Survey of Nanomaterials,
Zhiyuan College, Shanghai Jiao Tong University, July 2016
Professor Thomas Seery

Course Text: Series of papers from the literature.

Schedule: Lectures are on Monday,- Thursday at ????????

Homework: Homework will be assigned each week during lecture and due the following Monday. Homework assignments will consist of brief written responses to the assigned reading based on observations from class discussion.

Evaluation:
There will be two exams
The course grade will be calculated from the scores on exams and homework in the following way:

Exam and Quiz –	50%	1 Exam, 1 Quiz
Homework –	50%	

Contact Information:
Thomas Seery, office: 537 Zhiyuan College, e-mail: thomas.seery@uconn.edu
Office hours: Formally Wed 2-4, Students will be required to meet with Prof. Seery over dinner in small groups at least once during the first 3 weeks. A signup sheet will be provided.

Course Description: At the nanoscale (1-100 nm), materials have unusual properties that derive simply from the size scale alone and that differ from bulk properties in unexpected ways. For example, melting points of nanomaterials may be significantly lower than that of the bulk material, this can be primarily understood as a surface effect. Smaller sized particles increase their surface area substantially. Thus, surface forces take on special significance. Thin films may be fabricated from polymers with thickness of the order of a radius of gyration. Carbon nanotubes have amazing tensile strengths but also highly variable conductivity that makes them candidates for the next generation of molecular electronics. Quantum dots and gold nanoparticles have unusual spectroscopic properties that stem, in part, from their sizes being below the wavelength of visible light

Date	*Lec.#*	Topic
Week 1	*1*	Nanoparticles: Synthesis, Characterization and Properties
	2	Quantum dots, Gold NPs, Oxide and sulfide containing NPs
	3	Microscopy, Scattering, Spectroscopy, Chromatography
	4	Nanoparticles as platforms for thin film studies, synthesis
Week 2	*5*	Polymers as nanomaterials
	6	Block copolymers, synthesis, photoresists, BCP phase diagrams, Microphase separation
	7	Polymers in thin films, physics, applications, Neutron scattering and reflectivity
	8	Exam 1
Week 3	*9*	Nanotubes
	10	Carbon nanotubes, chirality and conductivity, separation and processing
	11	Multiwall and Single wall, Carbon vs Metal nanotubes
	12	Graphene, Graphene oxide, Boron Nitride analogs
Week 4	13	Nanocomposites, Combining the above for new properties
	14	Dispersal and surface forces, Scattering vs microscopy – inverse vs real space
	15	Applications and history, Review
	16	Exam 2