水土保持系

Department of Soil and Water Conservation

(一) 必修科目 Required Courses

376001 專題討論(一) 2 必 李錦育 上、下

本課程為四學期課程，旨在訓練研究生彙整蒐集與水土保持或碩士論文有關參考文獻與試驗方法，經閱讀後整理成摘要，然後提出報告、討論。第一、二學期，每一學生必須針對其有關碩士論文進度做口頭報告，並由參與教師評分。

376001 Seminar I 2 R C. Y. Lee , F, S

There is four semesters in this course. The course is mainly designed to train graduate students to sort out the reference literatures, material and method of soil and water conservation or their master thesis. A sequence of training may promote the ability of academic lecture for students, which are required to search and review literature and draw up a brief, then presentation and discussion will convene in the course. The presentation is scheduled for every student once a semester. In the first and second semesters, each student is required to present on the schedule of his master thesis. Their performance is evaluated by the faculty member.

376002 專題討論(二) 2 必 唐琦，上、下

本課程為四學期課程，旨在訓練研究生彙整蒐集與水土保持或碩士論文有關參考文獻與試驗方法，經閱讀後整理成摘要，然後提出報告、討論，藉以提升學術講演表達能力。後二學期，每一學生必須針對其有關碩士論文主題做口頭報告，並由參與教師評分。

376002 Seminar II 2 R C. Tang, F, S

There is four semesters in this course. The course is mainly designed to train graduate students to sort out the reference literatures, material and method of soil and water conservation or their master thesis. A sequence of training may promote the ability of academic lecture for students, which are required to search and review literature and draw up a brief, then presentation and discussion will convene in the course. The presentation is scheduled for every student once a semester. In the last two semesters, each student is required to present on the topic involving his master thesis. Their performance is evaluated by the faculty member.

376003 碩士論文 6 必 吳嘉俊，上、下

本課程為研究生畢業之前的必修課程，主要針對論文主題進行試驗研究、資料收集與分析、學位論文撰寫、論文答辯等。

376003 Thesis 6 R C. C. Wu，F,S

This is the last required course that graduate students need to take before completion of a master degree. This course is mainly allocated for the execution of experiment or theory derivation, data collection, data analysis, thesis writing, oral presentation and final defense.

二、選修科目 Elective Courses

376004 文獻選讀 2 選 許中立

本課程之目的係由教師輔導學生選定其有興趣之研究題目，進行文獻收集、閱讀及討論分析，並將結果整理撰寫成摘要後提出報告。

376004 Literature Review 2 S C. L. Hsu

The purpose of this course is to let each student will select a research topic of interest, by searching and reviewing literature or reporting result of their experiments and presenting at least once a semester.

3760005 數值分析 3 選 吳嘉俊

本課程旨在介紹以數值分析求取工程相關問題組構方程式的求解技巧，藉由對各個數值分析方法的理論推導、電腦程式的撰寫、流程圖的介紹等，讓學生得以瞭解數值分析求解的方便。本課程教授的內容包含：內插與近似解求解技巧、數值積分技巧、矩陣求解技巧、聯立方程式求解技巧、微分方程與偏微分方程求解技巧等。

376005 Numerical Analysis 3 S C. C. Wu

This course is emphasized to problem formulation and mathematical analysis which leads to the construction of solution algorithm or procedure suitable for execution on a computer. Through computer derivation of formulas, work examples, and flow charts, students should gain an appreciation of what to expect during the implementation of particular numerical techniques. The following subjects will be covered in the course depended upon students' ability in computer programming and comprehension: interpolation and approximation, numerical integration, matrices operation, systems of equations, approximation of ordinary and partial differential equations.

376006 高等應用數學 4 選 李明熹

本課程將純數理論中之代數、分析及幾何等議題，彙整成應用數學的基礎架構，利用統計應用軟體，如 SPSS、MAPLAB、Mathmatics，使學生具備應用數學之知識與實作之能力。

376006 Advanced Applied Mathematics 4 S M. H. Lee

This course included the topics of algebra, analysis and geometry in mathematics theory. Using the applied statistics software such as SPSS、MAPLAB and MATHEMATICS to provide applied mathematics knowledge for objective basis to study. To make the students possess the ability of knowledge and practice in applied mathematics is the major purpose in this course.

