M.Sc. Watech

„Water Technology, Water Reuse and Water Management“

TECHNISCHE UNIVERSITÄT DARMSTADT

Prof. Dr.-Ing. habil. Martin Wagner
m.wagner@iwar.tu-darmstadt.de

VGU
Vietnamese - German University

Curriculum vitae
Prof. Dr.-Ing. Martin Wagner

TECHNISCHE UNIVERSITÄT DARMSTADT

25.03.1958	born in Oestrich, Hesse
04.10.1977	Study of Civil Engineering at Darmstadt University of Technology
21.04.1983	Diploma (Civil Engineering)
18.08.1983	Assistant Professor at the Institute for Water Supply, Waste Water and Regional Planning at Darmstadt University of Technology
01.11.1990	Chief Engineer and Senior Researcher at TU Darmstadt
15.02.1991	PhD-degree (Influence of surfactants on oxygen Transfer and aeration)
	General Manager of the Institute WAR (TU Darmstadt)
04.06.1997	Postdoctoral lecture qualification (Waste Water Technology) (Habilitation)
	University Lecturer (Darmstadt University of Technology)

Curriculum vitae
Prof. Dr.-Ing. Martin Wagner

TECHNISCHE UNIVERSITÄT DARMSTADT

09.02.2005:	Associate Professor (Darmstadt University of Technology)
06.12.2006:	Honorary Professor (Qingdao Technological University)
since 2007:	examiner for expert witnesses in the sector of wastewater technology
since 2009:	Head of the Section China of German Water Partnership
since 2014:	Honorary Professor at Tongji University Shanghai

Distinctions:

- White Magnolia; highest award for foreigners of the Government of Shanghai
- Qilu-laurate, highest award for foreigners of the Shangdong Province, China
- honored by the Vietnamese Water Supply Association for contributions for the development of Vietnam Water Supply Sector

M.Sc. Watech

„Water Technology, Water Reuse and Water Management“

TECHNISCHE UNIVERSITÄT DARMSTADT

Prof. Dr.-Ing. habil. Martin Wagner
m.wagner@iwar.tu-darmstadt.de

VGU
Vietnamese - German University

General information

- **Vietnamese-German University** (Ho-Chi-Minh City)
- **4 semesters**
- **120 ECTS-CP**
- **25 to 30 students** per year

- **Special focus**: Water Treatment and Water Management. **Water Reuse** (municipal and industrial) is an **unique selling point** of the study course

Concept I

TECHNISCHE UNIVERSITÄT DARMSTADT

1. Sem.

- Water Chemistry and Microbiology Luu/VGU
- Legal Aspects of Water management Hieu/VGU
- Spatial Planning in flood prone aeras Huong/VGU
- GIS and water management Son/VGU
- English Scientific Writing Spittl/GU

2. Sem.

- Economics of Infrastructure Linke/TU
- River Basin Management Schmalz/TU
- Lab Course Water Analytic Luu/VGU
- Water Treatment Processes Engelhart/Lackner/TU
- Fundamentals of Waste Technology Schebek/TU

3. Sem.

- Interdisciplinary Project Wagner/Luu TU/VGU
- Drinking Water Lackner/TU
- Municipal Wastewater and Reuse Wagner/TU
- Industrial Wastewater and Reuse Engelhart/TU
- Planning/Constructing of Wastewater Treatment Plants/ Kocks Consult
- Operation of WWTP´s Wagner/TU
- Hydromechanics and Distribution network Song/VGU
- Flood Management Lehmann/TU
- River Engineering Lehmann/TU
- Hydraulic Structures and Modelling Lehmann/TU
- Modelling details of Hydrosystems Song/Trung/VGU

