HU WISU
Humboldt Winter and Summer University

Green Cities and Humboldt's Cosmos of Nature in the Age of Mega Urbanization and Climate Change

5 January – 23 January

CATEGORY
Metropolitan Studies & Urban Development

COURSE STRUCTURE
You will receive a total of **45 hours of academic lessons** (one lesson equals 45 minutes; 15 hours per week). Lessons will comprise lectures, group work, discussion sessions, and excursions.

WEEKLY SCHEDULE
HUWISU courses are grouped into different time tracks. Your course will take place in **Track B.**

Monday: 1.00 pm – 2.30 pm & 2.45 pm – 4.15 pm
Tuesday: 4.45 pm – 6.15 pm & 6.30 pm – 7.15 pm
Wednesday: 1.00 pm – 2.30 pm & 2.45 pm – 4.15 pm
Thursday: 9.00 am - 10.30 am & 10.45 am - 12.15 pm

COURSE LANGUAGE
This course is taught in **English**, including the readings. For the understanding of the texts and the discussions in class, a language-level of B2 (Common European Framework of Reference for Languages) is required.

TARGET GROUP
This course is designed **for undergraduate and postgraduate students of all subjects** with a strong interest in ecological, environmental, cultural, urban planning and agricultural topics.

CREDITS & CERTIFICATES
Participants will receive **6 ECTS** credit points and a certificate if they attend regularly (at least 80% attendance), participate actively and fulfill all course assignments. Additionally, six weeks after the end of the course a Transcript of Records is issued by Humboldt-Universität zu Berlin. All courses are accredited according to the European Credit Transfer System (ECTS).

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CULTURAL ACTIVITIES

In addition to the academic program, you are invited to **join our cultural and social program**. We offer a fine selection of interesting activities that aim to give you an unforgettable stay in Berlin. Through excursions, social gatherings, and sport activities, you have the opportunity to get to know the city, the university, and to meet students from all parts of the world. **Costs for these offers are included in the program fee**. Below, you find examples of previously offered cultural activities. You will be informed about the respective cultural program shortly before the start of the program via email as well as during the course period.

POLITICAL AND HISTORICAL GUIDED TOURS

- Federal Chancellery (*Bundeskanzleramt*)
- German Parliament (*Bundestag*)
- House of Representatives (*Abgeordnetenhaus*)
- Topography of Terror exhibition
- Political Archive of the Federal Foreign Office

CULTURAL GUIDED TOURS

- Kreuzberg Tour
- Museum Island (*Museumsinsel*)
- Berlin Cathedral (*Berliner Dom*)
- Daytrip to Potsdam
- Exhibitions

SOCIAL GATHERINGS

- Welcome Session
- Ice Skating
- Farewell Get2gether

EXPECTATIONS & POLICIES

Preparation for lively discussions in the classroom: Be on time, have at least the required readings completed, and points in mind for discussion or clarification.

Assignments: Complete all assignments according to the specified requirements on the schedule including handing them over to the lecturer.

Commitment in class: Pay particular attention to the lecturer and respect differences of opinions (classmates', lecturers').

Academic guidelines: Comply with academic integrity policies (such as no plagiarism or cheating, nothing unethical) especially the academic honor code and the student code of conduct.

Attendance policy: No unexcused absences are permitted. Students must follow teachers' instructions to catch up on missed work – to excuse absence please contact the HUWISU office.

COURSE DESCRIPTION

In the age of climate change and mega urbanization, urban green and gardening, providing multiple functions and benefits to cities and their biodiversity and dwellers all season long. The course shows and discusses new perspectives of how cities can be developed greener, sustainable and resilient.

The classes will deal with the history of urban agriculture and garden cultures, for example from the old Persian world and the ancient cultures from Asia, Europe, North and South America. The students will follow in the footsteps of Alexander von Humboldt, who attempted to explain nature in its complexity through his research trips within Europe, South and North America, and Asia at the end of the 18th and beginning of the 19th centuries.

The course will discuss the history, current role and the future of urban gardening locally and worldwide. Por example the urban gardening movement that has its obstacles to be involved in the concepts of smart, clean, compact and global cities.

The students will be equipped with valuable knowledge and skills. *Experience, academic research and suggestions in theory and practice are provided for future decision-makers in urban design and planning, environmental planning, civil engineering, architecture and landscape architecture as well for students studying life science, (health and medicine issues), disaster and climate management, mathematics, physics, chemistry and pharmacy, finances, administration, politics and legislations and law.*

The lectures, seminars and excursions will offer the students a deeper insight of plants and greenery as an integral part of urban sustainable development. The ecological, economic and social advantages are manifold: healthy climate and nutrition, biodiversity, reduced loss of food due to adequate transport and storage, poverty reduction through income opportunities. The variety of urban green infrastructure provides spaces for climate improvement, energy savings, rainwater management, recreation, education and biodiversity of urban wildlife.

