INATECH
INSTITUT FÜR NACHHALTIGE
TECHNISCHE SYSTEME

Fraunhofer universität freiburg

Welcome and Orientation Meeting
M.Sc. SSE, 8th batch

Prof. Dr. Anke Weidlich
Dean of Academic Affairs

Ester Gnandt
SSE Program Coordinator

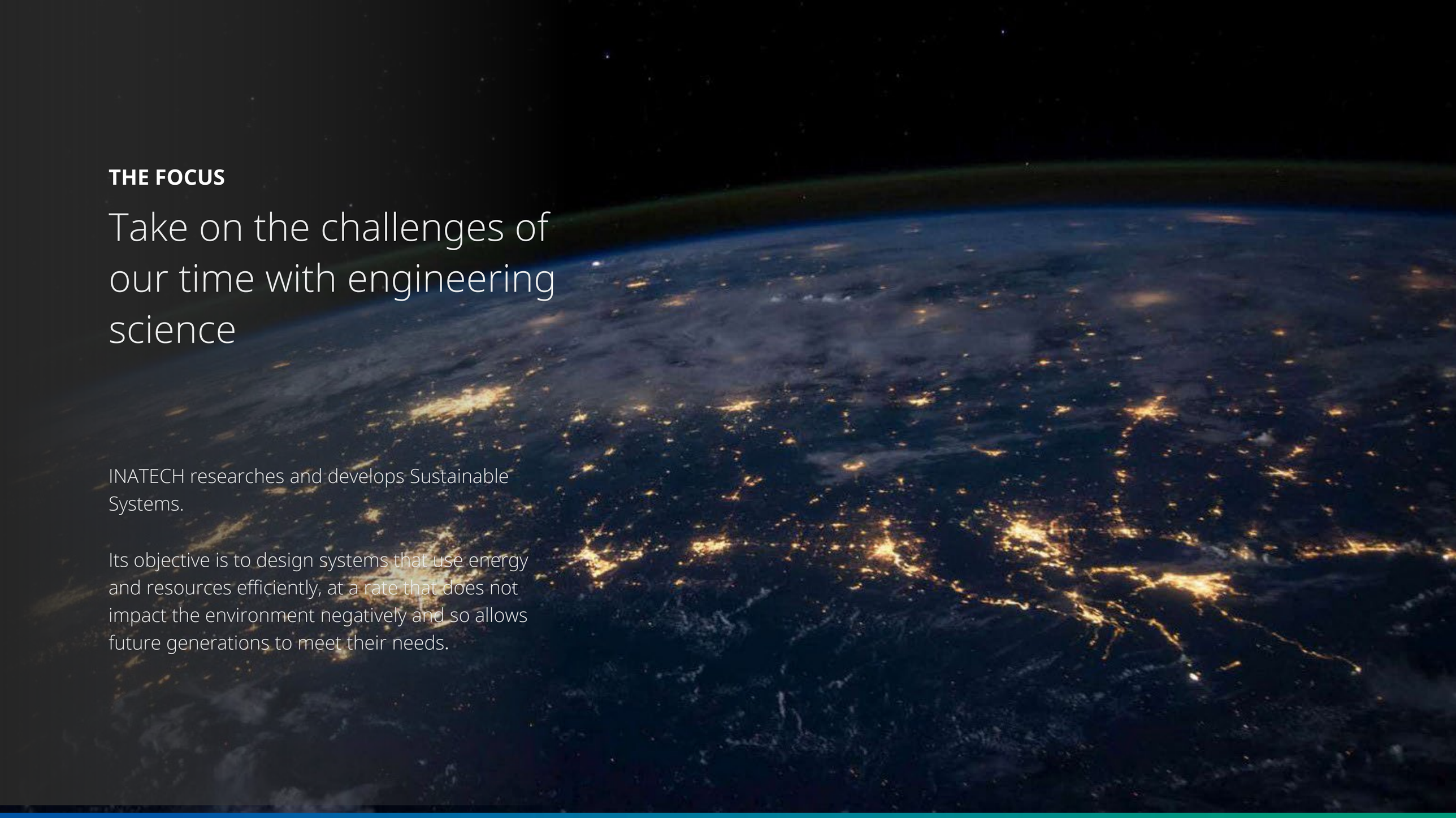
Freiburg, 13 October 2023

Welcome to INATECH

VISION

Establishing sustainability as the guiding principle in the development of technical systems

With this goal in mind, the University of Freiburg founded the Department of Sustainable Systems Engineering in 2015.



