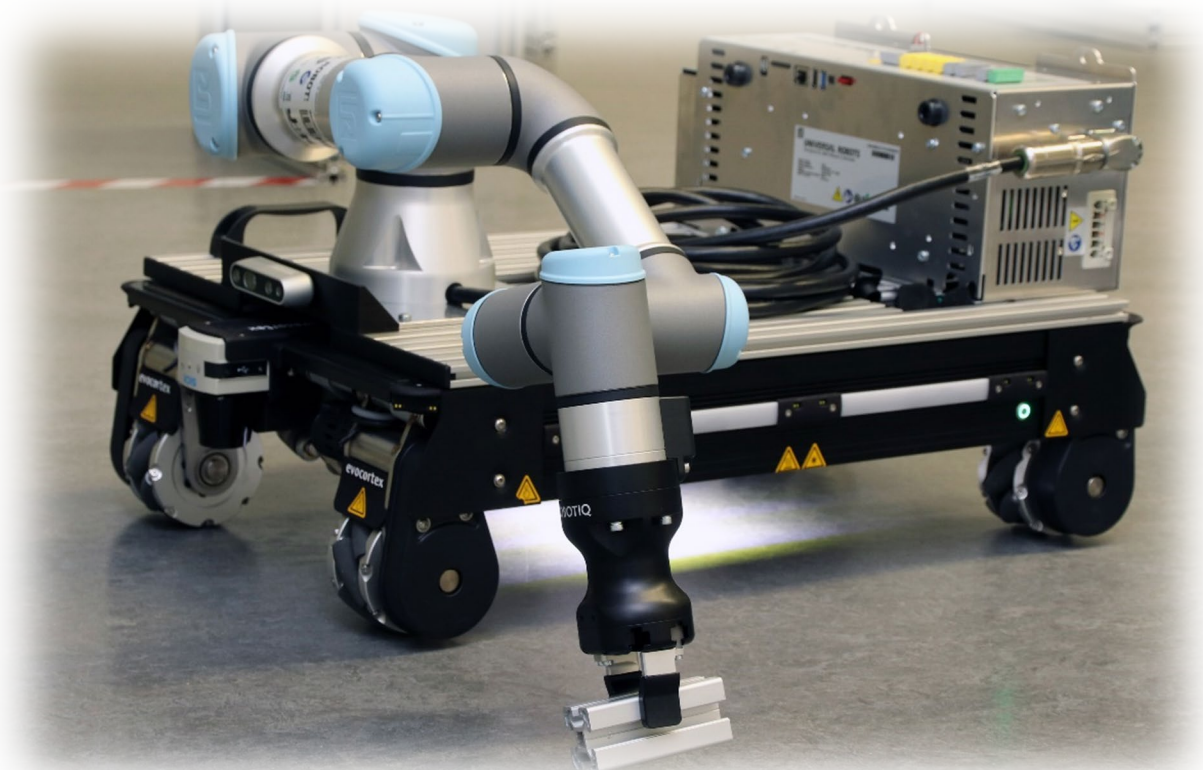




Study Plan

Bachelor Robotics (IRO)

SPO 2020 and 2023



Winter semester 2023/2024

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Abbreviations

| | |
|------------------|--|
| APO | General Examination Regulations of THWS |
| AWPF | General elective course |
| AWPM | General elective module |
| BA | Bachelor's thesis |
| bZv | Special admission requirements |
| CP | Credit points |
| D | German (as language of examination) |
| E | English (as language of examination) |
| ECTS | European Credit Transfer and Accumulation System |
| FANG | Faculty of Applied Natural Sciences and Humanities |
| FE | Faculty of Electrical Engineering |
| FM | Faculty of Mechanical Engineering |
| FWPM | Core elective |
| LV | Course |
| m.E./o.E. | Passed successfully / failed |
| mP | Oral examination |
| NG | Grade weights |
| P | Internship or lab course |
| Pro | Project |
| RaPo | State Examination Regulations |
| S | Seminar |
| soP | Other type of assessment |
| sP | Written exam |
| SPO | Study and examination regulations |
| SuSe | Summer semester |
| SU | Seminar-like lecture |
| SW | Schweinfurt |
| SWS | Hours per week and semester |
| Tpf | Compulsory attendance |
| Ü | Practical course |
| V | Lecture |
| WiSe | Winter semester |

Contact Information

Phone

09721 940 -

Switchboard THWS in Schweinfurt

- 5

BRO/IRO Office

Ms Daniela Glöckler

- 8520

Ms Andrea Scheuring

- 8735

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Tue and Wed

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and by arrangement

Website

<https://studium-robotik.thws.de/en/>

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Tue and Wed

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Thu

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Tue

8:30 to 12:00

Please send your inquiries by using the contact form on the website.

