



# BEST PRACTICES: PROJECT-ORIENTED PROBLEM BASED LEARNING

Integrated Design Project (IDP)



# About the Speaker

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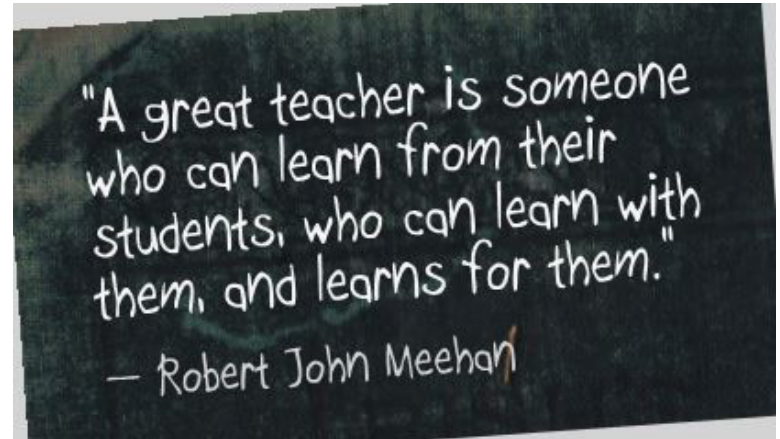
- Associate Prof. Dr. Samsuzana Abd Aziz
- PhD (Agricultural Engineering)- Iowa State University
- 3 years teaching Agricultural and Biosystems Engineering Integrated Design Project (EAB4947)

# Learning Objectives

- Understand the main practices of POPBL in IDP class
- Receive and give constructive feedbacks on the POPBL practices -- Learn from each other 😊

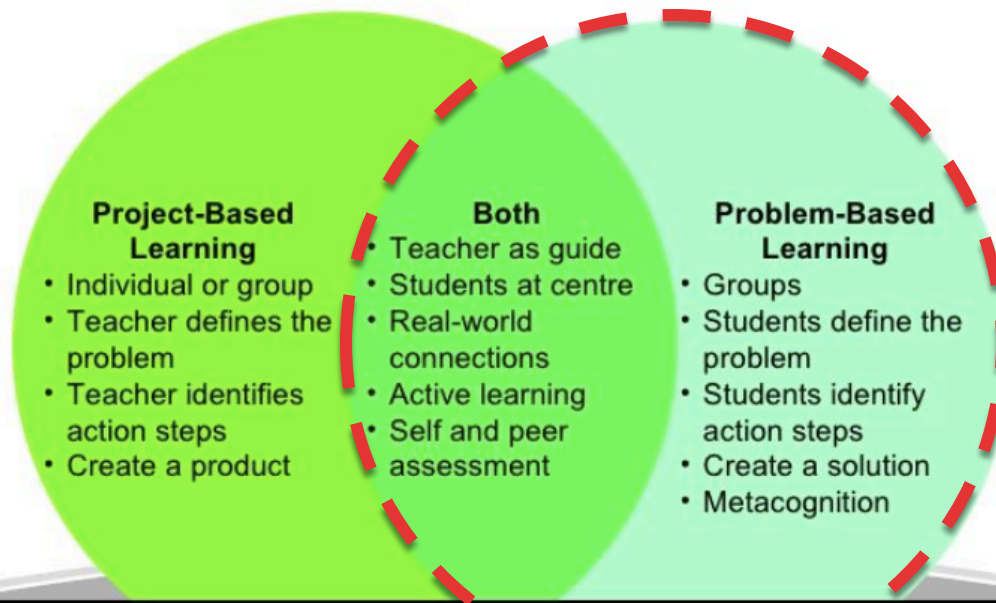
~~CO-PO Mapping~~

~~Assessment Rubrics~~



# Problem BL vs. Project BL

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POPBL:  
Integrated Design Project

**Bottom Line:** In Problem-Based Learning, students have more control over their own learning and the processes involved.



