

Structure of Higher Education System at Technische Universität Dresden

TEMPUS Project
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The TU Dresden is one of the three biggest universities in Germany

4 sciences (natural, medicine, Humanities and Social, engineers)

14 faculties

35.000 students

8.000 employees

Total budget 500 mill. Euros,

Approx. 108 mill. Euros third-party-funded

(third-party funds for research and other specific projects by industry, enterprise, governances as well as EU)

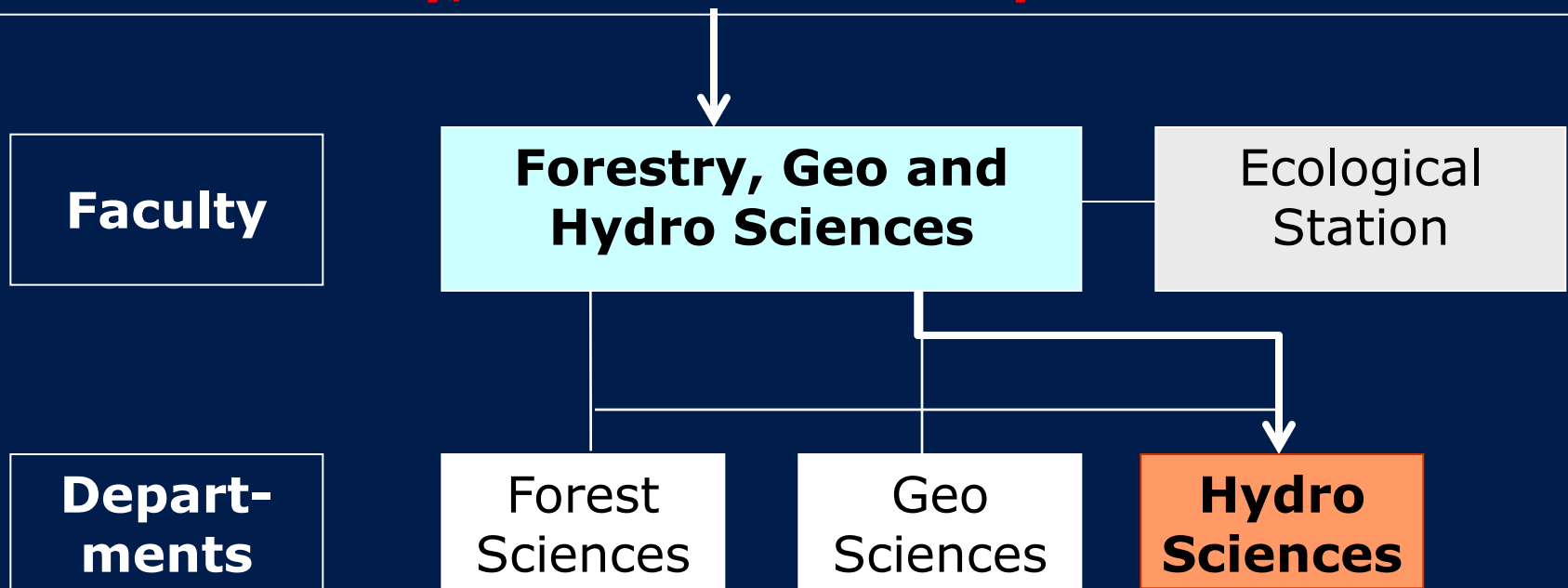
'Knowledge builds bridges – education unites people'

Profiles of TU Dresden

1. Regenerative medicine and molecular bioengineering
2. Materials science, biomaterials and nanotechnology
3. Computer Sciences
4. Population, Infrastructure and transport
5. Water, Energy and Environment
6. Social Changes, Culture and Education

Faculties at TU Dresden

Natural Sciences and Mathematics, Philosophy, Linguistics and Literature, Education, Law, Economics, Computer Science, Electrical Engineering, Mechanical Engineering, Civil Engineering, Architecture, Transport and Communications, Medicine,
Forestry, Geosciences and Hydro Sciences



Faculty of Forest, Geo and Hydro Sciences

The association of the scientific fields forest, geo and hydro sciences under one umbrella is uniquely in Germany

