一、課程說明(Course Description)

※能源

This series of 7 lectures are aimed to give a general overview of contemporary energy issues from basic engineering/technical aspects. The course is for freshmen in the engineering college to provide them with global vision before detailed studies of energy-related topics in terms of materials, devices, processes, etc.

※智慧機械

本微課程的目的在於提供學生對智慧機械的了解，課程將以五週深入淺出課堂講解以及兩週的實際驗證讓學生能夠透過課堂上與教授的雙向交流、以及以三人為一組實際進行 Project Base Learning 製作並測試自駆車和機械手臂，來探究並了解智慧機械的基本組成、以及智慧機械在不同領域的應用和機會。

※航空渦輪引擎材料科技

The aim of this course is to highlight the importance of interdisciplinary engineering learning. The subject of jet engine will be used as an example to show students what kind of role can materials play in the development of advanced jet engine. Cast, forge, powder metallurgy, additive manufacturing processes will be introduced. At the end, a lab tour will be arranged to show the three core aspects of materials science and engineering, i.e. structure-processing-properties.

※最佳化與工業工程

簡介工業工程領域之若干主題，包含作業研究、機率、生產管理、品質管理、網路問題、人因工程、供應鏈管理。另外，深入介紹線性規劃、整數規劃之最佳化技術，及其數學建模之方法與實例應用，並利用套裝軟體實際求解問題。

二、指定用書(Text Books)

無

三、參考書籍(References)

無

四、教學方式(Teaching Method)

投影片講述，邀請專家演講

五、教學進度(Syllabus)

※能源

Groups 1 & 3

9/13 Energy: the foundation of societal prosperity and development
9/20 Fossil energy: environmental issues, global warming and CO_2 emission.
9/27 Nuclear energy: reactor types, operational safety, and waste storage
10/11 Wind, hydraulic, geothermal and tidal energy
10/18 Solar cells: silicon-based, organic, and dye-sensitized devices
10/25 Energy storage: secondary batteries
11/1 Summary: resource availability, cost/gain evaluation, and future prospects

Groups 2 & 4

11/8 Energy: the foundation of societal prosperity and development
11/22 Fossil energy: coal, petroleum, and related resources
11/29 Nuclear energy: reactor types, operational safety, and waste storage
12/6 Wind, hydraulic, geothermal and tidal energy
12/13 Solar cells: silicon-based, organic, and dye-sensitized devices
12/20 Energy storage: secondary batteries
12/27 Summary: resource availability, cost/gain evaluation, and future prospects

※智慧機械

第一週 機械工程與力學導論
第二週 機械元件與設計
第三週 熱流力學與能源
第四週 PBL Project I 測試: 老鼠夾自驅車
第五週 機器人與機電整合
第六週 工業 4.0 與智慧製造
第七週 PBL Project II 測試: 機械手臂

※航空渦輪引擎材料科技

1. Course overview
2. Introduction of jet engine
3. Advanced cast components in jet engine
4. Other materials technologies
5. Introduction of Additive manufacturing process
6. Lab Tour
7. Summary

※最佳化與工業工程

1.生產管理
2.供應鏈管理
3.品質管理
4.機率模式與決策方法
5.網路分析
6.線性規劃
7.整數數規劃

六、成績考核(Evaluation)

※能源

Final Exam

※智慧機械

上課心得: 共五次共佔 30%
PBL Project I: 測試結果 25% 心得報告(ppt) 10%
PBL Project II: 測試結果 25% 心得報告(ppt) 10%

※航空渦輪引擎材料科技

期末考

※最佳化與工業工程

Detail to be announced in the first class