

International Workshop and Advanced Study Course:

Ecohydrology and Biotechnology for Sustainable Integrated Water Resources Management in HELP and Ecohydrology Basins

PROGRAMME



Lodz, Tresta, POLAND, 12 - 22 September 2010

International Institute of the Polish Academy of Sciences -
European Regional Centre for Ecohydrology (ERCE)
under the auspices of UNESCO, Lodz, Poland

In cooperation with

University of Lodz
Department of Applied Ecology, Lodz, Poland

Institute for Agricultural and Forest Environment of the Polish
Academy of Sciences (IAFE), Poznan, Poland

Polish aid

United Nations Educational, Scientific
and Cultural Organisation - International Hydrological Programme



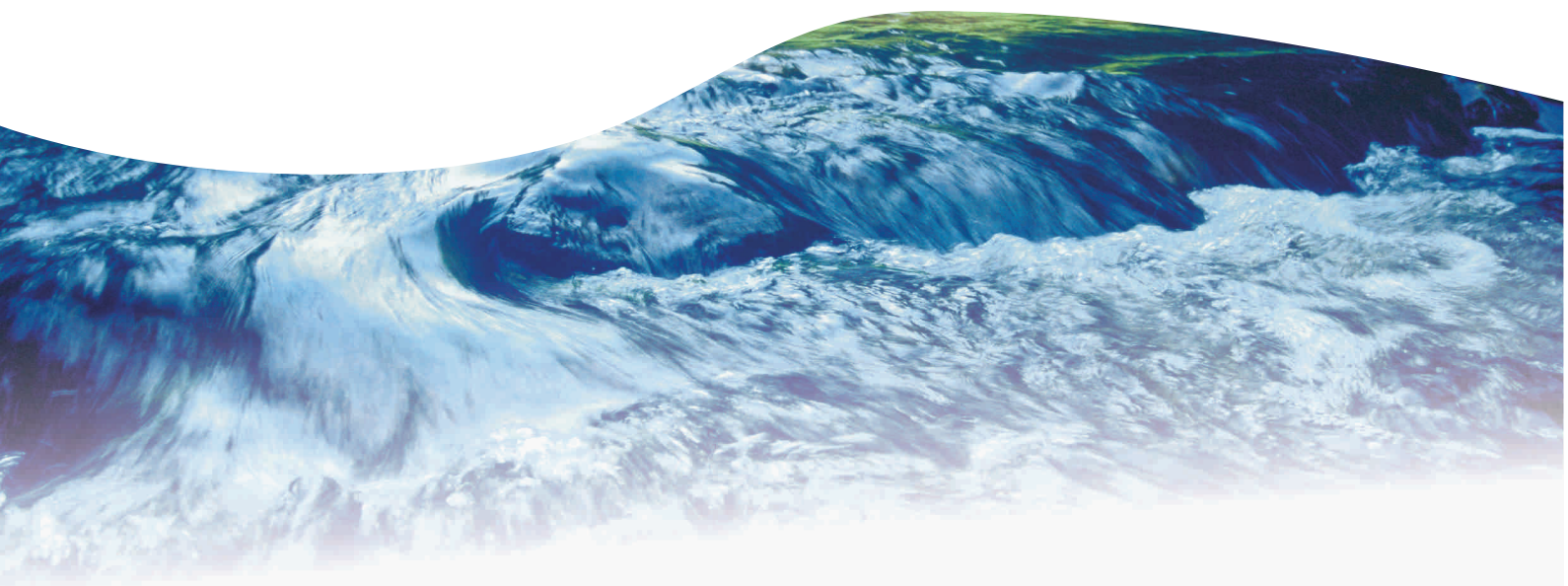
COURSE RATIONALE

In the face of global challenges such as changes in geopolitical and economic centers, as well as demographic processes, combined with progressing degradation of the environment and its resources, there is an urgent need to formulate a new proactive strategy that harmonize the humanity needs with water resources and ecosystem potential.