Also, the Winter School in the cold season will identify and show examples of the many functions that green spaces, agriculture and horticulture activities fulfill in large cities, especially in the case of Berlin. Explore different ways to save and create green spaces. Knowledge acquisition and skills about:

- different techniques to protect and create green spaces, in order to identify the interdisciplinary character of welfare effects on urban life;
- institutional conditions of green infrastructure in urban planning processes through its ecological, economic and social benefits;
- strategies for mitigation and adaptation to climate change in order to decrease greenhouse gas and the urban heat island (UHI) effect;
- practice on different ways to cultivate and process agricultural products for food security and income-earning reasons in cities, applying new and traditional production methods;
- conservation of resources through energy and water cycles as well as recycling of waste (composting);

Learn about urban agriculture and horticulture projects in Berlin, such as allotment gardens, community gardens, green roofs and walls and market oriented urban farms (vegetable, fish and algae production). The Course addresses the issues of ecological challenges and responsibilities in sustainable urban development, in order to improve planning, design, architecture, politics, standards and laws in cities.

COURSE OBJECTIVES AND LEARNING OUTCOMES

By the end of the course, students will be able to understand:

- Alexander von Humboldt - the world traveler, researcher, explorer and explainer of nature at the end of the 18th and beginning of the 19th centuries;
- the role, benefits and institutional aspects of urban green and sustainable development in context of urbanization and climate change – winter and summer;
- applied research and innovation in urban gardening – classical urban green, such as – parks, gardens and forests; and new technologies of greening and urban food production, such as green roofs and walls, rail track, riverside and roadside greening - permaculture - aquaculture and aquaponic gardening;
- the environmental, economical and social aspects in terms of education and integration of different generation and cultures on climate change, food security and biodiversity;
- scientific research and best practice of urban gardening (agriculture and horticulture) at the Humboldt University and in the city of Berlin.
- tolerance and understanding - to form, organize and working in mixed groups of students from different countries, different native languages and different professional and cultural backgrounds.

ASSIGNMENT INFO

Working in groups of 4-5 students from different countries to present:

1. Paper (each student 4-5 pages),
2. Presentation (each group presents, discussion).

Material and information be generated by students out of:

1. Lectures, seminars and excursion,
2. Interviews, readings and literature research.

In order to be granted 6 ECTS, students are required to

1. participate actively in all lectures, seminars and field trips;
2. do the readings in time and preparing discussion questions on them in advance;
3. active participation in working groups and quality of assignments;
4. Punctuality and attendance rate (a minimum of 80% attendance rate is required).
5. Failure to fulfill one of the mentioned components results in failure of the class.

The final grade will be composed to the mentioned components and assignments.

YOUR INSTRUCTORS

Mr. Volker Minks, holds a doctor degree of science of the Universidade de Sao Paulo (USP) and a master degree in agricultural engineering with specialization in urban gardening, landscape design and sustainable urban planning from Humboldt Universität zu Berlin. Mr. Minks has worked in interdisciplinary research projects in the areas of urban agriculture and horticulture, green technology, innovation and sustainable urban planning in Germany, the United States, Cuba and Brazil.

Until now he works with Professors from the Life Sciences Faculty at the Albrecht Daniel Thaer-Institute of Agricultural and Horticultural Sciences of Humboldt-Universität zu Berlin, and is affiliated with the Escola Superior de Agricultura "Luiz de Queiroz" University of Sao Paulo (USP), currently working on a Post-Doctoral Project - City of the Future: A greener and more livable São Paulo – Strategies for integrating green infrastructure into ecologically sustainable urban planning. The case studies are Berlin, New York and Singapore.

His research is related to the ecological, economic and social benefits of green areas in cities as ecosystems, especially in the context of research, practice and education on megacities and climate change. In 2011 he worked as coordinator for the C40 Sao Paulo Large Cities - Climate Summit and co-produced the publication - Building Sustainable Cities. Since 2011 he acts as coordinator and lecturer for the HUWISU summer school course "Land in the City, Green in the City". Since 2009 he is developing the cooperation between USP and HU Berlin, and organized several KOSMOS Workshops as coordinator and instructor at USP and Humboldt: Berlin meets Sao Paulo: Cities for all – livable and sustainable.

Since 2014 he is part of the Cátedra José Bonifácio of the Ibero-American Center (CIBA USP), dealing with the challenges of Latin America in the areas of international governance, trade, negotiations, security, energy, education, innovation and environment. Currently he works with The Global Institute for Peace (GLIP USP) at the University of Sao Paulo. Working in projects with balance of gender and diversity, ESG, e as well with the indigenous population to promote preservation of biodiversity and culture, green infrastructure food security, peace and sustainability.

Specifically, this year of the COP 30 in Belem in between Brazil and France, he works at GLIP USP on projects with indigenous communities addressing issues such as conflict resolution, healthy nutrition and food security, securing livelihoods, and defending their rights and territories against encroachment by urbanization and agribusiness.

