

School of Sciences

Minutes of the 8th School Board Meeting

8th School Board Meeting held on 9th June, 2023 at 2:30 through Offline/online mode (Google Meet). The following members were attended the meeting:

1	Prof. Salman Ahmad Khan	Chairman ✓
2	Prof. Saeeduddin	External Member ✓
3	Prof. V. Srinivas	External Member ✓
4	Prof. Hariramakrishna	External Member ✓
5	Prof. Abdul Wahid	Member ✓
6	Prof. Badeeuddin	Member ✓
7	Prof. Najmul Hassan	Member ✓
8	Prof. Shakeel Ahmed	Member ✓
9	Prof. Parveen Jahan	Member ✓
10	Prof. H. Aleem Basha	Member -
11	Prof. S. Maqbool Ahmed	Member ✓
12	Dr. Afroz	Member ✓
13	Dr. Salahuddin	Member
14	Dr. Khaja Moinuddin	Member ✓

The meeting was chaired by Prof. Salman Ahmad Khan, Dean, School of Sciences. The Dean welcomed all the members and commenced the meeting with a brief overview of UG, B. Voc. (MLT & MIT), PG Mathematics and Ph.D. in all subjects viz., Mathematics, Physics, Chemistry, Botany and Zoology offered by the school and from the next academic year 2023 M. Voc. in MLT & MIT, M. Sc in Physics, Chemistry, Zoology and Botany will be started.

The following agenda items were placed before the School Board for discussion and approval:

Item 8.1.: Confirmation of the minutes of 7th School Board meeting

The minutes of the 7th School Board meeting were approved by all the members (**Annexure-I**)

Item 8.2.: To discuss detailed syllabus, number of credits, intake, fee structure and Eligibility of Certificate, Diploma, that can go up to Undergraduate and Post Graduate levels in multi-disciplinary mode as per NEP guidelines in future.

In the present condition it is proposed to start two-years Diploma programme with exit option (Certificate). The curriculum was thoroughly discussed in detailed with regards to number of credits, intake, Eligibility of 2 Years Integrated Course (Certificate & Diploma) in Geo-Environmental Sciences with Exit option. (**Annexure-II**)

مولانا آزاد نیشنل اردو یونیورسٹی
MAULANA AZAD NATIONAL URDU UNIVERSITY
(A Central University established by an Act of Parliament in 1998)
Accredited 'A+' grade by NAAC



School of Sciences

2 Years Integrated Course (Certificate & Diploma) in Geo-Environmental Sciences with Exit option

Programme: 2 Years Integrated Course in Geo- Environmental Sciences with Exit option	Selection Process	Intake	Eligibility
Certificate: One Year (Two Semesters) Diploma: 2Year (Four Semester) Fee per Semester Rs. 4000/-Rupees	Merit-Based	30,	I. Urdu as a subject/language or as a Medium in 10th /12 th /Graduation level or equivalent Madrasa courses with Urdu as medium of instruction approved by MANUU. II. Intermediate (10+2) in Science Subjects with 55% marks in aggregate

The same has been approved

Item 8.3.: Any other item with the permission of chair.

No any other agenda

Chairman, School Board Prof. Salman Ahmad Khan thanked all the members and concluded the meeting.

Prof. Salman A Khan
Chairman, School Board

Annexure II

2 Years Integrated Course (Certificate & Diploma) in Geo-Environmental Sciences with Exit option (from Session 2023-24)

It will be **4 semesters** (2 Years) Program with field works, practical and Dissertation

