Shared Teaching Materials for Advanced Manufacturing (STAM)

Project Directors

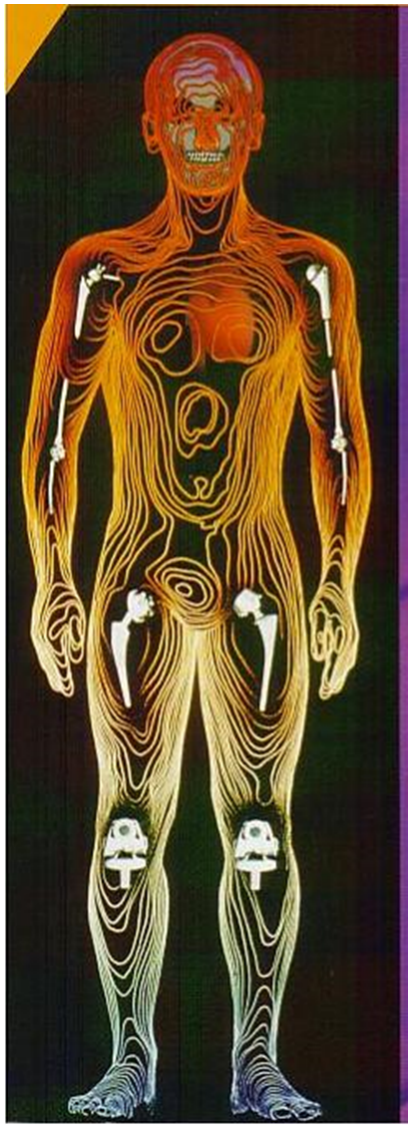
Dr. Richard A. Wysk, NC State University

Dr. Gul Okudan-Kremer, Iowa State University

Technical Committee: All of you

A sincere welcome to all of you

- I am Rick Wysk, and I have been teaching a BROAD set of manufacturing courses for 42 years. I am not quite this bad as this picture, but I am about half way there.
- I am here to see if we can form a “manufacturing community” focused on teaching modern manufacturing while bringing excitement about making things to the next generation.
- I am retiring this summer and would like to leave a “footprint” in this community.



Let’s go around the room and introduce ourselves

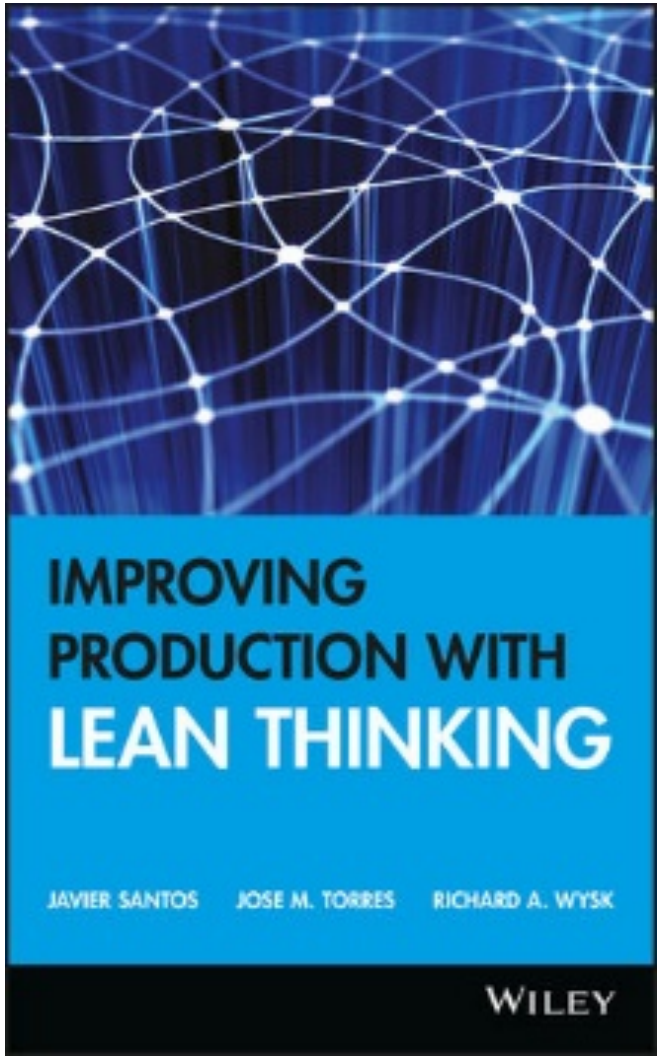
- Who are you?
- Why are you here?
- Is there something special you offer the community?

Purpose of the Workshops

- Cultivate a community of experts teaching in advanced manufacturing
- Understand the roadblocks associated with developing a Shared Repository of teaching materials
- Develop a proposal that can be FUNDED by the NSF IUSE Program

Our basic hypothesis

- We feel that an Advanced Manufacturing Teaching Repository will serve as the seed for an “organic set of teaching materials”, which will continue to grow over time.
- We feel that a focused technical community of college educators will share their technical experiences, materials and teaching experiences so that a broad compilation of educational materials can be provided to participating schools that will catalyze advances in *Modern Manufacturing*.