COURSE SCHEDULE AND READINGS

Week 1: Introduction, History and Role of Nature, Urban Gardening and the Green Urban Design Network

Course introduction

Presentation of Topics

Presentation of Students

Logistics

Introduction to the History and Role of urban Green and Gardening in the Age of Mega-Urbanization and Climate Change (L)

Urban Greenery has important functions, whether in summer and in winter. For example, they are recreational area, habitat, food source, compensation of temperature and humidity, rainwater management, pollutant degradation, as well protection against dehydration and erosion of the soils. For functional ecosystem services land, conditions, variety, health and maintenance of plants playing a major role.

The ability to grow crops has changed the way of life for humankind. The development of agriculture made it possible to settle. Since then, food has been grown outside and inside of cities. The class will deal with the history of urban agriculture and horticulture techniques and garden cultures as examples from the old Persian world, Europa, Africa, Asia and America.

Within intensive industrialization and urbanization the gardens were lost in many cities. Now with increasing environmental problems, lack of farmland and food supply, urban agriculture and horticulture activities, also described as urban gardening, can find the way back into the cities. Therefore, it is subject of intense debates regarding its viability, efficiency and impact to mitigate climate change and increase biodiversity.

Today, more than 50% of the world population lives in urban areas. In 2050 approximately 66%. Urban Gardening can help to fulfill the changing needs and demands of people who live in the growing urban areas. Urban Gardening is a term for a large and complex area of scientific horticulture and sustainable urban food production. It deals with the complex problems of growing plants in dense populated areas, using them effectively, and maintaining their long-term health and functional value.

The urban gardening movement has its obstacles to be involved in the concepts of smart, green, compact, global and resilient cities. The current role and the future of urban gardening in the world will be discussed and explored.

Recommended Field Trips: Domäne Dahlem - Museum and Organic Farm, Allmende Kontor - Tempelhofer Feld, Rehberge Kleingartenkolonie (Allotment Gardens)

Cuba's urban farming revolution (2014): www.architectural-review.com/comment-and-opinion/cubas-urban-farming-revolution-how-to-create-self-sufficient-cities/8660204.article

Kraas, F. (Hg.) at al. (2014): Megacities: Our Global Urban Future. Springer Verlag. Heidelberg.

Horticultural Industry, European Journal of Horticultural Science by Verlag Eugen Ulmer. ISSN (printed): 1611-4426. ISSN (electronic): 1611-4434

Müller, Ch. (2011): *Urban Gardening: Über die Rückkehr der Gärten in die Stadt*. oekom. München.

Roaf, S.; Crichton, D.; Nicol, F. (2005): Adapting Buildings and Cities for Climate Change. Architectural Press.

UN HABITAT (2016): World Cities Report 2016: Urbanization and Development – Emerging Futures. Nairobi

UN Revision of World Urbanization Prospects (2015): https://esa.un.org/unpd/wpp/publications/files/key_findings_wpp_2015.pdf

Nature, Ecosystem Services and Climate Change – The current Situation of Cities and Bioeconomy - Land Use, Governance and Adaptation Strategies (L)

Nature as a productive force provides *ecosystem functions and services* in ecological, economic, as well as cultural (social) terms. Basic services are oxygen production and carbon dioxide reduction, soil formation, provides raw material, protection for erosion, as well water and temperature management, food production and recreation opportunities.

For example, terrestrial and oceanic ecosystems absorb nearly 60% of the carbon that enters the atmosphere through human activities. Nature's air purification processes counteract the greenhouse effect and slow down global and local *climate change*. However, with increasing population and urbanization, human demand for ecosystem functions and services is increasing enormously and increasing the pressure on ecosystems with their biodiversity. The concept of *biodiversity* has become established for the diversity of living nature in ecosystems.

In this context, *biodiversity hotspots* play an important role. Are regions in which large numbers of endemic plant species occur, and their habitats are particularly endangered. Around 25 biodiversity hotspots are recognized worldwide.

The extent of global environmental degradation is high. Over the past 300 years, 50% of the wetlands and 40% of the forest land of the original stock has been lost. This means that

humankind is carrying out a huge worldwide depletion of ecosystem functions and biodiversity.

Especially in cities most natural resources are consumed. At the same time, the relationship to nature is the lowest. The overuse of forest, soil, water, air, land and resources is little or not noticed. With the removal and alienation from nature, mankind itself is in danger, as the relation of the individual to the achievements of the ecosystems is lost.

A measure for the strain on the ecological structure of the earth by humans is the *ecological footprint*. He measures how much nature is available on earth, how much people use, and who benefits, and reflects the relationship between the natural resources used by man and the resources actually available.

According to experts, economic productivity depends on the quality of the environment and natural capital. Therefore, nature and environmental protection play an essential role for long-term economic development. A worldwide networked *bioeconomy* with green growth strategies can improve natural capital by reducing environmental degradation. The integration of ecosystem and biodiversity values into the economic, technological and urban planning processes of companies, cities and economies are crucial.