Research areas are derived from global problems:

- Developing and sustainable protection of the human living space
- Regeneration and protection of the limited resources soil and water
- Consequence of the industrialisation, environmental pollution as well as urbanisation
- Effect of the climate change and the Global change
- Preservation of the biological variety in flora and fauna

Faculty profile lines:

- Monitoring, modelling and visualization of the system Earth
- Integrated management of water resources including ecotechnology
- Water balance and change of physical, chemical and biological components in aquatic systems
- Forests and trees as tools for global, regional and urban risk management
- Sustainable development and value added in rural regions: resources and energy from forests
- Geo-information technologies for the generation of geo-data infrastructure
- Regional development, regional planning, and environmental management as associated with demographic change and sustainability

Faculty profile lines

The Faculty is concerned with TU Dresden Profile Lines No. 5 (Water, Energy and Environment) and No. 4 (Population, Infrastructure and Transport), it touches, however, also the Profile Lines 3 (Information Systems Technology) as well as Profile Line No. 2 (materials engineering, biomaterials, nanotechnology).

Forestry, Geo and Hydro Science

Forestry

Forest Botany, Forest Zoology, Soil Management, Location Economics, Planet and Wood Chemistry, Forestry Economics and Informatics, Woodculture, Forest Exploitation, Forest Technology, International Forestry and Forest Products, Forest Protection, Ecology and Environmental Protection

Geosciences

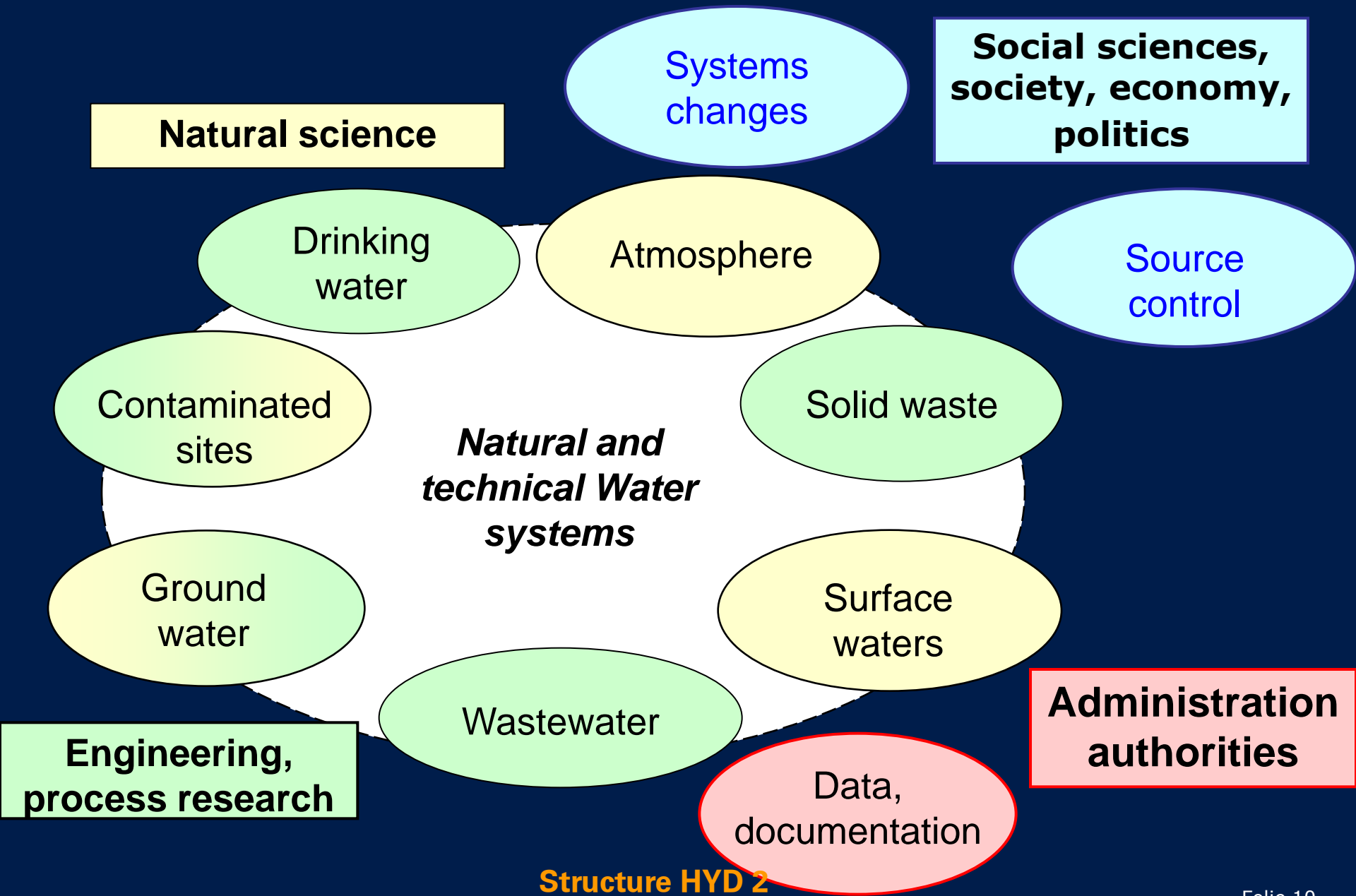
Geodesy, Photogrammetry, Remote Sensing, Cartography, Geography, Geo Information Systems (GIS)