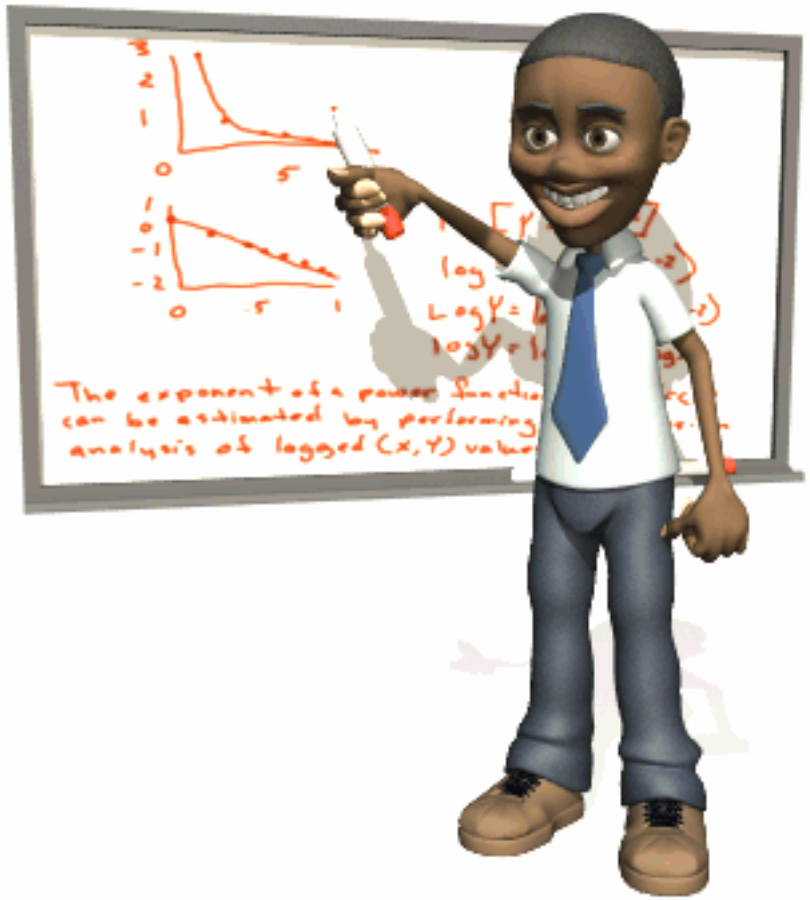


Foundation: A test repository

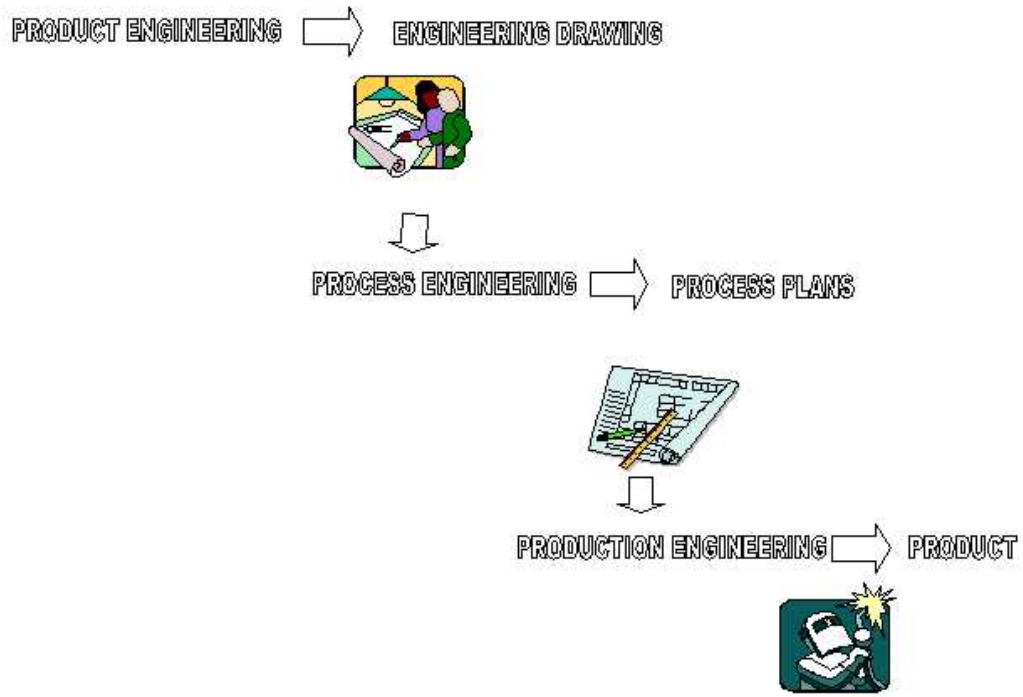
- Dr. Wysk has created a Repository at NC State for teaching Advanced Manufacturing
  - Topics are organized from a collection of 40 years of teaching
    - Chapters of text materials
    - Presentations
    - Engineering product models
    - Quizzes
    - Homework
    - Tests
    - Laboratory Exercises