THE FOCUS

Take on the challenges of our time with engineering science

INATECH researches and develops Sustainable Systems.

Its objective is to design systems that use energy and resources efficiently, at a rate that does not impact the environment negatively and so allows future generations to meet their needs.

RESEARCH FOCUS

Sustainable materials, energy systems and resilience

Together with partners from the public and private sectors, INATECH uses interdisciplinary research projects to develop technical systems that take on the challenges of our generation.

STUDY PROGRAMS

Educate engineers who change the world for the better.

Bachelor and Master program in Sustainable Systems Engineering: INATECH offers two study programs that both provide in-depth engineering skills in sustainable materials, sustainable energy systems, and resilience engineering.

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STRUCTURE

INATECH is composed of an equal partnership between the University of Freiburg and the five Fraunhofer institutes in Freiburg.

This foundation is unique in the research field, a structure that covers the entire spectrum from fundamental research to industrial application.

Chairs at the INATECH

Prof. Dr. Dr. Oliver Ambacher
Power Electronics

Prof. Dr.-Ing. Frank Balle
Power Ultrasonics and Engineering of Functional Materials

Prof. Dr. Oana Cojocaru-Mirédin
Cross-Scale Material Characterization

Prof. Dr. Sonia Dsoke
Electrochemical Energy Storage and Storage Systems

Prof. Dr. Stefan Glunz
Photovoltaic Energy Conversion

Prof. Dr. Hans-Martin Henning
Solar Energy Systems

Prof. Dr. Stefan Hiermaier
Sustainable Systems Engineering

Prof. Dr. Holger Neuhaus
Material Systems for Solar Energy Use

Prof. Dr. Rüdiger Quay
Energy Efficient High-Frequency Electronics

Prof. Dr. Alexander Reiterer
Monitoring of Large-Scale Structures

Prof. Dr.-Ing. Alexander Stolz
Resilience Engineering for Technical System

Prof. Dr. Anke Weidlich
Control and Integration of Grids

VISION

Halving energy loss in communications and energy-exchanging systems

Oliver Ambacher researches and develops energy-efficient, electronic power components.

PROF. DR. DR. OLIVER AMBACHER
Power Electronics

VISION

Renewable materials systems with nearly infinite life

Frank Balle researches and develops sustainable, multi-functional materials concepts as well as their characterization and process technologies.

PROF. DR.-ING. FRANK BALLE
Walter und Ingeborg Herrmann Chair for Power Ultrasonics and Engineering of Functional Materials

VISION

Re-Designing energy materials via cross-scale characterization

Oana Cojocaru-Mirédin researches the design of energy materials with new functionalities.

PROF. DR. OANA COJOCARU-MIRÉDIN
Cross-Scale Material Characterization

VISION

To make photovoltaics the most important energy technology of the 21st century

Stefan Glunz investigates and develops high-efficiency solar cells.

PROF. DR. STEFAN GLUNZ
Photovoltaic Energy Conversion

VISION

Establish solutions for an almost climate-neutral building stock

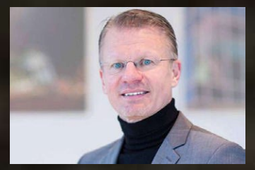
Hans-Martin Henning researches and develops technical energy systems for buildings.

PROF. DR. HANS-MARTIN HENNING
Solar Energy Systems

VISION

Establishing sustainability as the guiding principle of engineering science

Stefan Hiermaier researches the areas of lifecycle analysis, resilience quantification and materials behavior under dynamic and static loads.



PROF. DR.-ING. HABIL. STEFAN HIERMAIER
Sustainable Systems Engineering

VISION

A world-wide web that saves more resources than it consumes

Rüdiger Quay researches data-transmission and sensor-technology concepts and their resource-efficient realization.

Prof. Dr. Rüdiger Quay
Energy-Efficient High-Frequency Electronics

VISION

Sustainable security through intelligent and targeted monitoring

Alexander Reiterer researches and develops multi-sensor systems and software for monitoring artificial and natural objects.