The current 2030 Agenda formulates 17 sustainability goals that promote economic development in harmony with social justice and the Earth's ecological boundaries.

The class will discuss the subjects: nature, ecological footprint, ecosystem functions and services, climate change and bioeconomy – the current situation and strategies of Cities

ALCAMO, J. et al (2003): Ecosystems and Human Well-Being: A Framework For Assessment. Aufl.2. Island Press. Washington.

BOENIGK, J. et al. (2014): Biodiversität und Erdgeschichte. Springer Verlag. Berlin/Heidelberg.

GERMAN BIOECONOMY COUNCIL (2018): Bioeconomy Policy (Part III) Update Report of National Strategies around the World. Berlin.

ELMQVIST, T. et al. (2013): Urbanization, Biodiversity and Ecosystem Services: Challenges and Opportunities. Springer Dordrecht/Heidelberg.

Rosenzweig, C. et al. (2011): *Climate Change and Cities: First Assessment Report of the Urban Climate Change Research Network*. Cambridge University Press.

UN (2016): The 2030 Agenda for Sustainable Development. In: https://sustainabledevelopment.un.org/content/documents.08/2018.

Green Cities - The Green Urban Design Network and the Berlin Open Space System (S)

Urbanization, buildings and vegetation seem to be three difficult non-compatible elements within cities. The Green Urban Design Network includes agriculture and horticulture activities as an integral part of sustainable urban planning processes.

The lecture introduces the students to green infrastructure and ecological design technologies that help render the urban environment sustainable, crucial to addressing the economic, demographic, social and environmental challenges in cities. The different ways to protect and create new green habitats: green roof and walls, allotment gardens, city farms, rail track and roadside greening, riverside greening, parks, tree planting and forestry, vertical farming, community gardens, guerrilla-gardening and others. The class also shows that market oriented urban farms with vegetables, fish and algae production can play a important role of urban sustainable development. The city of Berlin combines today all kinds of green spaces and technologies and is an example of a green City. The Open Space System in Berlin connects green areas by district cross linking through "green corridors" and "green belts". A network of green spaces to multiply the social and environmental benefits.

Discussion: urbanization, destruction of nature and food production - challenges of urban development

Recommended Field Trip: Senatsverwaltung für Stadtentwicklung – Modelle der Stadtentwicklung Gestern (BRD & DDR) und Heute

Carreiro, M. M. et al. (2011): *Ecology, planning and management of urban forests - an international perspective*, ISBN 0-8148-0030-3.

Despommier, Dickson (2010): The Vertical Farm - Feeding the World in the 21st Century. Thomas Dunne Books. St. Martin's Press. New York.

Dunnett, Nigel. Kingsbury, Noël (2005): Planting green Roofs and Living Walls. Timber Press. Portland. London.

Elmquist, T. et al. (2013): Urbanization, Biodiversity and Ecosystem Services: Challenges and Opportunities. Springer Dordrecht/Heidelberg.

Foster, Hal. The ABCS of contemporary Design, Hall Foster 2002.

Fry, Tony. Design futuring: sustainability, ethics, a new practice, Berg, New York, 2009.

Johnston, David; Gibson, Scott (2008): Green from the Ground Up: Sustainable, Healthy, and Energy-Efficient Home Construction. Taunton.

Köhler, M. et al. (2012): Handbuch Bauwerksbegrünung. Planung. Konstruktion. Ausführung. Rudolf Müller. Köln.

Miller, R. W. (2007): Urban Forestry: Planning and Managing Urban Greenspaces. Waveland Press. Long Grove. ISBN 1-57766-510-4.

Ryn, Sim Van der; Cowan, St. (1996): Ecological Design. Tenth Anniversary Edition. Island Press.

Snodgrass, Edmund C. at al. (2006): Green Roof Plants: A Resource and Planting Guide. Timber Press. Portland.

Alexander von Humboldt – The Discovery of Nature (L)

Alexander von Humboldt, the brother of Wilhelm von Humboldt. The researcher, explorer and traveler of his own accord. He collected minerals, plants and animals, made innumerable measurements, saw nature in its complexity and let it in his mind. After him are named universities, schools, streets and plants.

With his scientific activities, numerous letters, publications and lectures he has shaped the understanding of nature as a living whole, as a C*osmos*, in which everything is interconnected, and to understand the diversity of nature as a network with its plant and animal societies. Humboldt explored nature in all its dimensions: climate, vegetation, animals, soils, minerals, electricity, mountains, valleys and people. He traveled and explored Europe, Russia, China, North, Central and South America, and other parts of the world.

The universal genius was in constant contact with other scientists, philosophers and scholars from different fields, for example Goethe, Schiller, George Foster, Joseph Banks, Amine Bonpland, Jose Celistino Mutis and others. Charles Darwin was inspired by his research work.