Currently, at the start of Academic year 2016-7

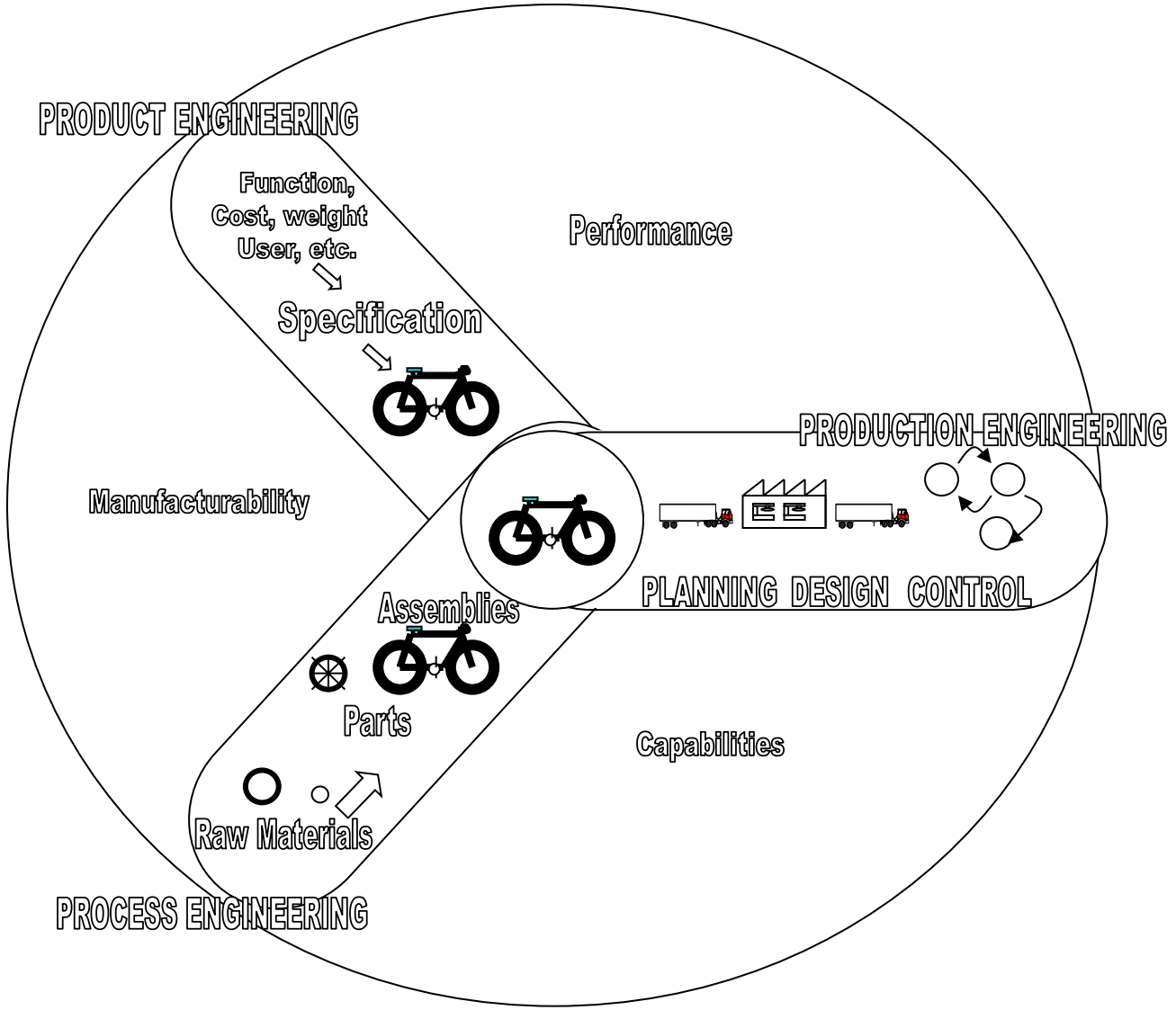
- A collection of stuff
  - Poorly organized
  - In need of editing
  - Forty plus years of work