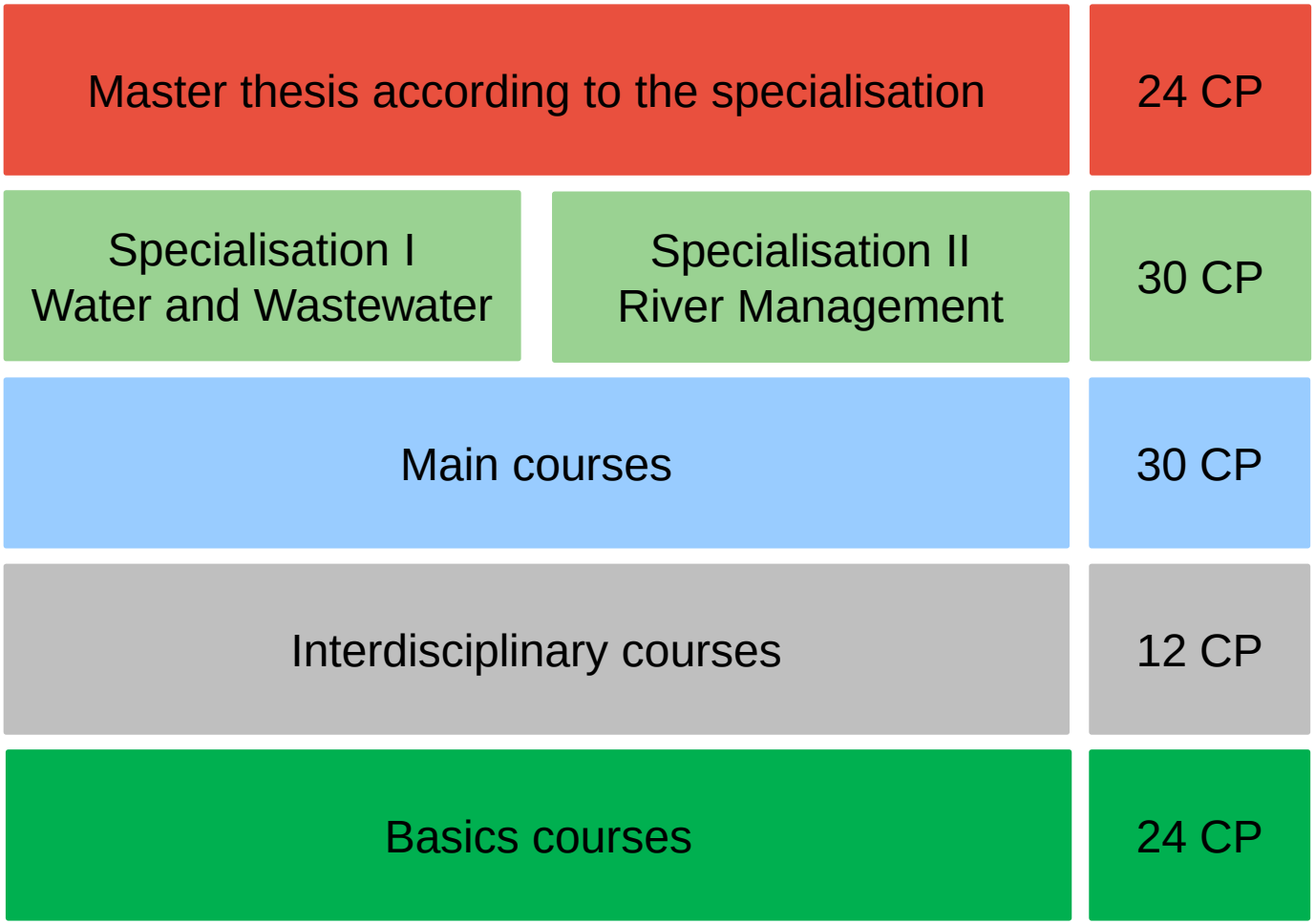
4. Sem.

- Master-Thesis Wagner and N.N./TU

Legend:

- Common Sessions
- Specialisation: Water and Wastewater
- Specialisation : River Management

Concept II


Master thesis according to the specialisation
24 CP
Specialisation I
Water and Wastewater
Specialisation II
River Management
30 CP
Main courses
30 CP
Interdisciplinary courses
12 CP
Basics courses
24 CP

Requirements

- **B.Sc. (180 CP) or compatible international degree:**
  - Water and/or Wastewater Engineering
  - Water Management
  - Civil/Environmental/Chemical Engineering etc.
- **Minimum of 12 CP** in WaterTech related courses
- **Final bachelore grade:** 2,5 or better (German)
- **English:** Unicert 3

Structure

1. Semester → Common Sessions

2. Semester → Common Sessions

3. Semester → Specialisation: Water and Wastewater

or

→ Specialisation: River Management

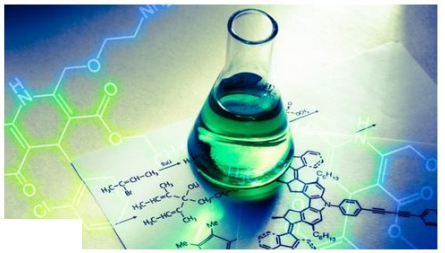
→ Interdisciplinary Project

4. Semester → Master-Thesis

First Semester

TECHNISCHE UNIVERSITÄT DARMSTADT

- **Water Chemistry and Microbiology**
  - General scientific research, understanding and discussion
  - The chemical and microbiological component in water and wastewater
  - Specific method, diagnosis and treatment for water