Year	Semester	Introductory Course	Main Course	Internship/Skill Project/ Dissertation	Total Credit
I Yr	I	Advanced Sciences-I (Physics): 2cr Advanced Sciences-II (Chemistry): 2cr Environment and Ecosystems: 2 Cr Rural & Urban Environments: 2Cr	Applied Maths & Stats: 2cr Introduction to Universe and Earth System: 2cr Geological formations and their characteristics: 2Cr Weather System and Climatology: 2Cr	Working Knowledge of MS Office (Word, Excel and Power Point): 2Cr Practical on Statistics: 2Cr	20
	II	Natural Environment & Social Duties: 2 Cr Natural & Manmade Disasters: 4Cr Introduction to Climate Change: 2Cr	Groundwater resource: 4cr Hydrological Cycle-I: 2cr Estimation theory and basic Geostatistics: 2Cr	Field Visit & Data Collection: 2Cr <u>Areas of option:</u> 1. Rock 2. Air 3. Water Graphical Representation of field data: 2Cr	20
An exit here will be awarded with a Certificate in Geo-Environmental Sciences with 40 credits					
II Yr	III	Applied Maths II: 2Cr Basic Geology: 2Cr Basic Geophysics: 2Cr Environmental Economics: 2Cr	Various Climate Change models & downscaling: 3 Cr Hydrological Cycle-II: 3Cr Introduction to Geophysical Methods: 4Cr	Interpretation of the field data and preparation of various Maps: 2Cr	20
	IV	GIS and Remote Sensing: 2Cr Advanced Geostatistics: 2Cr Environmental disaster & Risk Transfer: 2Cr	Geomorphology and Stream Flow: 2Cr Air & Water Pollution: 2Cr Monitoring and Optimization of Monitoring Network: 4Cr Environmental Impact Assessment (EIA): 2Cr	Practical work on Monitoring parameters of Natural system: 2Cr Project Work: 2Cr	20
An exit here will be awarded with a Diploma in Geo-Environmental Sciences with 80 credits					

Advanced Sciences-II (Chemistry)

Unit I- Oxidation and Reduction:

Elimination, Oxidation and Reduction Reactions Alkyl halides (dehydrogenation, Saytzeff's rule), vicinal dihalides (dehalogenation), alcohols (Dehydration), Mechanism of E1 and E2 reactions (nature of substrate and base). Oxidation of alcohols with potassium permanganate, potassium dichromate, catalytic dehydrogenation.

Reduction of aldehydes and ketones, Catalytic hydrogenation, reduction with sodium borohydride, lithium aluminium hydride, Clemmensen, and Wolff-kishner reduction. Reduction of carboxylic acids and their derivatives. Reduction of nitro compounds, Acidic, alkaline and neutral reducing agents, lithium aluminium hydride and electrolytic reduction.

Unit II- Analytical Chemistry:

Introduction and importance of analytical chemistry. Role of instrumentation in chemical analysis. Collection, arrangement and analysis of analytical data. Types and sources of errors of analytical data, determinate and indeterminate errors, absolute and relative errors. Normal (or Gaussian error curve), accuracy and precision, statistical terms (mean, median, median deviation, standard deviation and variance). criteria of validity or rejection of result. Numerical problems.

Unit III- Air Quality:

Air Pollution: Major regions of atmosphere. Chemical and photochemical reactions in atmosphere. Air pollutants: types, sources, particle size and chemical nature; Photochemical smog: its constituents and photochemistry. Environmental effects of ozone, Major sources of air pollution SO₂, CO₂, CO, NO_x, H₂S and other foul smelling gases. Methods of estimation of CO, NO_x, SO_x Effects of air pollution on living organisms and vegetation.

Unit IV- Water Quality:

Water Pollution: Sources and nature of water pollutants, Techniques for measuring water pollution, Impacts of water pollution on hydrological and ecosystems. Water purification methods. Industrial effluents from the following industries and their treatment: Electroplating, textile, tannery, dairy, petroleum and petrochemicals, agro, fertilizer, etc.

Basic Geology

Unit I- Introduction:

Science of Geology, Scope and different disciplines of geology. Earth in relation to solar system. Origin of earth. Geological time scale. Internal structure of earth. Different layers of earth: Crust Mantle, Core. Lithosphere and Asthenosphere. Major discontinuities within the earth.

Unit II - Mineralogy:

Definition of mineral, Importance of study of minerals, Study of physical properties of following common rock forming minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite.

Unit III - Plate Tectonic:

Mantle convection and motion of plates. Types of plate boundaries: divergent, convergent and transform boundaries. Mid oceanic ridges. Subduction zone. Plate motion and earthquakes. Continental drift theory.

Unit IV - Economic resources of Earth:

Conditions and suitability of formation of coal and petroleum. Ore forming processes. Metallic and non-metallic deposits. Formation of uranium deposits. Groundwater resources. Study of other common economic minerals such as Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite.



Introduction to Universe and Earth System

Unit I – Introduction to Earth Science:

Introduction to various branches of Earth Sciences. Convection in Earth's core and Production of its magnetic field. Formation of core, mantle, crust, hydrosphere, atmosphere, and biosphere. Concept of sea-floor spreading, plate tectonics and continental drift.