Student Representation

- 6467

Academic Advisory Service

Mr Elmar Kemmer

0931 3511

- 6180

or

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E-Mail:

studienberatung@thws.de

A prior announcement by phone or e-mail is necessary!

Learning Outcomes to be Achieved

The degree programme is divided into three phases:

| | |
|-----------------------------|--|
| 1st to 4th semester | Orientation phase, foundation studies and lab courses |
| 5th semester | Internship |
| 6th and 7th semester | Focus and specialisation studies, Robotics Project and bachelor's thesis |

The Study Plan Robotics complements the study and examination regulations for the bachelor's programme in Robotics (SPO/IRO) at the University of Applied Sciences Würzburg-Schweinfurt.

It includes the following:

- The allocation of weekly hours per semester to each programme semester
- The course type of each subject
- Objectives and contents of the internship semester
- More detailed provisions regarding exams and certificates of participation
- The names of specialisation modules, their course type and weekly hours

Organisation of the Robotics programme

| | |
|-----------------------------|--|
| 1st to 4th semester | Fundamental theoretical and practical courses at THWS in mathematical and technical subjects as well as foundation courses in computer science, lab courses, completion of two core elective modules. |
| 5th semester | Internship semester spent in industry as well as courses at THWS teaching interdisciplinary contents (soft skills). <i>In order to enter the internship semester, a minimum of 90 CP is required. This minimum number of CP corresponds to having successfully completed 75% of modules from the first four semesters.</i> |
| 6th and 7th semester | Theoretical and practical courses at THWS, interdisciplinary contents, Robotics project, completion of two core elective modules, specialisation module and bachelor's thesis. <i>In order to start the bachelor's thesis, successful completion of the internship module as well as a minimum of 150 CP is required.</i> <i>We offer the following specialisations consisting of three specialisation modules each:</i> <ul style="list-style-type: none"> • <i>Industrial Robotics</i> • <i>Mobile Robotics</i> • <i>Humanoid and Service Robotics</i> <i>Choice is made by taking a specialisation module's exam for the first time.</i> |

Module Handbook

The Robotics Bachelor's programme is modularised, i.e. it consists of different module courses.

Modules combine subjects in thematically and chronologically complete, self-contained study units assigned with a number of credit points. They can be made up of different teaching and learning formats (such as lectures, exercise courses, lab courses, seminars etc.).

In general, modules are completed by an examination that is the basis for the award of credit points.

The degree programme's modules are relatively small study units to facilitate national and international recognition.

The module handbook contains details of important information on modules (such as learning outcomes and contents).

The current version of the module handbook for the Robotics programme is available online from <https://studium-robotik.thws.de/en/>.

Programme Structure

See the following figure for information on the programme structure. There are two variants available. For advice on anything concerning your individual course of study, please contact the programme advisor.

| B.Eng. in Robotics - Structure | | | | | | | | | | | | | | |
|--------------------------------|--------------------|---|----|---|----|---|----|---|---------------------|---|------------------------|----|----|---|
| Semester | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | |
| Study Plan | Foundation studies | | | | | | | | Internship semester | | Specialisation studies | | | |
| Variant A | GS | X | GS | X | GS | X | GS | X | PS | X | FV | X | FV | X |
| | | | | | | | | | | | | BA | | |
| Variant B | GS | X | GS | X | GS | X | GS | X | PS | X | FV | X | FV | X |
| | | | | | | | | | | | | BA | | |

Variant A: Start your bachelor's thesis immediately after your specialisation studies in the 6th semester