Hydro Sciences

Housing and Industry Water Engineering, Hydrology and Meteorology, Underground Water Management, Hydrobiology, Water Chemistry, Waste Management & Inherited Waste

Topics of Department of Hydro Sciences

- Risk management and development of concepts to protection of resources and to sustainable using of surface and subsurface water as well as soil
- Documentation and modelling in the field of environment and urban areas
- Regeneration and protection of soil
- Water resources management and rationing
- Effect of the climate change
- Consequence of desertification und salinisation
- Research of causes and effects as well as developing of solutions for local, regional and global context
- Interdisciplinary and transdisciplinary cooperation of engineers and natural scientists



Department of Hydro Sciences

**Environmental
Research
Centre**

**Institute of
Hydro
Mechanics**

Institutes

**Urban Water
Management**

**Ground
Water
Management**

**Hydrology
and
Meteorology**

**Hydro
Biology**

**Water
Chemistry**

**Waste Management
and Contaminated
Site Treatment**

Industrial
Water
Management

Groundwater
Management

Hydrology

Limnology

Hydro-
chemistry

Waste
Management

Water Supply

Meteorology

Technical
Hydrobiology

Contaminated Site
Treatment

Wastewater
Treatment

Systems Analys./
Computer Sciences

The Institute of Waste Management and Contaminated Site Treatment



IAA - The Institute of Waste Management and Contaminated Site Treatment at Technische Universität Dresden was founded by the Cooperation of the Chair of Waste Management and the Chair of Contaminated Site Treatment in 1995. This institute is a section of the Faculty of Forestry, Geosciences and Hydrosiences, located in Pirna, a midsize town 15 km SE of Dresden.

The site is a former industrial building built upon the banks of the Elbe River. Since its founding, the IAA has grown quickly and currently employs approximately 40 people. On September 20th, 2005, the IAA will celebrate it's 10th anniversary since its founding.

SYSTEMS ANALYSIS AND COMPUTER SCIENCES

PROF. DR. -Ing. HABIL. PETER-WOLFGANG GRAEBER

MAIN FIELDS OF RESEARCH

- Simulation and decision support system for leakage and groundwater prognosis
- Determination of groundwater protection areas using FUZZY-methods
- Methods for indirect parameter identification of geo-hydrological systems

ONGOING PROJECT

- Development of a computer-based decision support system for the forecast of landfill leaching (SiWaPro DSS)

SiWaPro DSS – A Helpful Software for Leachate Forecast and to Simulate the Processes in the Unsaturated Zone

What is SiWaPro DSS?

