Applied Physics 187 Course Syllabus

Course Title : Photonics and Applied Optics
Schedule : 1st sem AY 2019-2020 WF 8:30-11:30 R209 and R210
Section : WFRU and WFRU-1
Instructors : Dr. Maricor Soriano, Jayson Cubero, Mario Onglao
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Credit : 4 units (integrated lecture and lab)

Course description : Design of Data Acquisition Systems (DAQ) / Signal Processing-based instrumentation systems; current topics and techniques for engineering and design of optical instruments; non-destructive testing/measurement using optical methods; interferometry.

Objectives: At the end of the course the learner will be able to

1. Design, develop, and test an optoelectronic system
2. Perform measurements and experiments using an optical system
3. Conduct appropriate calibration tests on optical instruments

Course Requirements:

- Group Reports 50%
- Integration Project 40%
    - Design (design drawings - 10%)
    - Test (test results - 10%)
    - Execution (prototype and demo - 10%)
    - Paper (SPP Format - 10%)
- Individual Work 10%

Teaching Strategy : Active Learning, peer instruction, interactive lecture demos, integrated lecture and laboratory classes

Grade Equivalent for Raw Score X

X >= 90	:	1.0	70 <= X < 75	:	2.0	50 <= X < 55	:	3.0
85 <= X < 90	:	1.25	65 <= X < 70	:	2.25	40 <= X < 50	:	4.0
80 <= X < 85	:	1.5	60 <= X < 65	:	2.5	X < 40	:	5.0
75 <= X < 80	:	1.75	55 <= X < 60	:	2.75			

Class Policies:

A. Groups

1. You will be arranged in groups of 5. This will be your group throughout the sem so learn to get by. Also, most activities here cannot be done solo.
2. Each group will be required to purchase the following kits
    a. Raspberry Pi 3 Model B+ or higher (whichever is more readily available)
    b. Raspberry Pi Camera Module

    The reason you must buy your own kit is so that your group can work when and wherever you want outside class hours especially when you start doing the project.
3. Reports are per group and will be graded according to the following rubrik:

	Weight	0 Not done	1 Incorrect	2 Incomplete	3 Complete and Correct	4 Above and beyond
Objectives	1					N.A.
Procedure, Diagrams, photos or videos	2				Procedure can be duplicated by reader	
Data, tables, graphs	2				Graph details are readable	
Interpretation of results	3				Explains why the results are correct, valid, or acceptable	
Presentation	2		Sloppy	Rushed	Looks ok	Impressive

4. All reports must include a per member contribution breakdown.

B. Integration Project

1. Each group will design and develop an optoelectronic system.
2. You are free to choose what your system can do so long that it meets the following criteria:
    a. It is optics or photonics related, at the very least it uses light as a probe
    b. It either measures or controls something
    c. There is a way to validate the output of your system
3. The Integration project will be graded according to the breakdown given above.

C. Individual Work

1. 10 % of your grade is for work done individually. This includes certain activities and the dreaded Ringing Tone Quiz (see General Guidelines 2).
2. Also factored here are the peer evaluation you will receive from your group activities and integration project.

D. General Guidelines

1. Keep your **cellphones in silent mode or OFF** during my class because it is impolite to hear it during lecture. If I hear a cellphone beep in my class I will give a **Quiz** the next lecture day.
2. Unexcused absence during a **Ringing Tone Quiz** day results in a score equal to the **negative** of the total score.
3. **Absences** are deemed **excused** only for the following reasons and must be backed by written proof: death in the family, illness, participation in a university-recognized event.
4. Activities are posted before the start of the class. You may start working on it as soon as you receive it.

Course Outline

Week	Lessons	Activities
1	Course requirements discussion, Introduction	Human Eye, Microscopes, Telescopes
2	Color Science	Trichromaticity, Color Appearance Phenomena
3		Properties of light sources, light-matter interaction, Spectrometry
4	Cameras	Camera calibration, Distortion
5		Sensitivity, Modulation Transfer Function

6	Displays	Color Rendering, Device Independent Color Description
7		Gamut measurement
8	3D Imaging	Stereometry, Photometry
9		Profilometry
10	Interferometry	Different interferometer designs
11		Precise measurements
12	Integration Project Days	
13	Integration Project Days	
14	Integration Project Days	
15	Integration Project Days	
16	Project Presentation Days	