# What is POPBL?

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A systematic teaching method that engages students in learning **knowledge** and **skills** through an extended **inquiry process** structured around complex, authentic questions and carefully designed tasks over a period of time, resulting in a **product** presentation or performance. Typically has **timeline** and milestone, and other aspects of **formative evaluation** as the project proceeds.



# Why POPBL for IDP?

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- Student Centered Learning
  - In collaborative and interdisciplinary environment that motivates high level thinking
- Skills and abilities development
  - Problem solving
  - Communication
  - Cooperation
  - Negotiation
  - Decision making
  - Life-long learning



# What is our end-game?

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## AGRICULTURAL AND BIOSYSTEMS ENGINEERING INTEGRATED DESIGN PROJECT (EAB 4947)

CO1

Design projects related to agricultural and biosystems engineering (C6, CTPS, **ENGINEERING DESIGN (CONCEPT, CRITERIA, APPROACHES)!**)

CO2

Integrate software tools with traditional methods for agricultural and Biosystems engineering project (C6, C6, C6) **ENGINEERING DESIGN ANALYSIS**

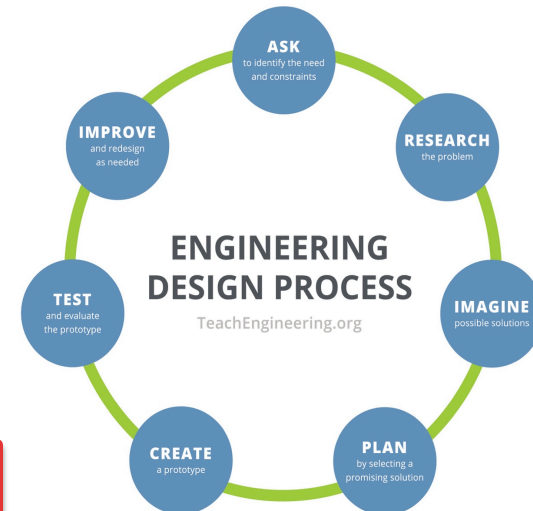
CO3

Organize the execution of the project includes planning, monitoring, financial and **ENGINEERING PROJECT MANAGEMENT**

# What's in it for Eng. students?

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	Design Approaches		
	Mechanical	Electrical	Chemical/Biological
Design Concept	Mechanically	Electronically	Chemically/ Biologically
Design Criteria	Materials, Aesthetics, Geometry, Physical Features, Cost, Reliability, Usability, Use environment		
Design Analysis	FBD, Strength, Force & Pressure analysis, Materials	Circuit analysis, Power analysis, Performance analysis	Mass, energy-balanced, thermal analysis
Output/ End Product	Simulation, Prototype Development	Simulation, Prototype Development	Procedures, Simulation, Prototype Development





# Understanding Teacher's Role

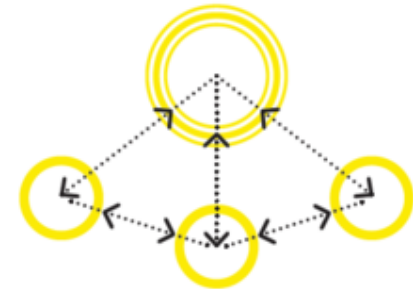
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- ❑ LECTURER/INSTRUCTOR?
- ❑ FACILITATOR? ✓ ✓
- ❑ COACH? ✓ SUPERVISOR
- ❑ SAGE?