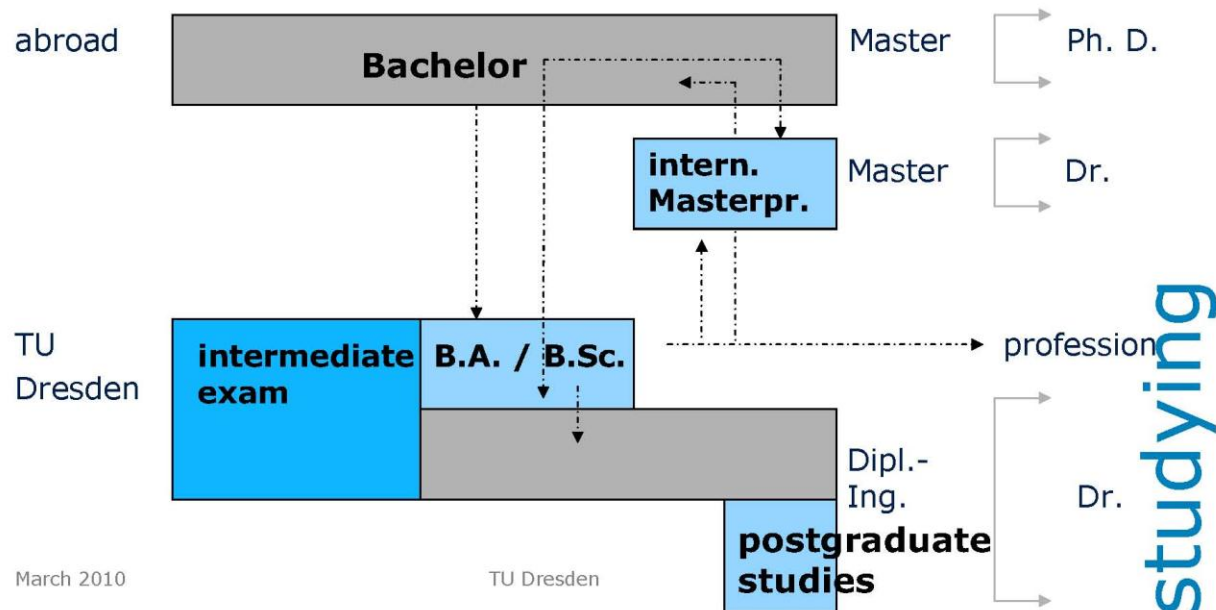
- Software system primarily used for leachate forecasts
- Flow and transport processes in the unsaturated zone
- Considering steady-state and transient conditions
- Discretization by Finite Elements using Galerkin Method
- Knowledge background based on soil and contaminant databases
- Graphical and numerical result output

Education

Einführung der „Boligna“-Beschlüsse für die Studiengänge im Fachbereich Wasserwesen

- Konsekutive Ausbildung
Bachelor (6 Semester) und Master (4 Semester)
- Bachelorabschluss als Schnittstelle für Incomings
und Outgoings
- Regelabschluss: Master of Sciences
- Einführung von Leistungspunkten (Credit-Points)
- Modularisierung
- Einführung der **A**llgemeinen **Q**UAlifizierung

Overview of qualifications



March 2010

TU Dresden

Study Programs - Hydro Sciences

Bachelor (6 semesters)

1. Water Management – engineering
2. Waste Management and Contaminated Site Treatment
3. Hydrology

Master (4 semesters)

1. Water Management – engineering
2. Waste Management and Contaminated Site Treatment
3. Hydrology
4. Hydro Biology
5. Hydro Sciences & Engineering

Research

Leistungen der TU Dresden für die Unternehmen (1)

- Praktikanten/Absolventenvermittlung
- Forschung auf erkenntnis-, anwendungs- und produktionsorientierten Feldern
- Forschung zu ausgewählten Schwerpunkten
- speziell orientierte Grundlagenforschung
- Weiterbildung für Wirtschaft und Verwaltung (TUDIAS GmbH)
- TUD Forschungsförderung/Transfer – Technologietransferstelle der TU Dresden
- Koordination der Gemeinschafts-Messestände: „Forschungsland Sachsen“ und
- „Forschung für die Zukunft“ (Messeinitiative von Hochschulen/ Forschungseinrichtungen aus Sachsen, Thüringen und Sachsen-Anhalt)
- Patentinformationszentrum (PIZ)
- Gründerinitiative „Dresden exists“