Alexander criticized slavery and also registered what destruction the unrestricted use of natural resources (especially deforestation) caused. The scientist who dealt with climate change and sustainability. Alexander von Humboldt has researched and explained the interdisciplinarity and close connections between the natural sciences (biology, physics, chemistry, geology - geosciences, meteorology, agriculture, pharmacy). He included technique, poetry, art, history and politics. his work - Cosmos.

Recommended Field Trips: Naturkunde Museum Berlin, Deutsches Historisches Museum, Humboldt Forum

Humboldt, A. von. (1845, 2014): Entwurf einer physischen Weltbeschreibung. Band 1-4. Die Andere Bibliothek. Neuauflage 2014. Berlin.

Humboldt, Alexander von, Rupke, Nicolaas A. (1997): Cosmos: A Sketch of the Physical Description of the Universe. Volume 1. Foundations of Natural History. Johns Hopkins University Press.

Meinhardt, Maren (2019): Alexander von Humboldt: How the Most Famous Scientist of the Romantic Age Found the Soul of Nature. Blue Bridge. New York.

Helferich, Gerald (2004): Humboldt's Cosmos: Alexander von Humboldt and the Latin American Journey that Changed the Way We See the World. Gotham Sheridan. Wyoming.

Daum, Andreas, W. (2024): Alexander von Humboldt: A Concise Biography. Princeton University Press.

Alexander von Humboldt's American Travel Diaries in the Staatsbibliothek zu Berlin: https://humboldt.staatsbibliothek-berlin.de/leben/

Wulf, A. (2015): The Invention of Nature: Alexander von Humboldt's New World. Knopf (US). John Murray (UK).

Biodiversity and Earth Last Biodiversity Hotspots – Biological Richest and Endangered Regions (S)

Biodiversity and its conservation it's one of the major challenges for the present and coming generations. The term biodiversity has become established for the diversity of living nature in ecosystems and unique species communities. Biodiversity is defined as the totality of the genes, species and ecosystems of a region and its processes. It combines the study of the exploration of biological diversity of plant and animal species in ecosystems, and the degree of the threat through environmental changes and human impact, as well the development of appropriate protective measures.

In this context the concept of Biodiversity Hotspots has become established. Biodiversity Hotspots are biologically richest and endangered regions where a large number (at least 1,500) of endemic species are found, and a high percentage of plant life found nowhere else on the planet. A Hotspots is irreplaceable, their habitats are particularly threatened and has already lost at least 70% of its original vegetation. The Hotspot studies covered range from genetics and taxonomy to evolutionary biology, biogeography and the social sciences. Around 35 biodiversity hotspots are recognized worldwide, were are already destroyed a large proportion of the original area and original flora and fauna.

The class will discuss the biologically richest and endangered regions in the world (especially Brasil - Mata Atlântica and the Amazon Rainforest Region). The impact of human activities and invasions in these regions, through deforestation and burning for urbanization and agriculture purposes. And above all protective measures on state, private and individual level.

Recommendation Field Trips: Naturkunde Museum Berlin, Zoologischen Garten and Tierpark Berlin

https://www.museumfuernaturkunde.berlin/en

Conservation International Agrupación Sierra Madre; CEMEX (2004): Hotspots Revisited: Earth's Biologically Richest and Most Endangered Terrestrial Ecoregions. Mexico City.

Zachos, F. E.; Habel, J. Ch. (2011): Biodiversity Hotspots: Distribution and Protection of Conservation Priority Areas 2011. Springer. Heidelberg/New York.

BAUR, B. (2010): Biodiversität. UTB Haupt. Bern.

WITTIG, R. et al. (2014): Biodiversität: Grundlagen, Gefährdung, Schutz. Springer Verlag. Berlin/Heidelberg.

UNEP (1992): Convention on Biological Diversity (CBD). Nairobi. In: https://www.cbd.int/doc/legal/cbd-en.pdf., 06/2017

Narayanankutty, A; Job, J. T. (2023): Global Biodiversity Hotspots and its Endemic Flora and Fauna: Part I. Scholars' Press. Chisinau.

Field trip: Botanical Garden Dahlem and Botanical Museum Berlin - From North to South – Protection, Research, Education of different Plant Species from all over the World (Ex)

Introduction to the Herbariums (plants and seeds of the world and Humboldt's forgotten treasures - the Berlin Botanical Garden) #BoBerlin International Center of Botanical Knowledge - https://www.bo.berlin/en/research
Guided tour from professers and reserachers with profound information about Alexander von Humboldt, nature and climate change.