376007 水土保持學 3 選 吳嘉俊

本課程主要的目的是專門為大學分本科系畢業但進入本系攻讀碩士學位的學生所開設的課程，主要的授課內容在於教導學生基本的水土保持概念，其中包含水土保持概論、坡地保育、水土保持工程、植生工程，土石流防治與生態工程等。

376007 Soil and Water Conservation 3 S C. C. Wu

This course is offered specifically for those who graduated from disciplines other than soil and water conservation but currently enrolled in the Department. Therefore, this course will cover the brief introduction of soil and water conservation, slopeland conservation, soil and water conservation engineering, debris-flow mitigation, and eco-engineering.

3760008 水土保持試驗設計 2 選 許中立

本課程在於講授如何安排水土保持之試驗處理，以求得較精確之結果。隨試驗因子、環境因子之不同而各有適用於不同條件的試驗設計分析方法。完全逢機、逢機完全區集、拉丁方格、交叉設計、複因子試驗、裂區設計、變積分析、平方和劃分等之原理與分析方法之介紹，以及各種設計之應用與問題資料之處理方法等均提出討論。

376008 Experimental Design 2 S C. L. Hsu
for Soil and Water Conservation

The purpose of this course is to introduce the principles and techniques of experimentation for soil and water conservation. Completely randomized, randomized complete block and Latin square designs, the factorial experiment, cross-over designs, split-plot design and other designs, covariance analysis, partition of sum of square are included in this course. Application of designs and data management will also be considered.

376009 水土保持研究方法 2 選 許中立

本課程之目的，在幫助學生了解水土保持研究的過程，使其能順利且有效地執行一項研究計畫，以解決管理上的各種問題。課程內容包括研究計畫書的撰寫與評估、研究設計的方法、資料收集的方式、資料分析、以及研究成果報告的表達。

376009 Special Topic of Research 2 S C. L. Hsu
Techniques for Soil and Water **Conservation**

The purpose of this course is to provide students with the knowledge and skills of scientific method they need to solve the problems and meet the challenges of a fast-paced decision-maki ng environment. The contents of this course include introduction to soil and water conservation research, design of research, the sources and collection of data, and analysis and presentation.

376010 坡地保育規劃特論 3 選 許中立

本課程旨乃以國土綜合開發與保育觀念出發，針對坡地合理之開發進行分析與規劃方法探討，由區域性基本資料調查所建立之資料庫，結合水文、水理分析方法與力學理論分析予以合理之規劃配置，使學生具備坡地開發與規劃之知識與實作之能力。

376010 Special Topic of Slopeland 3 S C. L. Hsu
Conservation Planning

The purpose of this course is from the country conservation planning viewpoint to focus on the analytical and planning methods for slopeland development reasonably. Establish the local database from primary surveying and experimentation at planned area is the necessary step in this course. Therefore, methods of layout safe and

reasonable constructions and maintain by the hydrology, hydraulic and mechanical theory analysis will be introduced. To make the students possess the ability of development and planning in slopeland is the major purpose in this course.

376011 工程地質學 3 選 陳天健

本課程旨在講述應用地質學知識與工程技術分析及解決生活環境上需求問題。其主要內容在介紹工程與地質之互動及其關係，依序地質作用、地質材料、地質構造、及地質環境因素如地形、板塊運動、活動斷層，以及工程調查及分析計量化之應用方法；另外坡地災害分析及野外調查實習等亦在本課程中論及，以增進學生水土保持實務技能。

376011 Engineering Geology 3 S T.C. Chen

The course comprehends the methodology of analysis and deal with the problems of human environments with geological knowledge and engineering technical. Contents show the influence and interaction between engineering and geology, include subjects of geology process, material factor, geological structures, and environmental factors of geology, such as geomorphology, plate tectonic motion and fault effect. As well as the method of engineering investigation and quantified of influence parameters. Last, the reconnaissance for slopeland disaster and practice of field investigation are also introduced to fulfill the skill of learner in soil and water conservation.

376012 水土保持工程技術 4 選 許中立

本課程旨在講解水土保持工程之規劃、設計及施工的技術原理與方法，並著重於土砂災害防治、環境景觀綠化與工程品質管制等工程與實務應用。主要內容包括：標準設計圖、土石流與崩塌地、道路邊坡與河道岸堤之案例分析與施工管理及系統之規劃與分析。

376012 Engineering Technology of Soil and Water Conservation 4 S C. L. Hsu

The principle and methodology of planning, design, and construction technology of soil and water conservation structures are discussed in this course. The subjects include: slope land drainage, gully control, and slope stabilization. The subject of this laboratory study is to practice of individual soil and water conservation structure design and construction management. Thesubjects of the practice include :Check dam, slope land drainage, and slope stabilization.