Research

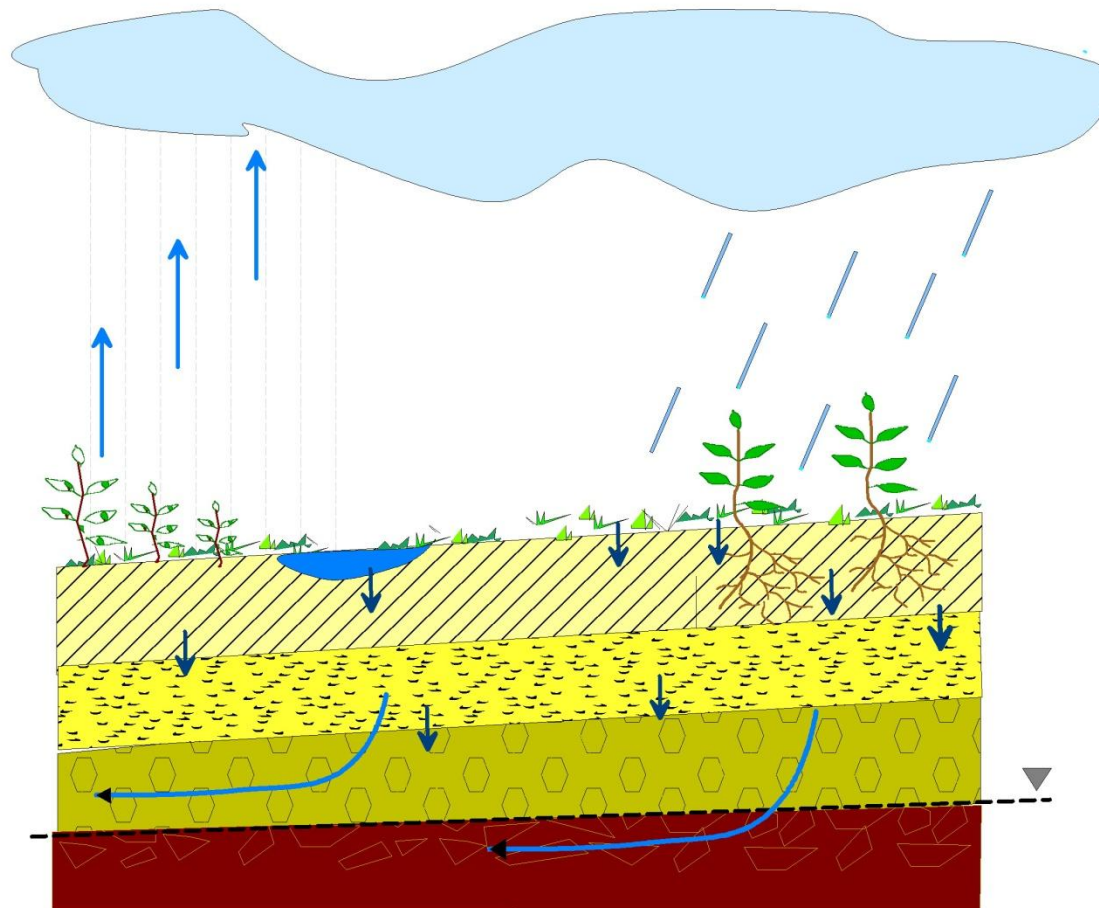
Leistungen der TU Dresden für die Unternehmen (2)

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- Forschungs-CD-Rom „TRANSFER DIRECT“
- Forschungsinformationssystem (FIS)
- Dresdner Transferbrief
- GWT – TUD mbH (Gesellschaft für Wissens- und Technologietransfer der TU Dresden mbH)
- Sächsische Patentverwertungsagentur (SPVA), ein Geschäftsbereich der GWT-TUD mbH
- TechnologieZentrumDresden (TZD)
- Netzwerk TechnologieAllianz

Innovation at the TU (1)