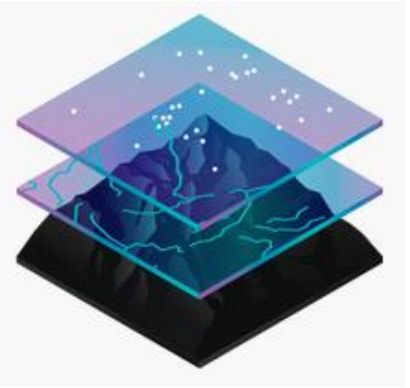
- **Legal Aspects of Water management**
  - Understanding of legal aspects in Vietnam
  - How legal system affect water management
  - Basic rules to plan and manage water supply, wastewater, etc.

First Semester

TECHNISCHE UNIVERSITÄT DARMSTADT

- **Spatial Planning in Flood Prone Areas**
  - Definition, purpose and basic elements
  - Flood management in the context of sustainable urban development
  - Land-use in flood-prone areas/flood-adaptive urban design

- **GIS and Water Management**
  - Basic introduction and handling of GIS
  - Editing of vector and raster based geographic data
  - Visualization and map design



First Semester

TECHNISCHE UNIVERSITÄT DARMSTADT

- **English Scientific Writing**
  - Fundamentals
  - Necessary contents of reports and research proposals
  - Style, structures and layouts
  - Presentation techniques

Second Semester

- **Economics of Infrastructure**
  - Systems of infrastructure and economic background
  - Economic assessment methods
  - Financing of water and waste infrastructure

- **River Basin Management**
  - Hydrological cycle and processes
  - Integrated water resources management
  - Land use and climate change

Second Semester

TECHNISCHE UNIVERSITÄT DARMSTADT

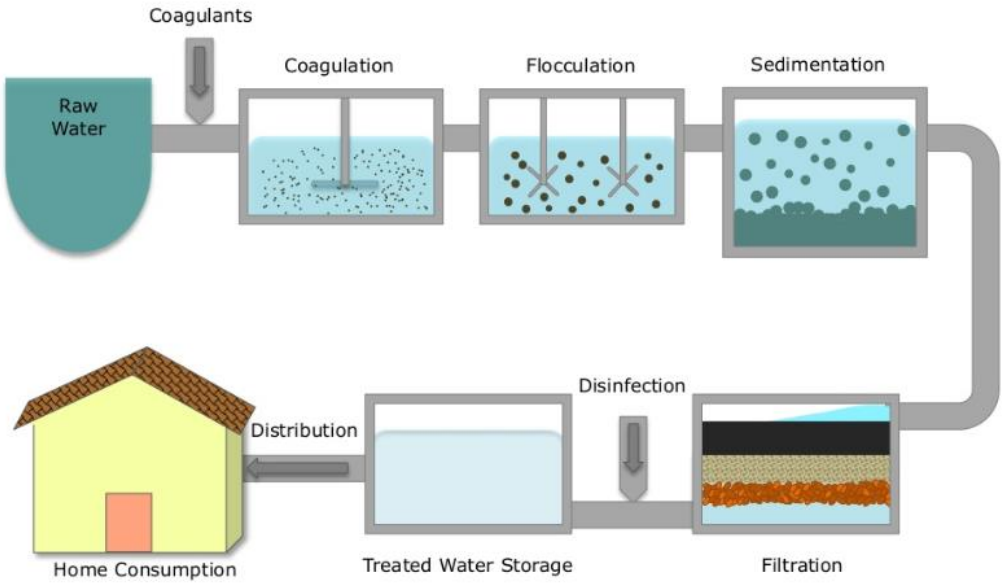
- **Lab Course Water Analytic**
  - Traditional methods of wastewater quality assessment
  - Identification of heavy metal concentration in drinking water
  - Identification of ion concentration and organic compounds

- **Fundamentals of Waste Technology**
  - Principles of waste separation, collection and transport
  - Different technologies for waste treatment
  - Design of treatment concepts

Second Semester

TECHNISCHE UNIVERSITÄT DARMSTADT

- **Water Treatment Processes**
  - Understanding of physical, chemical and biological processes
  - Analyse and optimize complex processes
  - Assess and design process combinations for water treatment



Third semester

TECHNISCHE UNIVERSITÄT DARMSTADT

- **Interdisciplinary Project**
  - Training scientific work and soft skills
  - Typical planning project of a water works or WWTP
  - Calculations, drawings, presentations