Teaching vs. facilitating



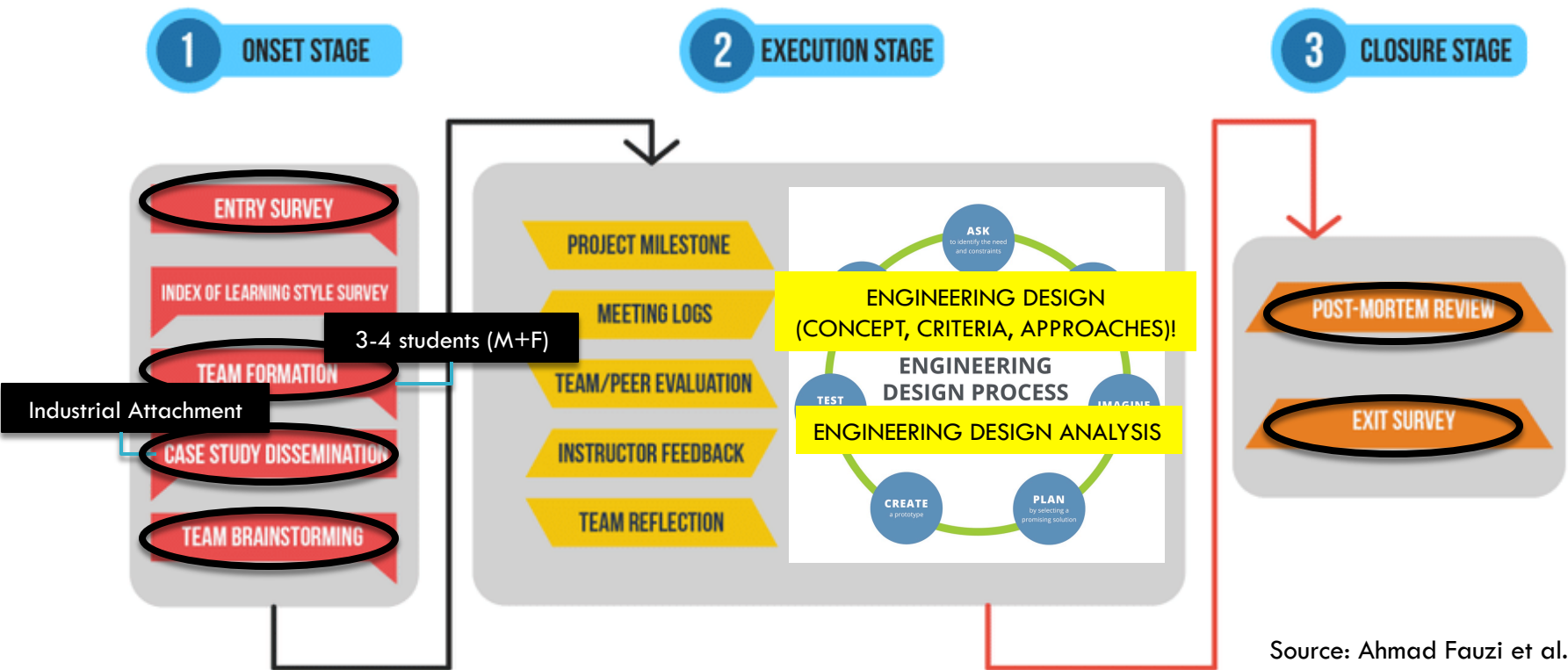
One directional dissemination of knowledge through a teacher