Unit II – Soil Science:

Soils-Processes of formation, soil profile and soil types, requirements of fossilization, Fossils, processes of fossilization and different kinds of fossils. Introduction to geology and geomorphology of Indian subcontinent. General concepts about geochemical cycles.

Unit III – Solar System:

Solar system: Energy from the sun, solar window, atmospheric effects, diffused radiations, Air mass, effect of Air Mass, seasonal effects, environmental effects on standard test conditions.

Unit IV- Interior of the Earth, Deformation and Tectonics:

Basic concepts of seismology and internal structure of the Earth. Physico-chemical and seismic properties of Earth's interior. Concepts of stress and strain. Behaviour of rocks under stress; Folds, joints and faults. Earthquakes – their causes and measurement. Interplate and intraplate seismicity. Paleomagnetism, sea floor spreading and plate tectonics.

Geomorphology and Stream formation

Unit I - Introduction:

Introduction to Geomorphology, Principles of landform development as it relates to specific processes (Fluvial erosion, Glacial erosion, etc.), Topographic and Digital Maps.

Unit II - Weathering and Soil Formation:

Weathering, Concept of Time Scale in Geomorphology, Factors affecting weathering, Soil Formation, Soil Classification, Mass Wasting.

Unit III - Fluvial Landforms:

Stages of Stream Development, Specific landform features such as Oxbows, levees, cut-offs, floodplains, meanders, etc. Drainage Density.

Unit IV - Hydrological Characteristics of River Basin:

Channel patterns: Causes of development and morphological properties of straight, meandering and braided channels, Sediment load: Processes of entrainment and transport, types of load. Channel flow: Types, factors, energy principle in open channel flow. Watershed Management Programmes - its importance, policies and techniques with special reference to India

Basic Geophysics

UNIT I - Introduction to geophysics:

Geophysics and its importance among earth sciences Solar system: earth as a member of the solar system, basic facts relating to the earth's position in the solar system.

Geospheres: scope of study of various geospheres, atmosphere, ionosphere, asthenosphere, cryosphere, lithosphere, hydrosphere and biosphere. Meteorology, oceanography and hydrology.

UNIT II - Seismology:

Natural and artificial seismology and its relation to other earth systems sciences. Classification of earthquakes, causes and propagation of different seismic wave and fundamental laws. Various methods for determination of focal depth and epicentral location. Interior of the earth and earth quake prediction. Concepts of geodynamics.

UNIT III - Gravity field:

Gravity field and its variations on surface, internal and external field, geoids, spheroid and ellipsoid of the earth. Shape, size and structure of the earth. Geomagnetic field, magnetic elements and description of the magnetic field, origin and reversals of the magnetic field.

Paleomagnetism: Natural remnant magnetization, measurement of direction and intensity of NRM. Continental drift and polar wander curves.

UNIT IV – Geochronology:

Rock dating methods, U-Th, K-Ar, Rb-Sr, C-14, Fission-track and magnetic dating. Geothermic: heat sources, geothermal flux distribution over continents and oceans, thermal structure of the core, forces acting on the plates.

Oceanic lithosphere, mid-oceanic ridge, transforms fault, subduction zones, oceanic islands. Sedimentary basins, continental margins, continental rift zones.



Air and Water Pollution

Unit I - Air Pollution:

Air Pollution: Introduction to Air pollution, Causes of air pollution – sources, type and effect of air pollutants, Climatic & Meteorological effect on air pollution concentration- formation of smog and fumigation.

Unit II – Characteristics of Air Pollution:

Analysis of Air Pollutants, Collection of Gaseous Air Pollutants- Collection of Particulate Pollutants – Analysis of Air Pollutants like: Sulphur dioxide – Nitrogen oxide – Carbon monoxide – Oxidants & Ozone – Hydrocarbons – Particulate Matter.

Unit III – Water Pollution:

Water Pollution: Sources / Origin of waste water – Types of water pollutants and their effects
Chemical Pollutants: Toxic Organic & Inorganic Chemicals – Oxygen demanding substances
– Physical Pollutants: Thermal Waste – Radioactive waste.

Unit IV- Contaminant Mitigation:

Air and Water Pollution Control Measures & Equipment Control of Particulate Emission – Control of Gaseous Emission –Settling Chambers, Cyclones, Filtration, Spray Chambers, Ventury Scrubbers, Electrostatic Precipitator, Water Pollution Measurement Techniques – Water Pollution Control Equipment's & Instruments – Indian Standards for Water Pollution Control.