- the Patent Information Centre (PIZ), has a very high no. of yearly patents (approx. 70 per year)
- interdisciplinary teaching and research
 - Mechatronics, an interdisciplinary course with the faculties of mechanical engineering, transport and traffic engineering and electrical engineering
 - research at the BIOTEC Center: joint co-operation between chemists, physicists, doctors, materials scientists and biologists
- business start-up initiative „Dresden exists“: active support for converting research results into the formation of a company



Global climate
change impact

Local climate/
Precipitation/
Evaporation

Surface water

Growth of plants and roots

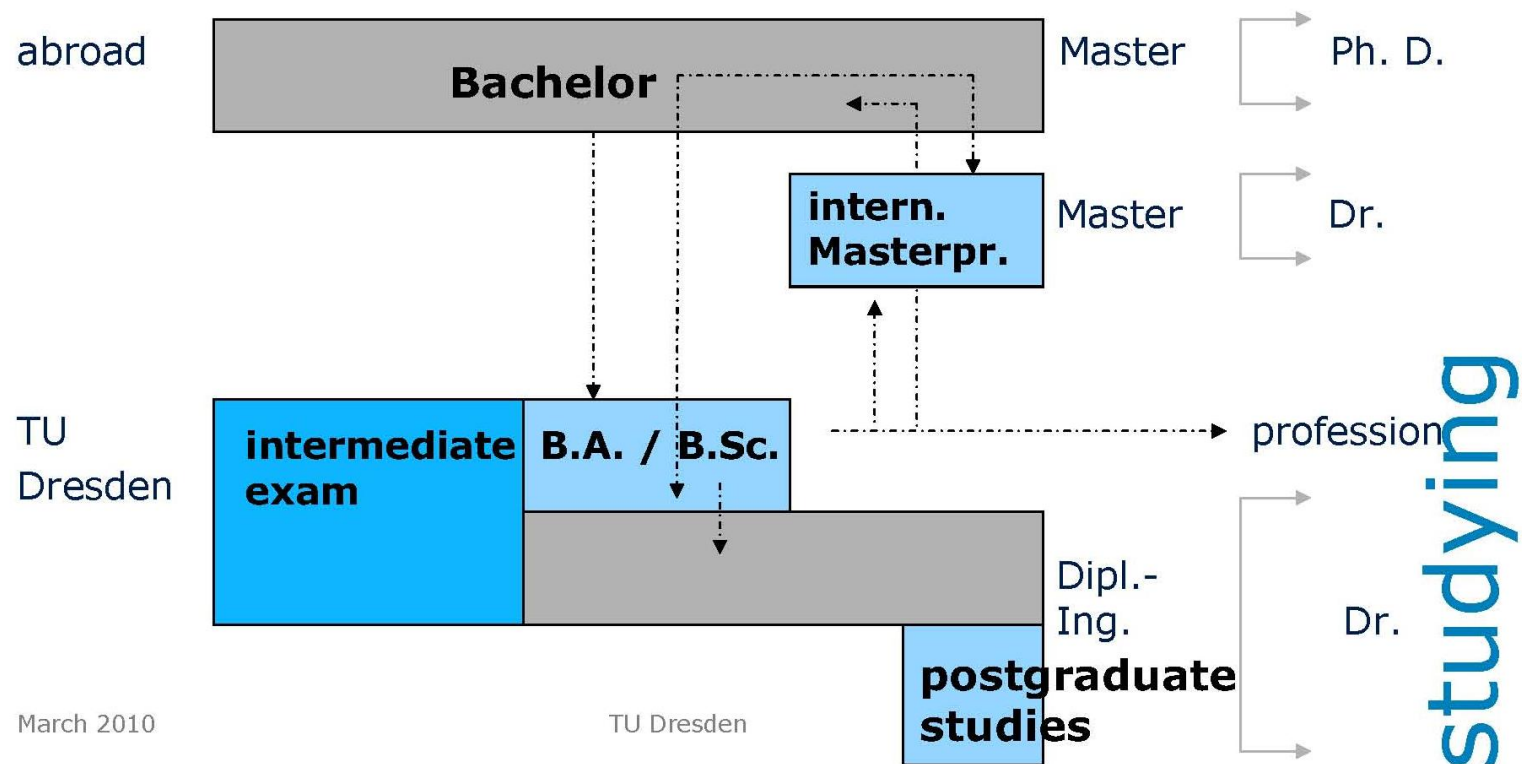
Water infiltration

Soil/Unsaturated zone

Groundwater/
Saturated zone

Levels for Higher Education

Overview of qualifications



Master „Water Management“ – Structure/Modules

1. Semester	Groundwater Management by Computer Models	Hydrogeologic and Hydrogeoche mic Methods	Modelling of Waste Water Systems	Process Water Treatment and Internal Water Management	Water Transport and Distribution	Mandatory Modules
2. Semester	Study Project	Seminar Module Water Management	Internship Water Management		Mandatory Modules	Mandatory Modules