*Variant B: Start your bachelor's thesis at the start of the 7th semester
(Note: BA grade possibly not available before the 8th semester)*

| | |
|----|------------------------|
| GS | Foundation studies |
| X | Semester break |
| PS | Internship semester |
| FV | Specialisation studies |
| BA | Bachelor's Thesis |

Appendix to the IRO Study and Examination Regulations

Semester 1 to 3

| | | | | | | | | | | | | | | | | | | | | | | |
|----|-------------------|--|---|---|---|-------|--------------------|--------------------|---|--|--|--|-----|---------------|---|--|------|---|---|--|--|--|
| | Semester 1 | | | | | | | | | | | | | | | | | | | | | |
| 1 | 4210100 / ENM1 | Engineering Mathematics 1 | 1 | 6 | 5 | SU, Ü | Prof. Dr. Diethelm | Prof. Dr. Diethelm | Prof. Dr. Diethelm | | | | sP | 90 Min. | e | | ja | 1 | 5 | | | |
| 2 | 4210200 / BEEN | Basics of Electrical Engineering | 1 | 6 | 5 | SU, Ü | Prof. Dr. Willert | Prof. Dr. Willert | Prof. Dr. Lormann / Prof. Dr. Friedrich | | | | sP | 90 Min. | e | | ja | 1 | 5 | | | |
| 3 | 4210300 / RME1 | Robot Mechanics 1 | 1 | 4 | 5 | SU, Ü | Prof. Dr. Meyer J. | Prof. Dr. Meyer J. | Prof. Dr. Meyer J. | | | | sP | 90 Min. | e | | ja | 1 | 5 | | | |
| 4 | 4210400 / BCEOS | Basics of Computer Engineering and Operating Systems | 1 | 4 | 5 | SU, Ü | Prof. Dr. Mathes | Prof. Dr. Mathes | Prof. Dr. Bodevig / Prof. Dr. Mathes | | | | sP | 90 Min. | e | | ja | 1 | 5 | | | |
| 5 | 4210500 / PRO1 | Programming 1 | 1 | 4 | 5 | SU, Ü | Prof. Dr. Borrmann | Prof. Dr. Borrmann | Prof. Dr. Borrmann / Herr Promeuschel | | | | sP | 90 Min. | e | | ja | 1 | 5 | | | |
| 6 | 4210600 / ROLAB1 | Robotics Lab 1 | 1 | 4 | 5 | S, LP | Prof. Dr. Meyer J. | Prof. Dr. Meyer J. | Prof. Dr. Meyer J., Prof. Dr. Ziegler, Prof. Dr. Herrler, Mr. Dax | | | | soP | H (m.E./o.E.) | e | | nein | 0 | 0 | | | |
| | Semester 2 | | | | | | | | | | | | | | | | | | | | | |
| 7 | 4210700 / ENM2 | Engineering Mathematics 2 | 2 | 6 | 5 | SU, Ü | Prof. Dr. Diethelm | Prof. Dr. Diethelm | Prof. Dr. Fabeck | | | | sP | 90 Min. | e | | ja | 1 | 5 | | | |
| 8 | 4210800 / BEC | Basics of Electronics and Components | 2 | 6 | 5 | SU, Ü | Prof. Dr. Lormann | Prof. Dr. Lormann | Prof. Dr. Lormann | | | | sP | 90 Min. | e | | ja | 1 | 5 | | | |
| 9 | 4210900 / RME2 | Robot Mechanics 2 | 2 | 4 | 5 | SU, Ü | Prof. Dr. Willert | Prof. Dr. Willert | Prof. Dr. Willert | | | | sP | 90 Min. | e | | ja | 1 | 5 | | | |
| 10 | 4211000 / SEME | Sensors and Metrology | 2 | 4 | 5 | SU, Ü | Prof. Dr. Hansmann | Prof. Dr. Hansmann | Prof. Dr. Meyer J. / Prof. Dr. Hansmann | | | | sP | 90 Min. | e | | ja | 1 | 5 | | | |
| 11 | 4211100 / PRO2 | Programming 2 | 2 | 4 | 5 | SU, Ü | Prof. Dr. Borrmann | Prof. Dr. Borrmann | Prof. Dr. Borrmann / Mr. Promeuschel | | | | sP | 90 Min. | e | | ja | 1 | 5 | | | |
| 12 | 4211200 / ROLAB2 | Robotics Lab 2 | 2 | 4 | 5 | S, LP | Prof. Dr. Meyer J. | Prof. Dr. Meyer J. | Prof. Dr. Meyer J. and others | | | | soP | H (m.E./o.E.) | e | | nein | 0 | 0 | | | |
| | Semester 3 | | | | | | | | | | | | | | | | | | | | | |
| 13 | 4211300 / STSE | Statistics and Sensor Data Fusion | 3 | 4 | 5 | SU, Ü | Prof. Dr. Fabeck | Prof. Dr. Fabeck | Prof. Dr. Fabeck | | | | sP | 90 Min. | e | | ja | 1 | 5 | | | |
| 14 | 4211400 / SYTHEN | Systems Theory | 3 | 4 | 5 | SU, Ü | Prof. Dr. Hirn | Prof. Dr. Hirn | Prof. Dr. Hirn | | | | sP | 90 Min. | e | | ja | 1 | 5 | | | |
| 15 | 4211500 / SECSN | Software Engineering and Cyber Security | 3 | 4 | 5 | SU, Ü | Prof. Dr. Daun | Prof. Dr. Daun | Prof. Dr. Daun | | | | sP | 90 Min. | e | | ja | 1 | 5 | | | |
| 16 | 4211600 / IMPR | Image Processing | 3 | 4 | 5 | SU, Ü | Prof. Dr. Willert | Prof. Dr. Willert | Prof. Dr. Willert | | | | sP | 90 Min. | e | | ja | 1 | 5 | | | |
| 17 | 4211700 / ESFBEN | Embedded Systems and Field Buses | 3 | 4 | 5 | SU, Ü | Prof. Dr. Daun | Prof. Dr. Daun | Prof. Dr. Daun | | | | sP | 90 Min. | e | | ja | 1 | 5 | | | |
| 18 | 4211800 / ROLAB3 | Robotics Lab 3 | 3 | 4 | 5 | S, LP | Prof. Dr. Meyer J. | Prof. Dr. Meyer J. | Prof. Dr. Willert, Mr. Löser, Mr. Iorpenda, Mr. Barthelmes | | | | soP | H (m.E./o.E.) | e | | nein | 0 | 0 | | | |