PROF. DR. ALEXANDER REITERER
Monitoring of Large-Scale Structures

VISION

Ensuring efficient system functionality in the face of any crisis

Alexander Stolz conducts research to develop methods and concepts to make socio-technical systems sustainable and resilient.

PROF. DR.-ING. ALEXANDER STOLZ
Resilience Engineering for Technical Systems

VISION

To make the energy system sustainable

Anke Weidlich researches the possibilities of sustainable energy provision.

PROF. DR. ANKE WEIDLICH
Control and Integration of Grids

Examination Regulations, Module Handbook and Course Catalog

Three important documents inform you about study requirements, modules and courses. **Please make yourself familiar with these documents.** The *Course Catalog* might at first sight be most interesting to read, yet the *Examination Regulations* and the *Module Handbook* specify important information that you need to know for succeeding in your studies.

Examination Regulations *2021* (*Prüfungsordnung; PO*): Form the legal foundation of the SSE program. Students are responsible for complying with these regulations and expected to have carefully read them. You can find a German and English on our website. The German version is the official version. The English version serves as a courtesy translation.

Module Handbook (*Modulhandbuch*): Gives detailed information on each module. You can find an English version on our website in a pdf format. You can also find an online version on our Campus Management System HISinOne.

Course Catalog *(Vorlesungsverzeichnis)*: Shows the offered courses and the corresponding modules for every semester. In addition, the Course Catalog provides information on course registration/sign up procedures, important dates during the semester and the content of the respective courses. See the step-by-step guide for the registration/sign up process.

Find further information on our website. Especially, to understand the difference between *Studienleistung* (pass/fail assessment) and *Prüfungsleistung* (graded assessment).

Important Terminology

Module

- Consists of several items (for example: lecture, exercise, PL and SL)
- ECTS credits are awarded for the entire module, not for completing parts of it

Types of Classes

- Classes are part of a module
- Lecture – Vorlesung (V)
- Exercise – Übung (Ü)
- Lab course – Praktikum/Praktische Übung (Pr)
- Seminar – Seminar (S)

Two types of assessments:

Studienleistungen, SL

- Part of a module
- Can be either graded or pass/fail
- If graded, the grade does not count into the grade point average (GPA)
- No negative consequences if failed (other than the need to repeat it the next time the class is offered)

Prüfungsleistungen, PL

- Part of a module
- Are always graded
- Grade counts into GPA
- Strict rules apply and the repeat attempts are limited

Structure of the Examination Regulations 2021

- We have a 3-6-9 ECTS credit system at the Faculty of Engineering.
- There are no “mandatory modules” in the 1st semester but only **Mandatory Elective Modules** or **Elective Modules**. Consequently, there is no fixed study plan/schedule for the first semester. Instead, students have the flexibility to focus on their preferred Technical Concentration Area from the beginning of their studies and design their studies to their liking within the examination regulations.
- There are 3 **Technical Concentration Areas**: *Energy Systems Engineering*, *Resilience Engineering, Sustainable Materials Engineering*. Those areas consist of a total of 10 defined Mandatory Elective Modules. Within each area, min. 2 Mandatory Elective Modules need to be completed as well as a min. of 6 ECTS credits from the Further Selection catalog. In other words, ECTS credits need to be earned in all 3 areas.
- Within the **Interdisciplinary Profile,** a minimum of 6 ECTS credits need to be earned. Further, there is the possibility to select <u>one</u> elective *Module <u>outside</u> the Subject Area* with a maximum of 6 ECTS credits. In order to differentiate between *Modules <u>related to</u> the Subject Area* and *Modules <u>outside</u> the Subject Area*, we created two lists which you can find in the module handbook.

Which modules should you choose for the 1st semester?

