

Mechanical Design (II)

機械設計 (二) 機三乙

Course Instructor :

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Office Hour : 5pm - 7pm, Thursdays, or by appointments

Teaching Assistant : 林東信 Office : 705, 儀器大樓 Tel : 06-2757575 ext.62159-51

Course Information :

Days and Hours : 10:10am- noon, Tuesdays ; 8:10-9:00 am, Fridays

Classroom : Room #204, ME Building

Webpage : <http://iteach.ncku.edu.tw> (需登入，確認已將此課程加入，並設定常用Email帳號)

Textbook :

“*Fundamentals of Machine Component Design*” 4th ed.

by Robert C. Juvinall, John Wiley & Sons Inc., (NCKU Bookstore : 06-274-4622)

Credit : 3

Grades (100%):

Term Project	40%
Attendance and Participation	10%
Midterm Exam #1	15%
Midterm Exam #2	15%
Final Exam	20%

Course Mission :

Provide concepts, procedures, and decision analyses that are essential in designing mechanical components. Students are expected to analyze individual element as well as the interfaces between elements as they work together to form a system.

Course Objectives :

- Introduce the design and analysis of power screw and threaded fasteners (Chap. 10)
- Introduce the design and analysis of various joining components and methods (Chap. 11)
- Introduce the design and analysis of various springs (Chap. 12)
- Introduce the design and analysis of bearings (Chap. 13, 14)
- Introduce the design and analysis of various forms of gear and gear systems (Chap. 15, 16)
- Introduce the design and analysis of shafts and related parts (Chap. 17)
- Introduce the design and analysis of brakes and clutches (Chap. 18)
- Introduce the design and analysis of various machine components (Chap. 19)
- Class review and case studies

Honor Code :

我在考試時絕不會給予別人協助，也不會接受他人的幫忙，所有作業及考試的答案均為本人努力的結果，若有違背誓言，一切依校規處置。

Class Schedule : (subject to changes)

* Holidays

Wk.	Dates		Lecture	Project Timeline
	Tue.	Fri.		
1	2/17	2/20	Syllabus, Chap.10 Power Screw	
2	2/24	2/27	Chap.10 Screw and Threaded Fasteners	Team Setup
3	3/3	3/6	Chap.11 Joining Components	
4	3/10	3/13	Chap.11 Joining Components Chap. 12 Springs	
5	3/17	3/20	Chap. 12 Springs	Design Concepts and Engineering Plot
6	3/24	3/27	Midterm Exam #1 (3/24) Chap.13 Bearings	
7	3/31	4/3*	Chap.13 Bearing	
8	4/7	4/10	Chap.14 Rolling Bearing	
9	4/14	4/17	Chap.14 Rolling Bearing	
10	4/21	4/24	Chap.15 Spur Gears	Progress Report
11	4/28	5/1	Chap.15 Spur Gears	
12	5/5	5/8	Chap.15 Spur Gears, Chap.16 Helical Gears	
13	5/12	5/15	Midterm Exam #2 (5/12) Chap.16 Helical, Bevel, and Worm Gears	
14	5/19	5/22	Chap.16 Helical, Bevel, and Worm Gears Chap.17 Shafts	Testing and Refinements
15	5/26	5/29*	Chap.17 Shafts	
16	6/2	6/5	Chap.18 Brakes and Clutches	
17	6/9	6/12	Chap.18 Brakes and Clutches Chap.19 Various Machine Components	Project Competition
18	6/16		Final Exam (6/16)	

Term Project：愛德華跳遠機

說明：三級跳遠是奧運田徑項目之一，選手必須在起跳線後三步入沙坑，並量得起跳點至入坑點之最短距離為成績。本設計專題主旨得自於三級跳遠概念，設計一可連續跳躍之機具。英國選手強納森愛德華為目前男子三級跳世界紀錄保持人，故名之。

規則：所設計之跳遠機的第一跳處即為起跳點，必須在一分鐘之內完成連續三個跳躍，每次跳躍時跳遠機必須完全離開地面，第一跳起跳至第三跳落地點之最短距離為總跳躍距離。每組有三次機會，取最遠距離為比賽最終成績。

設計限制：

- i. 動力來源為所給定之直流馬達，不得外加其他動力
- ii. 必須使用下列元件至少兩種：彈簧，(正，斜，傘)齒輪，螺絲(帽)，軸承，齒條，凸輪，棘輪，皮帶，鏈條，卡榫，鉚釘。
- iii. 除直流馬達外，其餘成本不得大於新台幣一千元（含所有材料成本及黏著劑等耗材）
- iv. 所有加工僅能使用機械工廠設備，除同組組員外，不得假手他人

進度規劃

時間	第1-5週	第6-10	第11-14週	第15-18週
內容	概念設計，製圖，細部規劃	材料搜尋及初步加工，設計修改	設計修改及測試	最終細部修改及模擬競賽
工廠實作	安全講習 機台認證	分組實作	分組實作	分組實作