Hydrometeorology and Lab
Course 35942

Syllabus

Instructor	Prof. Seon Ki Park (hydromet.ewu@gmail.com; spark@ewha.ac.kr) Room 459, Engineering Building B
Room/Time	Room B152, Engineering Building B Tue. 08:30~10:45, Fri. 11:00~12:15
Office Hours	By appointment only. E-mail correspondence is strongly encouraged.
Class Limit	Due to limitation in computer lab, it is limited to first 30 students.
Course Description	Hydrology is "water science" and studies the occurrence and movement of water by integrating various physical, chemical and biological processes above, on, and beneath the surface of the Earth. Forecasts of hydrological factors are central elements of solving many agricultural and environmental problems. For correct forecast of the occurrence and movement of water, information on precipitation from meteorological systems is also essential. More recently a new science called Hydrometeorology has emerged to fill the gap between hydrology and meteorology. In this course, we will study the global view of interactions among hydrology, meteorology and climate, and how they contribute to the water cycle on the earth. Land surface is at the core of such interactions, thus dynamical and physical processes of the land-atmosphere interaction will be addressed.
Texts and References	1. Eagleson, P.S., 2003: *Dynamic Hydrology*, European Geophys. Union, 462 pp. 2. Dingman, S.L., 2002: *Physical Hydrology*, 2nd Ed., Prentice Hall, 646 pp. 3. Brutsaert, W., 2005: *Hydrology, An Introduction*, Cambridge, 605 pp. 4. Wiesner, C. J., 1970: *Hydrometeorology*, Chapman & Hall, 232 pp. 5. Hornberger, G.M., J.P. Raffensperger, P.L. Wiberg, and K.N., Eshleman, 1998: *Elements of Physical Hydrology*. Johns Hopkins University Press, 302 pp. 6. Lakshmi, V., J. Albertson, and J. Schaake, Eds., 2001: *Land Surface Hydrology, Meteorology and Climate - Observations and Modeling*. Amer. Geophys. Union, 246 pp.

Course Structure	Oral Lecture; Oral Presentations by Students (fully in English); Some lab works may be included.
Course Requirements	Prerequisites: Engineering Mathematics or equivalent
Assignments	• Problems, Computer problems • Essay (English) • Lab analysis • Term project: Oral presentation as a team
Assessment and Grades	• Attendance and Participation (5%) • 3-minute Oral Presentation (5%) • Short Quiz (13%) • Homework (17%) • Term Project (20%) • Comprehensive Final (40%)
Important Notes	1. If you attend less than 5/6 of the total lectures, your academic record will be F. 2. Homework is due by 5 pm on the date announced. Students will be assessed a 20% penalty per day for late work, and work will not be accepted more than 2 days beyond the announced due date. 3. Submitting homeworks in time is very important! If you do not submit your homework once, you cannot get A. If you do not submit 4. your homework twice, you are guaranteed to get no better than C. I will strictly apply this rule no matter how good your records are in the exams.

Lecture Schedule

Week	Lecture Contents	Lab and Software
Week 1 (3/2, 3/5)	Introduction; Hydrological Cycle; Transport Processes in the Atmosphere and Oceans	
Week 2 (3/9, 3/12)	Transport Processes in the Atmosphere and Oceans; Physical Properties of the Atmosphere	Review of Basics
Week 3 (3/16, 3/19)	Physical Properties of the Oceans and Lakes	Thermodynamic diagram
Week 4 (3/23, 3/26)	Energy Balance of the Earth	Thermodynamic diagram
Week 5 (3/30, 4/2)	General Circulations of Atmosphere and Oceans;	Thermodynamic diagram
Week 6 (4/6, 4/9)	Cloud and Precipitation Physics (I)	Weather Chart
Week 7 (4/13, 4/16)	**Mid-term Exam** (Apr. 13, 8:30~10:30 AM) Cloud and Precipitation Physics (II)	
Week 8 (4/20, 4/23)	Precipitation Analysis (I)	FORTRAN Programming
Week 9 (4/27, 4/30)	Precipitation Analysis (II)	FORTRAN Programming
Week 10 (5/4, 5/7)	Land Surface Processes (I)	FORTRAN Programming
Week 11 (5/11, 5/14)	Land Surface Processes (II)	Software
Week 12 (5/18, 5/21)	**Term Project Presentation** (May 18, 8:15~10:45 AM) Land Surface Processes (III)	
Week 13 (5/25, 5/28)	Remote Sensing of Hydrometeorological Problems	Software
Week 14 (6/1, 6/4)	Climate Change and Water Cycles	Software
Week 15 (6/8, 6/11)	**Final Exam** (Jun. 8, 8:30~10:30 AM) Wrap-up	