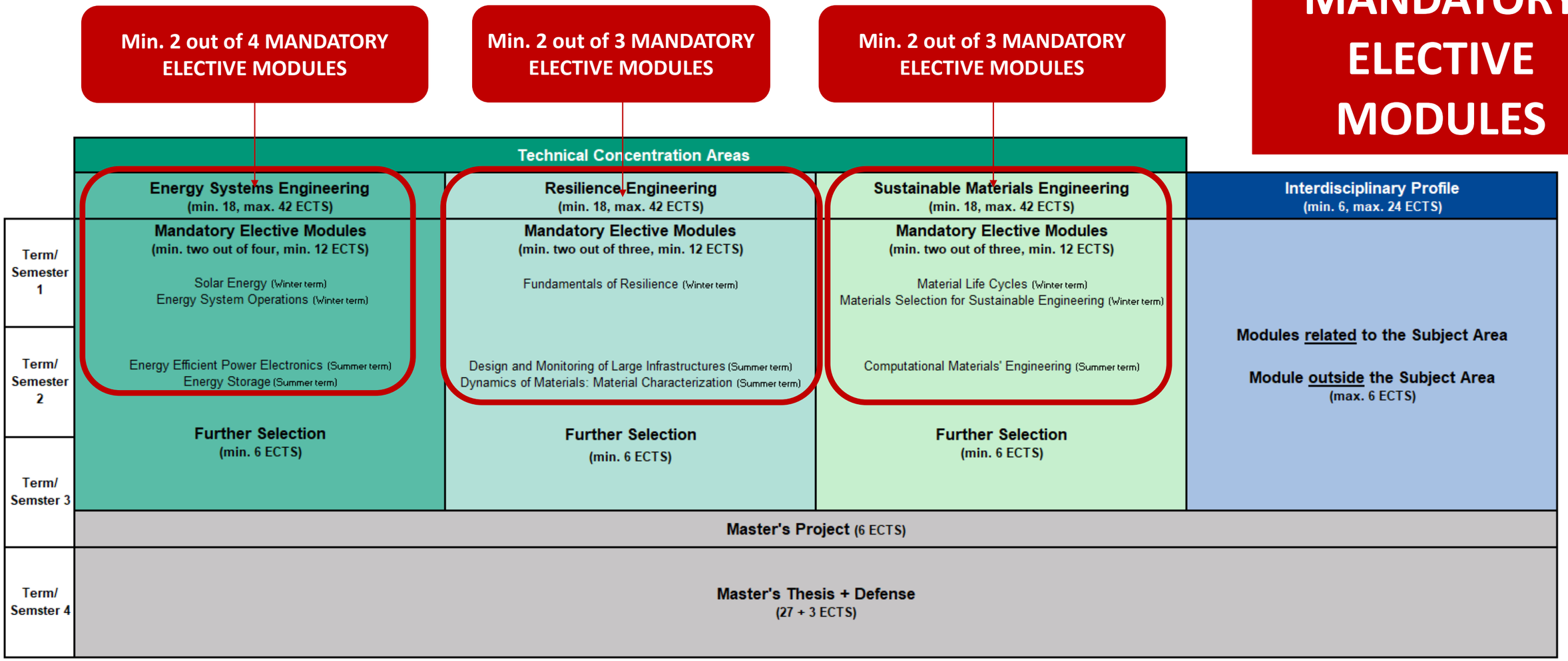
- Our recommendation: Start with the Mandatory Elective Modules since they form the “basis” for other courses.
- When planning and choosing the modules, keep their semester cycle in mind. Most modules are only offered once a year.

M.Sc. SSE framework (based on the *Examination Regulations 2021*)

	Technical Concentration Areas			
	Energy Systems Engineering (min. 18, max. 42 ECTS)	**Resilience Engineering** (min. 18, max. 42 ECTS)	**Sustainable Materials Engineering** (min. 18, max. 42 ECTS)	**Interdisciplinary Profile** (min. 6, max. 24 ECTS)
Term/ Semester 1	**Mandatory Elective Modules** (min. two out of four, min. 12 ECTS) Solar Energy (Winter term) Energy System Operations (Winter term)	**Mandatory Elective Modules** (min. two out of three, min. 12 ECTS) Fundamentals of Resilience (Winter term)	**Mandatory Elective Modules** (min. two out of three, min. 12 ECTS) Material Life Cycles (Winter term) Materials Selection for Sustainable Engineering (Winter term)	**Modules related to the Subject Area** **Module outside the Subject Area** (max. 6 ECTS)
Term/ Semester 2	Energy Efficient Power Electronics (Summer term) Energy Storage (Summer term)	Design and Monitoring of Large Infrastructures (Summer term) Dynamics of Materials: Material Characterization (Summer term)	Computational Materials' Engineering (Summer term)	
Term/ Semster 3	**Further Selection** (min. 6 ECTS)	**Further Selection** (min. 6 ECTS)	**Further Selection** (min. 6 ECTS)	
	Master's Project (6 ECTS)			
Term/ Semster 4	**Master's Thesis + Defense** (27 + 3 ECTS)			

