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MECHE 167 - MICROSCALE FLUID MECHANICS (3 UNITS)

(Taken from the UC Berkeley Course Guide (http://guide.berkeley.edu))

COURSE OVERVIEW

SUMMARY

Phenomena of physical, technological, and biological significance in flows of gases and liquids at the microscale. The course begins with familiar equations of Newtonian fluid mechanics, then proceeds to the study of essentially 1-D flows in confined geometries with the lubrication equations. Next is a study of the flow of thin films spreading under gravity or surface tension gradients. Lubrication theory of compressible gases leads to consideration of air bearings. Two- and 3-D flows are treated with Stokes' equations. Less familiar physical phenomena of significance and utility at the microscale are then considered: intermolecular forces in liquids, slip, diffusion and bubbles as active agents. A review of relevant aspects of electricity and magnetism precedes a study of electrowetting and electrokinetically driven liquid flows.

PREREQUISITES

40, 106, 109, (106 and 109 may be taken concurrently) Physics 7B or equivalent

Spring only

WORKLOAD

TIME COMMITMENT

X hours of class time. Y hours of hw time/study time.

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COLLEGE OF CHEMISTRY PEER SERVICES

Made by Angela Lee, c/o 2019

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