Semester 4 and 5

| | | | | | | | | | | | | | | | | |
|----|-------------------|---|---|---|----|-------|--------------------|---|-------------------------------------|--|-----|---------------|---|------------------|---|---|
| | Semester 4 | | | | | | | | | | | | | | | |
| 19 | 4211900 | Core Elective 1a | 4 | 4 | 5 | SU, Ü | | | | | sP | 90 Min. | e | ja | 1 | 5 |
| 20 | 4212000 | Core Elective 1b | 4 | 4 | 5 | SU, Ü | | | | | sP | 90 Min. | e | ja | 1 | 5 |
| | 4212002 | Digital Signal Processing and State Space Control | 4 | 4 | 5 | SU, Ü | Dean of Studies | Prof. Dr. Müller B./ Mr. Iff | | | sP | 90 Min. | e | ja | 1 | 5 |
| | 4212003 | Development Processes and Legal Basics | 4 | 4 | 5 | SU, Ü | Dean of Studies | Prof. Dr. Ziegler | | | sP | 90 Min. | e | ja | 1 | 5 |
| 21 | 4212100 | Control Systems | 4 | 4 | 5 | SU, Ü | Prof. Dr. Ali | Prof. Dr. Ali | | | sP | 90 Min. | e | ja | 1 | 5 |
| 22 | 4212200 | Distributed Systems and Network Communication | 4 | 4 | 5 | SU, Ü | Prof. Dr. Mathes | Prof. Dr. Mathes / Prof. Dr. Kullmann | | | sP | 90 Min. | e | ja | 1 | 5 |
| 23 | 4212300 | Machine Learning | 4 | 4 | 5 | SU, Ü | Prof. Dr. Herrier | Prof. Dr. Herrier | | | sP | 90 Min. | e | ja | 1 | 5 |
| 24 | 4212400 | Robotics Lab 4 | 4 | 4 | 5 | S, LP | Prof. Dr. Meyer-I. | Prof. Dr. Herrier / Prof. Dr. Bormann / Prof. Dr. Kaupp / Mrs. Zhao / Mr. Reinhart | | | soP | H (m.E./o.E.) | e | nein | 0 | 0 |
| | Semester 5 | | | | | | | | | | | | | | | |
| 25 | | Internship | 5 | 0 | 25 | P | - | - | | | | (m.E./o.E.) | e | nein | 0 | 0 |
| 26 | | General Elective | 5 | 4 | 5 | * | FANG | FANG | | | * | * | * | ja ¹⁾ | 1 | 5 |
| | | | | | | | | | 70 ECTS-Punkte aus den Modulen 1-18 | | | | | | | |

