Solar Driven Desalination Technologies

Course outlines

- **Introduction**
  - Short history and desalination development
  - Seawater Chemistry
  - Desalination Processes
  - Process classifications (Based on what extracted, energy needs and overall classification)
  - Desalination Industry worldwide (In particular MENA)
  - Assessment of desalination operations in UAE
- **Conventional Desalination Technologies**
  - Thermal Processes
    - Multi stage flash (MSF)
    - Multi effect distillation (MED)
    - Thermal vapor compression (TVC)
    - Multi effect humidification (MEH)
  - Membrane Processes
    - Reverse Osmosis (RO)
    - Electro dialysis (ED)
    - Membrane Distillation (MD)
  - Tutorial on conventional technologies
- **Desalination with renewable energy sources – State of art technologies for desalination driven by solar energy**
  - Solar thermal energy and desalination.
    - Solar stills
    - High capacity solar thermal distillation
    - Solar thermal membrane distillation
    - Solar thermal humidification/dehumidification
    - Solar ponds
  - Solar Photovoltaic driven desalination.
    - PV-RO/EDR Systems
  - Other renewable energy driven desalination
    - Wind energy driven RO or EDR Systems
    - Wave, tidal or geothermal energy driven desalination systems
- **Design and operation of solar driven desalination plants**
    - Operation and management of industrial plants.
    - Control and remote monitoring systems.
    - Handling detrimental effects of scaling, corrosion and fouling.
    - Necessary pre-treatments and post-treatments for successful plant operation.
    - Optimization of energy consumption and water cost
    - Environmental, Economic and sustainability issues