

BMEN6345 - Self-Assembly of Biomaterials

[BMEN 6345](#) Self-Assembly of Biomaterials (3 semester credit hours) This course will introduce students to the emerging and evolving fields of self-assembly and nanoengineered biomaterials. Upon completion of the course students will understand the principles of self-assembly and self-organization of small molecules (e.g. thiols and surfactants), macromolecules (e.g. polymers, block co-polymers, proteins, DNA), and colloidal dispersions. Students will also learn the important role weak non-covalent forces (e.g. ionic bonds, hydrogen bonding, hydrophobic interactions) play in determining the structure of self-assembled systems. Finally students will learn how scientists and engineers are designing and exploiting the principles of self-assembly to produce functional biomaterials and the techniques to characterize these biomaterials from the nano to macro level. Topics to be covered include the following: Introduction to Self-Assembly; Intermolecular and Colloidal forces; Self-assembly in solutions micelles, bilayers, liquid crystals, emulsions; Colloidal Self-Assembly; Self-Assembly at Interfaces; Biomimetic Self-Assembly; Nanoparticles; and Nanostructured Films. Prerequisites: [BIOL 2311](#) and [CHEM 1312](#) and [MATH 2417](#) and [PHYS 2325](#) and instructor consent required. (3-0) Y