The economic crisis of recent years provides evidence that recent economic theories do not possess sufficient predictive potential to resolve problems that are far more than economic and to guarantee a sustainable future for global society. Recent economic assumptions that advocate increased consumption as a major stimulator of economic growth should no longer be considered valid.

In addition, with global economic, social, and environmental changes, the economic crisis should be regarded as an early warning signal for the urgent necessity to change the current resource use into a more efficient economic development mode that recognizes the value of ecosystem resilience supported by **ecohydrology**, which regulates the hydrology/biota interplay. Such an approach is based on the assumption that the major drivers of the Biosphere evolution in the past and in the Anthropocene are, in the given thermal regime, the interactions between water and biota. Following this, the new holistic way of water resources management in a basin scale has to be expanded into a more integrative science which recognizes **ecohydrology as novel tool** for IWRM to: reverse degraded biogeosphere, eradicate poverty, achieve a sustainable future and the improved quality of life. This novel tool has the capacity to improve the water resources quantity and quality, increase biodiversity and food production, and enhance the use of bioenergy. Thus, **ecohydrology** has the potential to regulate the complexity of interactions between, water cycle, ecosystems and societies by **the three principles**:

1. Quantification of hydrological processes in the basin scale (GIS) and evaluation of hot spots needing remediation.
2. Analysis of ecosystem distribution within the catchment to determine which parts can be used for enhancement of carrying capacity (bio-economic use and biodiversity enhancement).
3. Implementation of ecohydrological biotechnologies - dual regulation of biological and hydrological system, with special consideration of harmonization with hydro-technical infrastructures and synergy between processes (e.g. denitrification and phosphorus transfer into no available pool; assimilation in biomass or absorption in biogeochemical barrier).



COURSE RATIONALE

1/ Reduction of threats of floods and droughts by control of stochastic character of hydrological processes in catchments by:

Use of social learning and communication methodology for formulation the vision, and creation of the future sustainable water ecosystem as far as adaptation of society to hydrological processes;

Incorporation of an understanding the past (e.g. paleohydrology, ecological succession patterns, human settlements and landscape spatio-temporal dynamics);

Integration of specific environmental science knowledge (e.g. geohydrology, soil, groundwater, plant cover and the floodplain characteristics used to understanding the specific patterns of hydro peaking process);

Harmonization of society's priorities with enhanced ecosystem carrying capacity.

2/ Development of the ecohydrological approach and biotechnologies for the agricultural landscape in order to increase the food /bioenergy productivity and to reduce diffuse pollutant emission and enhance biodiversity.

3/ In the urbanized areas the improvement of health and the quality of life, and the expansion of professional activity to incorporate ecohydrological methodology for city spatial planning with special consideration of storm water purification, and phytotechnologies. These new strategies will create a friendly **blue-green city landscape** with reduced energy consumption, pollutants emission, and improved aesthetic and cultural values.

4/ For the fulfillment of an MDG the future scenarios and proactive strategies should be based on: a holistic, transdisciplinary environmental science; a system approach; the foresight methodologies, and an education and social dialogue. Learning outcomes of the new transdisciplinary education has to be focused on the ability to formulate hypothesis related to highly complex processes up to the design of the system solutions and communication with decision makers and stakeholders.

The enhancement of the ecosystem resilience should be based on three elements:

synthesis and progress of the research on modification of the water cycle in agricultural and urban areas;

developing research on implementation of ecohydrology - using ecosystem processes as complimentary to technologies management tool;

and developing integrative science (ecology, hydrology, socioeconomy) for system approach in IWRM with the special emphasis on ecohydrological biotechnologies.

Ecohydrology for planning energy efficient Healthy City.

The principles of **ecohydrology** should serve for water sensitive urban design where storm water are purified by ecohydrological biotechnologies and retained for increasing the freshwater ecosystems and green areas in the city space for improvement health, quality of life and to reduce pollutants transfer into the river systems and costal zones by hydro peaking process. The **blue and green city** will reduce energy use for transport by declining the urban sprawl as far as by such solutions as conversion of sewage sludge into bioenergy in the areas of limited value. Such solution should be harmonized with the cultural heritage of the city.