Semester 6 and 7

| | | | | | | | | | | | | | | | | | | | |
|----|------------------------|--------|----|----|--------|--------------------------|--|--|--|--|--|-----|----------------------------|---|--|--|------|---|----|
| | Semester 6 u. 7 | | | | | | | | | | | | | | | | | | |
| 27 | Core Elective 2a | 6 | 4 | 5 | SU, Ü | | | | | | | SP | 90 Min. | e | | | ja | 1 | 5 |
| 28 | Core Elective 2b | 6 | 4 | 5 | SU, Ü | | | | | | | SP | 90 Min. | e | | | ja | 1 | 5 |
| | 4212004 / DELEEN | 6 | 4 | 5 | SU, Ü | Dean of Studies | | | | | | SP | 90 Min. | e | | Prof. Dr. Herrler | ja | 1 | 5 |
| | 4212005 / 3DMV | 6 | 4 | 5 | SU, Ü | Dean of Studies | | | | | | SP | 90 Min. | e | | Prof. Dr. Willert | ja | 1 | 5 |
| | 4212900 / ACTU | 6 | 4 | 5 | SU, Ü | Prof. Dr. Herranz Gracia | | | | | | SP | 90 Min. | e | | Prof. Dr. Herranz Gracia | ja | 1 | 5 |
| 30 | 4214110 / SIR1 | 6 | 4 | 5 | SU, Ü | | | | | | | SP | 90 Min. | e | | | ja | 1 | 5 |
| | 4214120 / SIR2 | 6 | 4 | 5 | SU, Ü | Prof. Dr. Ziegler | | | | | | SP | 90 Min. | e | | Prof. Dr. Motzek | ja | 1 | 5 |
| | 4214130 / SIR3 | 6 | 4 | 5 | SU, Ü | Prof. Dr. Ziegler | | | | | | SP | 90 Min. | e | | Prof. Dr. Ziegler / Prof. Dr. Friedrich | ja | 1 | 5 |
| | 4214210 / SMR1 | 6 | 4 | 5 | SU, Ü | Prof. Dr. Borrmann | | | | | | SP | 90 Min. | e | | Prof. Dr. Borrmann | ja | 1 | 5 |
| | 4214220 / SMR2 | 6 | 4 | 5 | SU, Ü | Prof. Dr. Borrmann | | | | | | SP | 90 Min. | e | | Prof. Dr. Meyer J. | ja | 1 | 5 |
| | 4214230 / SMR3 | 6 | 4 | 5 | SU, Ü | Prof. Dr. Borrmann | | | | | | SP | 90 Min. | e | | Prof. Dr. Borrmann | ja | 1 | 5 |
| 32 | 4214310 / SHR1 | 7 | 4 | 5 | SU, Ü | Prof. Dr. Daun | | | | | | SP | 90 Min. | e | | Prof. Dr. Daun | ja | 1 | 5 |
| | 4214320 / SHR2 | 7 | 4 | 5 | SU, Ü | Prof. Dr. Daun | | | | | | SP | 90 Min. | e | | Prof. Dr. Spiertz | ja | 1 | 5 |
| | 4214330 / SHR3 | 7 | 4 | 5 | SU, Ü | Prof. Dr. Daun | | | | | | SP | 90 Min. | e | | Prof. Dr. Daun | ja | 1 | 5 |
| | 4213300 / RPEN | 6 u. 7 | 10 | 10 | S, Pro | Prof. Dr. Meyer J. | | | | | | soP | A (m.E./o.E.) | e | | Prof. Dr. Borrmann, Prof. Dr. Herrler, Mr. Kranz, Mr. Schirmer, Ms. Zhao, Mr. Löser, Mr. Dak, Mr. Barthelmes | nein | 0 | 0 |
| 34 | 4213400 / VASE | 7 | 2 | 3 | S | Prof. Dr. Meyer J. | | | | | | SP | 90 Min. (m.E./o.E.) | e | | Mr. Berthold | nein | 0 | 0 |
| 35 | 4213500 / BDEN | 7 | 4 | 5 | S | Prof. Dr. Bräutigam | | | | | | soP | G | e | | Prof. Dr. Bräutigam | ja | 1 | 5 |
| 36 | 4213600 / BT | 7 | 0 | 12 | - | Dean of Studies | | | | | | BA | 150 ECTS-Punkte + Modul 25 | e | | Supervisor (examiner) appointed by the examination board | ja | 1 | 12 |

