ERE445/645:
HYDROLOGIC MODELING
SYLLABUS

Professor:	Chuck Kroll	424 Baker Lab	cnkroll@esf.edu
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Office Hours:	To be announced		
Mailbox:	Outside Baker 402		
Lectures::	Mondays and Wednesdays 2:15 pm – 3:30 pm, Baker 310		

Course Description: Three hours of lecture per week. An exploration of deterministic and stochastic hydrologic models, model development, and the use of computer programming to construct, calibrate, manipulate, and interpret hydrologic models. Theoretical and analytical approaches to describing hydrologic processes, including precipitation, evapotranspiration, infiltration, surface runoff, percolation, and groundwater discharge. Stochastic techniques include frequency, trend, and regression analyses. Fall. Note: Credit will not be granted for both ERE 445 and ERE 645.

Prerequisites: Introductory computer programming, Probability and Statistics, one year of Calculus.

Course Packet/Text: Course packet (for sale at SUNY ESF Copy Center)

There is no text required. You will be provided numerous handouts and reading, but to supplement this some suggestion are:

> Maidment's *Handbook of Hydrology*, 1993, McGraw-Hill
> > An excellent reference book on hydrology and hydrologic processes
> A general book on hydrology
> > Any hydrology book would be useful
> A general book on probability and statistics
> > The *Handbook of Hydrology* provides excellent summaries, but a good
> probability and statistics text is useful

Grading: 72% Assigned Problems, Projects and Presentations
28% Final Exam/Quizzes (20%/8%)

Course Objectives:
a) To develop and improve your computer programming and data manipulation skills
b) To gain experience in the development and programming of stochastic and deterministic hydrologic models
c) To introduce you to commonly employed rainfall-runoff models and modeling techniques, and to investigate the performance of some of these models
d) To critically evaluate some hydrologic publications, models, and modeling results
e) To provide an introduction to physics based and empirical models for hydrologic phenomenon, such as:

| Precipitation | Infiltration | Evapotranspiration |
| Groundwater Discharge | Runoff Mechanisms | Streamflow |

f) To introduce you to various literature sources that may aid you in future modeling efforts

Program Learning Objectives:
By the end of this course, students will have reinforced their ability:
a) To use the techniques, skills, and modern engineering/science tools necessary for engineering/science practice (ABET outcome k)

College Learning Outcomes:
This course will contribute to students achieving the following College-wide learning outcomes:
a) Quantitative Reasoning: Students will be able to effectively describe, interpret, apply, and evaluate quantitative information.
b) Communication: Students will be able to formulate and present ideas that reflect critical thinking skills and show awareness of audience, context, and purpose, and present a well-developed argument
c) Technological and Information Literacy: Students will be able to: use critical thinking skills to determine the information needed to solve a problem, access information using appropriate technologies, and effectively and appropriately use information to accomplish a specific purpose.
d) Critical Thinking: Students will be able to: identify, analyze, evaluate, and develop well-reasoned arguments.

Problem Sets:
a) There will be a number of assigned programming/modeling problems throughout the semester
b) Most problems will require the development of a mathematical model, construction of an appropriate computer program, and use of the program to solve the problem
c) Your code must be well documented, with all variables clearly defined at the beginning of the program!
d) You may freely discuss methods, programs, and results with anyone. However, you must complete your own analyses, programming, and write-ups. This write-up should be professional (i.e. clear and concise), but does not need to be typed.

Academic Dishonesty:
Academic dishonesty is a breach of trust between a student, one's fellow students, or the instructor(s). By registering for courses at ESF you acknowledge your awareness of the ESF Code of Student Conduct (http://www.esf.edu/students/handbook/StudentHB.05. pdf), in particular academic dishonesty includes but is not limited to plagiarism and cheating, and other forms of academic misconduct. The Academic Integrity Handbook contains further information and guidance (http://www.esf.edu/students/integrity/). Infractions of the academic integrity code may lead to academic penalties as per the ESF Grading Policy (http://www.esf.edu/provost/policies/documents/GradingPolicy. 11.12.2013.pdf).

Sources of Support and Class Absence:
If you experience academic or personal difficulties that affect your studies or life, there are people and resources that will help you. There is a website that serves to answer many student questions: http://www.esf.edu/students/success. In addition, the ESF Office of Student Life, 110 Bray Hall (470-6660) will provide academic support, career guidance, personal counseling, or direct you to the proper source of help. If you encounter a situation beyond your control in which you will be missing 3 or more days of classes, you should contact the Office of Student Life and they will get in touch with all your instructors for you. Supportive documentation may be required.

Accommodations for Students with Learning and Physical Disabilities:
SUNY-ESF works with the Office of Disability Services (ODS) at Syracuse University, who is responsible for coordinating disability-related accommodations. Students can contact ODS at 804 University Avenue- Room 309, 315-443-4498 to schedule an appointment and discuss their needs and the process for requesting accommodations. Students may also contact the ESF Office of Student Affairs, 110 Bray Hall, 315-470-6660 for assistance with the process. To learn more about ODS, visit http://disabilityservices.syr.edu. Authorized accommodation forms must be in the instructor's possession one week prior to any anticipated accommodation. Since accommodations may require early planning and generally are not provided retroactively, please contact ODS as soon as possible.

Inclusive Excellence Statement:
As an institution, we embrace inclusive excellence and the strengths of a diverse and inclusive community. During classroom discussions, we may be challenged by different ideas. Understanding individual differences and broader social differences will deepen our understanding of each other and the world around us. In this course, all people are strongly encouraged to respectfully share their unique perspectives and experiences. This statement is intended to help cultivate a respectful environment, and it should not be used in a way that limits expression or restricts academic freedom at ESF.

Religious Observance:
ESF protects the rights of students to observe religious holy days according to their tradition. Students will be provided an opportunity to make up any exam or work requirements that may be missed due to a religious observance provided they give the instructor reasonable advance notification.