Syllabus for Pollution of Water resources

- **Course information:**
  
  Title: Pollution of Water resources
  Credits: 2 (Theoretical)
  Instructor Information: Expert in Environmental Sciences
  Total hours: 32 h
  Additional Instructions:

- **Course goals:**
  
  The goal of this course is to improve the water quality throughout the Surface water and groundwater (e.g. lakes, rivers, oceans, aquifers and groundwater) when pollutants are directly or indirectly discharged into water bodies without adequate treatment to remove harmful compounds.

- **Syllabus:**
  
  1) Water Quality, Resources, Supply, Shortage, Sustainability, Consuming, Global water Crisis.
  2) Chemical, Physical and Biological properties of Water.
  3) Water ecosystems.
  4) Integrated Water Resources Management.
  5) Sources for water Pollution.
  6) Water contaminants, Aquatic toxicology, Heavy minerals, Organic contaminants, PCBs and other Halogens materials, PAH, Pesticides, Waterborne Pathogens and Water Microbiology.
  7) Destiny of contaminants transmission and transformation.
  8) Dissolved Oxygen and natural Purification.
  9) Waterborne Diseases.
10) Eutrophication of water resources.
11) Deposit - Water interaction.
12) Acidification.
13) Water resourcing Monitoring.
14) Point source Protection.
15) Water and sewage purification (treatment).
16) Decontamination Methods.
17) Water quality indicators.
18) Water Legislations, Standards, Instructions.

- Course readings/materials:
  2- Vigil K. 2003 clean water An Introduction to water quality and water pollution control. Oregon state university.
  4- Czernusenko W and Rowinski P. M. 2005 water quality hozards and dispersions of pollutions. Springer.

Syllabus for Environmental geology and Engineering projects
- **Course information:**
  
  Title: Environmental geology and Engineering projects  
  Credits: 2 (Theoretical)  
  Instructor Information: Expert in Environmental Sciences and geology  
  Total hours: 32 h  
  Additional Instructions:

- **Course goals:**
  
  The goal of this course is to investigate the short and long terms effects of execution of engineering projects on environment at large and small scales.

- **Syllabus:**
  
  1. General contents.  
  2. Dams and Environment.  
  3. Road construction projects and environment.  
  4. Urban and environment.  
  5. Irrigation and drainage projects and environment.  
  6. Airports and environment.  
  7. Ports and Wharfs and environment.  
  8. Line transmission and environment.  
  10. Effects of Geological features on engineering projects.  
  11. Engineering projects in different geomorphological areas.

  **Syllabus for Mineral resources and the environment**
- **Course information:**

Title: Mineral resources and the environment
Credits: 2 (Theoretical)
Instructor Information: Expert in Environmental Sciences
Total hours: 32 h
Additional Instructions:

- **Course goals:**

The goal of this course is to take the students to get deeper insights into environmental effects of Ore exploration, exploitation and processing and sustainable usage of mining products and energy resources.

- **Syllabus:**

1. Mineral reserves and resources definition, common classification.
2. Mineral resources and population.
4. Mineral resources effects on Environment (radioactive elements, toxic elements, mineral decomposition that are harmful for environment).
5. Mineral exploitation effects on environment (exploitation drilling and disposal).
7. Policies to prevent existing resources wastage (recycling of useful materials in industrial and urban wastes).
8. Generalities about energy resources, energy unit and global energy consumption.
9. Outlines about geology of Oil & Gas, distribution and reserves in the world.
11. Geology and classification of coals.
12. Geology and distribution of oil-shale and tar-sand reserves.
13- Heat value of fossil fuels.
14- Nuclear energy and usage methods, Fusion and fission.
15- Outlines about geology and distribution of radioactive elements.
16- New energy resources consist of tidal energy, Geothermal, solar energy, wind energy and Biomass energy and usage effects on environment.

- **Course readings/materials:**
  1- Moore F. Rastmanesh F. 2008 Geological resources, origin, application and environmental effects.
  3- Environmental science, Botkin & Keller, 2003 Wiley international.

Syllabus for Environmental geochemistry
- **Course information:**

Title: Environmental geochemistry

Credits: 2 (Theoretical)

Instructor Information: Expert in Environmental Sciences

Total hours: 32 h

Additional Instructions:

- **Course goals:**

The goal of this course is to take the students to get deeper insights into fundamentals of environmental geochemistry and application of analytical and organic chemistry for investigation of environmental problems, monitoring and analysis of environmental pollution and different ecosystems.

- **Syllabus:**

1- Generalities
2- Equilibrium thermodynamic and synthetics.
3- Acid and base equilibrium.
4- Redox (Reduction and Oxidation) reactions.
5- Mineral exploitation effects on environment (exploitation drilling and disposal).
6- Carbon chemistry.
7- Environmental minerals.
8- Atmosphere.
9- Continental environment.
10- Marine environment

- **Course readings/materials:**
2- Sherwood Lollar B (Editor) 2003 Treatise on geochemistry, Volume 9 Environmental Geochemistry, Elsevier, 612p.
3- Environmental geochemistry of potential toxic elements. Translated by Moore F. Rastmanesh F. Iranian department of Environment publications.

Syllabus for Geohazards
Course information:
Title: Geohazards
Credits: 2 (Theoretical)
Instructor Information: Expert in Environmental Sciences and Geology
Total hours: 32 h
Additional Instructions:

Course goals:
The goal of this course is to realize the natural geohazards and effects on environment

Syllabus:
1- Generalities, geohazards concept, risk zoning and assessment.
2- Volcanism and hazards.
3- Earthquakes and hazards.
4- Mass movements.
5- Problematic soils.
6- Floods and Rivers.
7- Coastal hazards.
8- Wind, Arid land.
9- Soil erosion and desertification.
10- Subsidence.
11- Mass extinction.
12- Climate changes.

Course readings/materials:
2- Bell F.G. 2002 Geological Hazards, Taylor and francis.
Syllabus for Medical geology
- **Course information:**

  Title: Medical geology  
  Credits: 2 (Theoretical)  
  Instructor Information: Expert in Environmental Sciences and Geology  
  Total hours: 32 h  
  Additional Instructions: 

- **Course goals:**

  The goal of this course is to take the students to get deeper insights into natural and man-made events concern to human health and organisms.

- **Syllabus:**

  1. Generalities, history and fundamental concept of the interdisciplinary course (Medical geology).  
  2. Distribution and amount of elements in the ground, the role of geological factors in health.  
  3. Entry paths of elements into food chain and organisms.  
  4. Absorption and action of elements in human body chemically point of view.  
  5. Absorption and action of elements in human body biologically point of view.  
  6. The role of toxic potential elements in Carcinogenesis, Congenital, Mutation.  
  7. Volcanic lavas and health.  
  8. Radon existence risk in water and air.  
  9. Deficiency and toxic of Selenium and Iodine in the environment.  
  10. Dust and health.  
  11. Environmental epidemiology and pathology.  
Course readings/materials:
2- Environmental medicine, Lennart Mottler, 2000, Falth and Hassler.

Syllabus for Special topics in environmental geology
- **Course information:**

Title: Special topics in environmental geology

Credits: 2 (Theoretical)

Instructor Information: Expert in Environmental Sciences and Geology

Total hours: 32 h

Additional Instructions:

- **Course goals:**

The goal of this course is to help the students to take a related topic to Environmental geology that is concern to their dissertation, whereas it is not incorporated in their syllabus (e.g. geotourism, earth indicators) or the students have never passed a practical training for their thesis (for example geohazards studies). They will take an specialist supervisor for their work.