376013 集水區分析 3 選 李錦育

該課程為協助學生瞭解集水區分析的方法論〔包括累積集水區影響；樹立水資源經營重要計畫；收集集水區內降雨資料；數化地形、地質、土地利用資料；集水區內發生崩塌危險地帶、推定集水區內流量與年洪水量與本流與支流水文歷線〕。

376013 Watershed Analysis 3 S C. Y. Lee

The objective of this course is to assist the students develop the methodology of watershed analysis, including cumulative watershed effects, setting up important planning of watersheds watershed, rainfall data collection, qualification of geomorphologic, geologic and land use data, predicting the risk of landslides areas, evaluating the discharge and

annual flood's amount of watershed, and hydrograph of mainstream & branches of watersheds.

376014 地理資訊系統應用 2 選 江介倫

地理資訊系統(GIS)是一門科技整合下的科學，它整合了地理數學、地圖測量、電腦科學，而其應用領域、技術及工具的發展隨著電腦軟硬體的日新月異而隨之改變。GIS 的應用範圍極為廣泛，舉凡地球科學、環境保護、自然資源管理、都市區域規劃與管理、交通運輸、地質災害分析與災害防救等等，幾乎無所不包。本課程的主題為學習地理資訊系統軟體操作之訓練，同時利用 GIS 進行環境與資源分析之應用，課程內容包含 GIS 中的空間分析、山坡地開發及地形分析、水文模式及集水區水文分析功能、環境敏感地區之劃定，及進行自然災害預測及防範，以及 GIS 與 3S 之科技整合。

376014 Application of Geographic Information System 2 S J. L. Chiang

Geographic Information System (GIS) refers to a computer system that has maps and geographic information, and sometimes analyses of geographic data. Geographic information systems have many uses including geoscience, environmental information, natural resource, government, transportation information, geohazard, and disaster mitigation, etc. Contents of course are focused on the utilization of GIS in spatial problem analysis, such as spatial analysis, topographic analysis of slopeland, hydrology analysis of watershed, zoning of sensitive environmental area, mitigation on natural hazard, and the application of 3S technology.

376015 水文學特論 3 選 李錦育

本課程主要授課內容包括：氣象因子概述、降水成因及降雨量資料分析、蒸發散量之估計、入滲因子，入滲分析、河川水流、逕流歷線，單位歷線、洪水演算、暴雨，洪水頻率分析。

376015 Special Topic of Hydrology 3 S C. Y. Lee

This course contents the following subjects：Climatological factor introduction、Types of precipitation and analysis Rain、Estimating Evaporation、Infiltration and methods of determining infiltration、Stream flow、Runoff and unit Hydrograph、Flood routing、Flood frequency probability and stochastic methods

376016 土壤學特論 3 選 簡士濠

本課程將講授一般土壤學知識及土壤性質試驗技術以加強土壤科學研究之基礎。課程包括土壤生態系統、土壤發育過程、土壤有機物、土壤礦物、土壤水分特性、土壤通氣性、土壤溫度分布、土壤肥力評估、放射性物質應用於土壤學之研究。

376016 Special Topic of Soil Science 3 S S.H.Jien

The purpose of this course is to provide general soil science knowledge and experiment technology for objective basis to study. It is including soil ecosystems, development processes, soil organisms and organic matter, soil minerals, characteristics of soil water,

aeration, distribution of soil temperature, evaluated soil fertility, and applications of radioisotopes to soil science research.

376017 水土保持植物特論 3 選 謝杉舟

研討不同生育環境及不同保育處理地區之植物種類分佈及其人為植生之應用方法。內容如下：植物之基本觀念：植生之生育型、植生群落之結構、植生群落結構之變化、植生群落之影響因子。植物的水土保持功能：台灣之植被、植物與水文、植物與土壤沖蝕、植物與土壤應力強度、植物與大氣流動、植物與坡面穩定。植栽設計與植物之應用：植物與環境應力、植生介植之種類、生態綠化之作法、工業綠地設置。水土保持植物材料特性：水土保持草類-禾草篇、、草皮（球場草類）-高爾夫球場、灌木類、喬木類（綠化樹種）-戶外教室。

