ENEE 408E Team Projects

The team members for each project are listed. For each design project there are two teams. Each team should come up with an overall design, including the selection of appropriate commercially available parts wherever possible. These will include: (1) light source(s), which may be lamps, LEDs, or lasers; (2) the design and layout of the passive part of the optical system, including for example, lenses, mirrors, fibers, etc. and (3) the detector or detectors, which may be photodiodes, photomultipliers, imaging arrays, etc. An opto-mechanical structure should be designed to hold the system together, and some form of CAD drawing of this included. A Code V analysis of any optical parts of the system should be included. For each project consider the ethical implications of the project. Are safety or regulatory issues involved? Are there any ethical considerations for the device being designed, for example undesired other applications? Explain the tradeoffs you make in deciding on your particular design. Each team should complete a project report and prepare a Powerpoint poster describing their project. There will be a poster template provided.

Project 1. Rifle Scope Communication System

Design a modified rifle scope that also doubles as a line-of-sight optical communications system between two individuals who aim the scopes at each other. The scope will need to function in its normal way, but will need to add a laser, photodetector, and electronics for audio and video data transfer.

TEAM A

Rosekrans, Sean Christopher
Amaya, Carlos David
Amin, Omar Farooq
Biondo, Ryan Christopher
Booher, Adam Wesley
Agrawal, Pankhuri

TEAM B

Carter, Jerome Lequan
Cheung, Calvin Ho-Yin
Chowdhry, Tapan
Concannon, James Francis
Cranor, Nicholas Conrad
Dupree, Brenda Joyce Miche

Project 2. 3-D Object Projector

Design a projection system that will illuminate a 3-D object on a platform, and image it onto a screen. This is a lot like an overhead projector.

TEAM A

Ebirim, Emeka
Fallon, Daniel Geoffrey
Ferede, Tewodros Yigzaw
Fung, Victor Tin King
Gebeyehu, Netsanet A
Hong, Jin Young

TEAM B

Geisbert, Charles Gilds
Goldberg, Hirsh
Gomez, Tenoch
Goodwin, Daniel Lee
Harmon, Sharon Rose
Francis, Joseph R

Project 3. Wide Angle Camera System

Design a 180^{o} camera system, which provides image capture over a full hemisphere. You can build on the fisheye lens design in Code V, but try and simplify the design, perhaps by reducing the number of surfaces and including some aspherical surfaces. Specify focal plane arrays for visible or IR imaging and the readout electronics.

TEAM A

Dai, Lin
Hulamm, Quin Truong
Hutchinson, Meredith Nicol
Jordan, Perry Nicholas
Kasmir, Jonathan Adam
Khan, Usman Ahmad

TEAM B

Ramirez, Ana Luisa
Rzasa, John Robertson
Larmooh, Paul Kwesi
Newton, Daniel Scott
Shah, Samir Mahendra
Sharma, Aman

Project 4. Borescope.

Design an optical instrument for examining the inside of long narrow structures, for example, pipes, conduits, or even the human body. The design will include an imaging chain, a built-in illuminator for visualization in dark spaces, and a CCD camera. Provide basic electronic design information for driving the illuminator.

TEAM A

Kilimnik, Boris
Kwon, Steve Junetak
Kyer, James Edward
Lennon, Joshua Paul
Leonard, Kurt Albert
Saunders, Akeenya Allen

TEAM B

Leoncio, Manuel Austria
Hill, William Joseph
Linde, Matthew Christopher
Liu, Arthur Wayne
Lteif, Anthony Jean
Panesar, Navneet

Project 5. Range Finder

Design an optical instrument for measuring the range of an object that is distant from 100m to 2km from an observer with an accuracy of 1m. This should not be a system based on time-of-flight optical pulse measurement. Use some type of parallax or split image technique.

TEAM A

McMahon, Jesse Colwell
Meghirbi, Meriam
Miller, Marshal Andrew
Momoh, Adeyinka Adebola
Mroczkowski, Ian Alexander
Muralidar, Richard Vinood

TEAM B

Nagendran, Siddharth
Nazar, Ahamed Ibrahim
Magsipoc, Robert Mesina
Pino, Daniel Enrique
Patel, Dharti Haridas
Pilar, Leslie Marie

Project 6. Reflectometer.

Design an optical instrument that will allow measurement of the reflectance of a surface as a function of angle and wavelength. The instrument should be able to discriminate between reflectance and scattering.

TEAM A

Pizarro, Ricardo Andres
Prebble, James Thomas
Price, Bryan Terrell
Quraishi, Montasser Mahmoo
Ramaseshan, Sathyaprasad S
Parsons, Sarah Elizabeth

TEAM B

Sharon, Erez
Walters, Zachary O'Brien
Zou, Qin
Siwak, Nathan Paul
Solomon, Benyam
Staley, Michelle Elizabeth

Project 7. Profilometer.

Design an optical instrument that will measure the surface profile of an almost flat and smooth surface with a precision of 100nm over an area of 10mm X 10mm.

TEAM A

Stryjewski, Matthew Joseph
Thompson, Daniel Keith
Tran, Martin Q
Tsehaye, Zekre Abay
Vlacich, Daniel Martin
Wahba, Sarah Maria

TEAM B

Wang, Yun Zhen
Williams, Lionel William
Yuan, Yong Kang
Zheng, Yi
Zhuk, Andrey Sergiyovych
Silva, Wendy Selena