

SPRING 2022 COURSE ANNOUNCEMENT

NANOSTRUCTURE SELF-ASSEMBLY II

ECE 600-03 (special topic)

3 PM MWF

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Self-assembly is one of the most exciting topics in current nanotechnology research. Crude directions and vague instructions given by humans can evolve simply into precisely assembled and positioned nanostructures that can exhibit unusual geometries and functions. This bottom-up process is quite unlike the traditional engineering approach of top-down assembly which requires extremely precise and expensive lithography tools such as electron beam pattern generators or x-ray exposure tools. Course lectures will review the principles of molecular level forces that drive many self-assembly processes, especially at atomic interfaces and in molecularly thin films. In parallel, students will perform individualized literature reviews of current research in nanostructure self-assembly leading to a term paper. In addition to nanotechnology, the course develops fundamentals of relevance to cellular biophysics, microfluidics and soft matter. Current research topics, such as active matter, nanoswarm behavior and nanorobotics will be introduced.

Main texts: J. Israelachvili, *Intermolecular & Surface Forces*

Individualized readings by each student of the current literature

Prerequisites: None. Specifically note that ECE675 *Nanostructure Self-Assembly I* is not a prerequisite. Instead the two courses present complementary approaches to self assembly. Students from all engineering departments, physics, chemistry, biology and molecular biology would find this course to be useful and are invited to attend.