Info: ECTS is a standard for comparing the study attainment and performance of students of higher education across the European Union and other collaborating European countries. For successfully completed studies in the master's program *Sustainable Systems Engineering* 120 ECTS credits are awarded. One ECTS credit equals on average 30 hours of workload.
For more information, see the **Subject-Specific** and **General Examination Regulations.** They both set the legal framework for the studies. The available modules/courses are listed and described in detail in the **Module Handbook**.

MANDATORY ELECTIVE MODULES



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M.Sc. SSE framework (based on the *Examination Regulations 2021*)

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ELECTIVE MODULES – Further Selection – Technical Concentration Areas

	Technical Concentration Areas			
	Energy Systems Engineering (min. 18, max. 42 ECTS)	**Resilience Engineering** (min. 18, max. 42 ECTS)	**Sustainable Materials Engineering** (min. 18, max. 42 ECTS)	**Interdisciplinary Profile** (min. 6, max. 24 ECTS)
Term/ Semester 1	**Mandatory Elective Modules** (min. two out of four, min. 12 ECTS) Solar Energy (Winter term) Energy System Operations (Winter term)	**Mandatory Elective Modules** (min. two out of three, min. 12 ECTS) Fundamentals of Resilience (Winter term)	**Mandatory Elective Modules** (min. two out of three, min. 12 ECTS) Material Life Cycles (Winter term) Materials Selection for Sustainable Engineering (Winter term)	**Modules related to the Subject Area** **Module outside the Subject Area** (max. 6 ECTS)
Term/ Semester 2	Energy Efficient Power Electronics (Summer term) Energy Storage (Summer term) **Further Selection** (min. 6 ECTS)	Design and Monitoring of Large Infrastructures (Summer term) Dynamics of Materials: Material Characterization (Summer term) **Further Selection** (min. 6 ECTS)	Computational Materials' Engineering (Summer term) **Further Selection** (min. 6 ECTS)	
Term/ Semster 3	**Master's Project** (6 ECTS)			
Term/ Semster 4	**Master's Thesis + Defense** (27 + 3 ECTS)			

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M.Sc. SSE framework (based on the *Examination Regulations 2021*)

ELECTIVE MODULES – Interdisciplinary Profile

	Technical Concentration Areas			
	Energy Systems Engineering (min. 18, max. 42 ECTS)	**Resilience Engineering** (min. 18, max. 42 ECTS)	**Sustainable Materials Engineering** (min. 18, max. 42 ECTS)	**Interdisciplinary Profile** (min. 6, max. 24 ECTS)
Term/ Semester 1	**Mandatory Elective Modules** (min. two out of four, min. 12 ECTS) Solar Energy (Winter term) Energy System Operations (Winter term)	**Mandatory Elective Modules** (min. two out of three, min. 12 ECTS) Fundamentals of Resilience (Winter term)	**Mandatory Elective Modules** (min. two out of three, min. 12 ECTS) Material Life Cycles (Winter term) Materials Selection for Sustainable Engineering (Winter term)	**Modules <u>related</u> to the Subject Area** **Module <u>outside</u> the Subject Area** (max. 6 ECTS)
Term/ Semester 2	Energy Efficient Power Electronics (Summer term) Energy Storage (Summer term)	Design and Monitoring of Large Infrastructures (Summer term) Dynamics of Materials: Material Characterization (Summer term)	Computational Materials' Engineering (Summer term)	
Term/ Semster 3	**Further Selection** (min. 6 ECTS)	**Further Selection** (min. 6 ECTS)	**Further Selection** (min. 6 ECTS)	
	Master's Project (6 ECTS)			
Term/ Semster 4	**Master's Thesis + Defense** (27 + 3 ECTS)			

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For more information, see the **Subject-Specific** and **General Examination Regulations.** They both set the legal framework for the studies. The available modules/courses are listed and described in detail in the **Module Handbook**.