坡面植生輔助材料之應用：植生（網）帶材料、袋曲植栽材料、坡面格框材料支柱與植物保護材料。

376017 Special Topic of Soil and Water Conservative Vegetation 3 S S. C. Hsieh

376018 災害管理 3 選 待聘

災害管理就是對危險情況一種持續性、動態性的規劃管理過程，其目的在於減少其不確定性及降低災害發生之可能。課程內容包含災害種類、預防方法、發生時間、應變方式、復原計畫、政策檢討均是災害管理的範疇。

376018 Disaster Manegement 3 S TBA

Disaster management is a process of management and planning specifically for damage control. Therefore, disaster management possesses the characteristics of continuation and dynamics so that possible danger can be comprehended as well as mitigated. This course will cover the introduction of disaster classification, disaster prevention, time of occurrence, reaction and countermeasures, recovery planning, as well as policy review.

376019 環境保育特論 3 選 簡士濠

本課程旨在講授環境資源永續經營之理念及相關之技術，主要內容包括環境生態系統、全球氣候變遷及防治對策、開發利用對環境之衝擊、環境影響評估方法、天然災害之類別及防治、環境分析技術。

376019 Special Topic of Environmental Conservation 3 S S.H.Jien

The purpose of this course is to provide relative principles and technology to sustainable for environmental resources. It is including environmental ecosystems, global climate change and it's controlled methods, environmental impact in development, assessment of environmental influence, hazards defense and control, environmental analysis.

376020 河川水力學 3 選 李明熹

野溪整治是水土保持的重點工作之一，因此本課程的授課重點將以水力學的觀點配合輸

砂理論，深入探討以下的重點：河流特性及河床演變、輸砂基礎理論、河流泥砂運動、河道整治。

376020 Fluvial Hydraulics 3 S **M. H. Lee**

River training and flood control is one of the important tasks in soil and water conservation. Basically, a river consists of two erodible stream banks and a stream bed. Both boundaries are considered as loose boundaries. Therefore, the course will initiate the discussion from the view point of Hydraulics, followed by Sediment Transport. The entire course will cover: Basic characteristics and migration of the river, 、Theory of Sediment Transport, 、Loose Boundary Hydraulics and sedimentation,、River training and flood control.

376021 集水區經營特論 3 選 **李錦育**

集水區經營與管理已隨著時代的變遷與需要，正逐漸改變之中，尤其近年來環保意識高張，如何維護自然資源的永續利用，已成為國家永續發展的必要策略；因此，集水區的經營與管理亦日趨艱鉅。本課程主要以整合的觀念，提出集水區累積影響的效果，並針對塊體移動、地表沖蝕、水文學、濱岸帶、河道、魚類棲息地、水質、水供給等資源予以評估，提出系列性分析及其監測的方法，使集水區生態系能發揮其最大的功能。

376021 Special Topic of Watershed Management 3 S **C. Y. Lee**

Although it is desirable to consider watersheds as a whole in relations of forest practices, there are practical and conceptual difficulties in doing so. These arise from several resources：Mass Wasting, Surface Erosion, Hydrology, Riparian, Stream Channel, Fish Habitat, Water Quality, Water Supply etc. Watershed ecosystems involve a complex dynamic between many watershed and biological processes operating at many spatial scales, the physical and biological characteristics of a watershed and sub-areas within it reflect the local geology, terrain, climate, vegetation and so on. Because of these differences in landscape features, the sensitivity of watersheds and sub-areas within them to forest practices also varies from lace to place. 0Watershed analysis is a principle but not an exclusive section of the forest practice rules that addresses cumulative watershed effects.

376022 電腦輔助坡地規劃 3 選 **謝杉舟**

本課程以坡地開發規劃與設計之實務為主，除了坡地規劃理論以外，對於坡地開發之地形、地質之基本資料調查與勘查到施工計畫、施工整地、邊坡穩定工程、排水計畫、坡地防災及工程管理亦詳加介紹。並利用電腦輔助設計軟體教導學生處理實務上的分析與設計問題。教學內容如下：山坡地基本資料調查、土地利用規劃、坡地分析與規劃設計、施工計畫、整地工程與土方計畫、邊坡工程、排水工程、防災工程與安全對策、工程管理與成本控制、電腦輔助規劃設計之軟體介紹與操作

376022 Computer Aided Slopeland Planning 3 S **S. C. Hsieh**

This course is mainly using computer as a tool for slopeland development planning. It starts with the introduction of slopeland planning, followed by the acquisition of background information including topography, geology, hydrology, and slope stabilization.