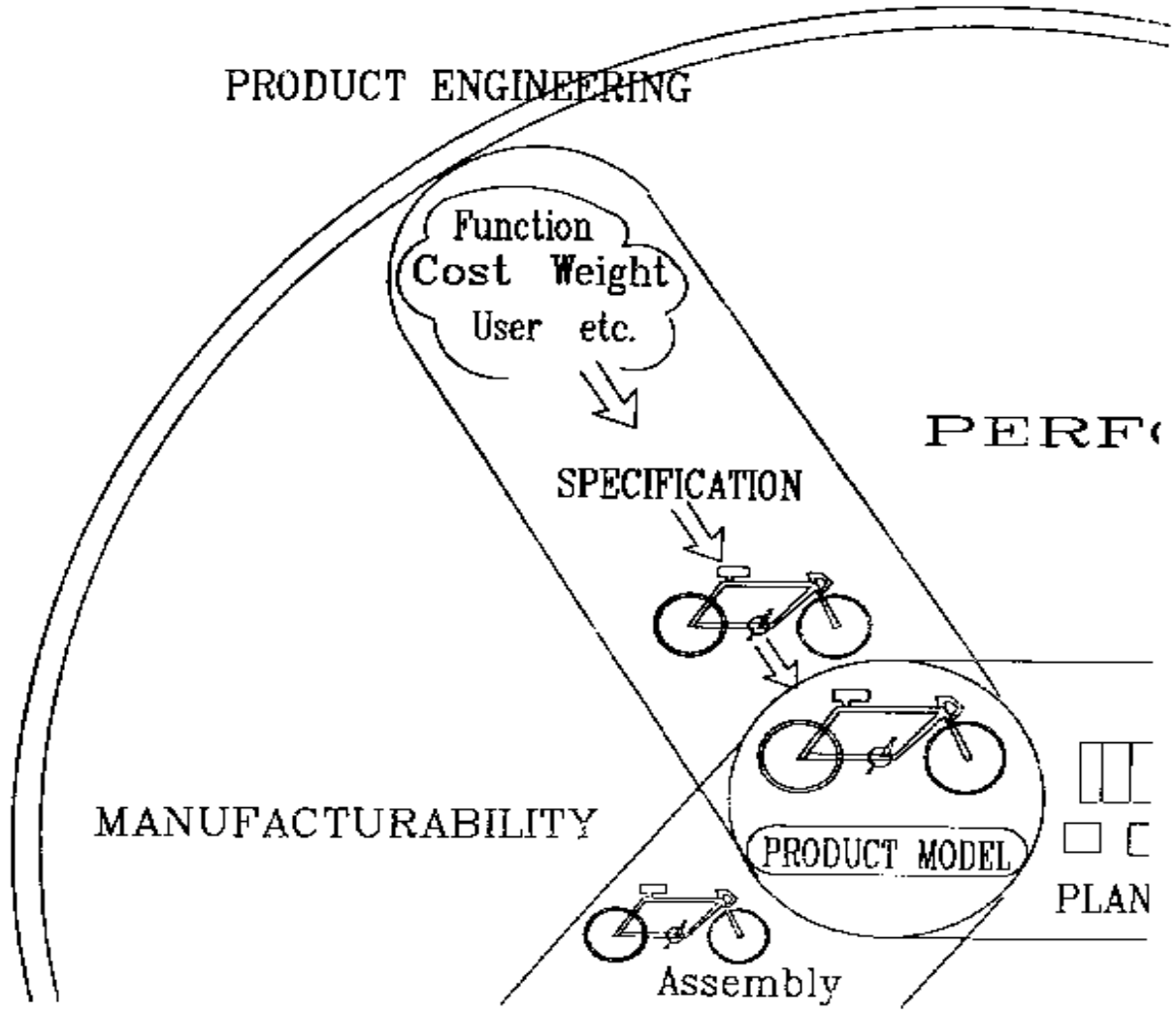
Focus: Traditional Engineering



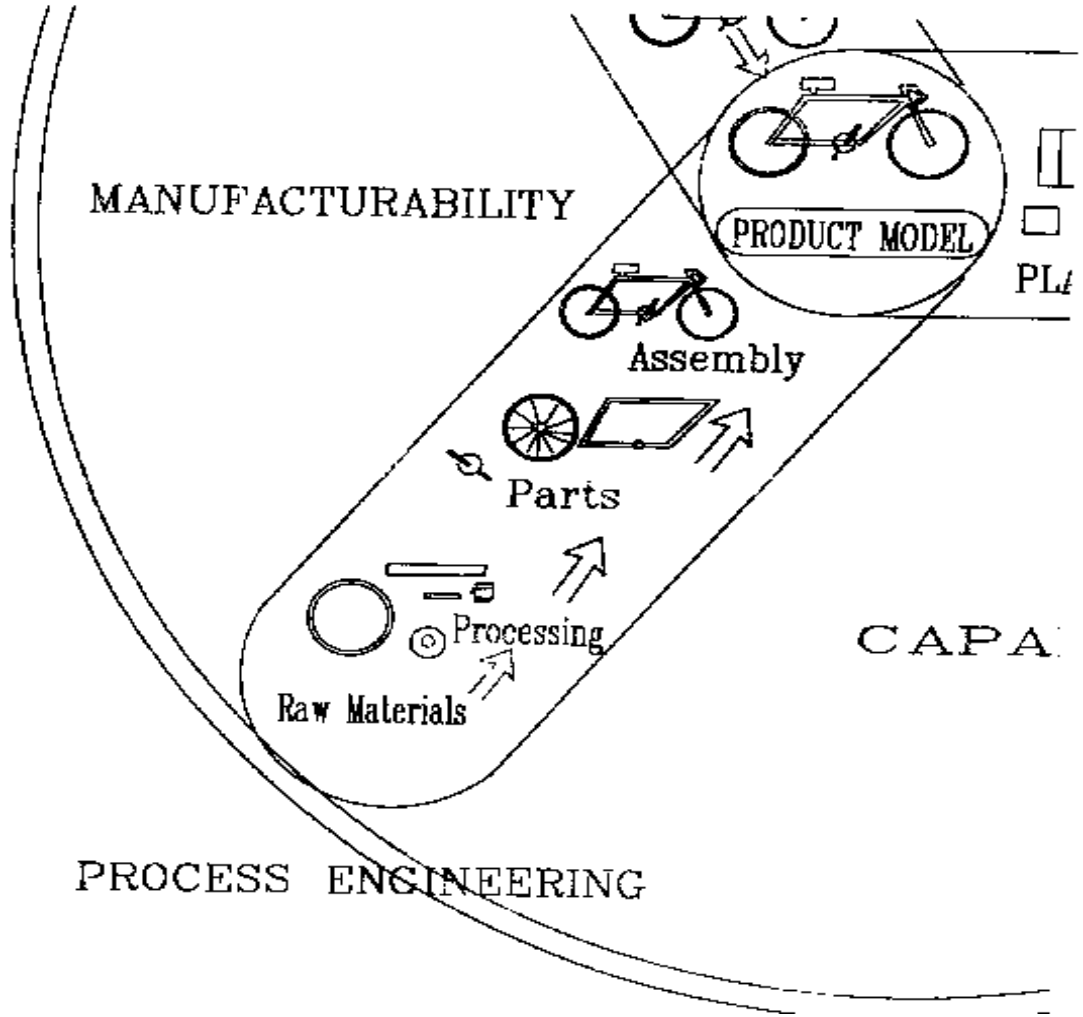
Concurrent Engineering



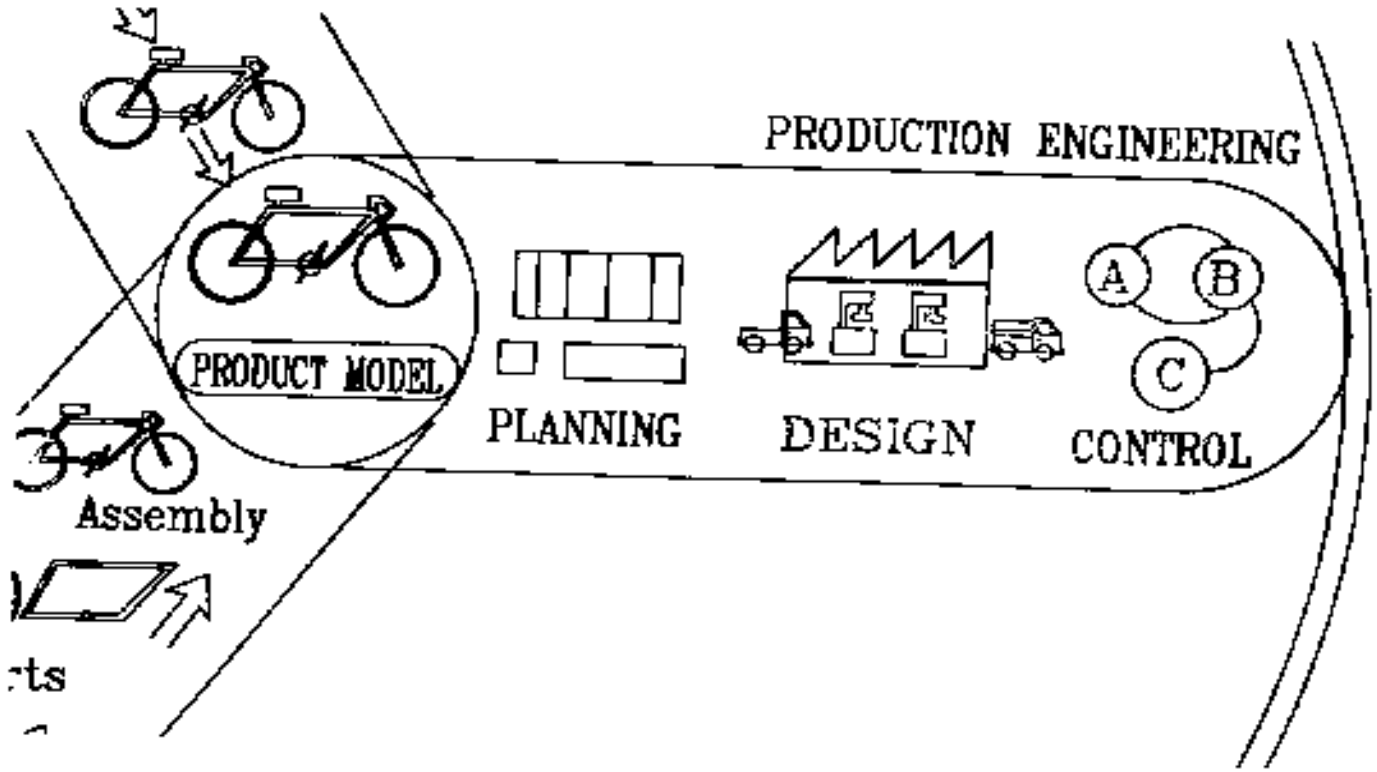
Product Engineering



Process Engineering



Production Engineering

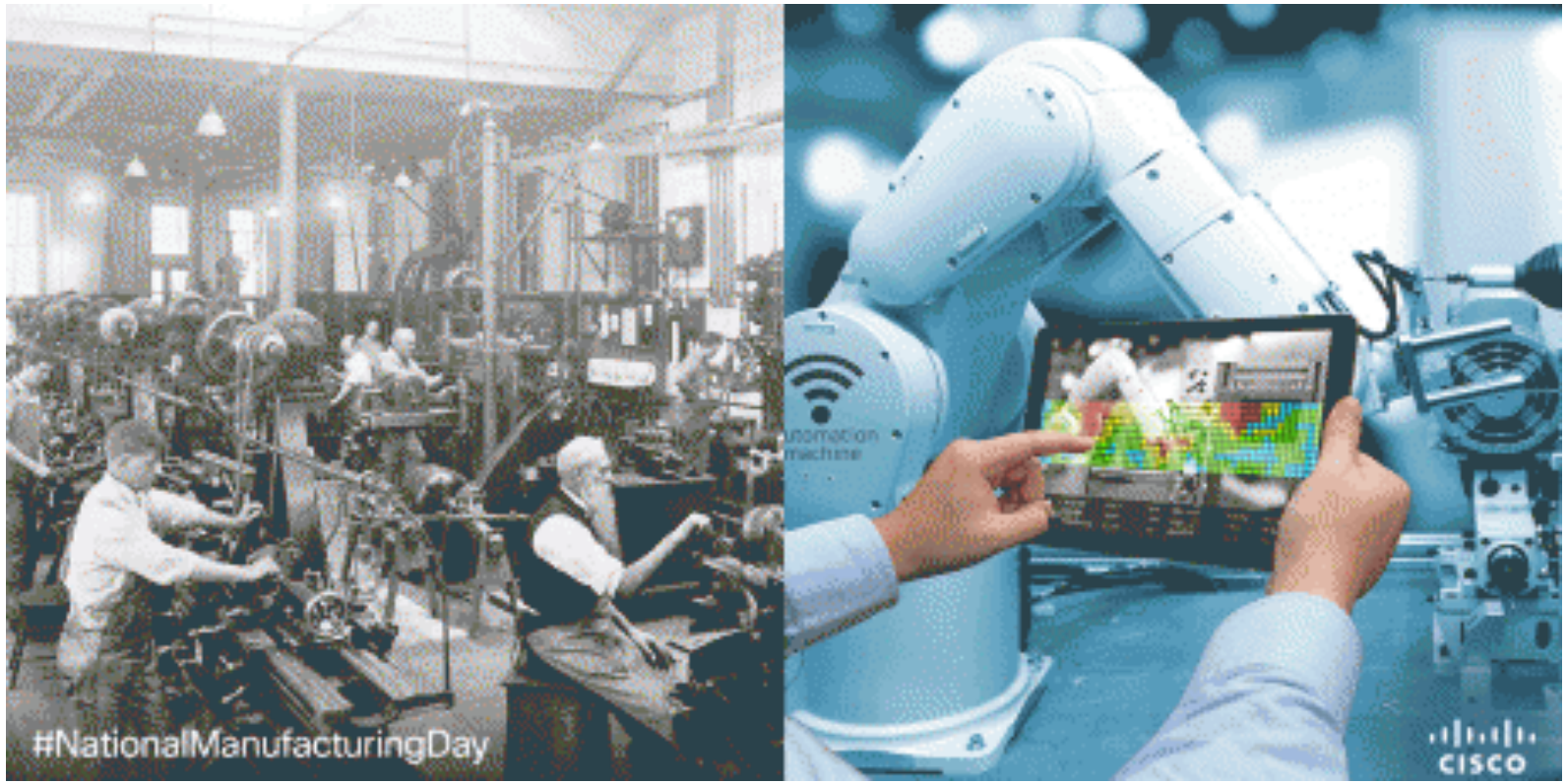


An Engineering Technology Taxonomy (ETT)

Product Engineering	**Process Engineering**	**Production Engineering**
Geometric Modeling	Process planning	Machining
ASME Y14.5	CAD/CAM	Casting
Product Design	Fixture Design	Injection Molding
GD&T	Product Economics	Sheet metal working
Miniaturization	Tool path planning	Inspection
Etc.	Etc.	Etc.