COURSE OBJECTIVES

Course objectives

The International Advance Study Course: “Ecohydrology & Biotechnology for Sustainable Integrated Water Resources Management in HELP Basins” is organized for the representatives of the HELP Basins, including a team composed of one young scientist and one decision makers/practitioner for each HELP basin. The Course will be open for all countries, however it is especially addressed to developing regions.

The number of participants will be 20 people, with maintained gender balance. The scheduled duration of course is 9 days.

The course will include six types of classes given by invited specialist from: IHP, IAP (Inter Academy Panel), International Institute for Ecology Polish Academy of Sciences, European Regional Centre for Ecohydrology under the auspices of UNESCO, Department of Applied Ecology – University of Lodz (UŁ) and Department of Research Agricultural and Forest Environments, PAS in Poznan.

The types of classes:

1. Opening lectures and participants presentations of water management and water / environment / social issues in different HELP basins.
2. Lectures on ecohydrology in the Integrated Water Resources Management.
3. Technical trips - demonstrating ecohydrology and ecosystem biotechnologies research activities and implementation for existing problem solving, in:
 - a) Pilica River HELP Basin and demonstration project in Ecohydrology, and the field station of the University of Lodz (Tresta),
 - b) demonstration site of the EU SWITCH Project on urban ecohydrology (Lodz),
 - c) agricultural landscape – heat and water budget for sustainable food production and biodiversity restitution (Poznan).
4. Demonstration of ecohydrological and biotechnological methods (low cost – high technology) – molecular biology, chemical, physical and biological analysis of samples, statistical data analysis, laboratory experiments; using prognostic and decision support mathematical model.
5. Interactive workshops – series of interactive classes will refer to three phases of ecohydrology: information gathering, knowledge generation and implementation as a key for IWRM problem solving. They will base on recent methodologies including Visioning and Strategizing, World Café, Open Space, interview, expert’s panels and the others that allow discussing water related and facilitate stakeholders participation.
6. Self-study sessions – preparation of the report from the course and manuscripts for publishing in the International Journal of Ecohydrology & Hydrobiology.

