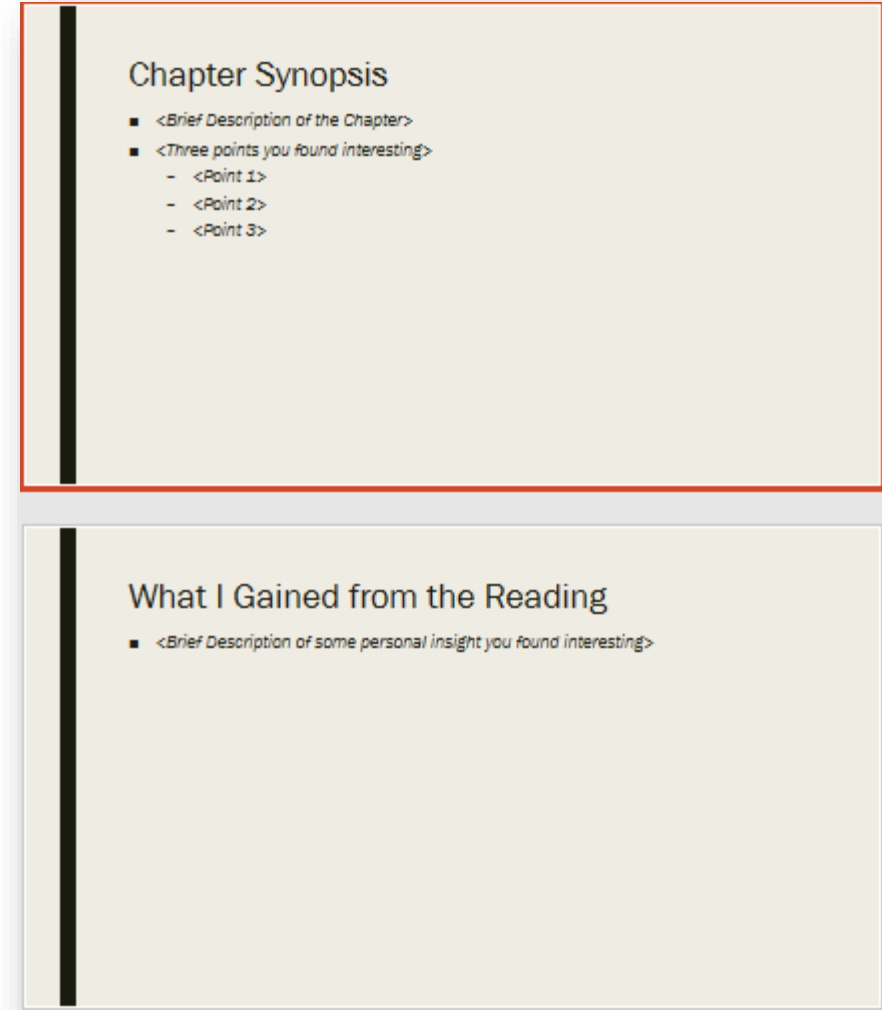
- ▶ No more than 3-slides total
 - ▶ Synopsis of chapter (short paragraph)
 - ▶ 3-bullet points discussing the main focus of the reading
 - ▶ Comments on what you personally gained from the chapter

▶ Purpose

- ▶ Ensure that you are doing the reading before class
 - ▶ Better class discussion
- ▶ Get a sense of presentation style
- ▶ I frequently bring student slides into my lecture.