Related taxonomy

- Prerequisite materials: Fundamentals of materials, Mechanics, etc.
- Introductory materials: Motivating, defining and scoping the topics



Types of materials included in the repository

- Text chapters
- Exercises and problems
- Presentation slides
- Quizzes
- Tests
- Videos (empty, except for a few youtube urls)

Organizations of materials

- Use ETT as the basic topical search structure
- Create a set of users and privileges
  - Administrators
  - Instructors
  - TAs
  - Lab Managers
  - Enrolled students
  - Interested instructors
  - Interested students

An Initial site is under construction at NC State

- A very generous offer was made at the beginning of this semester in my ISE316 course. As I was going over the ground rules for the course, a young man approached and offered to help with my concept. That individual has by now probably been “broken of the habit to volunteer”, but has still offered to attend our Workshop today to talk about our initial.
- Let’s welcome, Sam Cynamon, an NC State student to demonstrate how such a repository might work.

Manufacturing Education

Technical Website Introduction and Review

Introduction

- Senior ISE (2020)
- Currently in ISE 316 under Dr. Wysk and Dr. Lee
  - Free Textbook

- Occupation: OIT Web-Tool Development Lead (ClassTech)
  - Coop: SPT (Elizabethtown) Manufacturing Plant

- Project: semi-automated academic repository and resource hub
  - Minimize Student Costs
  - Increase Professional Participation / Partners

NC STATE UNIVERSITY

RESOURCES search ncsu.edu

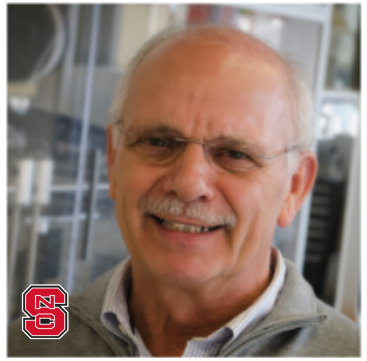
Manufacturing Education

Home Topics

Welcome to Manufacturing Education,

Charter Statement

"To design and develop an online service for academic institutions to expand the available resources and source materials within the next year."