Engineering-related tasks, for instance, slope stabilization, drainage network, disaster prevention, engineering management, control of cost and benefit, will also be taught in the class.

376023 坡地氣候特論　　3　選　　唐琦

本課程介紹地形因子如坡向、坡度及海拔高度等氣候因素如氣壓、日照時間、日射量、風、氣溫、溼度及降水量等影響，並對山區氣候之形成過程及局部環流（如山風、谷風）加以闡述。

376023　Slopeland Climatology　　3　S　　C. Tang

This course will introduce the geographical conditions such as direction of slope, degree of slope and altitude above sea level, those conditions how to influence the climatical elements such as are pressure, Sunshine duration, solar radiation, wind, air temperature, humidity and precipitation, Then the formation process of mountainous climate and its local circulation（mountain wind and valley wind）will be explain.

376024　沖蝕力學　　3　選　　吳嘉俊

本課程教學的重點在使學生瞭解沖蝕的原理及其相關的力學。因此，課程授課的內容包含土壤沖蝕概論、雨滴沖蝕現象及相關力學的介紹、逕流所造成之沖蝕現象、水蝕力學、風蝕原理與力學等。除此之外，視學生之興趣與需要，本課程將考慮加授沖蝕土壤的運動力學，以幫助學生對土壤沖蝕原理及沖蝕力學機制有全盤性的瞭解。

376024 Erosion Mechanics　　3　S　　C. C. Wu

The objective of this course is to teach students the principle of erosion and erosion mechanics. Therefore, the course covers the general background introduction of soil erosion, phenomena of raindrop erosion, runoff erosion and its mechanics, and the principle and mechanics of wind erosion. In addition, basic mechanics of sediment transport will also be covered in the course to help students fully understand the erosion mechanics.

376025　土壤物理特論　　3　選　　簡士濠

本課程旨在針對具備土壤學及一般土壤物理學基礎之學生，講授進階土壤物理學之原理及其數學之推導，其中包括土壤間水分之靜力、達西公式、飽和土壤中水分流動、未飽和土壤中水分流動、土壤中混合取代作用以及土壤中空氣與溫度傳輸之特性。

376025　Special Topic of Soil Physics　　3　S　　S.H.Jien

This course will teach the principles and these mathematical manipulations for the students who had background of soil science and basic soil physics, including static water in the soil, Darcy's law, water flow in saturated and unsaturated soil ,miscible displacement and movement of solutes through soils, soil aeration transport and temperature distribution.

376026　高等水力學　　3　選　　李明熹

本課程主要在接續一般明渠水力學課程未能完整介紹的部份，其中包含緩變流中的空間變化流、急變流中的水流通過溢洪道、水躍、水流經橋墩、非穩定流之緩變與急變流、以及洪水演算。因為所以內容是接續明渠水力學，故學生必須以明渠水力學為先修課程。

376026　Advanced Hydraulics　　3　S　　M. H. Lee

This course continues the contents that hardly been able to fully covered in ordinary open channel hydraulics. The contents of this course include spatially varied flow in gradually varied flow, flow over spillways, hydraulic jump, flow between bridge piers, gradually varied unsteady flow, rapidly varied unsteady flow, and flood routing. Since this course completes the entire course in hydraulics, therefore, basic knowledge in open channel hydraulics is required.

376027 土石流防治特論 3 選 李明熹

土砂災害一直是山高水急的台灣必須面臨的問題，因此本課程首先從地形學、地質學的觀點介紹土砂災害的種類與成因；其中包含崩塌、地滑與土石流。再以流變學的觀點，探討土石流的特殊流動特性及其基本特質。隨後將探討土石流發生的機制，輔以摩爾庫倫破壞理論，探討土石流發生的臨界條件。最後簡單介紹目前台灣所採用的土石流預警系統及防治工法，並參考日本在土石流防治工法上的經驗，讓學生瞭解土石流防治的基本理念與技術。

376027 Special Topic of Debris Control 3 S M. H. Lee

Disasters caused by massive movement have always been a threat to Taiwan. Therefore, the course will start with the introduction of debris disasters from the viewpoints of geomorphology, geology, and soil science. In-depth discussion on the characteristics of debris flow as well as its flowing phenomena will be conducted during the middle third of the class period. Mohr-Column Failure theory will be used to identify the incipient motion of debris flow. At the end, the early warning system and control structures used in other countries as well as in Taiwan will conclude the entire class.