Accompanying and shaping a learning process together

# Designing IDP: POPBL Framework

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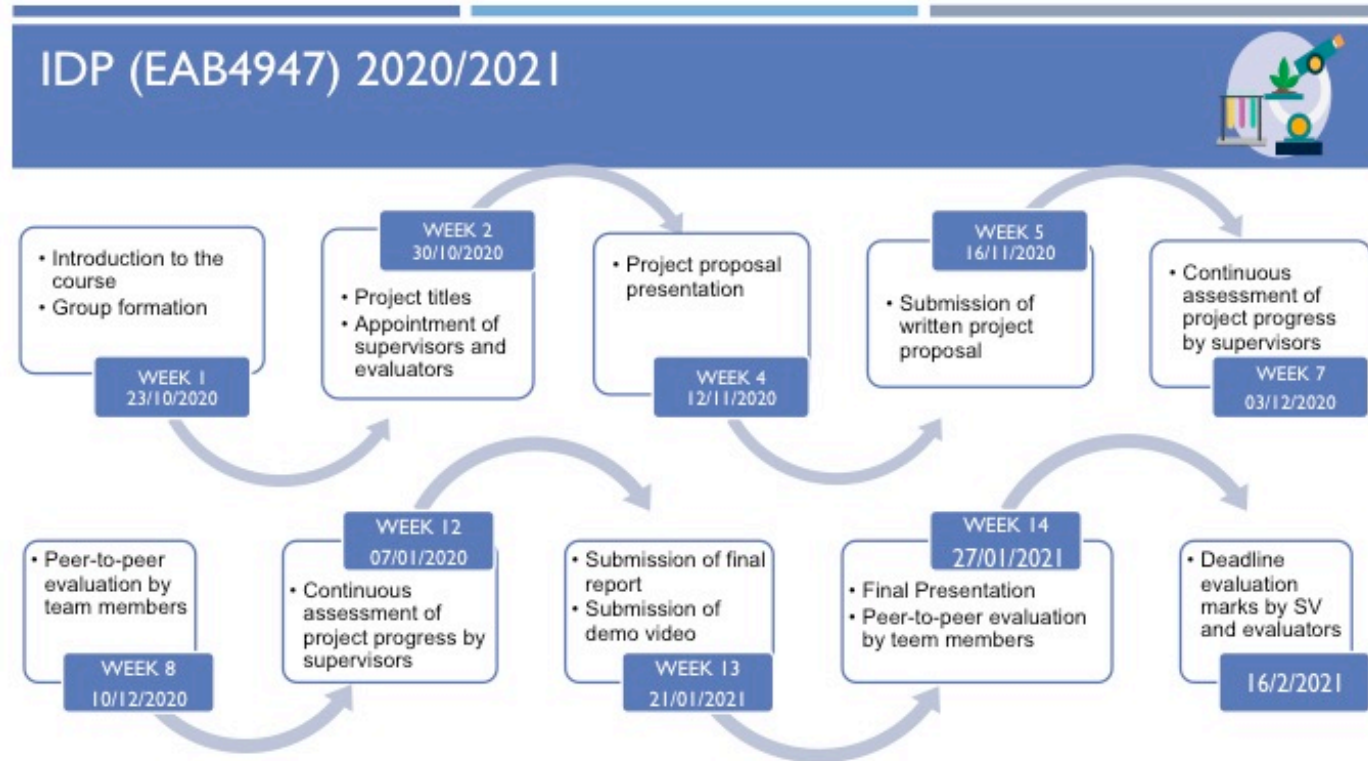
# Example of Real-World Problem Projects

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## Agricultural and Biosystems Engineering Design Project (EAB4947) SEM 1 2020/2021

Kumpulan	Tajuk Projek
1	Ananas Sucker Picker
2	Fixed Distance Pineapple Planter
3	Auto Fertiliser Mixer for Fertigation And Hydroponic System.
4	Portable Poultry Auto Feeder
5	Oil Palm Loose Fruits Collector
6	Rice Hill Seeding Mechanism
7	Vertical Farming of Azolla Pinnata
8	lot Based Monitoring System For Empurau Fish Farming
9	An Automated Sensing System for Methane Gas Release in Bio-Booster Production
10	Development of Lemon Grass Transplanter for Smallscale Farmers
11	Automated Irrigation System for Seed Germination

# Planning for Implementation





# Rethinking Assessment

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□ Assessment **for** Learning  
(Formative)

Gaging-- to help student learning, to  
improve teaching approaches

□ Assessment **as** Learning  
(Learning approaches)

Project proposal, Proposal presentation,  
Peer-to-peer evaluation, Logbook/  
Project Management App/Portfolio

□ Assessment **of** Learning  
(Summative)

Final report, Final Presentation, Demo  
video



# Project Proposal and Report

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- Clear instruction!
- Provide outline – eg: [ASABE manuscript template](#)
- Emphasis the content that we are looking for:

CLEAR PROBLEM STATEMENT AND OBJECTIVES

ENGINEERING DESIGN (CONCEPT, CRITERIA, APPROACHES)!

ENGINEERING DESIGN ANALYSIS!



# Presentation Guidelines

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## PRESENTATION FORMAT & TIPS

### 10 MINUTES (10-12 SLIDES ONLY)

Presentation will be done on Zoom platform. Each group will be given 10-12 minutes presentation, and 3-5 minutes Q&A.