Dr. Richard Wysk

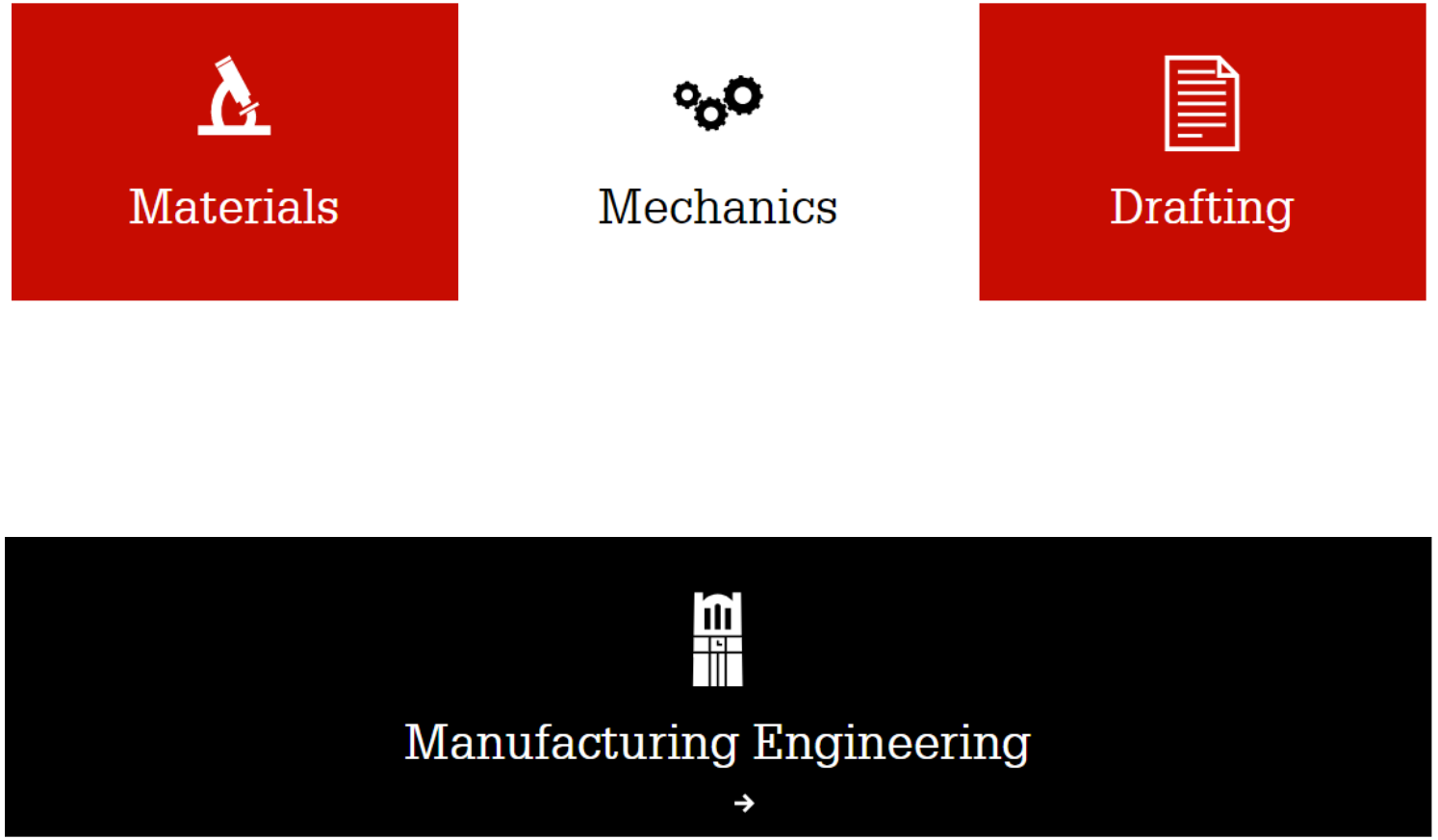
Dr. Yuan-Shin Lee

Dr. Gül E. Kremer

Facebook Twitter

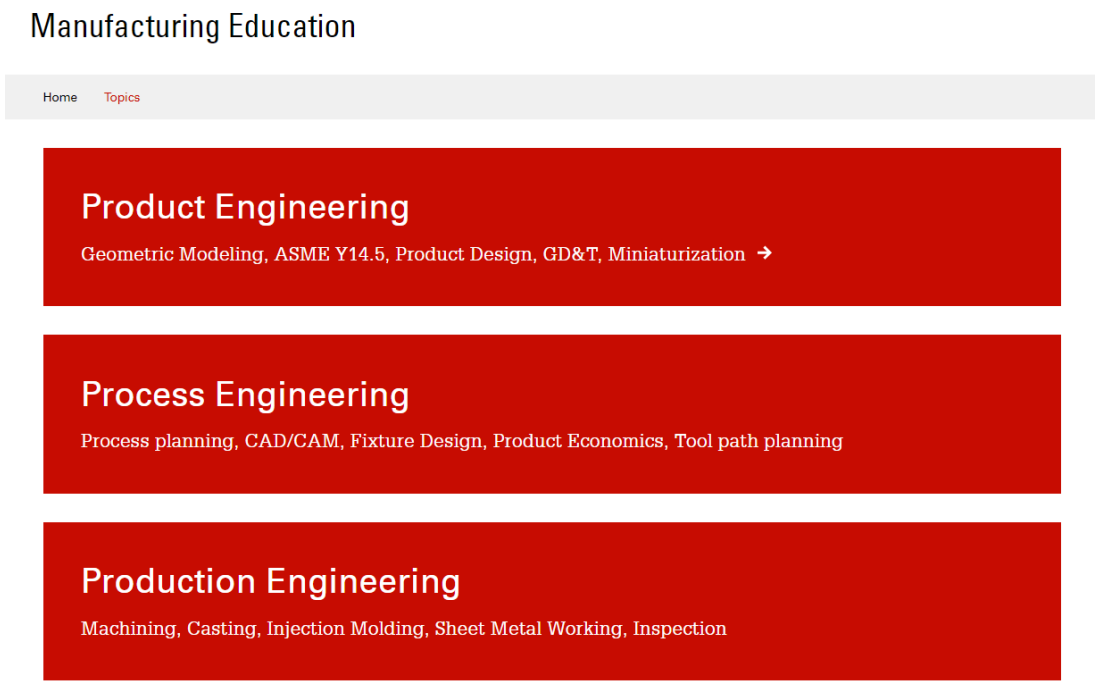
Topics

- Fundamentals
  - Materials
  - Mechanics
  - Drafting
- Engineering
  - Manufacturing
    - Product
    - Process
    - Production
  - Quality **
  - Biomechanical **
- Limitless Expansion



** - indicates topics not yet implemented, just future examples

Subject Materials



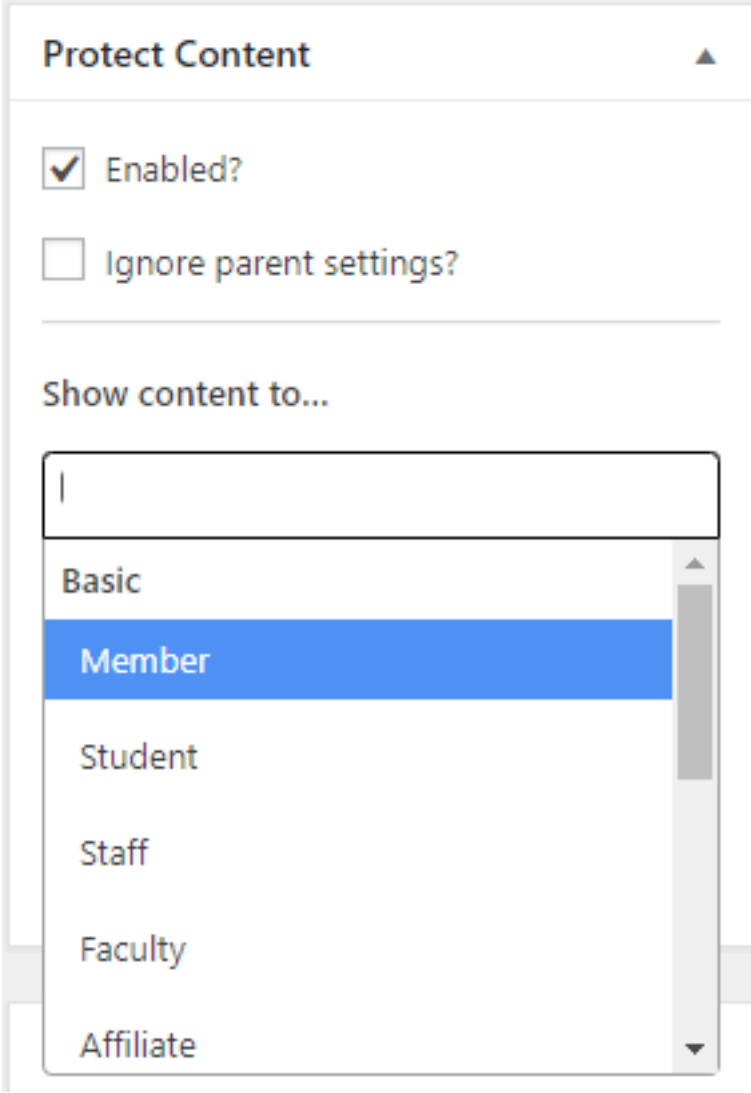
- Students
  - Subject Examples w/ Solutions
  - Relevant Textbook Readings
  - Lab Lessons
- Professors
  - Course Structure
  - Lecture Slides
  - Exams / Quizzes (Exclusive)
- Access can be independently determined

