



Course Catalogue

Module Descriptions

2023/24

Architecture

Our School of Engineering is composed of 3 departments

- Architecture
- Civil Engineering
- Geoinformatics and Surveying

Each department offers major and minor subjects, which you should focus on. Besides we offer additional courses, open to all incoming students, such as language courses, business creativity (e*), culture management (e), project management (e)... (*e = taught in English)

The ECTS (European Credit Transfer System) is the foundation for your individual workload. 30 ECTS credits (ecp) is the maximum workload you should opt in for. Major subjects are quite large 10 ecp and it is not recommended to choose more than two of them. Minor and department-overarching offers are 4 -6 ecp. Hence 2 majors and up to 3 minors/additional is what you choose. If your desired study programme comprises a German course (what it should), you must clarify with your home university whether the credits will be acknowledged (what they should).

Most courses will be graded according to the table below, however there are subjects where credits will be awarded for regular, pro-active participation – without getting a mark.

Local grade	
1,0 - 1,5	EXCELLENT: outstanding performance with only minor errors
1,6 - 2,5	VERY GOOD: above the average standard but with some errors
2,6 - 3,3	GOOD: generally sound work with a number of notable errors
3,4 - 3,7	SATISFACTORY: fair but with significant shortcomings
3,8 - 4,0	SUFFICIENT: performance meets the minimum criteria
>4,1	FAIL: more work required before the credit can be awarded
	Tg: course attended

Due to possible late failures (a course has been cancelled...), timetable overlaps, the initially selected subject does not meet your expectations, or whatever reason you may think of, we cannot guarantee that every course is feasible during your stay. Therefore, you should name at least 45 credits in your order of preference and return the attached course selection form by email to kathrin.krechel@hs-mainz.de

In general the teaching language is German, but English will be the common language and you are expected to speak **English** on an advanced level (**B2**). We are running a „buddy system“: German fellow students will assist and guide you through your studies, help with translations, explain briefings etc and of course all the profs speak English. Theoretical courses are only accessible for German speaking students and they are not listed below.

Architecture

There is no predetermined study programme for incoming Architecture students. The lectures will be taught in German, and we have to tailor an individual programme for you. Please note that your workload should not exceed 30 ECTS. If your home university agrees, German language courses may be part of your workload. Of course, you are welcome to study in our International Built Environmental Pathway in English.

The Modules presented in the following Course Catalogue are those, that we recommend to exchange students.

Additionally, they have the possibility to choose from different Modules, independent of their academic year.

An example for a study program in architecture could look like this:

3 rd year first semester	3 rd year second semester
Integrated Design Project 4 / 10 ecp	Integrated Design Project 5/ 5 ecp
Impromptu Design / 5 ecp	Technology 3 / 5 ecp
Practice 2 / 5 ecp	Practice 2/ 5 ecp
Digital 3D City Models / 5 ecp	Impromptu Design / 5 ecp
German / 5 ecp	Building Information Modelling / 5 ecp
	Business Creativity B2 / 5 ecp
30 ecp	30 ecp

M 8.1 one -Internship 10 ecp

The students have the opportunity to participate in a practical Module (supported through the Erasmus-Plus program) in which they do an internship at the Institute of Architecture at the Hochschule Mainz – University of Applied Sciences (AI MAINZ). They could also pass their internship at any registered architectural office in Mainz, but since the AI Mainz offers their students additional financial support, an internship at this institute is to be recommended.

As part of this practical Module, that is provided with 10 credits, the students can also attend to a German course and receive 5 more credits.

Digital Building Survey 6 ECTS / 180h

Prof. Dr.-Ing. Piotr Kuroczyński

Students learn to:

- to deal with the opportunities and challenges of the digital transformation against the background of the construction industry,
- fundamentals of digital building survey,
- BIM objectives, BIM use cases, EIR/BEP and modeling guidelines
- to survey a building by means of laser scanner (TLS/SLAM) and, if necessary, photogrammetry (SfM),
- practice-oriented data processing (registration) and post-processing (final drawing) as preparation for 3D modeling in BIM-supporting software,
- the interaction of specialist software solutions (including for registration, 2D/3D visualization and final drawing/3D modeling) and be able to output the data appropriately,
- the ability to correspond professionally with clients, authorities, specialist planners and construction companies.

