Unstructured-grid modeling for oceans and estuaries
Course numbers: VIMS MSCI 602 (Banner CRN: 27726)

Instructor

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Course outline:

Three modules in total, with ~15 lecture hours and ~15 lab hours.

Module I: mesh generation

Topics	Date	Lecture/lab	Pre-reading materials	Learning goal
Introduction	Jan 23	Overview of the course (recording)		Prepare and learn expectations for this course
SMS	Jan 28	Demo of model workflow in SMS and on Sciclone using the idealized toy case; xmgredit5 video (recording 1)	xmgredit5 tutorial: video 1	Learn the general workflow for SCHISM modeling
	Jan 30	Fundamentals of mesh generation for SCHISM with SMS, Part I (recording 1)	SMS wiki first 6 chapters until 'Modules Overview'; will take ~2 hours to go through	Learn the basics of mesh generation for SCHISM
Mesh generation	Feb 4	Fundamentals of mesh generation for SCHISM with SMS, Part II (recording 1)	A simple tutorial on SMS by Jiabi Du	
	Feb 6	Lab: SMS mesh generation for a toy 2D case (recording 1)	Tutorial by SMS developer Dr. Alan Zundel (including some nice shortcuts)	Do hands-on exercise for mesh generation for a toy case
Hands-on for mesh generation	Feb 11	Lab: Mesh generation for a realistic case (Delaware Bay) (recording 1) Homework#1 due by Feb 25		Do hands-on exercise for mesh generation for a realistic case

Module II: 2D model

Topics	Date	Lecture/lab	Pre-reading materials	Learning goal
2D formulation	Feb 18	SCHISM 2D physics and numerics (recording 1)	Skim over 'Model Formulation' of online manual	Learn some basics on SCHISM 2D

2D setup	Feb 25	[SCHISM 2D setup](#) ([recording 1](#); [recording 2](#))	'Getting started' of [online manual](#)	Learn important inputs for SCHISM 2D
2D lab	Mar 4	[Lab: Set up DEB 2D model](#) ([recording 1](#); [recording 2](#))	[Whitney & Garvine](#)	Apply lessons learned to set up a 2D realistic model
Mid-term project: extend the DEB 2D model to 60 days; add rainfall (<mark>due by March 25</mark>)				

Module III: 3D model

Topics	Date	Lecture/lab	Pre-reading materials	Learning goal
	Mar 11,13	Spring break		
3D fundamentals	Mar 18	3D model physics & numerical formulations (recording 1)	Skim over 'Model Formulation' of online manual	Learn the basics of SCHISM 3D formulations for physics and numerics
Vertical grid	Mar 20	Lab: LSC^2 vertical coordinate system (recording 1)		Learn the vertical grid system of SCHISM
3D setup	Mar 25	3D model setup procedure (recording 1)	Skim over 'Inputs/outputs' of online manual	Learn details on how to set up SCHISM3D
3D lab	Mar 27	Lab: set up the toy case in 3D (recording 1) Homework#2 due by April 10		Practice 3D model setup using the toy problem
3D lab	April 1	Lab: set up DEB 3D (recording 1; recording 2) Homework#3 due by April 17		Practice 3D model setup for Delaware Bay
Eddying regime	April 3	Meshing in eddying and transitional regimes (recording 1)		Learn the basics of meshing in eddying and cross regimes
Eddying regime	April 8	Lab: Set up the Guam case (recording 1)		Practice lessons on vertical grid, eddying regime on a realistic case
Wrap-up	April 15	3D model calibration (recording 1;)		Learn the tips on how to calibrate SCHISM
Final project	April 17	Final project overview: Kuroshio (or your own domain) (10 femto nodes reserved)	Yu et al. (2017)	Practice skills for setting up cross-scale applications with SCHISM