WordPress Platform

- NCSU OIT fully-supported
- Simple GUI for Admins
- **Pages**
  - Static, Manually Edited Web pages
- **Posts**
  - Subject Material Specific
    - Textbook Readings & Exams
  - Keywords for quick search
  - PDF or Text Compatible

Security

- NCSU Wordpress Platform
  - Shibboleth Protection
  - Pros:
    - Well-known security firewall
    - Limited user access by affiliation
    - Page independant settings
    - Wide range of default designs
  - Cons:
    - NCSU account required
    - No control of User levels
    - Manual admin/posting access changes



Future Features

- Field Expert Contacts
- Expanding Academic Subjects
- Videos of Subject Review
- Integrating additional Universities

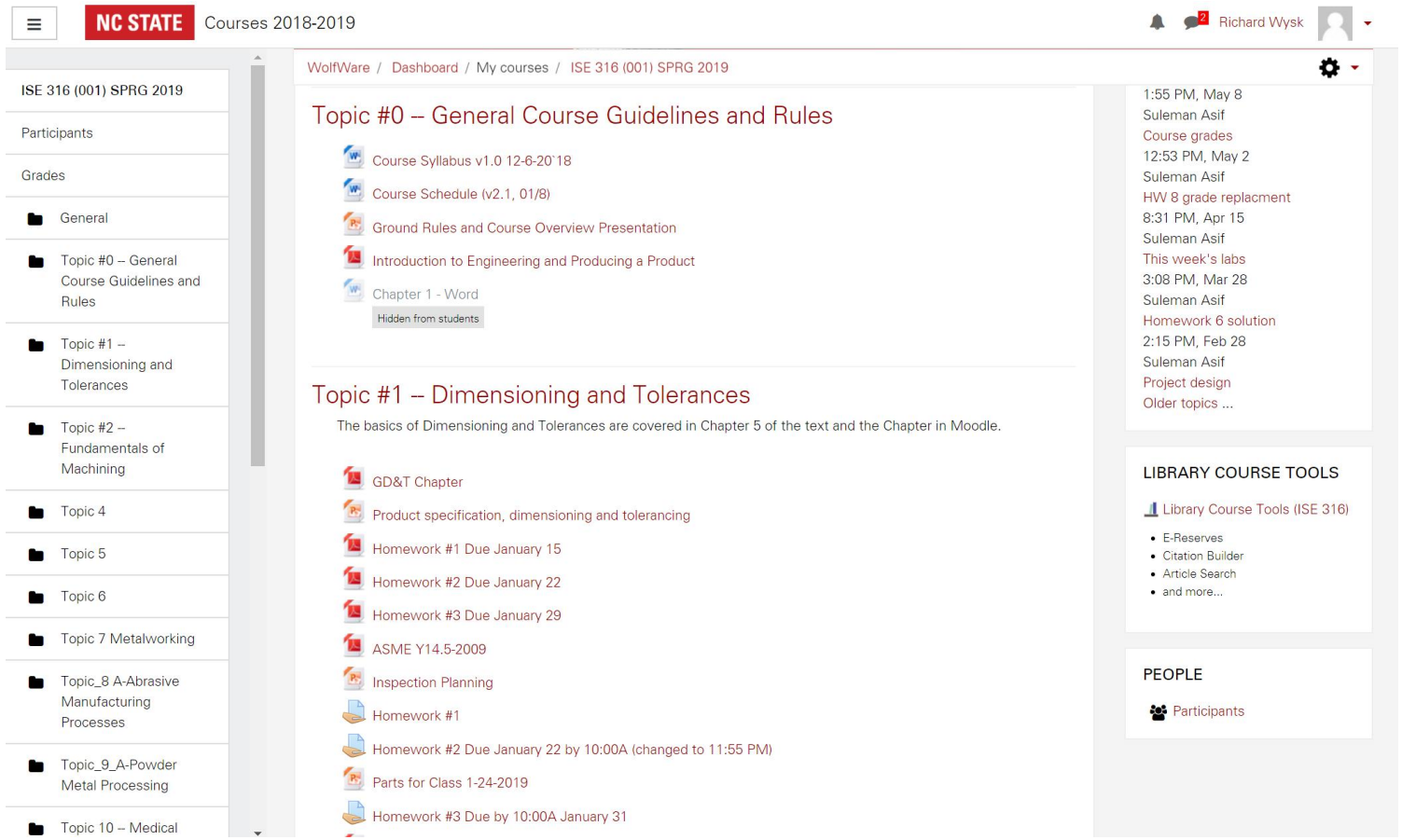
Summary

- Web-based repository with custom user authentication settings
  - Making resources accessible regardless
- Manufacturing has a strong initial repository of materials available
- Allows versatility in teaching styles
  - Flexibility in course construction
  - Students can access materials on their own time
- Goal: **easy to update, simple to access, and contains the desired knowledge**

NC STATE UNIVERSITY

COLLEGE OF ENGINEERING

Current implementation for Spring 2019



Agenda for our day

- Overview of STAM
- Breakout for: What are the values for STAM?
- Breakout for: What are the Roadblocks associated with implementation?
- Breakout for: What are user and value-added issues? How can we interest you?
  - User
  - Developer
  - Reviewer