

## GENERAL SCIENCE (SC) COURSES

### SC 215 SCIENTIFIC METHODS

2 UNITS

#### Objectives

By the end of this course, students are expected to be able to:

Demonstrate knowledge on how to design and write scientific research proposals

Report, summarize and interpret data scientifically

Write scientific reports

#### Content

Developing clear questions and hypotheses based on scientific concepts and observations. Designing and conducting scientific investigations, answer questions and verify hypotheses, techniques, practices and resource that can generate accurate data, organizing data in scientific acceptable displays, scientific data and concepts presentations (through oral and written exercises), writing scientific research proposals and reports, developing skills in reading and interpreting scientific literature by answering critical thinking scientific questions.

**Delivery:** 30 lecture hours and 15 hours of tutorials

**Assessment:** Coursework = 40%, Final examination = 60%

#### Text books

1.Scheiner, S.M and J.Gurevitch. Editions 1993. Design and Analysis of Ecological Experiments. Chapman and Hall, New York, pp 445.

2.Kothari, C.R. 1997. Research Methodology. Methods and Techniques. Second Edition. Wishwa Prakashan Publishers, pp 468. ISBN 81 7328 036 3

#### References

1.Sokal, R.R. and J.F. Rohlf, 1995. Biometry. The Principles and Practice of Statistics in Biological Research. Third Edition. W.H Freeman and Company. New York, pp.887. ISBN 0 7167 2411 1

2.Zar, J.H. 1984. Biostatistical Analysis. Second Edition. Prentice-Hall International Inc.,pp718. ISBN 0 13 077595 9 01

### EV 200 ENVIRONMENTAL SCIENCE I

2 UNITS

#### Objectives

By the end of the course, students are expected to be able to:

Recognize a broad-based understanding of the complex nature of environmental science issues through the interdependence of physical, chemical and biological processes.

Explain the various aspects of the exploitation, and management of the environment and its resources, in the context of environmentally sustainable development.

Explain some of the ways in which humans have modified natural environmental processes and evaluate a range of techniques by which the human impact on the environment can be assessed and managed.

#### Content

Introduction to environmental science as a multidisciplinary study and its scope. The sun as the ultimate source of ALL sorts of energy (*through photosynthesis*). Environment as ecosystem. Flow of energy in ecosystem: food chains, food webs, ecologic pyramids, trophic levels and energy transfer efficiencies.

Introduction to the role of microorganisms (*and effective microorganisms*, *E.M*) to the cycling of energy and minerals in the environment. Environmental process, resources and hazards: Bio-geochemical cycles, hydrological cycle, atmospheric processes, soil erosion, water, mineral and biological resources.

Earthquakes, volcanoes, land slides, floods, drought, mapping and prediction of natural hazards.

Environmental Energy Resources: Renewable sources: biomass, hydro-geothermal, waves, winds & solar. Non-renewable sources: Fossil fuel and nuclear energy, Man's impact on the earth energy balance.

Energy resource management. Environmental pollution, degradation and toxicology: Sources, effects and types of air, water and soil pollution. Types, sources, properties and effects of pollutants, Impact of human activities on health and the environment. Environmental toxicology and monitoring of pollutants.

Environmental conservation and Management: Environmental Impact Assessment (EIA). Public

education and awareness, legislation (local and international), natural reserves, National parks, Institutions involved in environmental protection and enforcement. Environmental modelling.

**Delivery:** 30 lecture hours and 15 hours of tutorials

**Assessment:** course work = 40 %, final examination = 60%

#### Textbooks

1. Enger, E.D and B.F. Smith 2000. Environmental science: a study of interrelationships. McGraw Hill Boston 429 PP. ISB 0-07-290908-0
2. Danny, H.L.D. 2000. Climate and global environmental change . Pearson Education Ltd. Essex, UK. ISBN 0582 32261-8.
3. Cilpin, A. 1995. EIA cutting edge for the 21<sup>st</sup> Century. Cambridge University Press. Cambridge.

#### References

1. Sawyer, C.N., P.L. McCarty and G.F. Parkin. 1994. Chemistry for environmental engineers. McGraw Hill New York 650 pp. ISBN 0-07-113908-7
2. Polpraser, C. 1996. Organic Waste Recycling: Technology and Management Wiley, New York 412 pp. ISBN 0471 964344
3. Oates, J.F. 1999. **Myth and Reality in the rain forest: How conservation strategies are failing in West Africa. University of California Press Ltd. London. ISBN 0-520-21782-9**
4. Heinsohn, R.J. and R.L. Kabel. 1999. Sources and control of air pollution. Prentice Hall London. ISBN 0-13-624834-9.
5. Cracraft, J. and F.T. Grifo. 1999. The living planet in crisis: Biodiversity, science and policy. Columbia University Press New York.

### **EV 300 ENVIRONMENTAL SCIENCE II**

**2 UNITS**

#### Objectives

By the end of the course a student should be able to:

Design and Develop a research proposal

Use their skills in making accurate measurements, analyzing data and interpreting results write and edit a scientific report.

Implement a research activity with minimum supervision

Write a scientific research report

#### Content

**Students will carry out a supervised research project in environmental science. More emphasis will be given on research proposal formulation, experimental design and scientific report writing.**

**Delivery: Equivalent to 90 hours of practical.**

**Assessment: Continuous Assessment 40% [(Oral presentation of proposal (10%) and final results (10%), Laboratory/field conduct: Log / Data book (20%)]; Final Assessment: Final report 60%.**