M.Sc. SSE framework (based on the *Examination Regulations 2021*)

MANDATORY MODULES

	Technical Concentration Areas			
	Energy Systems Engineering (min. 18, max. 42 ECTS)	**Resilience Engineering** (min. 18, max. 42 ECTS)	**Sustainable Materials Engineering** (min. 18, max. 42 ECTS)	**Interdisciplinary Profile** (min. 6, max. 24 ECTS)
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M.Sc. SSE framework (based on the *Examination Regulations 2021*)

In all areas together, the Technical Concentration Areas and the Interdisciplinary Profile, a maximum of 84 ECTS credits can be earned!

	Technical Concentration Areas			
	Energy Systems Engineering (min. 18, max. 42 ECTS)	**Resilience Engineering** (min. 18, max. 42 ECTS)	**Sustainable Materials Engineering** (min. 18, max. 42 ECTS)	**Interdisciplinary Profile** (min. 6, max. 24 ECTS)
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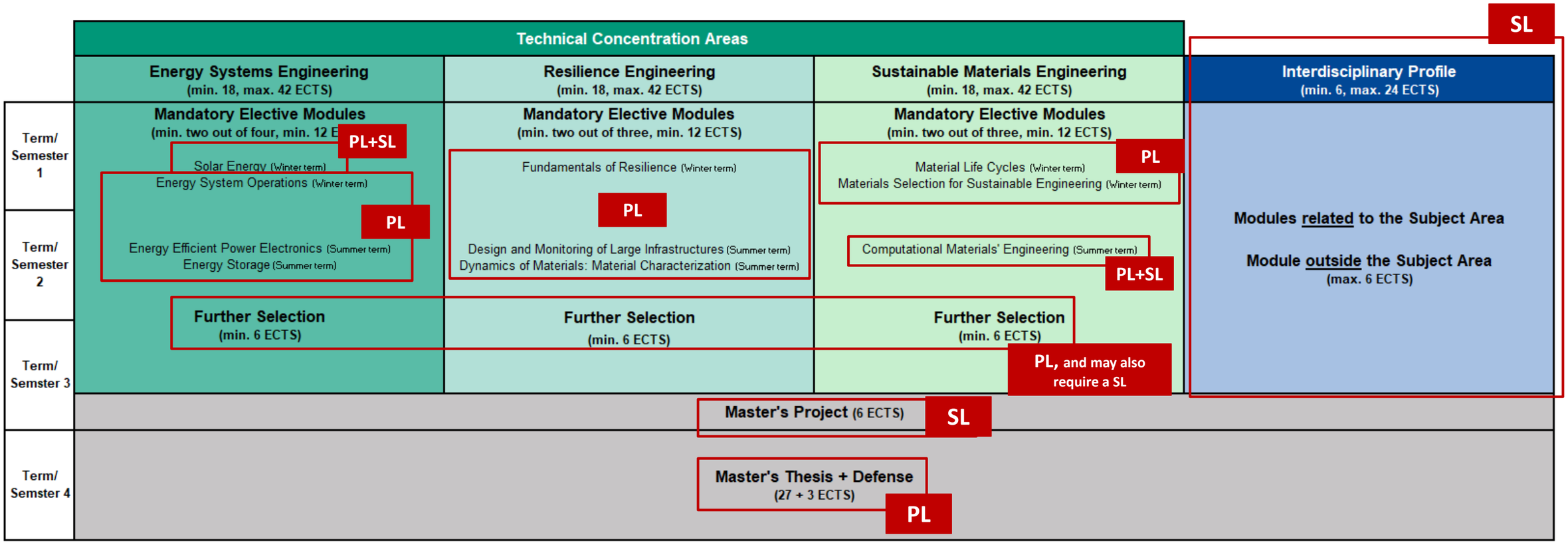

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M.Sc. SSE framework (based on the *Examination Regulations 2021*)

Signing up for classes

- **Read your examination regulations and consult the module handbook!**
- Feel free to take a look at the entire course catalog of the university, but please sign up for classes only via the Planer of Studies.
- Make use of the Step-by-step Course Registration Guide.
- Remember: Different types of classes have different booking periods.
- If you have issues while signing up for classes, contact me at study@inatech.uni-freiburg.de. Please include your full name, matriculation number, name of the class and, ideally, a screenshot.
- If you cannot sign up for a mandatory elective class in your first semester because it is fully booked or end up on the waiting list, contact me.
- If you forgot to sign up for a class, contact the lecturer and ask whether it is feasible that you join late.
- Do not contact the examination office about class registration!