COURSE OBJECTIVES

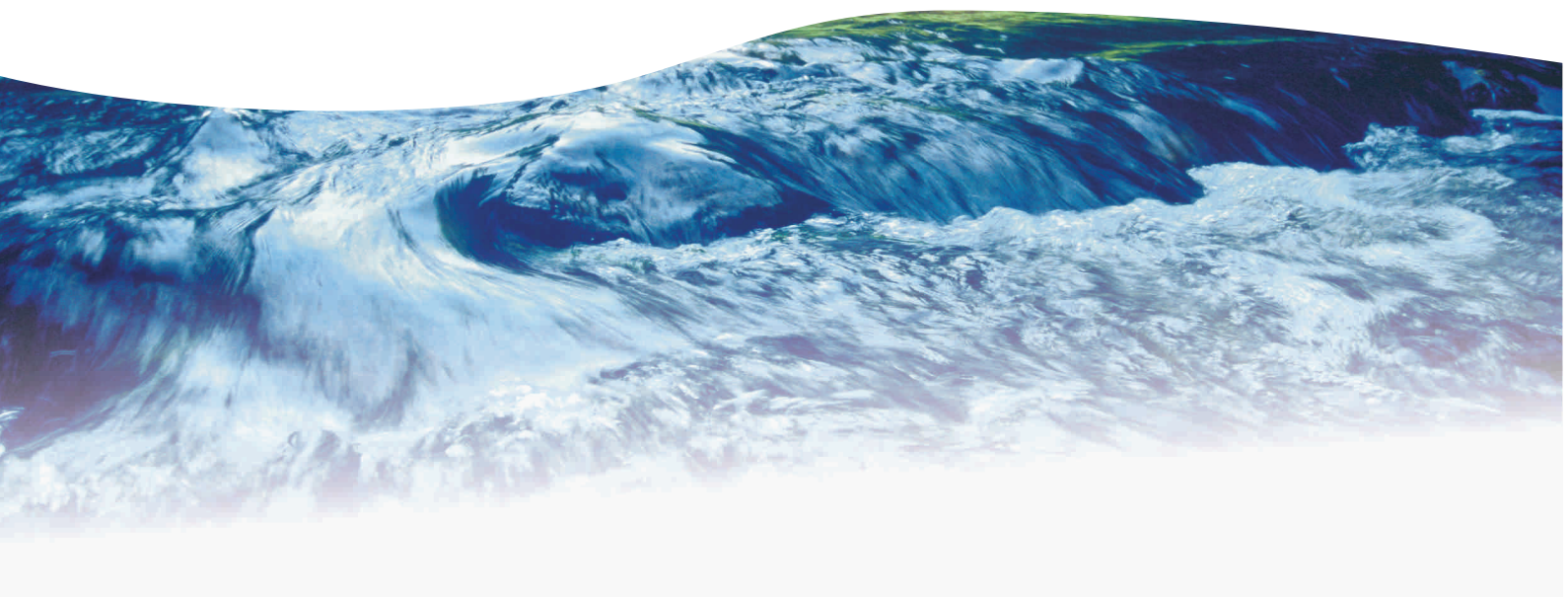


HELP (Hydrology for the Environment, Life and Policy) is a cross cutting and transdisciplinary initiative of the United Nations Educational Scientific Organization (UNESCO) led by the International Hydrological Programme (**IHP**).

HELP is creating a **new approach to integrated catchment management** through the creation of a framework for water law and policy experts, water resource managers and water scientists to work together on water-related problems. From the technical perspective, the broad objectives of HELP are to strengthen field-oriented, experimental hydrology using the drainage basin (up to scales 10^4 to 10^6 km²) as the framework. Water related physical (hydrological, climatological, ecological) and non-physical (technical, sociological, economics, administrative, law) observations will be made in these catchments which address the most critical policy and management issues as perceived by “**users**” under different **biophysical and socio-economic environments**, taking into account needs for sustainable development. The desire for this new programme to be truly “**user-driven**” will require the **active involvement of both policy and facilitating (water and land resource managers) groups** to set the policy agenda and ensure the scientific results will benefit **societal needs** through the revision of policy and management practices.

Why H.E.L.P. ?

At present there is a "Paradigm Lock" between outdated accepted practices adopted in water resource management for the benefit of stakeholders and the application of more recent scientific findings. Scientific research is isolated by lack of proven utility, whilst water policy and management is isolated by legal and professional precedence.



COURSE PROGRAMME

Sunday, 12 September 2010

Bus transfer from Lodz to Swolszewice
Arrival and check-in at Hotel Kruk (Swolszewice)

20:00 Welcome Dinner at the hotel

Monday, 13 September (Swolszewice) 2010

Opening Day

08:00 – 09:30	Breakfast
09:00 – 10:00	Registration
10:00 – 10:30	Welcome by Dr. Iwona Wagner
10:30 – 11:00	Opening and Introduction by Prof. Dr. Shahbaz Khan
11:00 – 11:45	? <i>to be confirmed</i>
11:45 – 12:15	Coffe break
12:15 – 13:00	? <i>to be confirmed</i>
13:00 – 13:45	? <i>to be confirmed</i>
14:00 – 15:00	Lunch at the hotel
15:00 – 19:00	Presentations by Participants - (7 min.) introduction to poster session Poster session
19:30	Dinner



