



Master of Science

# Simulation and Experimental Engineering

## Profile

### What are simulation and experimental engineering?

**Simulation engineering** describes technical processes using mathematical equations and predicts them with computer calculations – almost like in a weather forecast. The advantage: fast technical development at reasonable effort and analysis of many possible scenarios in their entire complexity. This applies to single parts of processes – e.g. nozzle flow – as well as the simulation of an entire power plant process.

**Experimental engineering** refers to: planning, conducting and evaluating experiments on devices or sub-components of test benches or entire plants in practice; using suitable, calibrated measurement instruments; processing the results of the experiments and illustrating them graphically using state-of-

the-art information technology. Experiments confirm calculations, prove safety and improve simulation models.

### **Why simulation and experimental engineering?**

Experiments provide realistic results, e.g. as a basis to design simulation models. Simulations save time and money compared to experiments. The results of an experiment can back up a simulation model. Combining the two methods greatly benefits research and development.

### **Specialisation: Energy and Environmental Technology**

Contents include: advanced energy and environmental technology, detailed heat and mass transfer, combustion processes, renewable energies in heating and cooling, efficient ways to produce, store and distribute electrical power, (reduction of) the impact of power engineering systems on the environment, e.g. air pollution and noise.

### **Specialisation: Environmental and Process Technology**

Contents include: advanced environmental and process technology, state-of-the-art software tools to simulate industrial processes and design chemical plants, strategies to save energy and minimise emissions in industrial processes, (reduction of) the impact on the environment, e.g. air pollution and noise.

**Please note:** The language of instruction is mainly German.

## **Career Options**

### **What to expect from professional practice?**

Optimising existing and developing new processes, devices and process plants; researching new technologies; simulating sequences and processes; experimenting on test benches and plants in practice; designing, planning and calculating energy, environmental or industrial plants; operating and monitoring plants; energy and environmental management in companies and authorities.

### **Where can I work with this degree?**

Corporate development departments in various sectors, higher education institutions (e.g. doctoral studies) and other research institutions; producers of components, devices and plants in energy, environmental and process engineering; engineering services, energy suppliers, public utilities, corporate energy and environmental or process engineering departments; inspection or regulation agencies; water supply and waste water treatment, process plant and machine design.

# SYLLABUS

## SEMESTERS 1-2

### **Methodology (choose 4 out of 5)**

- Experiment Design and Evaluation
- Computer-Based Measurement Technology
- Optimisation and Simulation
- Computational Fluid Dynamics
- Engineering Mathematics

### **Study Projects and Compulsory Elective Modules**

- 3 Compulsory Elective Modules or Study Projects

## SPECIALISATION (CHOOSE 1)

### **Specialisation: Energy and Environmental Technology**

- Heating and Cooling – Renewable Energies, Combustion, Heat and Mass Transfer
- Electrical Power – Conversion, Storage, Distribution
- Environment – Noise Protection, Measurement Technology Air

### **Specialisation: Environmental and Process Technology**

- Computer-Aided Process and Process Plant Design
- Energy and Environmental Process Optimisation
- Environment – Noise Protection, Measurement Technology Air

## SEMESTER 3

- Engineering Conferences
- Master's Thesis
- Colloquium

Please check the module manual for detailed information on the contents of the study programme.

## Further Information

### Faculty contact:

Dean's Office at the Faculty of Mechanical  
and Process Engineering

T +49 211 4351-2400

[dekanat.mv@hs-duesseldorf.de](mailto:dekanat.mv@hs-duesseldorf.de)

About the programme, admission requirements  
and application:

[mv.hs-duesseldorf.de/mset-en](http://mv.hs-duesseldorf.de/mset-en)

## Get in Touch

### Admissions Office

[zulassung@hs-duesseldorf.de](mailto:zulassung@hs-duesseldorf.de)

[hs-duesseldorf.de/zulassungsstelle](http://hs-duesseldorf.de/zulassungsstelle) (in German only)

### Student Advisory and Counselling Service (ZSB)

[studienberatung@hs-duesseldorf.de](mailto:studienberatung@hs-duesseldorf.de)

[hs-duesseldorf.de/zsb-en](http://hs-duesseldorf.de/zsb-en)

### International Office (IO)

[international-office@hs-duesseldorf.de](mailto:international-office@hs-duesseldorf.de)

[hs-duesseldorf.de/io-en](http://hs-duesseldorf.de/io-en)

### Family Support Centre

[familienbuero@hs-duesseldorf.de](mailto:familienbuero@hs-duesseldorf.de)

[hs-duesseldorf.de/fam-en](http://hs-duesseldorf.de/fam-en)

### Office of Counselling and Disability Services (ABS)

[barrierefrei@hs-duesseldorf.de](mailto:barrierefrei@hs-duesseldorf.de)

[hs-duesseldorf.de/abs-en](http://hs-duesseldorf.de/abs-en)

### Psychological Counselling Service (PSB)

[info.psb@hs-duesseldorf.de](mailto:info.psb@hs-duesseldorf.de)

[hs-duesseldorf.de/psb-en](http://hs-duesseldorf.de/psb-en)

## HSD Invites You

Visit us! Join courses during our yearly trial week  
(Schnupperstudium) and attend our information events  
(e.g. *Tag der offenen Tür*, *Hochschulinformationstage*,  
*Wochen der Studienorientierung*).

Information on all events (in German only):

[hs-duesseldorf.de/zsb\\_veranstaltungen](http://hs-duesseldorf.de/zsb_veranstaltungen)

HSD on social media  
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[instagram.com/hsduesseldorf](https://instagram.com/hsduesseldorf)

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