Signing up for exams – A little Heads-up

- Signing up for exams is a separate step from class registration.
- Pay attention to the dates and deadlines for exam registration.
- The examination office will inform you about exam registration in their own session in the course of the semester. Please attend this meeting!
- If there are issues with exam registration during the registration period, contact the examination office. Please include the necessary information, such as your full name, matriculation number, name of the exam and a screenshot if necessary.

Things to remember each semester

Reregistration

- Pay the semester fees for the upcoming semester.
- Period:
  - Summer term: 15.01. – 15.02.
  - Winter term: 01.06. – 15.08.
- More information on reregistration

Class registration

- Different types of classes have different registration periods.
- Dates and deadlines for class registration
- Step-by-step Course Registration Guide.

Exam registration

- Do not forget to register for exams (PL) and pass/fail assessments (SL)!
- Dates and Deadlines for exam registrations
- How-to video for exam registration

Get important information

Generally, you are expected to look for information independently and also carefully read it! Most of the questions are already answered on one of the many websites of the university and the faculty or other provided documents. *Googling might help too* ☺! However, if you still have questions that are left unanswered and you need to contact someone, please make sure that you contact the correct person/department with a clearly formulated question/issue indicating at least your full name and, if necessary, your matriculation number. Please do not contact several people at the same time with the same request. Be patient.

Sign up for university-wide newsletters
Use myAccount to sign up for important newsletters. You will find a list of options under the tab *mail- and lists administration*.

Check your Faculty of Engineering email address
The IT department will set up a special email account at the Faculty of Engineering for you. This happens automatically. You will get an email with the login. Make sure to use it! If you don't want to check your faculty email address on a regular basis, please make sure to forward those emails to your personal email account. Otherwise you will miss out on important information.

Sign up for mailing lists at the Faculty of Engineering
You will be automatically be signed up for the mailing list „Student". In addition, you may sign up for the mailing list „Markt".

... AND ALSO CHECK THE INATECH WEBSITE AND THE WEBSITE OF THE FACULTY OF ENGINEERING!

Information and events (offline/online) for new students

Check out the links below and read the offered information carefully. Also enjoy the numerous orientation events, which are offered online and offline.

→ General introduction for all master students: 10th of October, 2 p.m.
→ Introduction and orientation for all M.Sc. SSE students: 13th of October, 11 a.m.

- Information and orientation events offered by the Student Service Center
- Welcome Days offered by the Student Service Center
- Information and orientation events offered by the Faculty of Engineering
- Orientation events offered by the Student Council (Fachschaft)

- Life in Freiburg - the first steps
- Welcome Guide for International Students (for Germans as well)
- Manual for the campus management system HISinOne
- Calendar and Dates at the Faculty of Engineering
- A to Z – Study FAQ at the Faculty of Engineering
- Information on the campus life in general

More video impressions:

- Introduction to the study program SSE
- Get to know the campus (in German)

Sustainability Talks

Interdisciplinary Lectures

LCA & BIM - developments in sustainability assessment of building structures

09.11.2023 Prof. Dr. Markus Nöldgen, TH Köln

Energiewende in Germany - much more than a technological and political challenge (online only)