The World in a Garden - is since 1889 the mission of the modern Botanic Garden Berlin created by the first director Adolf Engler. The botanical garden has a long history and developed a impressive rich diversity of plants, por example from herbaceous and medicinal plants to roses, aquatic and marsh plants, an arboretum including American trees, an Italian garden, an impressive art nouveau Tropical Greenhouse with subtropical plants. The Botanic Garden in Berlin is one of the world's leading gardens, with an area of over 43 hectares and about 22,000 different plant species. He is part of the Freie Universität Berlin and has the status of a faculty-independent central institution. The task is the protection, research, demonstration and education of plant species from all over the world. https://www.bgbm.org/de/

Week 2: Research, Innovation and Concepts in Scientific Horticulture, Garden Cultures, Urban Gardening and Sustainable Urban Development in Cities

History of Garden Cultures and Urban Agriculture (S)

Gardens and the vegetation have inspired human history and art. The vision of paradise - ‘paradesa’ *pairi-daēza the* old Persian word for a fenced area - has influenced the phantasy of human kind with the aspiration of heaven on earth. Even today the many different types of garden cultures reflect this basic need to create a place of beauty and connectedness to nature according to diverse interpretations of esthetical values and philosophy.

Garden cultures are excellent examples of the concept of ‘Nature-Culture‘, that will show the way human beings have accommodated within their social and natural environment. The human ecological triangle as the Nature-Culture arrangements operates with two dynamic motivations. There is the need for social acceptance, as articulated by the contemporary German philosopher Axel Honneth alongside and as strong as the one for material existence. The Lecture will introduce the human ecological framework that will help to analyze the history of garden cultures in different parts of the world.

Discussion: What do gardens and paradise mean and how are they culturally aligned?

Kuhnke, Rainer W. (2001): Byzanz und die islamischen Gärten. In: Sarkowicz, Hans (Hg.): Die Geschichte der Gärten und der Parks, Insel Verlag, Frankfurt, S. 108 – 123.

Teherani-Krönner, Parto 2012: Gärten der Begegnung – Entstehung transkultureller Räume in der Stadt. Unsere Pflanzen und tägliche Nahrung – ein Stück Kulturgeschichte. In: Hammerich, Kurt et al. (eds.)Minderheiten im Umgang mit der Natur. Academia Verlag, Sankt Augustin, S. 359-41

Teherani-Krönner, Parto (2008): Geschlechtergerechtigkeit – Zugangsrechte zu Ressourcen, eine humanökologische Aufgabe, in: Bruckmeier, Karl und Wolfgang Serbser (Hg.), Ethik und Umweltpolitik. Humanökologische Positionen und Perspektiven, oekom Verlag, München, S. 237 – 260.

Thacker, Christopher 1979: The History of Gardens, Berkeley, University of California, *Berkeley* and Los Angeles.

Visiting the greenhouses, laboratories and experimental fields of the Albrecht Daniel Thaer-Institute of Agricultural and Horticultural Sciences. Explore and understand research and practice in urban agriculture and horticulture.

Albrecht-Daniel Thaer Institute of Agriculture and Horticulture - Campus Dahlem - Introduction to research projects and teaching

Plants serve different purposes, whether food, medicinal purposes, climate and water improvement, urban design and garden function, they all have different requirements in terms of soil, water and care. Different cultivation methods and techniques are used. Combined with energy and water saving technologies.

The CUBES Circle (L), Bio-Invitro, Introduction to FYTA- Sensors, Hyperspectral Imaging - cultivation, conditioning and use of ornamental Plants and Campus Tour

In the future, food production will be based on connected and standardized production modules communicating with each other. Together they form the CUBES Circle. Besides population growth and climate change, urban growth is one of the largest challenges of the 21st century. Spatial and infrastructural borders between urban centers and rural areas disappear. Agricultural production needs to feed an ever-growing population. At the same time, current innovations in animal breeding and plant cultivation, as well as measures for increasing productivity are not able to compensate for the ever-diminishing cultivation area. The vision of agricultural systems of the future is based on the idea that food will be produced in connected, mutually communicating and standardized production units, the so-called CUBES. Those CUBES are the basis for a closed food production system, which overcomes the weaknesses of earlier agricultural production systems by using ISO-standards, stackable units and a bio-cybernetic regulation approach. At the same time, the system integrates easily into the urban future. Due to its mobile nature, adaptability to a changing environment and an inherent scalability, the CUBES can be implemented in urban, rural and even desertified sites. Principles of closed cultivation methods will be integrated into a new process chain and the individual elements of the chain are intelligently connected and regulated. https://www.agrar.hu-berlin.de

The ornamental plant range offers a wide range of different species and varieties from different origins. For many inexperienced consumers, this can lead to cultivation errors and ultimately to the death of the plants when fulfilling the species-specific requirements. On the other hand, the plants are often only seen as inanimate objects or decorations, which creates a certain throwaway mentality among many consumers.

The Berlin start-up company FYTA GmbH has set itself the goal of actively supporting people in caring for their plants and also educating them about the basics of ornamental plant cultivation. The long-term survival of the plants should be supported and promoted through positive experiences and an active examination of the plants.

Campus tour at the Agricultural Research Institute in Dahlem

Aquaculture and Aquaponic Gardening - An Introduction to Theory and Practice (S)

This Seminar will introduce students to the theory and practice of aquaculture and aquaponic gardening. A 2011 FAO report predicts that food production will need to increase by 70% globally and by 100% in developing countries, to meet the increasing demand for nutritious food. In order to produce greater quantities of high quality food and adapt to the drastically changing horticultural production conditions, including climate change and increasing resource scarcity, new and comprehensive knowledge, as well as innovative methods and approaches, are required. One such promising innovation is aquaponic gardening. Aquaponic links aquaculture with hydroponic vegetable and herb production as a bio-integrated system.

