2011-2012 ICTP POSTGRADUATE DIPLOMA PROGRAMME
EARTH SYSTEM PHYSICS

Introduction to the Physics of the Earth System (ESP-IPES)
(12 lectures : 18 hrs)

- Lithosphere
- The Rock Cycle: Igneous Rocks, Sedimentary Rocks, Metamorphic Rocks.
- Structure of the Earth: Plate Tectonics, Polarized plate tectonics, Crustal Deformation: Folding and Faulting, Earthquakes, Volcanism and Volcanology.
- Physiography of the Earth's Surface, Weathering, Introduction to Soils, Erosion and Deposition, Streamflow and Fluvial Processes.
- The Drainage Basin Concept, Morphostructural zonation.
- Introduction to Glaciation. Climatic modulation of seismicity in mountain ranges.
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- - Atmospheric Composition
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- - The layered Atmosphere
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- Physical behavior of the Atmosphere and the Gas laws.
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- - Atmospheric Pressure
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- - Atmospheric Effects on Incoming Solar Radiation
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- - Global Patterns of Insolation Receipts
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- - The Greenhouse Effect
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- - Net Radiation and Planetary Energy Balance
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- - Daily and Annual Cycles of Temperature
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- - Forces Acting to Create Wind

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- - Local and Regional Wind Systems
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- - Global Scale Circulation of the Atmosphere
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- - El Nino, La Nina and the Southern Oscillation
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- Introduction to Oceanography: History, Geography, Measurements
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- Oceanic Volume, Salt and Heat budget
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- Properties of SeaWater, its distribution and structure
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- Rotation, Geostrophy, Response to Winds (Ekman layers)
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- Wind-driven Circulation: Sverdrup interior and Western Boundary Currents
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- Deep Circulation: Atlantic and Global MOC, water masses
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- Atlantic, Pacific, Indian and Southern Ocean Systems