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)
Instructor:	Timothy N. Burcham, P.E., Ph.D. Professor & Gilbert Parker Chair of Excellence
Address:	254 Brehm Hall, Univ. of Tennessee at Martin, Martin, TN 38238
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Phone:	(731) 881-7275 (Office) (731) 881-7968 (FAX)
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.
Textbook:	Design Hydrology and Sedimentology for Small Catchments. Authors: E.T. Haan, B.F. Barfield, and J.C. Hayes. Academic Press. Copyright 1994, 1981. ISBN: 0-12- 312340-2
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
F low 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 y Groundwater Hydraulics
Fracture Rock Hydrology
Movement of Pollutants