COURSE PROGRAMME

Tuesday, 14 September (Swolszewice) 2010

08:00 – 09:00	Breakfast
9:00 – 10:00	Prof. Maciej Zalewski : “Ecohydrology as transdisciplinary science and system approach for integrated water resources management”.
10:00 – 11:30	Prof. Dr. Shahbaz Khan: “Workshop: Setting Goals for Environmental Management in UNESCO HELP Basins”.
11:30 – 12:00	Coffe break
12:00 –13:30	Prof. Dr. Shahbaz Khan: “Workshop: Putting Ecohydrology in Practice through the Demo Projects”.
13:30 – 14:30	Lunch
14:30 – 16:00	Prof. Dr. Shahbaz Khan: “Workshop: Managing Ecological Assets in River Basins”.
16:00 – 18:00	Monika Dziegielewska-Geitz: “SWITCH Lodz Learning Alliance as an example of a Multi-Stakeholder Platform for application of Ecohydrology a demand-led, problem-solving research”.
18:00 – 18:15	Reflection of the day
19:00	Dinner / International music



COURSE PROGRAMME

Wednesday, 15 September (Tresta) 2010

Hydrological principle

Quantification and integration of hydrological and biological processes from landscape to molecular processes

08:00 – 09:00	Breakfast
09:30	Bus transfer to Tresta (10 min)
09:30 – 10:30	Prof. Artur Magnuszewski: “Geographic Information System as a tool for decision making in floodplain management”.
10:30 – 11:30	Dr. Malgorzata Stolarska: “Application of GIS methods in Ecohydrology”.
11:30 – 12:00	Coffee break
12:00 – 12:30	Dr. Agnieszka Bednarek: “Application of biological method for reduction of nitrogen pollutants in agricultural catchment”.
12:30 – 13:15	Dr. Agata Drobniewska: “Phytotechnology for regulation water, nutrients and pollutants in dynamic landscape”.
13:15 – 14:30	Lunch in Tresta
14:30 – 17:30	Field and Laboratory Work: I group – Dr. Malgorzata Stolarska: “Application of GIS methods in Ecohydrology”. II group – Dr Agnieszka Bednarek: “Construction and functioning of “Denitrification wall” for reduction of nitrogen pollutants in agricultural catchment”. III group – Marek Ubraniak: “Application of geofibers materials in field implementation ecohydrological methods - construction, functioning and service of sequential biofiltration system for purification water from aquaculture”. IV Maciej Sklodowski: “Role of willows communities in the Pilica River valley in retention of the biogenic compounds”.
18:00 – 18:30	Reflection of the day
19:00	Dinner in Tresta

After Dinner Bus transfer to the hotel



COURSE PROGRAMME

Thursday, 16 September (Tresta) 2010

Shallow reservoir case study
Ecological principle

Enhancement of carrying capacity of the ecosystem (ecosystem resilience to anthropogenic stress, restoration of biodiversity, biological productivity, ecosystem services for society)

08:00 – 09:00	Breakfast
09:30	Bus transfer to Tresta (10 min)
09:30 – 10:15	Dr. Katarzyna Izydorczyk: “Influence of abiotic and biotic factors on cyanobacterial bloom intensity”.
10:15 – 11:00	Prof. Piotr Frankiewicz: “The influence of hydrological conditions on trophic relationships and water quality in reservoirs”.
11:00 – 11:30	Coffee break
11:30 – 12:15	Dr. Malgorzata Lapinska: “Implementation of the EU Water Framework Directive – assessment of “good ecological status” on the basis of fish communities analyses” (an example of best European policy practice).
12:15 – 13:00	Dr. Zbigniew Kaczkowski: “Fisheries research and aquaculture in Ecohydrology perspective”.
12:30 – 13:30	Lunch in Tresta
13:30 – 16:30	Field and Laboratory Work: All Participants: “The use of bongo net for estimation of vertical distribution of fish and large zooplankton”. All Participants: Dr. Zbyszek Kaczkowski: “Fisheries research and aquaculture in Ecohydrology perspective”.
16:30	Coffee break - transfer to the Poznan City
21:00	Dinner in Poznan



COURSE PROGRAMME

Friday, 17 September (Poznan) 2010

Terrestrial Phase of Ecohydrology

Prof. Andrzej Kedziora and prof. Zbigniew W. Kundzewicz

08:00 – 9:00	Breakfast
09:00 – 11:00	Methods of micrometeorological data measurement and heat and water balance calculations.
11:00 – 13:00	Field and Laboratory Works: Calculation of heat and water balance elements for certain ecosystems.
13:00 – 14:00	Lunch
14:00 – 16:00	Methods of quantity measurements of different animal groups.
16:00 – 18:00	Field and Laboratory Work: Usage of selected different field methods: birds, small mammals, insects, spiders, etc.
19:00	Barbeque dinner