Bernstein, S. (2011): *Aquaponic Gardening - A Step-by-Step Guide to Raising Vegetables & Fish Togeteher*, New Society Publishers; Original edition, ISBN-13: 978-0865717015

Graber, A., and Junge, R., 2008. Aquaponic Systems: Nutrient recycling from fish wastewater by vegetable production", ScienceDirect, Desalination 246 (2009) 147–156.

Hughey, T. W., 2005. Barrel-Ponics. Aquaponics in a Barrel. Available free online: http://www.aces.edu/dept/fisheries/education/documents/barrel-ponics.pdf

Jones S., 2002. Evolution of Aquaponics. Aquaponics Journal 24, Vol. 6, No 1.

Savidov, N., 2003. Aquaponics, an Environmentally Friendly Production System. Agrinews.

Wilson, G., 2005. Greenhouses Aquaponics Proves Superior to Inorganic Hydroponics. Aquaponics Journal, Issue 39.

Field Trip - ECF - Efficient City Farming - Aquaponic-Water Circulation System combines fish Farming with Vegetable and Herb Cultivation (Ex)

The ECF City farming system enables vegetable, herb and fish production within an urban environment. Is a CO2-neutral production with no pesticides, zero transportation miles, and with a reduced water footprint. The result is year-round sustainable food production with high resource efficiency and exemplary environmental standards. Ideal for all city farmers: restaurateurs, hoteliers, supermarkets, architects, schools and universities. Students learn about the manifold benefits. The economic and environmental protection goes hand in hand with 1) sustainable production of local vegetables and fish; 2) elimination of environmentally harmful transport routes and cold chains; 3) transparent production process; and 4) synergistic effects of using waste heat to allow year-round cultivation.

Discussion: the revolution of food production - chances and risks

www.ecf-center.de

Urban Green and sustainable Landscaping in Megacities – Urban Concepts of Classic & New Greening Technologies – Berlin, London, Ney York, Tokyo, Sao Paulo and Singapore (S)

Since the 1960's in Europe and since the 1990's in many other parts of the world, an awareness of environmental problems has developed a growing urban greening market with new technologies, adapted new plant species, guidelines, laws, educational and financing programs. The various measures are intended to establish greening technologies as part of sustainable urban development. In many cities, cooperation between research institutes, municipalities and various companies in the field of greening, land use and construction has also developed. The establishment of classical urban greenery and new greening technologies as part of city laws and programs intent to promote climate and environmental protection and efficient resource management of gray, blue and green infrastructure, construction and recycling. Some Cities have implanted various programs: Strategies and Networks on Green Infrastructure; Environmental Action Plans; Soil, Water und

Temperature Management Strategies and Regulations; Fauna-Flora, Biodiversity and Land Protection Programs; and New Green Building Codes and Certificates are part of this development.

The class will discuss examples on urban gardening, greening technologies and sustainable development in context of new guidelines, laws and programs in Cities around the world, such as Berlin, Chicago, London, New York, Portland, Tokyo, Toronto, Singapore and others. The students should be part of the discussion with their own experiences and cities.

Earth Pledge (2005): Green Roofs – Ecological Design and Construction. Schiffer Publishing. Atglen.

EFB (2015): White Paper - Green Roof and Wall Market report. In: http://efb-greenroof.eu/wp-content/uploads/2016/12/efb_whitepaper_2015.pdf, 06/20172015.

LEED - Leadership in Energy and Environmental Design. http://leed.usgbc.org, 10/2015.

Senatsverwaltung für Stadtentwicklung und Umwelt Berlin Hg. (2012): Stadtgrün in Berlin – Urban Green Spaces in Berlin - Recreation and encounters with nature. Oktoberdruck. Berlin.

The City of London Corporation (2016): The City of London Biodiversity Action Plan 2016-2020. In: https://www.cityoflondon.gov.uk/things-to-do/green-spaces/city-gardens/wildlife-and-nature/Documents/city-of-london-biodiversity-action-plan-2016-2020.pdf, 08/2017.

The City of Singapore: https://www.nccs.gov.sg/news/lusher-and-greener-singapore-ura-and-nparks-introduce-schemes-promote-skyrise-greenery, 02/2017.

The City of Singapore: https://www.nparks.gov.sg/skyrisegreenery/incentive-scheme, 02/2017.

Tokyo Metropolitan Government (2007): Basic Policies on the 10-Year Project for Green Tokyo. In: http://www.kankyo.metro.tokyo.jp/en/attachement/10-year_project.pdf, 07/2016

Gardens of the World - Garden Cultures from around the World - Bali, Japan, China, Korea, the Orient and Europe

In the eleven theme gardens, tradition meets contemporary garden art. Gardens from all over the world from Bali, Japan, China, Korea, the Orient and Europe. Complemented by aquatic gardens of the "Promenade Aquatica", the rose garden and the rhododendron grove.