Third semester – Water and Wastewater

TECHNISCHE UNIVERSITÄT DARMSTADT

- **Drinking Water**
  - Planning, construction, operation and maintenance of water supply systems
  - Legal frameworks concerning drinking water
  - Need of water quality and quantity

- **Municipal Wastewater Treatment and Reuse**
  - Fundamentals and process combinations
  - Mechanical and biological treatment (different treatment techniques)
  - Reuse procedures

Reuse options (municipal and industrial)

Cooling water

Toilet flushing

Irrigation water

Fire-fighting water

Water for road cleaning

Third semester – Water and Wastewater

TECHNISCHE UNIVERSITÄT DARMSTADT

- **Industrial Wastewater and Reuse**
  - Mechanical pretreatment
  - Biological treatment (aerobic/anaerobic), AOP
  - Reuse possibilities

- **Planning/Constructing of Wastewater Treatment Plants (WWTP)**
  - Design basics for municipal WWTPs
  - Design guidelines/design criteria/design recommendations of WWTP
  - Wastewater and sludge treatment processes

Third semester – Water and Wastewater

TECHNISCHE UNIVERSITÄT DARMSTADT

- **Operation of WWTP´s**
  - Accident prevention and safety at work directives
  - Operating instructions (supervision, disturbances, business administration, energy consumption)
  - Technology of biological treatment and sewage sludge treatment regarding operational aspects

Third semester – River Management

TECHNISCHE UNIVERSITÄT DARMSTADT

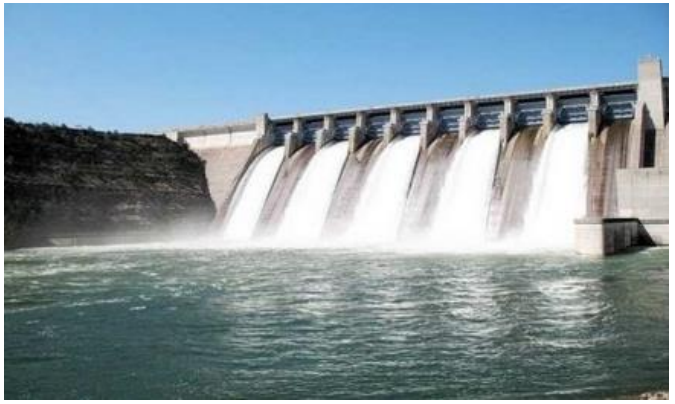
- **Hydromechanics and Distribution network**
  - Basics of fluid mechanics
  - Flow in natural hydro systems with particular emphasis on groundwater
  - Flows in pipes and open channels will be discussed

- **Flood Management**
  - Understanding Flood Hazard
  - Understanding Flood Impacts
  - Flood Risk Management – Structural Measures/Non-Structural Measures

Third semester – River Management

TECHNISCHE UNIVERSITÄT DARMSTADT

- **River Engineering**
  - River Hydraulics and Engineering Measures
  - Navigable Waterway Construction
  - Watercourse development

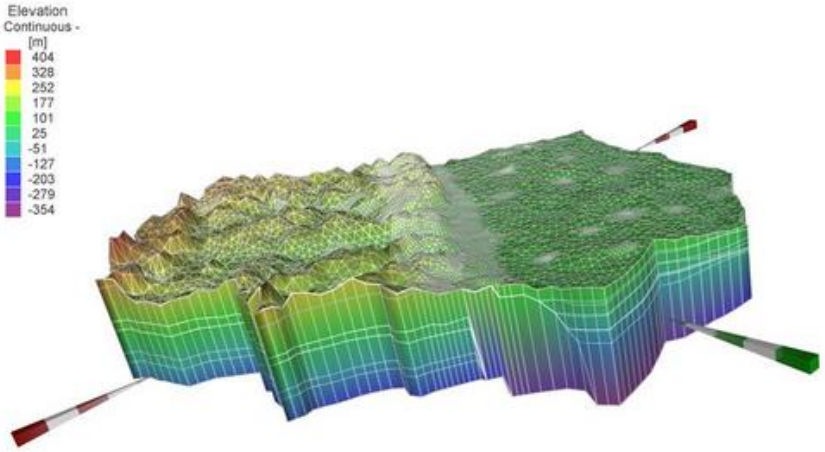


- **Hydraulic Structures and Modelling**
  - Physical models and numerical models
  - Water abstraction structures
  - Head Works, dams, weirs, outlet works, hydropower plants

