

# 國立臺北大學自然資源與環境管理研究所

## 108 學年度第一學期『環境工程科學概論』

### 課程講義(11)：土壤與地下水污染概要 Introduction to Soil Contamination and Groundwater Pollution

- GROUNDWATER CONTAMINATION/POLLUTION
  - Groundwater: the water that flows or stays under the surface of the land  
指流動或停滯於地面以下之水
  - Porous Media – Solid Matrix, Pore, and Multiple-Phase Fluids  
⇒ Porosity vs. Permeability; Hydraulic Conductivity
  - Groundwater Pressure and Piezometric Heads  
⇒ Unsaturated Zone or Vadose Zone => Soil Layer(?)  
⇒ Saturated Zone and Aquifers => Confined and Unconfined Aquifers  
⇒ Hydraulic Gradient => Water Table, Hydraulic Head, Flowing Artesian Wells
  - Darcy's Law: The Theory Governing Fluid Flow in Porous Media  
⇒ [A brief historic remark](#): Henry Darcy, Les Fontaines Publiques de la Ville de Dijon (1856).
  - Groundwater Contaminants and Pollution Transport  
⇒ Contaminants vs. pollutants; contamination vs. Pollution  
⇒ Diffusion and Dispersion: Plume  
⇒ Retardation: Adsorption (Absorption)  
⇒ NAPL (Non-Aqueous Phase Liquid): DNAPL and LNAPL
  - Groundwater as a Source of Water Supply  
⇒ Drawdown and Cone of Depression; Capture Zone; Well Head Protection Area
  - Remediation Technologies  
⇒ Hydraulic Control; Pump-and-Treat; Soil Vapor Extraction  
⇒ In-Situ Bioremediation; Permeable Reactive Barriers  
⇒ Managed Natural Attenuation or Monitored Natural Attenuation
- SOIL CONTAMINATION
  - Contamination in the Unsaturated Zone
  - Reaction with the Saturated Zone and Ground Surface
  - [土壤及地下水污染整治法](#) =>概述
  - 污染場址：控制場址、整治場址、污染管制區=>監測標準、管制標準  
各級主管機關應定期檢測轄區土壤及地下水品質狀況，其污染物濃度達土壤或地下水污染管制標準者，應採取適當措施，追查污染責任，直轄市、縣（市）主管機關並應陳報中央主管機關；其污染物濃度低於土壤或地下水污染管制標準而達土壤或地下水污染監測標準者，應定期監測，監測結果應公告，並報請中央主管機關備查。  
⇒ [污染場址判定流程](#)
  - 場址類別：農地、加油站、儲槽、工廠、非法棄置場址、其他 =>[場址查詢](#)
  - Reclamation of Contaminated Land => Renewable Energy Development