

## Geomicrobiology 206-24071 – 2 credits

Dr. Zeev Ronen

### Syllabus

1. Earth (hydrosphere and lithosphere) as a substrate for microorganism growth
2. Physiological and biochemical basis for microbial processes
3. Research methods in geomicrobiology and environmental microbiology
4. The carbon cycle: movement of carbon through the food chain in marine and aqueous systems. Recycling of carbon dioxide autotrophic and heterotrophic processes and their influence on the geochemistry of water, soil and rock; methanogenesis and methylotrophism
5. Geomicrobiology of nitrogen, sulphur and phosphorus: Fixing of molecular nitrogen, recycling of organic and inorganic nitrogen compounds and their influence on geochemistry of water, rock and soil. Oxidation and reduction of sulphur in various systems. Role of microorganisms in phosphorus recycling.
6. The iron, manganese and silica cycles: iron as a source of energy for bacteria; oxidation and reduction of iron and manganese by microorganisms and their influence on the geochemistry of water, soil and rock. Solution and precipitation of manganese by microorganisms. Biogenic concentration and solution of silicon
7. Microorganisms and ground water: Pollution by pathogenic bacteria, application of microorganisms in purification of groundwater polluted by organic and inorganic materials.
8. Microorganisms and mineral and coal extraction: bioleaching; acid mine drainage
9. Geomicrobiology of fossil fuels.

### Bibliography

Course reading materials are placed by the instructor on the course Web page during term time.

### Course Requirements

2 hr lecture

### Grading

10% - class participation

10% - midterm writing assignment

80% - writing seminar and lecture