

January 12, 2010

PRELIMINARY LECTURE AND LAB SCHEDULES

1. Hydrology and Water Resources Management

Topics to be covered include:

The hydrologic cycle, rainfall-runoff analysis, hydrograph theory, infiltration, evaporation, runoff, soil water balance analysis, design rainfall analysis, flood frequency analysis, probable maximum flood theory, deterministic and stochastic analysis of precipitation and runoff, water quantity and quality measurements, wells and groundwater flow, hydrologic models, design coefficients, hydrologic and hydraulic routing, reservoir analysis, river basin management, principles of integrated water resources management, institutional, legal and economic aspects of basin management plans, collection and management of hydrologic data.

Day	Lecture topic
1	Introduction, explanation of course syllabus, the hydrologic cycle, infiltration, evaporation, runoff, soil water balance analysis
2	Design rainfall analysis, rainfall-runoff analysis, probability theory, design storms, recurrence intervals
3	Hydrograph theory, flood frequency analysis, probable maximum floods; hydrograph synthesis
4	Design coefficients, runoff and flood control measures, basin plans
5	Groundwater theory, wells and groundwater flow
6	Deterministic and stochastic analysis of precipitation and runoff, hydrologic models
7	Hydrologic and hydraulic routing, reservoir analysis,
8	Principles of integrated water resources management
9	Institutional, legal and economic aspects of basin management plans
10	Collection and management of hydrologic data

Lab period	Exercise
1	Water quantity and quality measurements
2	Advanced hydrologic instrumentation

3	Computer simulation models
4	Computer simulation exercises cont'd
5	Demonstration of fluid flow principles – UG hydraulics lab
6	Field visit to EDWC
7	Field visit to GWI and drilling site
8	Hydrology lab exercise at UG
9	Field visit organized by NDIA, Hydromet
10	Infiltration exercise at UG – Mr. Jackson

2. Drainage and Irrigation

Topics to be covered include:

Crop water relations, drainage for crop productivity, water table management, design drainage criteria, drainage for flood control, drainage modeling, design of surface drainage systems, design of subsurface drainage systems, canal drainage and hydraulic theory, pipe and open channel hydraulics, water control structures, pumps, drainage construction techniques and equipment, drainage models, irrigation water requirements, irrigation technologies, reference crop evapotranspiration and modeling crop water modeling and, irrigation scheduling, soil moisture monitoring techniques, irrigation efficiencies, irrigation and drainage project planning, assessing the performance of irrigation and drainage systems, institutional and economic aspects.

Day	Lecture topic
1	Introduction, explanation of course syllabus, objectives of irrigation and drainage, crop water relations, soil water properties
2	Drainage for crop productivity, water table management, design drainage criteria
3	Drainage for flood control, drainage system components, and drainage for urban and rural development
4	Pipe and open channel hydraulics, canal drainage and hydraulic theory
5	Design of surface drainage systems; drainage outlets
6	Design of subsurface drainage systems
7	Drainage construction techniques and equipment
8	Water control structures, pumps
9	Irrigation water requirements, irrigation technologies
10	Irrigation and drainage project planning, assessing the performance of irrigation and drainage systems, institutional and economic aspects.
Lab period	Exercise
1	Field visit to MMA
2	Field visit to GUYSUCO estate
3	Drainage simulation models

4	Drainage simulation models cont'd
5	Field visit to Canal Polders and pumping station
6	Flow through porous media lab at UG
7	FAO CROPWAT modeling exercise
8	Irrigation modeling cont'd
9	Field or lab exercise on irrigation efficiencies
10	Soil moisture demonstration and calibration exercise

3. Hydraulic Structures and Geotechnical Investigations

Topics to be covered include:

Storage dams, embankments, earthworks engineering, river protection works and training structures, diversion works, sluices and outfall structures, drop structures, conveyance and control structures, culverts, soil mechanics, geotechnical investigations, slope stability analysis, seepage control, foundation design, geotextiles, soils and engineering construction, pore water pressure, consolidation, compaction.

Day	Lecture topic
1	Introduction, explanation of course syllabus, soil mechanics, pore water pressure, consolidation, compaction.
2	Geotechnical investigations, slope stability analysis
3	Earthworks engineering, earthmoving equipment
5	Seepage control, foundation design, geotextiles
6	Soils and engineering construction, piles, cofferdams
7	Storage dams, embankments
8	River protection works and training structures,
9	Sluices and outfall structures, drop structures
10	Conveyance and control structures, culverts, diversion works

Lab period	Exercise
1	Soil particle size distribution and grain size analysis – UG lab
2	Compaction and consolidation – UG lab
3	Shear strength and triaxial tests – UG lab

5	Field visit to EDWC and in situ soils investigations – arranged by NDIA
6	Field visit for borehole tests – arranged by UG
7	Field visit to sea and river defence projects – arranged by Ministry of Agriculture and UG
8	Lab or field studies
9	Lab or field studies
10	Visit to private soils lab