

UNIVERSITY OF HOUSTON
Department of Civil and Environmental Engineering

CIVE 6390: Municipal Drinking Water Treatment
(Usually offered each Spring Semester)

Catalog data and description:	CIVE6390: Cr. (3-0). Prerequisite or co-requisite: CIVE 6377. Theory and design of unit processes used in conventional drinking water treatment, coagulation, rapid mix, flocculation, sedimentation, filtration, and disinfection. Source water control is also studied.
Course objective:	To provide an in-depth description of important (and emerging) unit processes employed in municipal water treatment.
Professor:	Dr. Shankar Chellam, Assistant Professor of Environmental Engineering
Required textbook:	Lawler, D.F. and Benjamin, M.M. (2002) Water: Physical-Chemical Treatment, McGraw Hill Publishing Company. <i>Textbook in Preparation.</i>
References and suggested reading:	<ul style="list-style-type: none">• Letterman, R.D. (Editor) Water Quality and Treatment, 5th Edition, McGraw Hill, 1999• Mallevalle, J., Odendaal, and Wiesner, M.R. (Editors) Water Treatment Membrane Processes, McGraw Hill, 1996• Tchobanoglous, G. and Schroeder, E.D. <i>Water Quality – Characteristics, Modeling, and Modification</i>, Addison Wesley, 1985.• Scientific journals including, <i>Journal of the American Water Works Association</i>, <i>Environmental Science and Technology</i>, <i>Journal of Environmental Engineering</i>, <i>Water Research</i>, <i>Journal of Colloid and Interface Science</i>, <i>Journal Water SRT – Aqua</i>, <i>Journal of Membrane Science</i>
Prerequisites / co-requisites by topic:	<ul style="list-style-type: none">• Aquatic chemistry• Proficiency in any spreadsheet and graphing program• Calculus with differential equations• Linear algebra
Topics:	<ul style="list-style-type: none">• Health and aesthetic aspects of water quality• Regulations• Coagulation and flocculation<ul style="list-style-type: none">○ Colloid stability and destabilization○ Transport processes in coagulation○ Rectilinear and curvilinear models○ Turbulent flocculation○ Slow coagulation○ Jar testing• Particle size distributions<ul style="list-style-type: none">○ Measurements using electrical sensing zone devices○ Representations• Gravity separations• Media filtration<ul style="list-style-type: none">○ Iwasaki's model○ Clean bed removal○ Headloss○ Filter dynamics• Chemical disinfection<ul style="list-style-type: none">○ Inactivation kinetics○ Chemistry of selected disinfectants• Membrane filtration<ul style="list-style-type: none">○ Cake filtration○ Homogenous solution diffusion