The lecture will cover the following topics:

- Digital transformation and visualization in construction,
- Building survey – an introduction with an outlook.
- Historic Building Information Modeling (HBIM) as a collaborative planning method and the normative structuring.

In the exercise the following topics will be covered:

- Data acquisition in the field using TLS/SLAM and UAV, if applicable,
- Data processing in the office (registration),
- Data evaluation, analysis and output.
- Employers information requirements (EIR) and BIM execution plan (BEP)
- Object-based 3D modeling in LOD200/300 (HBIM)

Test Performance: Students submit project documentation in the form of a portfolio (digital) and present the results of their work in a final presentation using the 3D model and other tools.

Requirements: Interest in digital tools and cultural heritage (historical architecture). Spatial awareness and knowledge of Archicad are an advantage, but not a prerequisite.

Duration: 1 semester

M 1.4 - Integrated Design Project 4 10 ecp / 300h

This Module contains 4 courses: <https://eduroam.org/?p=faq>

Design + Construction (EP11) [project1/phase1](#)

- Design of an everyday construction task with at least two different uses. Examination of the content of the design topic; statements and research on ancillary factors such as topography, history of the site, urban structure, type of building, load-bearing system, functional areas, materials, etc.
- Methodological generation of alternatives and versions. Ability to make one's own assessment based on comprehensible criteria. Selection of the best solutions for further development in the following semester
- Concepts, volumes and tectonic dispositions initially in three-dimensional model studies, parallel in two-dimensional representations, sketches, preliminary studies, drawings (floor plans, sections, interiors, views), verification on models, (sectional) models and partial models (excerpts)
- Design task based on the topics of building analysis

Supporting Structures (EK11) [project1/phase1](#)

- Methodological development of a sensible load-bearing concept for the design and integration of the supporting structure into the design drawings.

Project 1 Phase 1 Energy Concepts (EE11) [project1/phase1](#)

Methodological development of an integrated energy concept. Identification of interactions between design decisions, construction and technical services and their effects on the overall energy requirements during the construction and operation of the building.

Building Theory 1 (EE11)

Lectures and seminars on different building typologies with an emphasis on the design project. Understanding the term type in architecture. Learn and understand different, simple building typologies. Analysis of constructed typologies.

Aim of Module:

The students are able to use and apply knowledge they have already acquired in various sub- disciplines for a design task with a medium degree of complexity in an integrated manner.

They have perfected their own organizational skills in the planning and execution of the individual development steps, and are able to work simultaneously on several requirement levels of the planned building and in several different scales.

They are in a position to develop and work out a comprehensible range of forms and designs for a building and present the results personally.

Test performance: Project work over a period of 16 weeks with final presentation

Requirements: none

Duration: 1 semester

M 1.5 - Integrated Design Project 5 5 ecp / 150h

Design + Construction (EP12) [project1/phase2](#)

Optimization of the architectural designs from Project 1 Phase 1 and in-depth design processing: A synthesis of basic requirements and aspects of the construction, shell and supporting structure.

Development and discussion of a comprehensive design system for the internal and external appearance.

Supporting Structures (ET12) [project1/phase2](#)

- Optimization and deepening of the structural design

Aim of Module:

The students are able to develop a synthesis with the different disciplines, taking into account concerns and suggestions in the final critique, as part of the advanced study of architectural design with a medium degree of difficulty. They are able to continue the concept that defines the design on a larger scale.

Test performance: Project work over a period of 8 weeks with final presentation

Requirements: Passed Modules: M 1.4 Design 4 (Integrated Design Project 4)

Duration: 1 semester

Energy Concepts (ENKO)

Influence of building services engineering in the energy concept on the building design in all phases, especially in the main focus on the development of passive building concepts.

Teaching of content from the areas:

- Climate-friendly construction that conserves resources
- Sustainable design strategies
- Factors influencing the energy budget of buildings
- Energy-conscious and site-appropriate building planning under consideration of building form, layout and storage capacity
- Passive and active building facilities, such as solar thermal energy, air collectors, rainwater utilization, photovoltaics, sensor technology, etc.
- Strategic orientation of the design according to the aspects of generation and operating energies
- The German Energy Saving Ordinance and the passive house

As part of the design work and exercises, appropriate materials and construction methods are discussed and tested. Factors relevant to the design, such as optimized spatial planning, are contrasted and compared. Examination of the relationships between spatial, functional, technical and design methods and how they influence each other and change the system as a whole.

