Engineering Summer Academy at Penn
Nanotechnology 2016

Welcome to University of Pennsylvania's Summer Nanotech Program!

Nanotechnology, shortened, "Nanotech," is the study of the control of matter on an atomic and molecular scale. Generally, nanotechnology deals with structures of the size 100 nanometers (nm) or smaller, and involves developing materials or devices within that size. There has been much debate on the future implications of nanotechnology. Nanotechnology has the potential to create many new materials and devices with wide ranging applications, such as in medicine, electronics, and energy production. On the other hand, nanotechnology raises many of the same issues as with any introduction of new technology, including the concerns about the toxicity and environmental impact of nanomaterials.

This class with focus on the atomic and molecular structure of nanomaterials and other concepts necessary to understanding why very small systems exhibit unique behavior. We will also explore various applications. Through lecture, class discussion, and labs, we will cover topics in nanomaterials, nanofabrication techniques, imaging technology, real-life applications of nanotechnology, and nanoscience ethics.

Class time and dates:
July 5 – July 22, Monday – Friday, 9AM – 5PM
All students should begin each morning and afternoon in Berger Auditorium unless advised otherwise.

Location:
AM: Laboratory Sessions (225 Skirkanich)
PM: Lecture and other Activities in Berger Auditorium (Skirkanich)

Grading:

Lecture		**Lab**	
Final Presentation	10%	Lab Reports	15%
Final Paper	15%	Lab/Lecture Exam	30%
Final Poster	5%	Poster Preview	5%
Quizzes (2)	10%		
Homework (5)	10%		
	50%		50%

The ESAP - Nano Staff
Instructor: Dr. Marylin Huff
Lecture TA: Sebastian
Laboratory Instructor: Dr. Robert Bucki
Lab TA: Dr Katarzyna Pogoda
Resident TAs: Anthony, Kyra, Amy, Olivia

ESAP - General, ESAP - Nano Lab, ESAP - Nano Lecture, ESAP - Nano Projects, ESAP - Nano Tours/Guests

Mon Jul 4 – Fri Jul 8, 2016 (Eastern Time)

	Mon 7/4	Tue 7/5	Wed 7/6	Thu 7/7	Fri 7/8
				HW1 due	HW2 due
8am					
9am		Welcome Assembly @ Cohen G17 9am - 10:20am	Lab 9am - 10:50am	Lab 9am - 11:50am	
10am		Lab 10:30am - 12:20pm			Tour Prep 9:30am - 10am Singh Characterization Tour (A) Singh Intro Presentation (B)
11am			ISSS Orientation @ Raisler Library Workshop - domestic		Singh Characterization Tour (B) Singh Intro Presentation (A) Tour Debrief 11:30am - 11:55am
12pm		Lunch 12:30pm - 1:20pm	Lunch 12pm - 12:50pm	Jeffrey Babin - Intro to Entrepreneurship 12pm - 1:20pm Lunch 12pm - 12:	Lunch 12pm - 12:50pm
1pm		Lecture 0: Introduction - Mark Allen 1:30pm - 2:50pm	Lecture 3: Lattices 1pm - 1:50pm	Lecture 5: Electron Microscopy 1:30pm - 2:20pm	Lecture 7: NanoFab 1pm - 1:50pm
2pm		Project Option Discussions 3pm - 3:50pm	Project Option Discussions 2pm - 2:50pm	Project Option Discussions 2:30pm - 2:55pm	Project Selections 2pm - 2:50pm
3pm		Lecture 1-2: Atoms/Elements and Bonding	Lecture 4: Nanostructures 3pm - 3:50pm	Lecture 6: Scanning Probes 3pm - 3:50pm	Lecture 8: Bottom Up Fab 3pm - 3:50pm
4pm			Library Workshop - int'l students 4pm - 4:50pm	Quiz 1 4pm - 4:50pm	Overview of Technical Paper 4pm - 4:50pm
5pm					
6pm					