▶ Due

- ▶ 8:00 pm on day before lecture
- ▶ 2-points if on time, 1-point if late



Chapter Synopsis

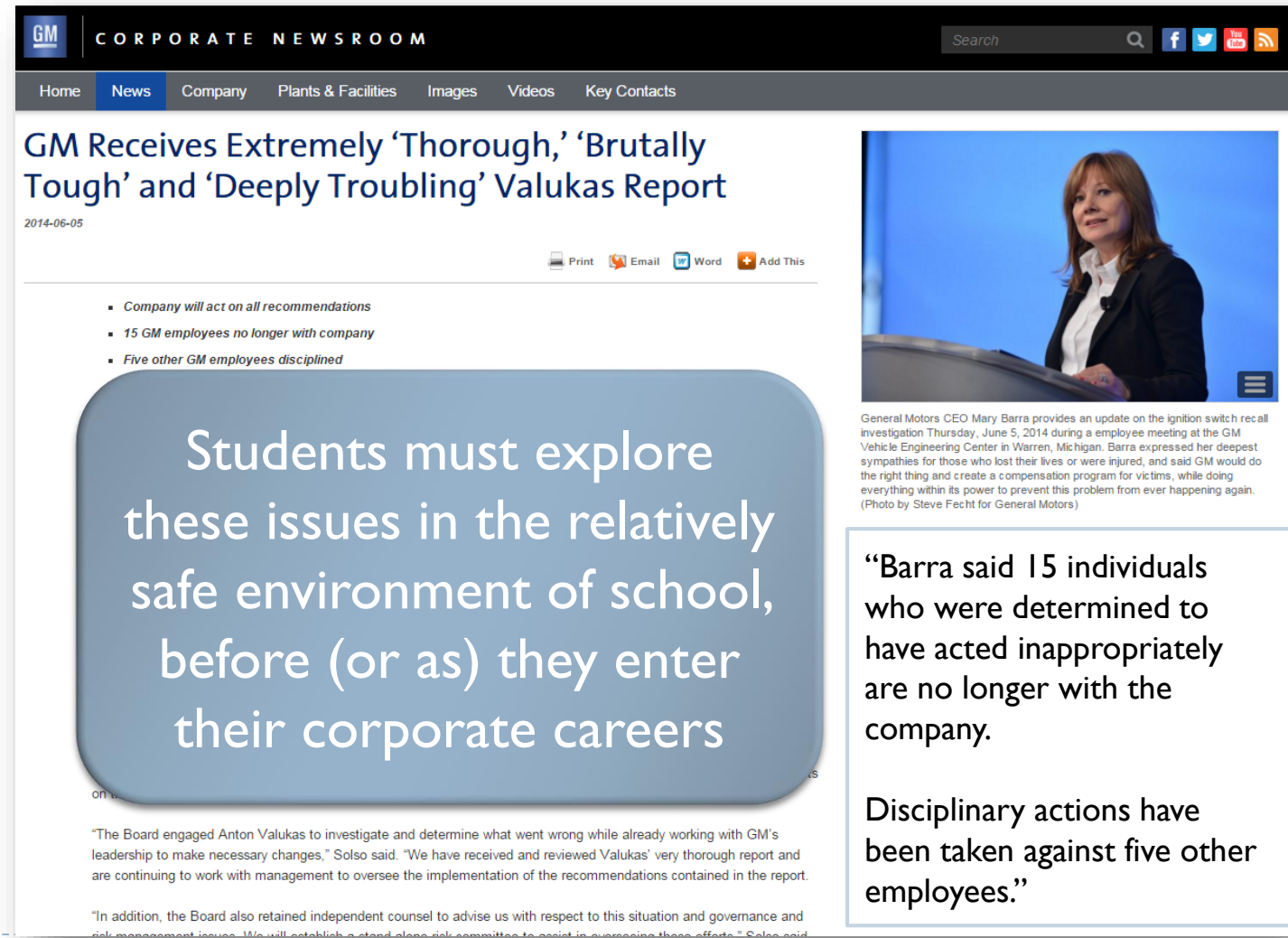
- <Brief Description of the Chapter>
- <Three points you found interesting>
 - <Point 1>
 - <Point 2>
 - <Point 3>

What I Gained from the Reading

- <Brief Description of some personal insight you found interesting>

Term Project: Valukas Report on GM Ignition Switch

- ▶ The Problems faced by GM* are PLM-related problems
 - ▶ *and many companies
- ▶ This report is a thorough look at
 - ▶ product design,
 - ▶ The impact of design mistakes
 - ▶ The willingness of a culture to address it's own shortcomings