Geographic Information System & Remote Sensing

UNIT - I Remote Sensing:

Basic concept of remote sensing, Data and Information, Remote sensing data Collection, Remote sensing advantages & Limitations, Remote Sensing process. Historical Components of Remote Sensing Principles & methods of remote sensing - Active and Passive remote sensing.

UNIT II - Data Product and Image Analysis:

Types of Data Products - types of image interpretation - basic elements of image interpretation - visual interpretation keys. Digital image processing - Image enhancement - image classification - Supervised and unsupervised.

UNIT III - Geographic Information Systems:

Introduction, History of GIS, GIS Components, GIS Applications in Real life. The Nature of geographic data, Maps, Types of maps, Map scale, Types of scale, Map and Globe, Coordinate systems, Map projections, Map transformation, Geo-referencing.

UNIT IV - Application of Remote sensing and GIS:

Application of Remote Sensing and GIS in Precision Agriculture - Monitor Crop Health - Management Decision Support Systems. GIS based network planning.



Environmental Impact Analysis (EIA)

Unit I - Introduction: The Need for EIA, Indian Policies Requiring EIA, Advantages and Limitations of EIA, Hierarchy in EIA, Statutory requirements in EIA,

Unit II – Risk Assessment: Project Screening and Scoping for EIA, Use of Risk Analysis in EIA, Environmental Risk Management, Health Risk Assessment, Risk Characterization, Socio economic environment, Methods of impact analysis,

Unit III – Various Prediction:

Prediction and Assessment of Impacts on the Air Environment, Prediction and Assessment of Impacts on the Surface Water Environment, , Prediction and Assessment of Impact on the Groundwater, Assessment of impact on air, water and biological environment.

Unit IV – Legislation and Governance:

Environmental Legislation, Environmental laws and protection acts, Constitutional provisions- powers and functions of Central and State government, The Environment (Protection) Act 1986, The Water Act 1974, The Air act 1981, Wild Life act 1972, Guidelines for control of noise.



Weather System and Climatology

Unit I - Atmosphere:

Nature and scope of climatology, Composition and structure of the atmosphere; Insolation and its factor; heat Budget; Horizontal and vertical Distribution of temperature.

Unit II - Weather Parameters:

Atmospheric Evaporation; Humidity; Condensation, Precipitation, types of rainfall

Unit III – Weather Disasters:

Atmospheric pressure and winds, Air Masses and Fronts; Cyclones and anti-cyclones, Tropical and Temperate cyclones; Thunderstorms: Type and Distributions.

Unit IV - Climate and Warming:

Koppen's Classification of Climates, Global Warming; Air Pollution, Climatic Change and its impact on the earth.

Natural & Man-made Disasters

Unit I – Natural Hazards:

Hazards and Disasters, Risk and Vulnerability in Disasters, Natural and Man-made disasters, earthquakes, floods drought, landside, land subsidence, cyclones, volcanoes, tsunami, avalanches, global climate extremes.

Unit II – Man-made Hazards:

Man-made disasters: Terrorism, gas and radiations leaks, toxic waste disposal, oil spills, forest fires.

Unit III – Earthquakes and Floods:

Earthquakes and its types, magnitude and intensity, seismic zones of India, major fault systems of India plate, flood types and its management, drought types and its management, landside and its managements case studies of disasters in Sikkim (e.g) Earthquakes, Landside).

Unit IV – Socio-economic aspects:

Social Economics and Environmental impact of disasters.



Estimation Theory and basic Geostatistics

Unit I – Spatial Statistics:

Plotting and representation of spatial data, Univariate and Bivariate Data Display: Scatterplot or Cross plot Histogram, Probability Density Function (PDF), Cumulative Density Function (CDF), Mean, median, variance, Standard Deviation, Measures tools of Location and Spread.

Unit II – Interpolation:

Basic spatial interpolation: nearest neighbours, inverse distance, trend surfaces. Linear Regression, Other interpolation methods and their comparison in applied aspects.

Unit III – Variability:

Characterization of spatial processes: Variogram and covariance, Estimating and modeling the Variogram, Local estimation or prediction and quantifying uncertainty in estimates: kriging

Unit IV – Multivariate Analyses:

Cross-correlation, co-regionalization, cokriging,
Cross validation and comparing the discussed geostatistical methods