Robotics Lab

In each semester of the foundation phase (1st to 4th semester) a Robotics Lab for 5 ECTS credits each is scheduled. The Robotics Lab complements the foundation modules of robotics and serves to deepen the acquired specialist knowledge.

Each Robotics Lab covers four main areas:

- Robotics applications
- Robot development
- Software tools
- Lab experiments.

The corresponding courses are offered at fixed dates. These dates will be announced at the start of the semester by the Robotics Lab responsible.

Successful completion of the Safety Briefing is required for participation in the Robotics Lab.

The number of participants in the individual experiments is limited. Depending on the lab course, available places are either allocated or you can register independently via THWS E-Learning. Information on this will be announced at the start of the semester via the THWS E-Learning.

A Robotics Lab is completed as soon as all exams/assessments listed on the Attestation Card (a form listing required exams/assessments) have been completed. Successful completion is recorded on the Attestation Card.

Students can also take German-taught lab courses of the German Robotics programme (BRO) if places are available. There, too, exams/assessments have to be documented on the Attestation Card.

For some lab courses (esp. lab experiments) experiment instructions are usually available in the E-Learning. These instructions have to be worked through in advance. At the start of the experiment, it will be checked whether participants have prepared themselves suitably. Sufficient preparation is a prerequisite for participating in the lab experiment as well as for a positive statement on the Attestation Card.

After each Robotics Lab, the Robotics Lab responsible checks the attestation card for completeness and notifies the Department of Student Affairs (HSST) about successful completion of the lab.

Internship Module during the 5th Semester

The internship semester is intended to introduce students to activities and work methods used by engineers by way of concrete tasks. At the same time, students should gain in-depths insights into technical areas and social structures of companies. The internship has a duration of at least 20 weeks, but no more than 26 weeks.

Only students who have gained 90 ECTS credits at the start of the Internship Module are entitled to enter this part of studies.

This internship semester is complemented by a general elective module (AWPM) accompanying the internship.

General Elective Module (AWPM)

For the General Elective (No. 26), you must choose two courses (2 SWS each) from the AWPM catalogue. The elective courses offered are available from the catalogue of FANG. For more information, please visit the faculty's website:

<https://fang.thws.de/fakultaet/awpf/>

Robotics Project

During the specialisation studies (in the 6th and 7th semester) the Robotics Project is scheduled where you will work in teams and apply soft skills as well as already acquired specialist skills.

Here, students will work in small groups on industrial development tasks. Each participant must comply with the agreed schedule (completion of assigned work in due time, participating in team meetings).

The Robotics Project's success is assessed on the basis of the project execution on the basis of the development systematic progress of the project, the project documentation of 15-20 pages as well as the project presentations.

The project offer is limited and addressed to students in the 6th and 7th semester. Projects will be presented at the beginning of the 6th semester. Efforts will be made to assign the students to the projects in accordance with their individual preferences. However, since the number of participants in the projects is limited (usually 3-5 participants per project), participation in the preferred project cannot be guaranteed.

