機構設計 (502 U1440) Fall 2015

課程說明: 本課程為機動學之延續，為知識領域課程之一。由機動學以圖解法為主的古典機構學基礎出發，本課程介紹現代機構(**Modern Kinematics**)以解析法為主之**機構設計**方法與**機構合成**方法，經由實例討論與專題研究，使學生對機構設計有所了解，並能應用所學，解決使用機構時的問題。

課程目的： 培養學生具有以解析與圖解方法分析機構的構造、運動、以及其力學的能力，並能**系統化的搜尋機構構想與評估機構設計的可行性與合理性**。

教師：陳達仁 時間：週二 7、8、9 (新 501)

Handout: 隨堂分發/不補發

最新消息：http://iaid.me.ntu.edu.tw/tw/tw_teaching.html

參考書(R)：

R1. Waldron, K. J.and Kinzel, G. L., "Kinematics, Dynamics, and Design of Machinery", 2004, John Wiley & Sons, Inc. (ISBN: 0-471-24417-1)

R2. Erdman, A. G., Sandor, G.N. and Kota, S., "Mechanism Design, Volume I : Analysis and Synthesis", 4th edition, Prentice Hall. (ISBN: 0-13-040872-7)

R3. Norton, R. L., 2013, "Kinematic and Dynamics of Machinery", 2nd Edition, The McGraw-Hill Co.

R4. Tsai, L. W., "Mechanism Design – Enumeration of Kinematic Structures According to Function", 2000, CRC Press. (ISBN: 0-8493-0901-8) or
蔡隆文原著, 許正和譯, 機構設計, 高立圖書, 2003. (ISBN: 986-412-089-1)

課程大綱：

1. Analytical Linkage Analysis Quiz 1, (PP)
2. Forces Analysis of Machines
3. Basic Synthesis Concepts Quiz 2
4. Kinematic Synthesis of Linkage Quiz 2
5. Systematic Design of Mechanism Quiz 3

Grading:		
	個人機構解析作業 (PP)	10%
	Quiz 1	25%
	Quiz 2	25%
	Quiz 3	15%
	群組作業* (GP)	15%
	作業、平時、課堂互動	10%

* **需作口頭/書面報告** synthesis practice/paper reading (**10/13 完成分組登記)**

Tentative Schedule: 09.09.15

Week 1:	9.15	**Introduction and Review**
Week 2:	9.22	**Analytical Linkage Analysis** (I) Four-Bar Linkage: Closure equation; Geometric Approach
~~Week 3:~~	~~9.29~~	No Class (颱風假)
Week 4:	10.06	Analytical Linkage Analysis (II) Four-Bar Linkage: Numeric Approach; Position, Velocity, Acceleration Analysis **PP** Multi-loop Mechanism; Singular Configurations HW 1&2
Week 5:	10.13	**Force Analysis**
Week 6:	**10.20**	**Quiz 1**
Week 7:	10.27	Basic Concepts of Synthesis **Kinematic Synthesis (Linkage)** (I)
Week 8:	11.03	Kinematic Synthesis (Linkage) (II) **PP due** **Basic Concepts of Graph Theory** HW 4&5&6
Week 9:	11.10	Structural Characteristics of Mechanism
Week 10:	11.17	Isomorphic Detection, Systematic Design of Mechanism **GP**
Week 11:	**11.24**	**Quiz 2**
Week 12:	12.01	Case Study: Variable Stroke Engine
Week 13:	12.08	Case Study: Geared Mechanism
Week 14:	12.15	Case Study: Differential Geared Train
Week 15:	12.22	**GP discussion (by appointment)**
Week 16:	12.29	Case Study: VTM, Gravity-Balanced M/M
Week 17:	01.05	**Quiz 3 GP report**
Week 18:	01.12	**GP Due**