Aim of Module:

The students are qualified to use natural resources sparingly in the construction and operation of buildings. They are able to develop effective and suitable solutions using appropriate methods and integrative approaches, reconciling design, construction, spatial properties and sustainability.

The students are able to create energy concepts that are compatible with the design based on the examination and analysis of comparable objects and to assess subject-specific interrelationships, processes and conditions.

The students have the ability to create independent, energy-conscious design, as well as the well-timed consideration of ground plan configurations for the requirements of passive solar energy generation. They have developed an awareness of the fact that the energy standard of a building can be considered on an equal footing with regard to other important factors such as load-bearing structure, functional implementation and architectural aesthetics.

The students have knowledge of the basic modes of function of active and passive façade systems and their effect on the design, function and energy budget of the building, and are able to integrate the façade into the overall energy budget and the technical features of the building.

Test performance: Project work over a period of 16 weeks

Requirements: Passed Modules: M 1.4 Design 4

Duration: 1 semester

M 1.6 - Integrated Design Project 6 10 ecp / 300h

Design + Construction (EP21) [project2/phase1](#)

Completion of planning tasks in urban planning contexts and with reference to existing buildings: projects whose typologies place diverse and special demands on design and space quality, utilization and functional classifications, on materials, construction and technical building equipment and cost-effectiveness.

Preparation of utilization and building analyses, independent creation and differentiation of spatial plans. Thorough involvement with the architectural design, its urban integration and its incorporation into the existing structure.

Different themes are to be coordinated among the participants, so that the performance requirements can be assessed in a sufficiently broad spectrum according to evaluation criteria that are comparable with one another. To ensure the principle of equality between the different design themes, the main elements, features and essences of the significant requirements for the different solutions are to be consistent.

Supporting Structures (ET21) [project2/phase1](#)

Methodological development of a viable static concept for the design and integration of the supporting structure into the design drawings.

Energy Concepts (EE21) [project2/phase1](#)

Methodological development of an integrated energy concept. Identification of interactions between design decisions, construction and technical services and their effects on the overall energy requirements during the construction and operation of the building.

Aim of Module:

The students are able to use and apply specialist knowledge they have already acquired in various sub-disciplines for a design task with a high degree of complexity in an integrated manner.

They are proficient in the methodological approach to the conceptual derivation of the design and in structuring their own planning process.

They are able to develop alternative solutions (plans and models), design a value system for assessing these alternatives (analysis-synthesis evaluation) and present their own results to students and instructors.

Test Performance: Project work over a period of 16 weeks with final presentation

Requirements: none

Duration: 1 semester

M 1.7 - Integrated Design Project 7 5 ecp / 150h

Design + Construction (EK22) project2/phase2

In-depth work on Project 2 Phase 1: A synthesis of the basic requirements and aspects of the construction, the shell and the supporting structure. Development and discussion of a design system for inside and outside.

Supporting Structures (ET22) project2/phase2

Optimization and intensification of the structural design

Pre-dimensioning and preparation of structural plans

Aim of Module:

The students are able to develop a synthesis with the different disciplines, as part of the more in- depth involvement with the previous design, and are able to continue the concept that defines the design on a larger scale.

Test Performance: Project work over a period of 16 weeks with final presentation

Requirements: Passed Modules: M1.6 Design 7 (Integrated Design Project)

Duration: 1 semester

M 3.6 - Technology 6 [Tech 6] 5 ecp / 150h

Interior Architecture (INAR) / Integration of Building Services Engineering (INGT)

Understanding interrelationships and interactions between conceptually determined room design and technical-constructive requirements for interior design technology and building services engineering.