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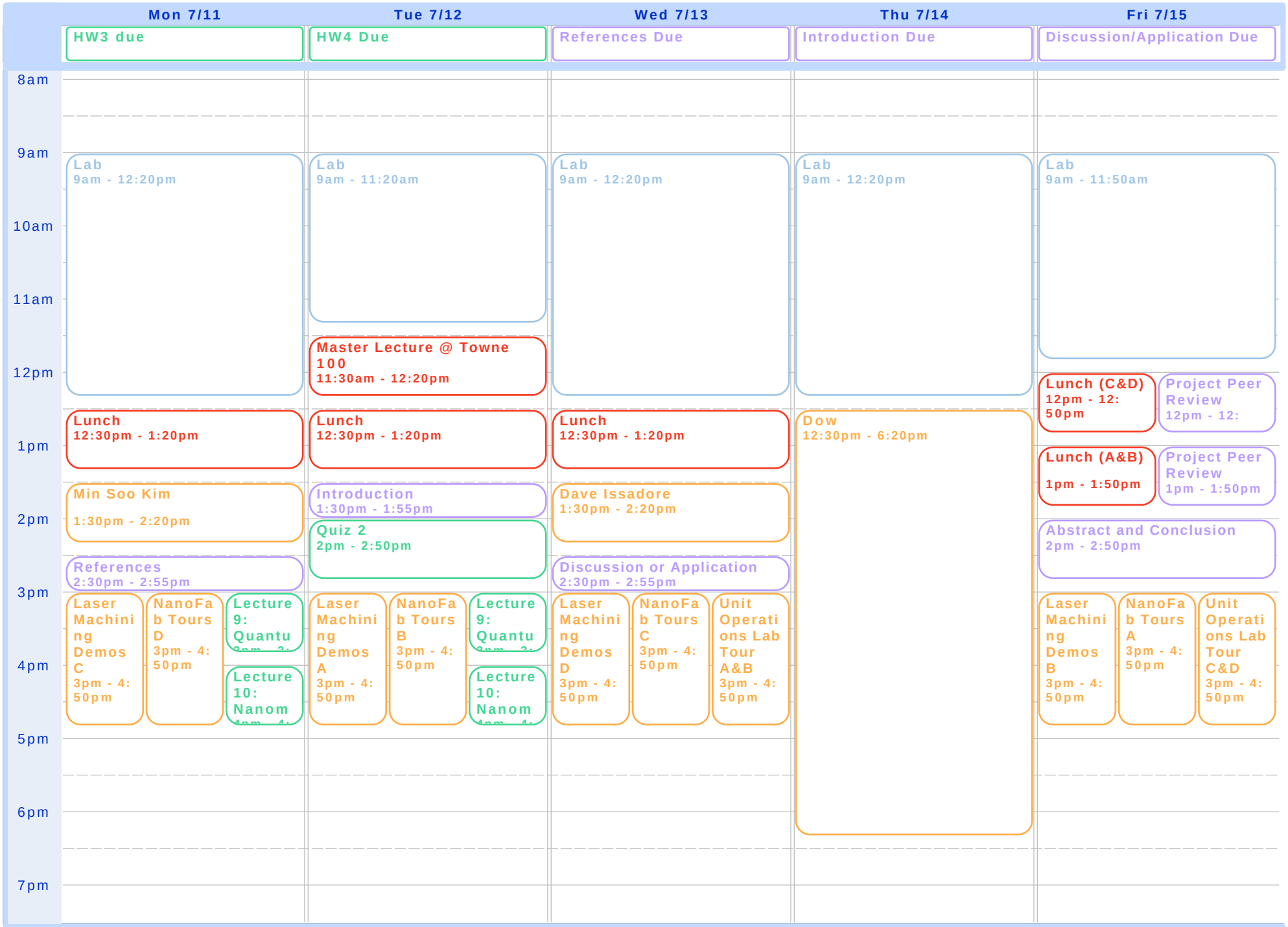
Mon Jul 11 – Fri Jul 15, 2016 (Eastern Time)



ESAP - General, ESAP - Nano Lab, ESAP - Nano Lecture, ESAP - Nano Projects, ESAP - Nano Tours/Guests

Mon Jul 18 – Fri Jul 22, 2016 (Eastern Time)

	Mon 7/18	Tue 7/19	Wed 7/20	Thu 7/21		Fri 7/22
	HW5 Due Abstract Due	Draft Poster Due	Poster Due	Presentation Due		Paper Due
8am						
9am	Lab 9am - 10:50am	Lab 9am - 11:20am	Lab and Lecture Finals 9am - 12:20pm	Lab 9am - 12:20pm		Presentations 9am - 10:20am
10am						Break - Posters 10:30am - 10:55am
11am	Admissions Workshop 11am - 11:50am	Poster Preview 11:30am - 12:20pm				Presentstions 11am - 12:20pm
12pm	Lunch 12pm - 1:20pm	Lunch 12:30pm - 1:20pm	Lunch 12:30pm - 1:20pm	Practice Presentations 12:30pm - 4:50pm	Lunch 12:30pm - 1:20pm	Lunch 12:30pm - 1:20pm
1pm						
2pm	Kate Stebe 1:30pm - 2:20pm	Poster Preview 1:30pm - 2:20pm	Finalize and Submit Posters 1:30pm - 4:50pm			Presentations 1:30pm - 2:50pm
3pm	Lecture 11: Solar Cells 2:30pm - 3:20pm	Lecture 12: Environmental 2:30pm - 3:20pm				Break - Posters 3pm - 3:25pm
4pm	Structuring a Poster 3:30pm - 3:55pm Project work session 4pm - 4:50pm	Structuring a Presentation 3:30pm - 3:55pm Project work session 4pm - 4:50pm				Graduation 4pm - 5:50pm
5pm						
6pm						