376028 邊坡穩定分析特論 3 選 陳天健

本課程係從地質學、力學、土壤力學等觀點，介紹邊坡滑動及崩塌災害的誘因、型態及可能的影響。課題包括以土壤力學、岩石力學的觀點介紹落石、平面滑動、弧形滑動分析原理與分析軟體之應用，以教導學生兼具邊坡穩定分析與實務應用的技術。

376028 Special Topic of Slope Stabilization 3 S T.C. Chen

This course is mainly designed for the graduate students with the major in Soil and Water Conservation. Contents introduce influences of landslide in geomorphology, geology, and soil mechanic. Landslide mechanism models are fully comprehension to the learner. The content includes the mechanism and model on rockfall, plane slide of slope, rotational slide of slope, as well as the operation of analysis software for case study to fulfill the skill of learner in slope stabilization.

376029 防砂工程特論 4 選 李錦育

該課程為協助學生瞭解一些基本資料分析〔如氣象、水文、溪流及土壤力學〕，以便能成功地解決設計者的問題。以資料收集及分析為探討重點，包括石礫及砂之水力與動態現象。學生必須對土壤力學、流體力學及粘土礦物粘彈性有所瞭解，以充份確認其論點。

376029 Special Topic of Sabo Engineering 4 S C. Y. Lee

The objective of this course is to assist the students develop an elementary knowledge

of some data analyses like meteorological, hydrologic, stream flow, and soil mechanics that have been successfully applied to designer's problems. This course lays special emphasis on basic data collection and analysis, in regards to its hydraulic phenomena, including gravel and sand. Students are required to major in soil mechanics, fluid mechanics and theology of clay minerals to help them confirm their viewpoints.

376030 氣候資源調查與分析 3 選 唐琦

本課程介紹如何針對特定區域蒐集各種氣候資源要素如日射、日照時間、氣溫、降雨量等，並分析各項要素與地形條件之關係，繪製各項氣候資源要素之網目分佈圖。

376030 Climatic Resources Assessment and Analysis 3 S C. Tang

This course will collect the climatical resources such as solar radiation, sunshine duration, air temperature and precipitation in some fixed area and to analysis the relationships between those elements and geographical conditions. Then the mesh map of climatical resources will be draw.

376031 水土保持農學技術 4 選 待聘

本課程在使學生具備水土保持農學觀念，介紹農場規劃方式與控制農地土壤沖蝕之新技術，以提昇生產、經營與保育效率。內容包括坡地農場經營原則、水土保持農藝方法、坡地灌溉排水、地面敷蓋與覆蓋處理等各種適用於農地之水土保持方法介紹。

376031 Agricultural Technology of Soil and Water Conservation 4 S TBA

The purpose of this course is to interpret the recently acquired soil and water conservation agriculture knowledge which not only makes easier the task of slopeland farm management, soil and water conservation agriculture methods, slopeland irrigation and drainage, and controlling soil erosion, but at the same time leads to more productive farming. It contains crop rotation, contour farming, strip cropping, deep plowing, green manure, cover cropping and mulching etc.

376032 植物生態分析 3 選 謝杉舟

本課程目標主要提供初學者瞭解植物生態社會之分析，重點在於利用近年來此領域試驗研究的各項成果，教導學生以統計分析為基本背景，進行植物生態調查與分析的研究。本課程研究之主題包含：1.生態學上之重要前人研究，2.生態之族群關係，3.生態學之有用的統計分析工具。

376032 Analysis of Plant Ecology 3 S S. C. Hsieh

Our goal in this primer is to provide the beginning student with an introduction to some of the current Analysis of Plant Ecology topics in community ecology. The scope and depth of coverage we give to the various methodologies presented are the product of later years of experience in teaching students having little or no prior exposure to statistical ecology and having only a basic background in statistical. In a one-semester course for beginning students we do not attempt an exhaustive survey of many methodologies available. Rather,

our intention is to introduce students to a select range of topics, some of which are 1.historically important in ecology, 2.popular among ecological, or 3.powerful statistical tools for analyzing ecological patterns.

It follows that some of the methods present might fall into one of these groups, but not necessarily all three. For example, we present diversity indices mainly because of their widespread popularity; students will have to contend with the frequent appearance of diversity indices in the ecological literature, and therefore, we attempt to cover some of their uses and misuses. The depth of treatment is intended to be a reasonable balance between oversimplification and excessive mathematical treatment.