Seminars

Regular attendance in the seminars' sessions is required for their successful completion. Attendance is documented by signing the attendance list. If students cannot attend, they usually have to notify the lecturer of the session(s) they will miss in advance.

In order to complete seminars successfully, students will be required to write reports, compile portfolio assignments and hold presentations.

Core Elective Modules (FWPM)

Core elective modules are offered in the 4th and 6th semester. They offer students the opportunity to accentuate their studies according to personal and professional interests.

The students have to choose from two separate catalogues of subjects. Core Elective 1a and Core Elective 1b have to be chosen from the catalogue "Core Elective 1"; Core Elective 2a and Core Elective 2b have to be chosen from the catalogue "Core Elective 2".

These electives can only be offered once per year and if there is a sufficient number of participants. Each core elective is completed by a written exam.

Specialisation Studies

Each student has to choose an area of specialisation. Choice is made by taking a specialisation module's exam for the first time. After this, a change of the area of specialisation can be made if the necessary written request is approved by the examination committee.

The range of specialisations offered depends on a sufficiently large number of students in a given year. There is no entitlement that all areas of specialisation are offered if there is not a sufficient number of participants.

Bachelor's Thesis

The bachelor's thesis is scheduled for the 7th semester. It can either be written within THWS or in collaboration with an external partner, such as an industrial company.

Starting the bachelor's thesis can take place at the earliest if

- a) the Internship (module no. 25) has been completed successfully and
- b) at least 150 ECTS credits have been earned.

The form for the registration of a bachelor's thesis is available in the E-Learning of the Faculty of Electrical Engineering: [Kurs: Info-Plattform Elektrotechnik, Abschnitt: Studiengang BRO / study programme IRO \(thws.de\)](#).

For **SPO 2020** students: If the thesis is assigned no later than one month after the start of the 7th semester, the completion period is 5 months; if the thesis is assigned later, it must be completed within 3 months.

For **SPO 2023** students: The thesis must be completed within 5 months.

Independent from the submission deadline, the workload is 12 ECTS credits, i.e. 360 hours.

Stays Abroad

Having international experience is of increasing importance. Many companies have global operations and even local companies collaborate with customers or suppliers based abroad. Thus, intercultural experience and foreign language skills are important not only for managerial personnel, but often also for the average employee. This professional aspect apart, a stay abroad is exciting and brings a lot of fun and loads of new impressions. The freedom abroad you enjoy as a student will be over when you are deployed for professional reasons.

There isn't just one way of going abroad. You can do the internship during your studies abroad, attend a summer or winter school, study for one or two semester at a foreign higher education institution or write your bachelor's thesis abroad. If you study abroad, you should keep in mind that the credits you earn there can be transferred to THWS. The core modules as well as general modules are particularly suitable for credit transfer, because in these cases the modules taken abroad do not have to correspond to the modules/courses in the Robotics programme.

Take care to plan your stay abroad well in advance for several reasons: to keep required deadlines here and abroad; to make the best use of possible funding opportunities; most importantly, to clarify already before you go abroad whether the credits you plan to earn can be transferred to THWS; to adjust your personal course of studies at THWS, if necessary.

A stay abroad makes sense after your 3rd semester; however, you should get information as soon as the 1st or 2nd semester. For more information, please contact the international affairs officer of the faculty and the THWS International Office (<https://international.thws.de/>)

European Credit Point Transfer System (ECTS)

Credit points awarded according the European Credit Transfer System (ECTS) are a measure for the students' workload; they facilitate the national and international recognition and transfer of academic achievements, for example for transfer students to/from another higher education institution.

One credit point corresponds to 30 hours of work of an average student. Sixty credit points are scheduled to be achieved per year of study. In order to obtain the academic degree Bachelor of Engineering, 210 credit points have to be achieved.

Graded modules contribute to the degree grade in proportion of their credit points. The study and examination regulations show further weighting factors.

In addition to other condition, the number of credit points earned decides whether a student may continue his or her studies as scheduled.

The student workload (30 hours per credit point) is calculated by taking the entire time needed to reach a module's qualification objectives. This not only includes the attendance time in lectures and seminars, but also the time for self-study, homework, preparation for and participation in exams.

