Course Syllabus for

Advanced Soil and Water Conservation Engineering

AGET 720

Department of Agriculture & Natural Resources
College of Agriculture & Applied Sciences

Course Title: Advanced Soil and Water Conservation Engineering (3)
Course Discipline: Agricultural Engineering Technology (AGET)
Course Number: AGET 720
Classification: Graduate
Credit: 3 hours
Clock Hours: Modular presentation via the Internet
Course Prerequisites: MSANR Systems Science in Agriculture elective

Instruction Type: Web-based-Online (Blackboard and audio enhanced PowerPoint)

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Office Hours: 9:00 AM to 12:00 Noon Mon – Fri

Person with a Disability: Any student eligible for and requesting academic accommodation due to a disability is requested to provide a letter of accommodation from PACE (Phone: 587-7195, Location: Gooch Hall, Rm 124) or Student Academic Support (Phone: 587-7744, Location: Clement Hall Rm 208). Please submit this documentation during the first 2 weeks of the semester.


Lecture Format: Lecture modules will be posted using the UTM Blackboard interface. It is the student’s responsibility to explore and complete each module by the assigned date (as determined by the instructor). This is NOT a self-paced course. It is NOT a self-study. It is NOT a correspondence course. Quizzes and cases studies will be assigned and completed by the student according the instructor posted due date. Mid-term and Final Examinations will follow the published UTM calendar for the semester the course is offered.
COURSE REQUIREMENTS/EXPECTATIONS

Grading: 35% - Online Quizzes/Homework Problem Submissions  
25% - Literature Review/Writing on Selected S&W Topics  
20% - Mid-term Exam (proctored)  
20% - Final Exam (proctored)

Grade Assignment:  
89.6 – 100 average = A  
80 – 89.5 average = B  
70 – 79.5 average = C  
65 – 69.5 average = D  
< 65 average = F

Punctuality: Each lecture module and associated assignments will have a definite completion date (as assigned by the instructor). Assignments, case studies, quizzes, etc. turned in after the posted due date will receive a 10-point (letter grade) deduction per day late.

COURSE PURPOSE, GOALS, AND OBJECTIVES

Catalog Description: **Advanced Soil and Water Conservation Engineering (3).** To provide the student with a thorough foundation for formulating and solving soil and water conservation engineering problems. Topics will include: Hydrologic Frequency Analysis, Rainfall Runoff Estimation, Open Channel Hydraulics, Hydraulics of Structures, Sediment Properties and Transport, Erosion and Sediment Yield, Sediment Control Structures, Groundwater, monitoring Hydrologic Systems, and Hydrologic Modeling.

Course Purpose, Goals & Objectives: To find optimal solutions for soil and water related problems.

Student Outcome: For the student to be competent in formulating and applying soil and water engineering principles to solve real-world problems.
AGRI 772 Advanced Soil and Water Conservation Engineering
(This outline is subject to change based on class progress and the instructor’s discretion.)

Using Blackboard
  i.1 Navigating the Blackboard shell
  i.2 Communicating using Blackboard
  i.3 Using the Digital Drop Box
  i.4 Uploading and downloading files

I. Introduction to Soil and Water Principles
  The Problem
  General Considerations
  Accepted Design Practice versus State of the Art

II. Hydrologic Frequency Analysis
  Return Period and Probability
  Risk Analysis
  Frequency Determinations
  Special Considerations
  Discussion of Flood Frequency Determinations

III. Rainfall Runoff Estimation in Stormwater Computations
  Hydrologic Cycle
  Precipitation
  Abstractions from Precipitation
  Runoff Estimation
  Estimation of Peak Runoff Rates
  Long Term Water Balances

IV. Open Channel Hydraulics
  Basic Relationships
  Uniform Flow
  Design of Open Channels
  Gradually Varied Flow
  Channel Transitions
  Hydraulic Jump

V. Hydraulics of Structures
  Introduction to Structures
  Hydraulics of Flow Control Devices
  Hydraulics of Culverts
  Hydraulics of Emergency Spillways
  Culvert Outlet Protection
VI. Sediment Properties and Sediment Transport
Basic Principles of Sedimentation
Particle Size Classification
Developing Particle Size Distribution Data
Sediment Transport

VII. Erosion and Sediment Yield
Introduction
Fundamental Erosion Modeling
Rill and Interrill Erosion Modeling - USLE and RUSLE Empirical Models
Estimating Sediment Yield
Predicting the Time Distribution of Sediment: a Sedigraph
Process-based Erosion Models: CREAMS Semitheoretical Rill and Interrill Model

VIII. Sediment Control Structures
Sediment Detention Basins
Constructed Wetlands
Vegetative Filter Strips and Riparian Vegetation
Porous Structures: Check Dams, Filter Fences, and Straw Bales
Sediment Traps
Inertial Separation: the Swirl Concentrator
Systems Approach to Sediment Control

IX. Groundwater
Channel Classification
Channel Morphology.
Alluvial Channel Bedform
Flow Resistance
Channels in Regime
Gravel Channels
Modeling Channel Response to Change
Dynamic Channel Response to Change

X. Monitoring Hydrologic Systems
Location of Groundwater Provinces
Basic Concepts of Groundwater Hydraulics
Fracture Rock Hydrology
Movement of Pollutants