清華大學物理系　實驗物理 Fall, 2019

課程概述與目標：

本課程分兩部分，一部分以力學、基礎電磁學、進階力學實驗為主，每週實驗四小時以上，含各實驗單元的原理介紹與操作，及實驗預習及結果報告繳交。另一部分已Matlab 為基礎，學習實驗的模擬與數據分析，擬合等，以實際作出一個小專題計畫為目標。

本教學目標主要如下：

1. 利用簡單的實驗儀器、與實驗模擬，分析軟體，驗證物理定律。
2. 熟悉基本儀器之特性與使用方法與數據的分析，以利將來從事更精密物理實驗與研究。
3. 培養獨立自主的研究精神，對於實驗種種因素所產生的實驗誤差及提升問題解決能力。
4. 學習使用電腦程式設計，模擬物理實驗及分析數據。

This is a one semester course intended to give students an introduction to basic laboratory and laboratory soft-ware techniques and software based physics simulation and theoretical analysis in the context of classical mechanics and electromagnetism. The course consists of a 4-hour lecture/lab-period per week. This is a hands-on class. You will have one lab partner for each experiment.

The primary goal of the course is to introduce students to basic concepts in experimental physics including:

- acquire basic concepts related to the experiments
- learn how to make reliable measurements
- understand standard measurement techniques for several physical properties.
- choose the appropriate instruments and measurement techniques for a given measurement task.
- Using computer programming to simulate experiment and perform analysis of data
- Practice writing laboratory reports
- learn how to approach an experiment systematically.

成績計算方式為預報，結報，實驗工作簿 50%，上課，做實驗情況、matlab home work、15％，期末小專題成果與報告 35%。

實驗物理　實驗課程表　2019.9-2020.1

週次	日期	組別/實驗名稱			
		1-4 組	5-8 組	9-12 組	13-16 組
1	9/9[一] 9/10[二] 9/13[五] 中秋節	課程說明，分組，MATLAB 程式安裝			
2	9/16[一] 9/17[二] 9/20[五]	Exp. A1	Exp. A2	Exp. A3	Exp. A4

3	9/23[一] 9/24[二] 9/27[五]教師節	Exp. A2	Exp. A3	Exp. A4	Exp. A1
4	9/30[一] 10/1[二] 10/4[五]	MATLAB programming I			
5	10/7[一] 10/8[二] 10/11[五]國慶日	Exp. A3	Exp. A4	Exp. A1	Exp. A2
6	10/14[一] 10/16[二] 10/19[五]	Exp. A4	Exp. A1	Exp. A2	Exp. A3
7	10/21[一] 10/23[二] 10/26[五]	Physics experiment simulation with MATLAB II			
8	10/28[一] 10/29[二] 11/1[五]	Exp. B1	Exp. B2	Exp. B3	Exp. B4
9	11/4[一] 11/5[二] 11/8[五]	Exp. B2	Exp. B3	Exp. B4	Exp. B1
10	11/11[一] 11/12[二] 11/15[五]	MATLAB programming III			
11	11/18[一] 11/19[二] 11/21[五]	Exp. B3	Exp. B4	Exp. B1	Exp. B2
12	11/25[一] 11/26[二] 11/29[五]	Exp. B4	Exp. B1	Exp. B2	Exp. B3
13	12/2[一] 12/3[二] 12/6[五]	MATLAB programming IV / Project in Physics experiment simulation with MATLAB I			
14	12/9[一] 12/10[二] 12/13[五]	Project in Physics experiment simulation with MATLAB II			
15	12/16[一] 12/17[二] 12/20[五]	/ Project in Physics experiment simulation with MATLAB III			
16	12/23[一] 12/24[二] 12/27[五]	Physics experiment simulation with MATLAB IV			
17	12/30[一] 12/31 [二] 1/3 [五]	MATLAB project presentations			

A1　重力常數測定(9)　A2 法拉第定律與地磁測量　A3 力學振盪（扭擺）(7) A4 磁力、磁矩測量

B1 力學耦合振盪(12)　B2 磁滯現象(5)　B3 非線性振盪(27)　　B4 微波光學(29)