Saturday, 18 September (Poznan - Lodz) 2010

08:00 – 9:00	Breakfast
09:00 – 11:00	Analysis of biological material collected on Friday. Evaluation of biomass and density
11:00 – 13:00	Modeller calculations of forest rings in agricultural area Calculations of advection heat.
13:00 – 14:00	Lunch
14:00	Transfer to Lodz
20:00	Dinner in Focus Hotel in Lodz

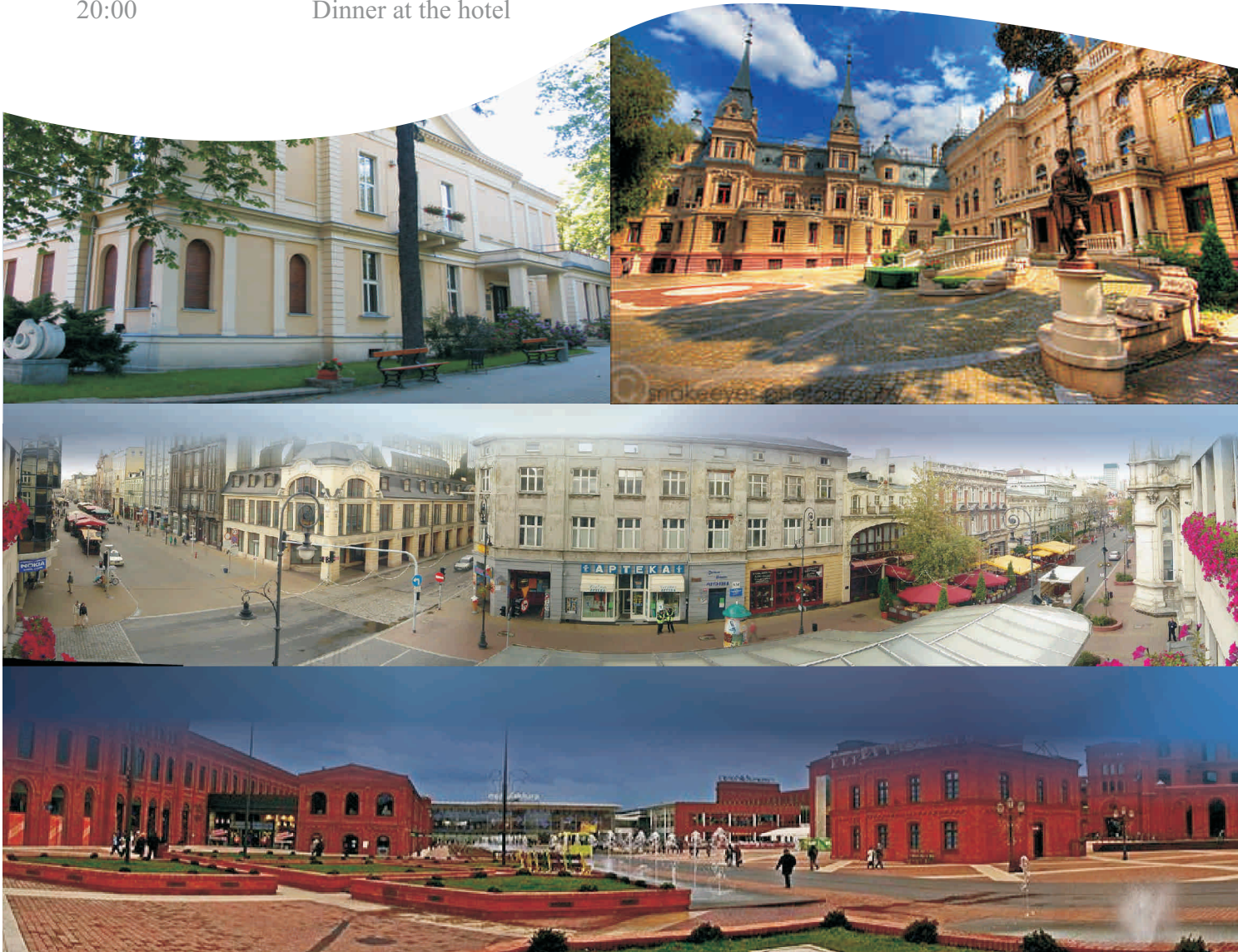


COURSE PROGRAMME

Sunday, 19 September (Lodz) 2010

Lodz Sightseeing tour

08:00 – 09:00	Breakfast
09:30	Bus transfer to Lodz
10:00 – 16:30	Lodz Sightseeing tour
12:00	“Ziemia obiecana”
13:00 – 14:00	Lunch at SPHINX
14:00 – 19:30	Free time
20:00	Dinner at the hotel



<http://pl.wikipedia.org> - National Film School in Łódź, by HuBar.

<http://www.panoramio.com/photo/> - Poznanski Palace in Lodz.

<http://brite.madebymonkeys.net> - Panoramic photo of Piotrkowska Street in Lodz, Poland , by Brite, source: <http://pl.wikipedia.org>.

<http://pl.wikipedia.org> - Manufactura: revitalized factories complex - Entertainment and Shopping Centre in Lodz.

COURSE PROGRAMME

Monday, 20 September (Poznan - Lodz) 2010

SWITCH – Lodz case study
Ecotechnological principle
Use of ecosystem properties as management tool

07:00 – 08:00	Breakfast
8:30 – 9:30	Dr. Iwona Wagner: “Urban ecohydrology for sustainable and healthy City of the Future – EH integrated urban water management”.
9:30 – 10:30	Dr. Kinga Krauze: “Facilitating a paradigm shift in urban biodiversity and water management”.
10:30 – 11:00	Dr. Michael Trepel: “Nutrients management in the Elbe basin - targets and measures”.
