

SKILL ENHANCEMENT COURSES

**Department of Environmental Science
Nagaland University**

2023

SEC1: REMOTE SENSING, GEOGRAPHIC INFORMATION SYSTEM and MODELLING

Unit 1: Remote Sensing.

Definitions and principles; electromagnetic (EME) spectrum; interaction of EMR with Earth's surface; spectral signature; satellites and sensors; aerial photography and image interpretation.

Unit 2: Geographical Information Systems

Definitions and components; spatial and non-spatial data; raster and vector data; database generation; database management system; land use/ land cover mapping; overview of GIS software packages; GPS survey, data import, processing, and mapping.

Unit 3: Applications

Applications and case studies of remote sensing and GIS in geosciences, water resource management, land use planning, forest resources, agriculture, marine and atmospheric studies.

Unit 4: Basic elements of statistical analyses: sampling;

types of distribution – normal, binomial, poisson; measurements of central tendency and dispersion; skewness; kurtosis; hypothesis testing; parametric and non-parametric tests; correlation and regression; curve fitting; analysis of variance; ordination.

Suggested Readings

1. Zar, J.H. 2010. Biostatistical Analysis (5th edition). Prentice Hall Publications.
2. Edmondson, A. and Druce, D. 1996. Advanced Biology Statistics. Oxford University Press.
3. Demers, M.N. 2005. Fundamentals of Geographic Information System. Wiley and Sons.
4. Richards, J. A. and Jia, X. 1999. Remote Sensing and Digital Image Processing. Springer.
5. Sabins, F. F. 1996. Remote Sensing: Principles and Interpretation. W. H. Freeman

SEC2: ENVIRONMENTAL IMPACT AND RISK ASSESSMENT

Unit 1: Framework of Environmental Assessment

Environmental impact assessment (EIA): definitions, introduction and concepts; rationale and historical development of EIA; scope and methodologies of EIA; role of project proponents, project developers and consultants; Terms of Reference; impact identification and prediction; baseline data collection; Environmental Impact Statement (EIS), Environmental Management Plan (EMP)

Unit 2: Impact Assessment Methodologies

Rapid EIA; Strategic Environmental Assessment; Social Impact Assessment; Cost-Benefit analysis; Life cycle assessment; environmental appraisal; environmental management - principles, problems and strategies; environmental planning; environmental audit; introduction to ISO and ISO 14000; sustainable development.

Unit 3: EIA regulations

EIA regulations in India; status of EIA in India; current issues in EIA; case study of hydropower projects/ thermal projects.

Unit 4: Risk assessment

Introduction and scope; project planning; exposure assessment; toxicity assessment; hazard identification and assessment; risk characterization; risk communication; environmental monitoring; community involvement; legal and regulatory framework; human and ecological risk assessment.

Suggested Readings

1. Barrow, C.J. 2000. Social Impact Assessment: An Introduction. Oxford University Press.
2. Glasson, J., Therivel, R., Chadwick, A. 1994. Introduction to Environmental Impact Assessment. London, Research Press, UK.
3. Judith, P. 1999. Handbook of Environmental Impact Assessment. Blackwell Science.
4. Marriott, B. 1997. Environmental Impact Assessment: A Practical Guide. McGraw-Hill, New York, USA