3. Semester		Management and Optimization of Waste Water Systems			Mandatory Modules	Mandatory Modules
4. Semester	Master Thesis					
Credits	5	5	5	5	5	5

Master „Hydrology“ – Structure/Modules

1. Semester	Applied Hydrology	Climatology	Hydrological Models	River Bassin Management	Applied Meteorology for Hydrologists	Ground Water Management by Computer Models
2. Semester			Soil Water Balance	Seminar Module Hydrology	Mandatory Modules	Mandatory Modules
3. Semester	Watershed Modelling	Hydro Melioration	Practical Training Hydrology		Mandatory Modules	Mandatory Modules
4. Semester	Master Thesis					
Credits	5	5	5	5	5	5

Master „Hydrobiology“ – Structure/Modules

1. Semester	Hydrobiology and Water Quality	Ecological Statistics and Systems Analysis			Ecotoxicolo gy	Mandatory Modules
2. Semester			Ecological and Molecular Biodiversity		Mandatory Modules	Mandatory Modules
3. Semester	Practical Training and Seminar in Hydrobiology		Research Internship in Hydrobiology		Mandatory Modules	Mandatory Modules
4. Semester	Master Thesis					
Credits	5	5	5	5	5	5

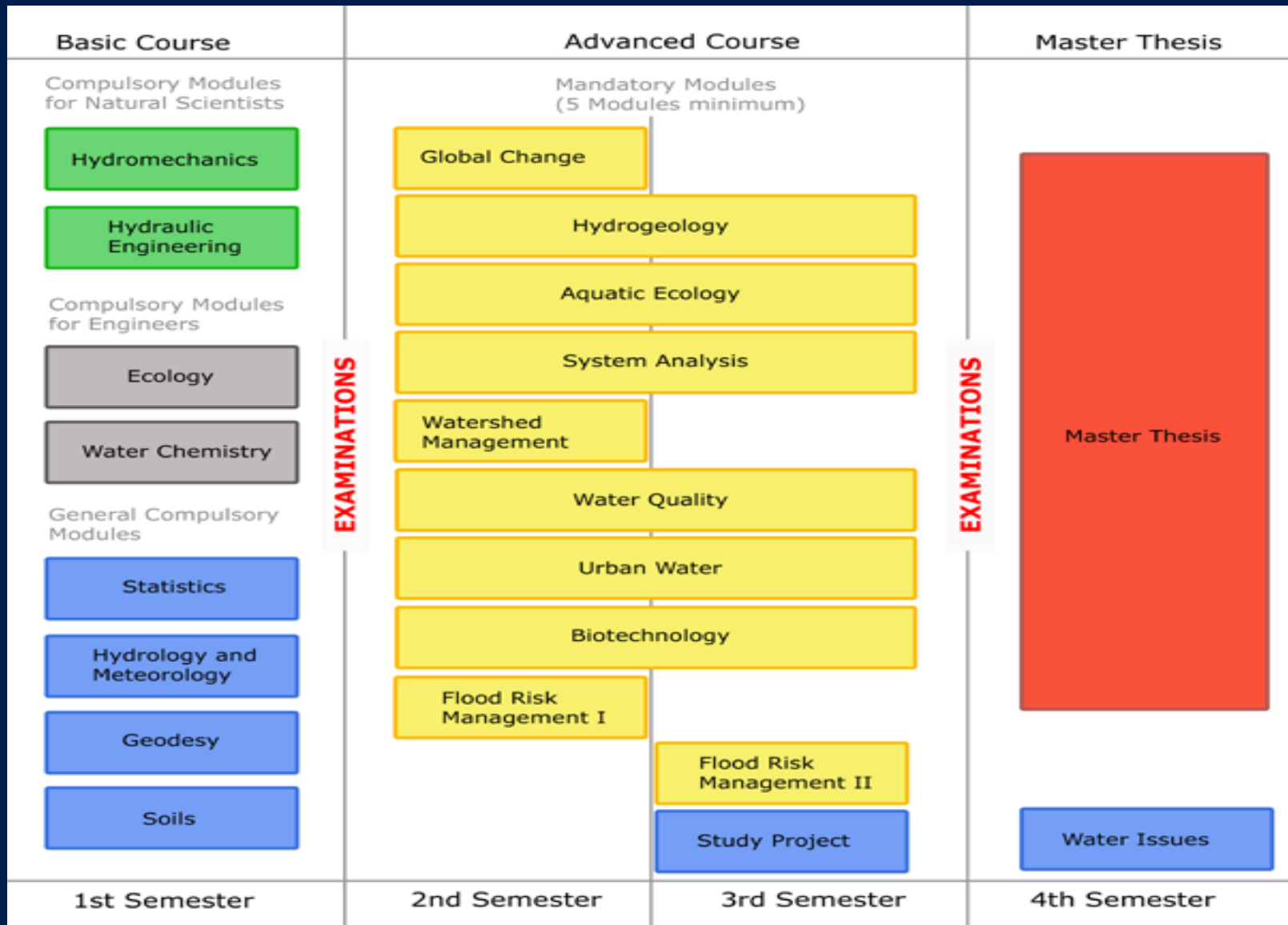
Master „Waste Management and Contaminated Site Treatment“ – Structure/Modules