11:30 – 12:00	Wojciech Fraczak: “Urban catchment: Ecohydrology concept in restoration of the Sokolowka river for storm water management and improvement water quality”.
12:30 – 13:30	Lunch
13:30 – 14:00	Bus transfer to WWTP (GOS)
14- 15	Field trip Waste Water Treatment Plant in Lodz (GOS).
15:00 - 15:30	Bus transfer to Sokolowka River
15:30 – 17:00	Field trip to Sokolowka River
17:00 – 18:00	Lab presentation at the Nofer Institute of Occupational Medicine in Lodz
18:00	Bus transfer to ERCE
18:00 – 18:30	Coffee break
18:30 – 20:00	Dr. Iwona Wagner, Dr. Kinga Krauze: “Workshop at ERCE: World Cafe: Urban Ecohydrology – challenges and opportunities”.
20:00	Bus transfer to the hotel
20:30	Dinner at the hotel

COURSE PROGRAMME

Tuesday, 21 September (Lodz) 2010

07:00 – 08:00	Breakfast
08:30	Bus transfer to ERCE
09:00 – 10:00	Prof. Maciej Zalewski: “The FORESIGHT methodology for implementation of ecohydrology in integrated water resources management (IWRM)”.
10:00 – 11:00	Prof. Joanna Mankiewicz-Boczek: “Toxic cyanobacterial blooms (consequence of eutrophication): monitoring of toxigenic strains and their toxins by application of genetic, biochemical and analytical methods”.
11:00 – 11:45	Dr. Tomek Jurczak: “Ecohydrologic rehabilitation of Arturowek reservoirs (in Lodz) as a model approach to rehabilitation of urban waters - LIFE+ project”.
11:45 – 12:15	Coffee break
12:30 – 13:30	Summary and Discussion
13:30 – 14:00	The End of the Course, Diplomas
15:00	Farewell Dinner (Restauracja Polska, Lodz)
After Dinner	Free time