The screenshot shows the GM Corporate Newsroom website. The main headline is "GM Receives Extremely 'Thorough,' 'Brutally Tough' and 'Deeply Troubling' Valukas Report" dated 2014-06-05. A list of bullet points includes: "Company will act on all recommendations", "15 GM employees no longer with company", and "Five other GM employees disciplined". A large blue callout box contains the text: "Students must explore these issues in the relatively safe environment of school, before (or as) they enter their corporate careers". To the right, there is a photo of Mary Barra at a podium and a caption: "General Motors CEO Mary Barra provides an update on the ignition switch recall investigation Thursday, June 5, 2014 during an employee meeting at the GM Vehicle Engineering Center in Warren, Michigan. Barra expressed her deepest sympathies for those who lost their lives or were injured, and said GM would do the right thing and create a compensation program for victims, while doing everything within its power to prevent this problem from ever happening again. (Photo by Steve Fecht for General Motors)". Below the photo, a quote reads: "Barra said 15 individuals who were determined to have acted inappropriately are no longer with the company." At the bottom, another quote states: "Disciplinary actions have been taken against five other employees."

Students must explore these issues in the relatively safe environment of school, before (or as) they enter their corporate careers

“Barra said 15 individuals who were determined to have acted inappropriately are no longer with the company.”

Disciplinary actions have been taken against five other employees.”

Syllabus

Date	Lecture	Reading
4-Jan-18	Intro to PLM	
9-Jan-18	VP Ch. 1 & Preso Skills	VP Ch 1 Wikipedia: Interchangeable Parts
11-Jan-18	VP Ch. 2	VP Ch. 2
16-Jan-18	VP Ch. 3 & GM IS Kickoff	VP Ch. 3, Pg. 1-31 of Valukas
18-Jan-18	VP Ch. 4	VP Ch. 4
23-Jan-18	VP Ch. 5	VP Ch. 5
25-Jan-18	VP Ch. 7	VP Ch. 7
30-Jan-18	VP Ch. 10	Tech Clarity Insight BOM Buyers Guide
1-Feb-18	Industry 4.0	Tom Alonghi
6-Feb-18	SysML Lite & Liability (Guest Speaker)	SysML Lite & Mike Sigelko
8-Feb-18	VP Ch. 8-9	VP Ch. 8-9
13-Feb-18	Procurement	Pat Smith
15-Feb-18	Midterm Open Discussion GM IS	Valukas Report as needed for presos
20-Feb-18	Winter Break	
22-Feb-18	Winter Break	

Date	Lecture	Reading
27-Feb-18	Class Preso (2) GM Ign Sw.	Valukas: Engineering & Investigation
1-Mar-18	Class Preso GM Ign Sw. & Intro Chg Mgt	Valukas: Leadership & Recommendations
6-Mar-18	Service Lifecycle	Kathryn Narayan
8-Mar-18	Innovator's Dilemma	Innovator's Dilemma
13-Mar-18	VP Ch. 13	VP Ch. 13
15-Mar-18	How our actions create our reality, Shared Vision, Collective Learning	Fifth Discipline Ch 1-3,10-11 (114 pp.)
20-Mar-18	MES/MOM	Mike Yost
22-Mar-18	MCW Ch. 2, 3	MCW Ch. 2, 3
25-Mar-18	Essential Scrum	Essential Scrum
27-Mar-18	MCW 4, 5	MCW 4, 5, 6
29-Mar-18	MCW 6, 7	MCW 7, 8 Challenger Customer Ch 1. (30 pp.)
3-Apr-18	Mental Models/Big Fat	Fifth Discipline Ch 9 (Mental Models) Big Fat Surprise Ch 2 Challenger Customer Ch 8
5-Apr-18	3D Negotiation	3D Negotiation
12-Apr-18	Five Myths	Greg Lamay
17-Apr-18	Ind. 4.0 thru the Tiers	Srilatha Ponnuru

Guest Lecturer

Student Preso



Thank You for Joining Us!

