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PROJECTS IN COMMUNICATIONS, ENERGY,
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Here is your chance to practice **Big Engineering**.
Explore the interdisciplinary nature of 21st century engineering projects with three fields of learning: technical, political, economic, and technological challenges of engineering practice by participating in projects with faculty and industry experts, and mixed media experts with interests in learning, design, analysis, optimization, reporting and research findings.
Instructors: J. C. Kallberg, M. N. Se
Last updated: 10/10/2017
Units: 12.5
Level: D
2.250 Grade Point Value
Last Offered: Spring 2008
This is a CI course that satisfies the peace requirement.

3.003 Principles of Engineering Practice

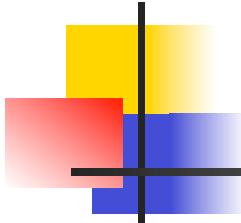
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Principles of Engineering Practice



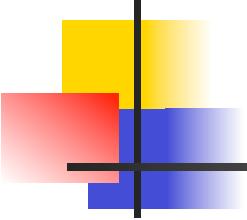
Engineering the Future of Solar Electricity

Project 1A
Solar Electricity Generation System Constraints
rate limiting factors



Project 1A,B,C,D Execution

- Each project status review will be presented by a team leader.
 - Take notes from meeting before
 - Manage delivery of commitments
 - Report results to the group (BIRAC format)
 - Goal
 - Progress
 - Next steps
- U Tokyo is part of your team
 - Post on new global website

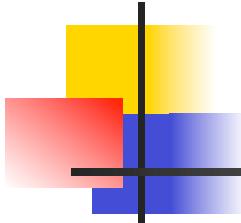


Project 1A: due 4-6

Electricity Generation System Constraints

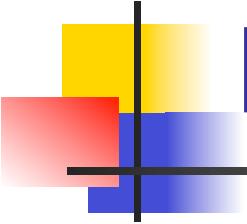
Applications: FOM Comparisons

- Strengths
 - Attributes of solar electricity
 - Optimization plot
 - x vs. y with maximum for solar attributes
- Weaknesses
 - Barriers
 - Crossover point to solar advantage
- Competition
 - Local power
 - Gasoline: energy/unit volume



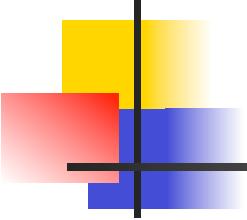
Engineering Practice

1. Problem Definition (B)
2. Constraints (I)
3. Options (R)
4. Analysis (A)
5. Solution (C)



Project Planning

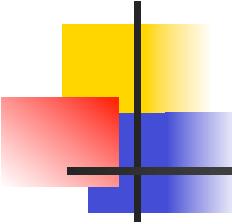
- Timeline
- Resources
- Problem Definition



Engineering the Future of Solar Electricity

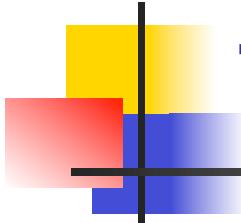
Teams: local power; grid connected power

- Project 1A: *due 4-6*
 - Electricity Generation System Constraints
- Project 1B: *due 4-13*
 - Materials Selection
- Project 1C: *due 4-27*
 - Solar Cell Solar Cell Design
 - Module Manufacturing Platform
- Pentachart Summary Presentations: *due 5-4*
- Project 1D: *due 5-6*
 - Final Report and Presentation



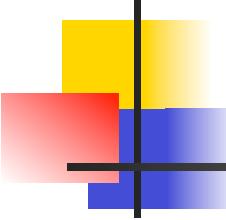
Infrastructure Change Issues

- New technology requires changing multiple components.
- Multi-vendor interoperability must be considered.
- Expected rewards in one area are sometimes accompanied by risks of disruption in other more critical application areas.
- Capital cost of infrastructure upgrade vs. sunk cost of existing.
- Missing or incomplete backward compatibility leading to replacing more equipment than will benefit from the upgrade.
- Incomplete value-chain availability, particularly in early stages of new technology.
- New skills availability and adoption.
- Changes in Economic Marketplace.



The Solar Cell

- 1) Principles of operation
- 2) Relevant performance metrics
- 3) Design for performance
- 4) Design for manufacturing
- 5) Design for application
- 6) What scale of production is consistent with (6)?



Project Execution

- One Project assignment is given and divided into parts for concurrent engineering by teams.
- One solution will be submitted per team. All members of the team receive the same project grade.
- Teams will complete four project stages during the term.
 - Plan; Initial Findings; Solution Consistency among Teams; Final Presentation to Panel of Experts
- The final deliverables are:
 - 20 minute presentation (5-10 slides), during which all workgroup members must speak.
 - Two days later, edited slides and a final two-page report.

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Spring 2010

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