Wednesday, 22 September (Lodz) 2010

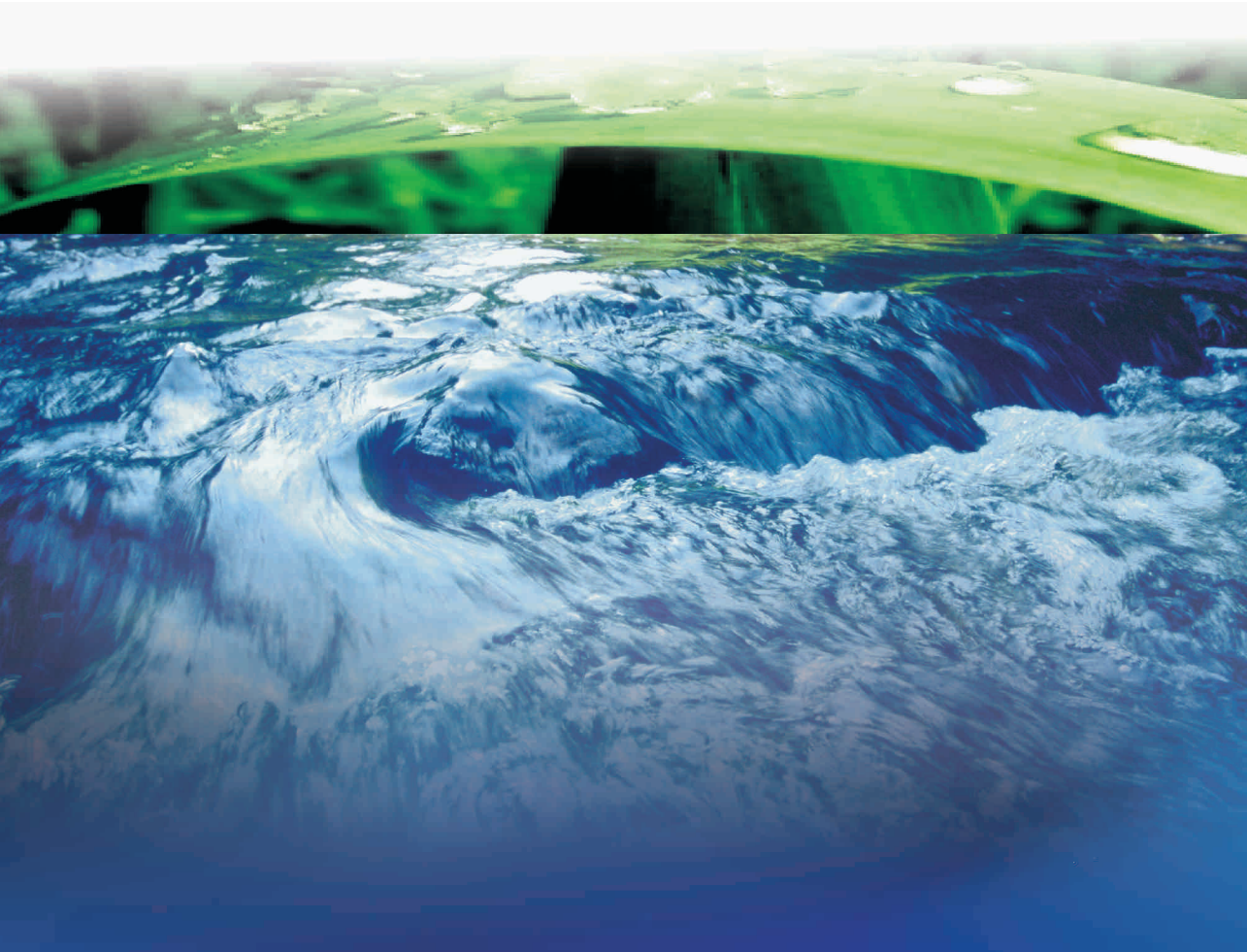
08:30 – 09:30	Breakfast
After Breakfast	Departures



Course Venue



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