1. Semester	Planning of Waste Treatment Plants	Evaluation of Waste Management Processes	Evaluation of Contaminated Sites	Applied Remediation of Groundwater and Soil	Mandatory Modules	Mandatory Modules
2. Semester	Practical Training in Environmental Technology – CST		Practical Training in Environmental Technology - WM		Seminar Module WM and CST	Mandatory Modules
3. Semester	Case Study WM and CST	Study Project WM and CST		Internship WM and CST		Mandatory Modules
4. Semester	Master Thesis					
Credits	5	5	5	5	5	5

WM = Waste Management

CST = Contaminated Site Treatment

Master „Hydrosience and Engineering“ – Structure/Modules



oder

Master „Hydrobiology“ – Structure/Modules

Credits	1. Semester	2. Semester	3. Semester	4. Semester
5	Hydrobiology and Water Quality		Practical Training and Seminar in Hydrobiology	Master Thesis
5	Ecological Statistics and Systems Ananlysis			
5		Ecological and Molecular Biodiversity	Research Internship in Hydrobiology	
5				
5	Ecotoxicology	Compulsory Moduls	Compulsory Moduls	
5	Compulsory Moduls	Compulsory Moduls	Compulsory Moduls	

Master „Hydrology“ – Structure/Modules

Credits	1. Semester	2. Semester	3. Semester	4. Semester
5	Applied Hydrology		Watershed Modelling	Master Thesis
5	Climatology		Hydro Melioration	
5	Hydrological Models	Soil Water Balance	Research Internship in Hydrology	
5	River Bassin Management	Seminar Module Hydrology		
5	Applied Meteorology for Hydrologists	Compulsory Moduls	Compulsory Moduls	
5	Ground Water Management with Computer Models	Compulsory Moduls Module 3	Compulsory Moduls	

Modules 3

Credits	1. Semester	2. Semester	3. Semester	4. Semester
5				Master Thesis
5				
5			Research Internship in Hydrology	
5				
5		Compulsory Moduls	Compulsory Moduls	
5		Compulsory Moduls	Compulsory Moduls	

Master „Waste Management and Contaminated Site Treatment“ – Structure/Modules

Credits	1. Semester	2. Semester	3. Semester	4. Semester
5				Master Thesis
5				
5			Research Internship in Hydrology	
5				
5		Compulsory Moduls	Compulsory Moduls	
5		Compulsory Moduls	Compulsory Moduls	