Groundwater Management and Geohydrology

Environmental Fluid Mechanics I in first semester sets the very important foundation on Groundwater Flow and its mechanics. Darcy equation and its importance is first realized. Regional Groundwater flow, flow to wells, brief introduction to salt water intrusion are covered in this module.
Computational methods in environmental modeling offers programming in MATLAB for solving various linear, non-linear and partial differential equations that we come across with different courses.

Environmental Fluid Mechanics II, which I think is prerequisite when going into Groundwater/ Porous medium field, deals with all the physical processes in the transport process. It is divided into two parts: Single-phase flow and Multi-phase flow. **Modelling of Hydrosystems**, likewise, offers various discretization schemes (Finite Element Method, Finite Difference Method and Finite Volume Method) to solve Darcy, Transport equations, Navier-Stokes equation using C++.
Integrated Watershed Modeling offers an overview on modeling of physical phenomenon and estimation of uncertainty associated with it. It is divided into Groundwater modeling, which deals with Darcy equation, and Hydrological Modeling, which deals with surface water modeling. **Hydrogeological Investigation** gives practical exposure to the field and lab experiments. Field trip to Horkheim offers experiments, for example: Tracer tests, Slug tests, pumping tests in finding Hydraulic conductivity of soil.

Multiphase modeling in porous media offers modeling of physical transport processes and remediation techniques using DUMUX, a powerful packaged tool which assembles several units to be able to simulate the physical process. All the concepts and processes that we learn on Modeling of Hydrosystems and EFM II are put together to apply in the physical world. Its applications range from thermal enhanced soil remediation to model fuel cells.
Stochastic Modeling and Geostatistics, is divided into two parts. Geostatistics deals with uncertainty estimation of, for example, hydraulic conductivity, porosity distribution over the concerned domain. Stochastic Modeling offers concepts and models on Hydrological modeling taking into account the uncertainty that it has to offer.
Groundwater and Soil Remediation offers physics behind porous medium flow and mass transfer, and gives an introduction to some remediation techniques, for example: Soil vapour extraction, encapsulation, Dig Dump, combination of remediation and subsurface energy storage, etc.

Animesh Nepal, WAREM Student 3rd semester, Generation 2018