376033 沖蝕模擬 3 選 吳嘉俊

本課程旨在介紹與土壤沖蝕相關的數值模擬模式，以便讓學生瞭解國際間研究團體或個人如何利用過去對於土壤沖蝕機制相關的研究成果於土壤沖蝕模擬模式的建立。本課程需要先行修過土壤沖蝕的基礎課程，並必須瞭解通用土壤流失公式如何估算土壤流失量的原理。本課程將以模式的概論談起，進而介紹目前土壤沖蝕研究常用的經驗模式與物理機制模式，同時讓學生瞭解目前國際間對於土壤流失量模擬的最新發展。

376033 Erosion Simulation and Prediction 3 S C. C. Wu

This course is emphasized on in-depth discussion of soil erosion related numerical simulation models so that students can acquire the inside view of how knowledge accumulated from the past erosion research is used in building simulation models. Soil erosion course is required as prerequisite, basic skill in estimating soil loss using Universal Soil Loss Equation is also required. This course starts with brief introduction of erosion models, follows by most frequently referred empirical and physical process based numerical models. The latest development worldwide in the area of soil loss estimation and erosion process simulation will be briefly covered in the course.

376034 崩塌地治理技術 3 選 許中立

本課程之目的，在探究崩塌地肇災之前因後果，瞭解地質、地形與水文之背景資料，以及崩塌地調查與分析之方法，並進一步以現場實例分析，解決實際的問題，以對崩塌地之安定及山坡地之開發有更深刻的認知。

376034 Technology of Landslide Control 3 S C. L. Hsu

The purpose of this course is to explore the entire process of the landslide, understand the background materials of the geology, topography, hydrology and the landslide investigation and analytical methods. And step forward with the instance of locality, trying solving the practical problems. Thus, let students have the deeper cognition in the landslides stability and hillslopes development.

376035 生態工法特論 3 選 謝杉舟

本課程為環境科學中應用生態學與土木工程之觀念，目的在於提供學生有關環境、自然生態系統與人類開發行為三者間密切關係之瞭解與認知，結合土木工程之技術，以達到水土保持生態規劃設計與治理之目標。本課程將以生態工法之基本概念為起始，再分別就法規面、

水理分析、生態環境調查、生態工法介紹、工料分析、景觀綠美化、生態工法管理與維護等內容之加以說明，並介紹人類活動對環境之影響及自然資源保育之關念。

376035 Special Topic of Ecological Engineering Methods 3 S S. C. Hsieh

This course is a part of Environment Science, which is concentrated on Applied Ecology. The objectives of this course are to offer the relationships between environment, nature ecosystem and human activities to students. We will begin with teaching the basic concepts of Ecological Engineering Methods, describing the Aspect of law, Hydrology analysis, Basic data of environmental, Ecological engineering methods, Analysis of material price, and Maintain of Ecological Engineering Methods then and introducing the influences of human activities on environment and concepts of natural resources conservation.

376036 遙感探測分析 2 選 江介倫

本課程之目的係讓學生了解遙感探測之原理、遙測數位影像之分析方法及其於水土資源調查與保育上之應用。其內容包括：遙感探測之基本概念、遙感探測之基本原理、光學衛星遙感探測、微波遙測、多譜掃描與波譜型式判別、數位影像處理、數位影像分類、遙感探測於水土資源調查與保育上應用等主題。

376036 Remote Sensing Analysis 2 S J. L. Chiang

The purposes of this course are introduce the principle of remote sensing, aware of the analysis methods of remote sensing digital image and with which in application of soil and water resources investigation and conservation. The contents include: basic concept of remote sensing, principle of remote sensing, remote sensing in outer space, microwave sensing, multi-spectral scanning, processing of digital image, classify and identify of digital image, Application of remote sensing in soil and water resources investigation and conservation, etc.

376037 防風定砂特論 3 選 待聘

本課程之目的在探討風砂災害的成因與謀求防治之道，並就風之生成及其影響、風之因素、砂之成因及其特性、風蝕現象及砂之移動、風蝕力之估測、防風設備設計、防風林設計、防風林營造與定砂技術等提出討論。

376037 Special Topic of Windbreak and Sand Stabilization 3 S TBA

The purpose of this course is to make the concept of wind and sand disasters accrued and windbreak and sand stability methods to the students and let them understand the wind and sand erosion or damage. It contains the following sections: formation and influence of wind, elements of wind, causes and quality of sands, phenomena of wind erosion and behavior of sand, estimations of wind erodibility, design of windbreaks structures, design of windbreaks forests, plantation of windbreak forests sand stabilization technique.