### CONTENT SHOULD CONSIST ALL PROPOSAL OUTLINE

Follow the content that is outlined in your written proposal. Show your understanding and focus on the key points that the evaluators need (refer to evaluator rubrics). Be creative in presenting your idea. Use fun and free templates like using CANVA App. Bottom line is, avoid glaring mistake like grammatical and spelling errors! Have your supervisor to review your slides.

### ORGANISATION AND PRESENTATION

Practise what do you want to say and how your team is going to present the proposal. Make sure it is within 10-12 minutes given time. Avoid using too many texts, use infographic instead. Keep it simple. Be prepared!





# Project Management App

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The screenshot shows a Trello board for a project named "ANANAS TENDRILS PICKER WORK PROGRESS". The board is organized into five columns: TO DO, IN PROGRESS, DONE, DUE DATES, and MEETINGS. The background of the board is a photograph of pineapples.

- TO DO:** Preparation for upcoming Final Presentation (Due: Jan 24)
- IN PROGRESS:** Design the Product using AutoCAD, Completion of Final Report
- DONE:** Assemble Team and Project Kick Off, Identify Team Project Topic, Discussion on Team Project Innovation, Approach potential supervisor to discuss on project, Proposal slides and ABE Design Form
- DUE DATES:** Proposal Presentation (Nov 12, 2020), Written Project Proposal (Nov 16, 2020), Submission of Final Report and Demo video (Jan 21), Final Presentation (Jan 27)
- MEETINGS:** Meeting with SV Dr. Nazren (Nov 3, 2020), Meeting with all group members (Nov 1, 2020), Meeting with SV on Proposal Presentation (Nov 10, 2020), Meeting with SV on work progress (Jan 8)

Navigation and settings at the top include: Board, ANANAS TENDRILS PICKER WORK PROGRESS, Group 1 (Ananas Sucker Picker) Free, Team Visible, Join Board, Calendar Power-Up, Butler, and Show Menu.

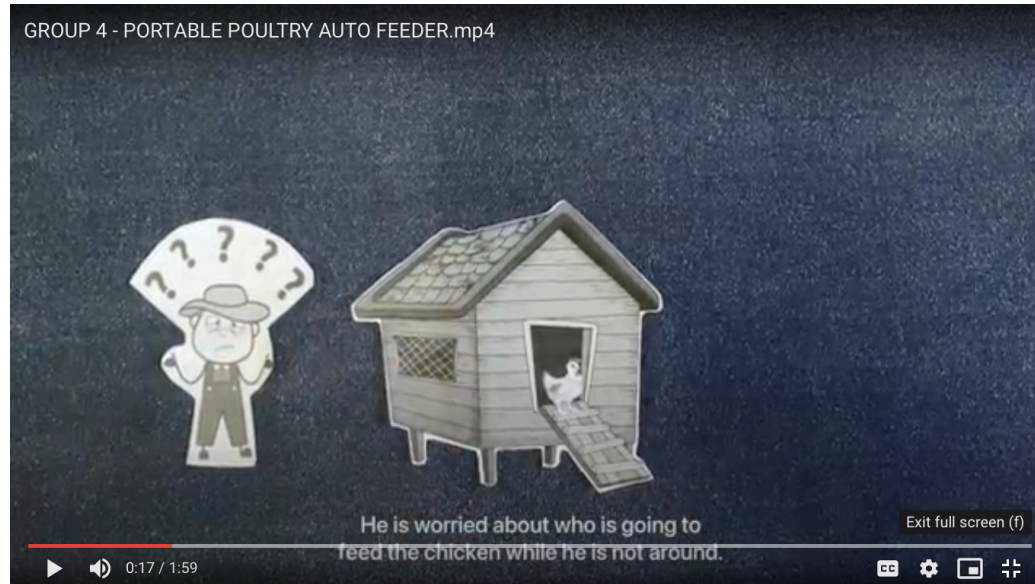
- Trello
- Teamwork
- ASANA
- Notion.so



# Demo Video

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## □ Example: Portable Poultry Auto Feeder