Shown are gardens that demonstrate their culture heritage and have their own specific view every season – the English landscape garden, the maze and labyrinth garden, the Karl Foerster (1874-1970) Perennials Garden – the Garden of the Four Seasons, the Jewish Garden, the Christian Garden and the Oriental Garden.

Even in winter, gardens provide space for exploration, learning, shelter, food source and living space for flora and fauna, design and recreation.

In the Gardens of the World students can rediscover and discuss elements of the topics discussed in the classroom.

https://www.gaertenderwelt.de

Week 3: Classical Urban Greenery and Ecological Design Principals – Education and Best practice in Berlin - Presentations and Examination

Field Trip - Into the Woods: Urban Trees and Forestry - From Plant Selection to tree and Park Management (Lectures and Ex)

The Großer Tiergarten, a habitat for flora and fauna, is situated in the center of Berlin. It is the place for recreation and nature experience as well as exploring various historical gardens and cultural monuments. Its history goes back 500 years and has a many faceted horticultural and scenery-formative tradition. Typically for the park are the wide laws crisscrossed with small watercourses and with groups of trees, the lakes with small islands and the numerous bridges and paths as well the single ornament gardens such as the Luiseninsel and the Rosengarten. In the 16th century it used to be a forest and hunting reserve with humid meadows and swamps. In the 18th century it was a baroque garden with forest character, and in the 19th century reshaped as a scenery garden in the style of English gardens by Peter Joseph Lenné. In the 20th century the Großer Tiergarten served during and after the second world war shortly as a firewood resource and agricultural space.

The Lecture will explain the history, planning and construction of the Tiergarten, and the excursion demonstrate certain botanical species, the characteristic of the landscape and habitats, as well the planting and institutional aspects to maintain the urban forest.

Discussion: urban forests last major refuges for fauna and flora - why and how to preserve

Carreiro, M.M., Song, Y., Wu, J.: Ecology, planning and management of urban forests – an International perspective. 2011. ISBN 0-387-71424-3

Krosigk, Klaus von: Der Berliner Tiergarten. Markus Sebastian Braun (Hersg.) – Berlin: Berlin-Ed., (Berliner Ansichten; Bd. 21), 2001. ISBN 3-8148-0030-3

Miller, R.W.: Urban Forestry: Planning and Managing Urban Greenspaces. 2007. ISBN 1-57766-510-4

Twardawa, Susanne: Der Tiergarten in Berlin – Das Abenteuer liegt um die Ecke. Berlin: motzbuch-edition, 2., überarbeitete Auflage, 2006. ISBN 3-935790-08-2

Permaculture - An Alternative Planning Method in Urban Gardening - Principles of Permaculture (L & Ex)

The lecture and the exercise will give an introduction to Permaculture as an alternative planning method. Bill Mollison (2002) has defined "*A Permaculture is a complex agricultural ecological system, which is designed, so that minimal work is put in and maximum harvest is gained*". Permaculture is based on ecological and biological principles. The Philosophy behind Permaculture is to work with nature instead of against it. This means a system which

is integrated harmoniously and sustainable between the environment and humans, food, energy and other materials. The Lecture gives an overview of the philosophy and the application area of Permaculture. Thus, biodiversity is the basic principle of the idea of year-round self-sufficiency in food.

The lecture discussed the 12 most important Permaculture planning principles created by Bill Mollison. In the outdoor exercise students will experience the philosophy of Permaculture.

Allen, J. and B. Mollison (2007): Smart Permaculture Design, New Holland, ISBN 978-1877069178

Frey, D. (2011): Bioshelter Market Garden: A Permaculture Farm, New Society Publishers

Mollison, B. (1988): Permaculture: A Designers' Manual, Tagari Publications, ISBN 978-0908228010

Field Trip - Climatic Garden Maxim - Urban Youth Educational Project (Ex)

The Climatic Garden Maxim is a project for leisure activities for children, youth and the neighborhood. It is part of a special research project for the development of climate adaptation strategies for Berlin and Brandenburg. The Maxim Climate Garden is an integrated "educational garden" which is managed with great commitment of dedicated people. The children and youth learn about climate change and practical gardening such as methods of water saving, organic cultivation of fruit, vegetables, herbs and flowers as well as specific preparation for serving and cooking of the garden products. The Maxim offers recreational opportunities and creative courses, music and theater performances as well it is open for artistic and sportive activities in summer and in winter.

The students will learn by guided tours about the different facets of this educational projects and garden experiments. They will have the chance to plant, as well to experience and taste fresh garden products.

Discussion: gardens as centers of social integration and environmental education - www.im-maxim.de

Presentations (Examination)

Final Presentation of the Student Working Groups

Evaluation and Certification