376038 地下水特論 3 選 待聘

概述：使學生瞭解地下水在飽和帶與不飽和帶的分布特性；並探討含水層的物理性質，達西定律及水力傳導度，水井系統、水井鑽探、抽水試驗，地下水水質及地下水污染模式等

內容。

376038 Special Topic of Groundwater 3 S TBA

Physical properties of ground water distribution in aquifers and vadose zones were emphasized. Also, Darey's law and hydraulic conductivity, well-flow system, groundwater exploration and well construction, pumping test , groundwater quality, and groundwater contamination were discussed in the class.

376039 保育政策分析 2 選 待聘

探討各國保育政策之制定情形與保育組織結構及文化關係，並就資源規劃與管理制度的發展、功能、影響、問題及差異性進行討論，同時檢視環境改變對保育政策制定的影響。

376039 Conservation Policy Analysis 2 S TBA

This course is to study the development, function, influence, issue, and difference of organizational structure, and human culture about conservation policy of resource planning and management system in different countries.

376040 植生工程特論 3 選 謝杉舟

講解植生工程之規劃設計原理、方法與施工技術。內容如下：緒論：植生工程之意義與內涵、植生覆蓋之重要性、植生工程基本設計類型、台灣邊坡植生工法之引進及試驗研究。植生前期作業：植生工程之定義與內涵、植生前期作業之設計依據、坡面處理及適用工法、坡面安定工程材料規格與應用、坡腳保護工程材料規格與應用、坡面排水工程材料規格與應用。植生工程：植生材料之特性與應用、植生工程之設計、植生工法各論。維護管理。特殊地區之立地特性及其植生工程之應用方法：礦區植生方法、泥岩地區植生方法、高爾夫球場植生方法、防風定砂植生方法、崩塌地植生方法、植生過濾保護帶植生對策、森林火災地區植生對策、堤防與護岸之植生綠化對策、自然保育地區植生保護對策。

376040 Special Topic of Vegetation Engineering 3 S S. C. Hsieh

This course is designed specifically for those who are interested in vegetation engineering. Therefore, the entire course is practice-oriented. Topics included in this course are: basic design of vegetation engineering, preparation prior to implementation, post maintenance technique, selection of proper vegetation species, application of vegetation engineering to specific areas. The specific areas that require additional planning, maintenance, and design include surface mining, mudstone, golf courses, coast line, landslide or land slump, embankments, etc.

376041 坡地土壤管理特論 3 選 簡士濠

基於人口增加經濟發展結果，以農業或非農業方式開發山坡地的行為日益增加，往往造成嚴重土壤沖蝕以及其他災害。為永續經營，坡地土壤管理包括選擇適當農業經營模式、考量非農業使用之土壤安定性以及確保坡地安全排水，均為坡地土壤管理主要課程內容。

376041 Special Topic of Slopeland Soil Management 3 S S.H. Jien

According to population increase and economic development, there are resulting severly soil erosion and other hazards, while the havoirs of agricultural or non-agriculture

utilization morly. For substainable management, slopeland soil management include considering the stability of slopeland soil for non-agriculture ultilzation, and making sure of safety of drainage. Those are the major content of the slopeland soil management.

376042 高等土壤分析　　3　　選　　簡士濠

本課程旨在講述土壤分析技術與各分析儀器之介紹及應用。其主要內容為依照土壤學實驗和土壤物理或化學實習的試驗項目為主，介紹其分析技術原理、理論基礎與分析儀器原理，其中儀器包含原子吸收光譜儀、感應偶合式電漿質譜儀、X-ray 繞射光譜分析、掃描式電子顯微鏡與能量散射光譜儀等，希望增進系上學生於土壤相關分析技術與儀器原理上之知識。

376042 Advanced Soil Analysis　　3　　S　　S.H. Jien

The major objectives of this course are introduction of soil analytic techniques and instruments used. Contents are based on various soil physical and chemical experiments. This course will introduce the principle and theory of soil analytic techniques and required instruments including atomic adsorptive spectrometry, inductively coupled plasma spectrometry, X-ray diffraction, scanning electron microscope and energy dispersive spectrometry, in order to improving the understanding of soil analytic processes and application of the instruments.