Third semester – River Management

TECHNISCHE UNIVERSITÄT DARMSTADT

- **Modelling Details of Hydro Systems**
  - Generalized modeling methods and approaches
  - Model concepts: Finite Difference, Finite-Element
  - Subsurface flow modeling: groundwater, transport
  - Free-surface flow modeling: river flow, coastal flow



Fourth semester

TECHNISCHE UNIVERSITÄT DARMSTADT

- **Master – Thesis**
  - Solving a scientific question of water supply, water treatment, water reuse and/or water management
  - Realisation at TU Darmstadt or VGU
  - Depending on availability of funding (private or third party)

After receiving M.Sc. degree

TECHNISCHE UNIVERSITÄT DARMSTADT

Students are able to

WWTP

WWTP

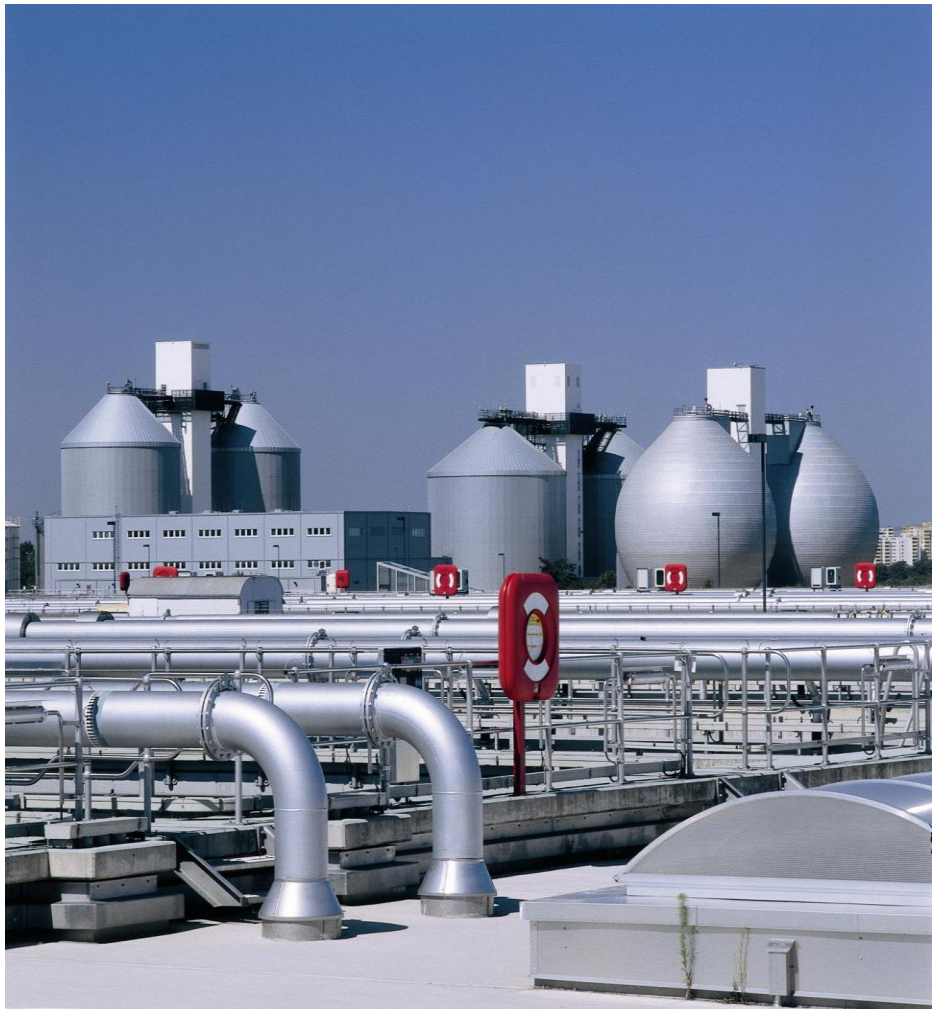
TECHNISCHE UNIVERSITÄT DARMSTADT

Inhouse WWTP

TECHNISCHE UNIVERSITÄT DARMSTADT

Resource Recovery Center

Digesters



Incineration plant

Weir

Fish ladder

River restoration

Water works

Water reuse plant

M.Sc. Watech

„Water Technology, Water Reuse and Water Management“

TECHNISCHE UNIVERSITÄT DARMSTADT

Prof. Dr.-Ing. habil. Martin Wagner
m.wagner@iwar.tu-darmstadt.de

VGU
Vietnamese - German University