# Online Evaluation and Assessment

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- Proposal presentation – internal evaluators
- Written proposal – supervisors
- Project Management – supervisors
- Peer-to-peer evaluation – classmates
- Demo Video – class facilitator
- Final Presentation – internal and external evaluators
- Project Report – supervisors

# Class of 2020 Virtual Design Day

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**11** Projects solving real world problem in ABE  
**11** supervisors  
**2** Lecturers and **4** professional engineers as evaluators

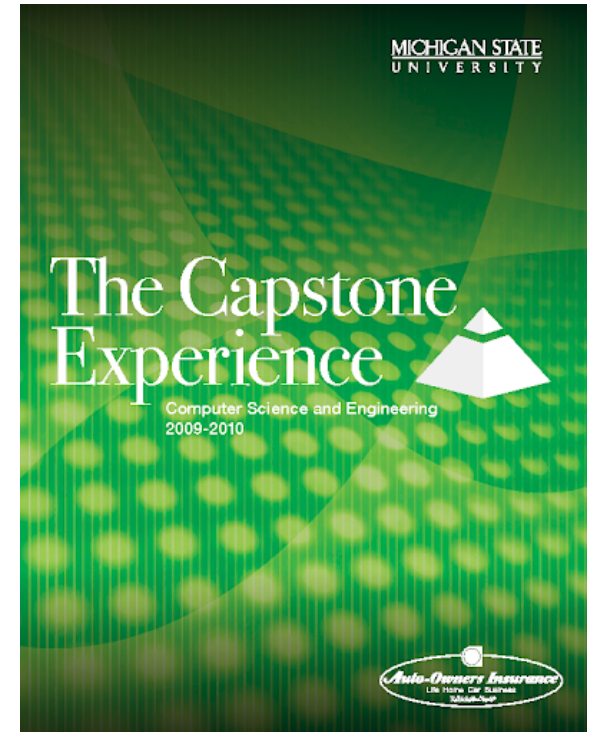
Participants visible in the grid include: Syamimi Najihah, SAMSUZANA BINTI..., Khairun Zamri, Melissa Chew Fui Y..., Razif Mahadi, anathasia, SITI KHAIRUNNIZA..., azdzharulnizzam.a, HarryJoy Jack, SUHASTUTI 199232, RAZIF BIN JEMIAN, MUHAMMAD IKMA, NURUL IZZAH BINT, SITI KHADWAL BIN, MUHAMMAD HAZI..., hazi, Nurshahida Azreen..., mahirah, tenny kubu, syawal Maulan, and SHAZLIN MOHD SH...



# Way Forward

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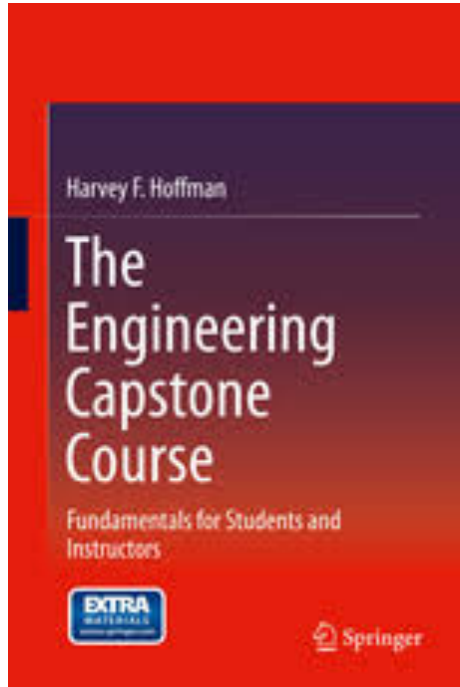
- IDP webpage
- Yearly Integrated Design Projects Compilation Book –Penerbit UPM
- Project sponsorship
- Any suggestion?





# Text Book

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**Hoffman, Harvey F.**

**The Engineering Capstone Course**

**Fundamentals for Students and Instructors**

Springer (2014)

*Thank You!*