جامعة الملك عبدالله
للعلوم والتقنية
King Abdullah University of
Science and Technology

Course Syllabus: Surface Hydrology - EnSE 222

Division	Biological and Environmental Sciences & Engineering Division
Course Number	EnSE 222
Course Title	Surface Hydrology
Academic Semester	Spring
Academic Year	2017/2018
Semester Start Date	01/28/2018
Semester End Date	05/24/2018
Class Schedule (Days & Time)	02:30 PM - 04:00 PM | Mon Wed

Instructor(s)

Name	Email	Phone	Office Location	Office Hours
Matthew Francis McCabe	Matthew.McCabe@kaust.edu.sa	+966128082882		Tue1430-1600. Send an email to matthew.mccabe@kaust.edu.sa to arrange an appointment outside of these times

Teaching Assistant(s)

Name	Email

Course Information

Comprehensive Course Description	The objective of this course is to introduce hydrology as both a science and as an engineering practice, particularly as relates to its application in water resources management and estimation. Students will have the opportunity to develop their theoretical knowledge on key aspects of hydrology, along with a more applied appreciation of monitoring and modeling hydrological processes. Topics that will be developed include understanding the Earth's water and energy cycles, describing and monitoring components of the hydrological cycle, and modeling aspects of hydrological systems. The course will develop knowledge on topics ranging from climatology, atmospheric circulation and meteorological measurements, as well as more detailed investigations into precipitation, streamflow measurement, hydrograph analysis, storm runoff and concepts in flood estimation and routing. A discussion on the consequences of a changing climate on Earth's water and energy cycles – particularly as relates to our understanding of hydrological systems – will also be explored.
Course Description from Program Guide	Fundamentals of surface hydrology, the hydrologic cycle, hydrologic processes, and water management with an emphasis on arid lands

Goals and Objectives	By the end of this course, the student will have gained competency in: -understand and quantify the flow of water and energy within the earth system -theoretical basis of hydrology -measurement and modeling of hydrological cycle components -estimating flood impacts and routing of flow in natural systems -understanding and intepretation of climate change and its related impacts on water and human settlements -a broader appreciation of water (and related food) security issues The course seeks to balance theoretical knowledge with practical applications of the science.
Required Knowledge	None.
Reference Texts	Course notes are provided. Reference text-book availabe in the library include: Physical Hydrology, by S.L. Dingman, 2nd Edition
Method of evaluation	**7.50**% - Course Project(s) **5.00**% - Scientific review article presentation **7.50**% - Problem sets **30.00**% - Midterm exam **20.00**% - Homework /Assignments **30.00**% - Final exam
Nature of the assignments	The Course Projects will consist of two or three laboratory exercises, undertaken in the hydrology lab or on campus. A brief report (approx. 3 pages) describing the laboratory motivation, objective, experimental set-up/methodology, results and discussion will be required to hand-in for assessment. These will contribute 7.5% There will be two assignments that will contribute a total of 20%. There will be approximately 5 tutorial hand-ins throughout the course for a total of 7.5%. A final course presentation on a topic of the students choice (related to hydrology) will be due at the end of semester (usually based around a published journal paper) is worth 5% The remaining assessments (60%) will be based on the mid-semester and final exam, which the student is required to pass.
Course Policies	A student should email the instructor to notify them of any absences during the semester. No extensions for assignments or tutorials will be provided without prior discussion with the instructor and will be at their discretion. Usually, students will need to pass both the mid-term and final examinations to achieve a pass mark in the course.
Additional Information	

Tentative Course Schedule *(Time, topic/emphasis & resources)*		
Week	**Lectures**	**Topic**
1	Mon 01/29/2018 Wed 01/31/2018	Course introduction. Basic hydrometeorology, weather and climate
2	Mon 02/05/2018 Wed 02/07/2018	Global and regional energy budgets: concepts and definitions
3	Mon 02/12/2018 Wed 02/14/2018	Global and regional water budgets: concepts and definitions
4	Mon 02/19/2018 Wed 02/21/2018	Catchment hydrology, delineation and rainfall processes
5	Mon 02/26/2018 Wed 02/28/2018	Measuring and monitoring the hydrological cycle: precipitation
6	Mon 03/05/2018 Wed 03/07/2018	Measuring and monitoring the hydrological cycle: soil moisture and infiltration
7	Mon 03/12/2018 Wed 03/14/2018	Measuring and monitoring the hydrological cycle: evaporation
8	Mon 03/19/2018 Wed 03/21/2018	Laboratory and mid-semester exam
9	Mon 03/26/2018 Wed 03/28/2018	Measuring and monitoring the hydrological cycle: streamflow and runoff
10	Mon 04/02/2018 Wed 04/04/2018	Rainfall processes: recurrence intervals and intensity-frequency-duration
11	Mon 04/09/2018 Wed 04/11/2018	Hydrograph analysis, flow generation and runoff prediction
12	Mon 04/16/2018 Wed 04/18/2018	Climate change and variability: hydrological context and understanding the past
13	Mon 04/23/2018 Wed 04/25/2018	Climate change and variability: impacts on water resources
14	Mon 04/30/2018 Wed 05/02/2018	Laboratory and Student Presentations
15	Mon 05/07/2018 Wed 05/09/2018	Final Exam
16	Mon 05/14/2018 Wed 05/16/2018	
17	Mon 05/21/2018 Wed 05/23/2018	
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Note

The instructor reserves the right to make changes to this syllabus as necessary.