Diploma Supplement

When the bachelor's examination has been passed, the student receives the Diploma Supplement and the Transcript of Records in addition to his or her Bachelor's Certificate.

The Diploma Supplement describes the type and contents of the degree programme and provides information on the German higher education system. It thus facilitates the programme's international classification.

Labs in the Faculty of Electrical Engineering

| Laboratory | Abbreviation | Room* | Supervisor |
|--|--------------|-----------|-----------------------|
| Automation Technology | FE | N.N. | N.N. |
| Automation Technology and Biomedicine | FE | 1.0.27-28 | Dr. Hansmann |
| Autonomous Mobile Systems | FE | 9.E.06 | Dr. Borrmann |
| Battery Technology | FE | N.N. | Dr. Lorrmann |
| Chip-Design and Microelectronics | FE | 1.1.04 | Dr. Endres |
| Circuit Design | FE | 1.E.34 | Dr. Schormann |
| CobotLab | FE | 9.E.02 | Dr. Kaupp |
| Communications Engineering | FE | 1.E.32 | Dr. Spiertz |
| Control Systems | FE | 1.1.08 | Dr. Ali |
| Control Technology | FE | N.N. | Dr. Mühlfeld |
| Cyber-Awareness, Cryptography and Hacking | FE | 1.0.30 | Dr. Mann |
| Data Processing and Embedded Systems | FE | 1.1.06 | Dr. Eckert |
| Dielectric Diagnostics and Simulation | FE | 2.1.04 | Dr. Zink |
| Electrical Machines | FE | 1.1.65 | Dr. Herranz Gracia |
| Electrical Power Supply | FE | 1.1.65 | Dr. Rahimpour |
| Electromagnetic Compatibility | FE | N.N. | Dr. Kasten |
| Hardwaredesign | FE | 9.E.05 | Dr. Kaupp |
| High Voltage Engineering | FE | 2.E.05 | Dr. Zink |
| Human Robot Interaction | FE | N.N. | Dr. Friedrich |
| Industrial Robotics | FE | 9.E.03 | Dr. C. Ziegler |
| Intelligent Industrial Control Systems | FE | 1.E.16 | Dr. B. Müller |
| Machine Learning | FE | 9.E.06 | Dr. Herrler |
| Machine Vision | FE | 9.E.17 | Dr. Willert |
| Mechatronics Lab I – Electric Drives | FE | 1.E.22-28 | Dr. Kempkes |
| Mechatronics Lab II – Power Electronics | FE | 1.E.22-28 | Dr. Ackva |
| Mechatronics Lab III – Automotive Electronics and Simulation | FE | 1.E.18 | Dr. Hirn |
| Medical Engineering | FE | 1.0.27-28 | Dr. Strobel |
| Metrology and Opto-thermic Sensors | FE | 1.0.26 | N.N. |
| Microwave Engineering | FE | 1.0.31 | Dr. Eberspächer |
| Mobile Robotics | FE | 9.E.17 | Dr. Kaupp |
| Network Engineering and Network Management | FE | 1.1.06 | Dr. Eckert |
| Operation and Simulation of Electrical Energy Systems | FE | 1.1.65 | Dr. Wellhöfer |
| Optoelectronics | FE | 1.0.29 | Dr. Bohn |
| PCB Technology | FE | 3.U.12 | Dr. Schormann |
| Robotics I | FE | 1.E.12 | Dr. Brandenstein-Köth |
| Service Robotics | FE | 9.E.06 | N.N. |
| Signal Processing | FE | 1.E.33 | Dr. Spiertz |
| Software and Systems Engineering | FE | 9.1.03 | Dr. Daun |
| Software Engineering | FE | 1.1.62 | Dr. Mathes |

| Institute | Abbreviation | Room* | Supervisor |
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| Institute of Medical Engineering Schweinfurt | IMES | 1.1.59 1.0.28 | Dr. Strobel Dr. Hansmann |
| Technology Transfer Centre for E-Mobility | TTZ-EMO | | Dr. Ackva Dr. Kempkes |

*Room number: 1-8.x.x = Campus Ignaz-Schön; 9.x.x = Robotics Campus Konrad-Geiger

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