23.11.2023 Prof. Dr. Manfred Fischedick, Wuppertal Institut für Klima, Umwelt, Energie gGmbH

Contribution of Geodesy to Monitoring Climate Change and Natural Hazards

09.01.2024 Prof. Dr. Dr. h.c. Harald Schuh, Helmholtz-Zentrum Potsdam

The Materials Science Behind Green Steel

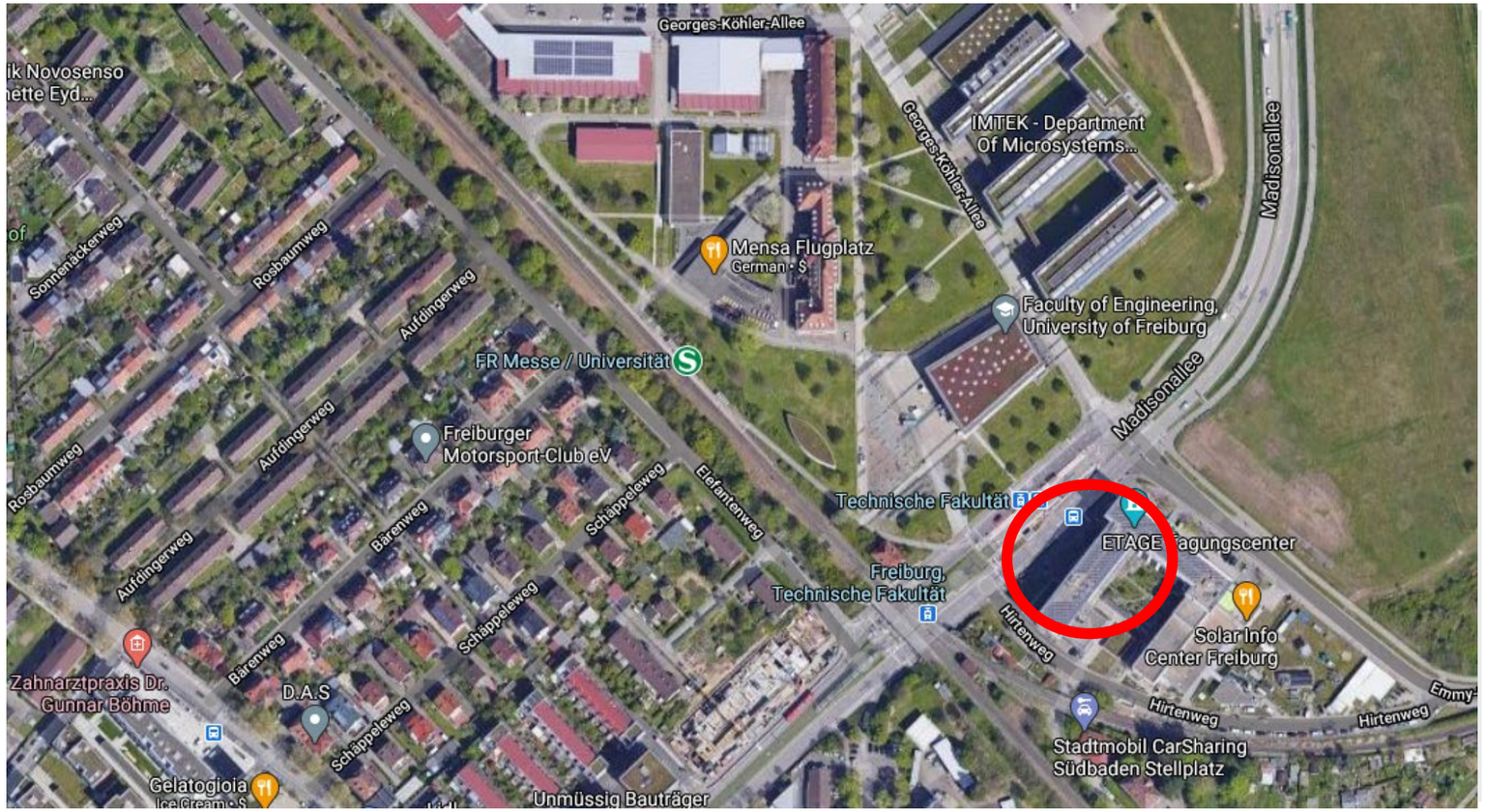
16.01.2024 Prof. Dr. Dierk Raabe, Max-Planck-Institut für Eisenforschung GmbH

Technological Learning for Terawatt-Scale Photovoltaics

23.01.2024 Prof. Dr. Jan Christoph Goldschmidt, Philipps-Universität Marburg

5:15 pm
Faculty of Engineering, 101-02-016/18

Zoom link and program soon to be found here.



Location

Solar Info Center
Emmy-Noether-Straße 2, 2nd floor north
79110 Freiburg

INATECH
INSTITUT FÜR NACHHALTIGE TECHNISCHE SYSTEME

CONTACT PROGRAM COORDINATION

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79110 Freiburg

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study@inatech.uni-freiburg.de

Appointments upon request.

INATECH.de