Analysis of design-relevant factors of interior design and extensions, guidance for the evaluation and development of possible alternatives:

- Imagination and perception of space
- Interior design concept
- Room simulation (reference to media design)
- Lighting and illumination
- Acoustics and interior design
- Color and material concepts (reference to color systems)
- Finishing: walls, ceilings, floors, doors, sanitary areas
- Furnishing principles
- Fittings (fixed furnishings), loose furnishings and furniture construction

Integration of technical building components in a separate design. Presentation of a superordinate technical building concept and the media distribution, with examples in more detail, such as:

- Heating and ventilation system
- Solar collectors, heat pumps, cogeneration units, etc.
- Lighting technology, electrical supply, PV technology
- Sanitary engineering
- Elevator and conveying technology

Aim of the Module:

The students are able to develop new interior design concepts. They have acquired a methodology for recognizing and assessing quality characteristics. They know the subject-specific interrelationships through the analysis of comparative objects. They also have the ability to integrate the defining interior components and technical requirements into the overall design.

They learned a complementary approach where a key concept determining the interior is taken into account as a decisive design factor.

This ability is accompanied by the integration of various technical aspects and the presentation of the synergetic effects of complementary systems in the space. Students can distinguish additive from integrated system components. They can verify revision and redundancy parameters, and clarify possible contrasts between flexibility, durability and design approaches.

Test Performance: Project work over a period of 16 weeks with final presentation

Requirements: Passed Modules: M1.6 Design Seven (Integrated Design Project 6)

Duration: 1 semester

M 1.8 - Impromptu Design 5 ecp / 150h

Analytical development, derivation and sketch-based execution of concepts; impromptu designs are part of the project work in the Impromptu Design module. They are assigned as tasks by various instructors and can be performed in the form of one-day or weekend impromptus or brief workshop designs. Their topics have a competitive character due to the simultaneous completion by several students. The task includes the presentation as part of an impromptu discussion.

The Impromptu Design project work is passed when the following receive the grade of “sufficient” or better within four semesters:

- eight one-day impromptus or
- four weekend impromptus or
- one brief workshop design

Aim of the Module

The students have the ability to quickly grasp and understand a design task, to analyze and derive an idea from given prerequisites. They are able to develop a sustainable conceptual solution and assess the urban, spatial and functional connections and their structural implementation according to typological, constructive, design and material- related criteria. They are able to prepare an analysis of strengths and weaknesses in versions and alternatives, and to present the solution with appropriate presentation tools.

Test Performance: 8 one-day impromptus, 6 hours each (every Friday afternoon) or 4 weekend impromptus, 3 days each or 1 workshop impromptu design

Requirements: none

Duration: 1 semester

M 8.2 - Practice 2 5 ecp / 150h

Field Trip [EXKU]

The field trip lasts at least five days, during which the student actively participates. Preparation of an oral presentation, drafting of brief information for the other field trip participants, oral presentation on site, preparation of a paper according to a given scientific standard in a uniform layout as a contribution to the joint report of the field trip in printed and digital form.

Aim of the Module

The participants understand and analyze historical and contemporary architecture in an urban, cultural and temporal context and know the origins of its creation. They are in a position to apply the knowledge they have acquired during their studies in a detailed on-site examination and analysis and to evaluate the insights they have obtained in the process. In a final written paper, they create a synthesis of literary studies and their own observations. The paper complies with scientific standards.

Test Performance: Seminar paper over a period of 8 weeks and presentation during the 5-day excursion

Requirements: none

Duration: 1 semester

Digital 3D City Models 5 ecp / 150h

The following content will be communicated to the students:

- Building history and the socio-cultural significance of the building industry in the course of time
- Building culture, current potentials and challenges
- Effects of digital change on the construction industry (Smart Cities, AR/VR, BIM standard, 3D capture, rapid prototyping, etc.)
- Common data models (LandXML, CityGML, IFC)
- 3D modelling approaches (CityGML “Surface Modelling” and BIM/IFC “Solid Modelling”)
- 3D modelling of an urban planning situation
- Data modelling (CityGML) and data exchange with BIM-compliant software
- Visualization methods and software solutions

Aim of the Module

The students will be able:

- to understand the cultural-historical and social significance of construction
- to recognize the potentials and challenges of the digital change in the building industry
- to distinguish the basics of conceptual digital modelling of landscapes, cities and buildings
- to identify and understand the specifications of the consortia (ISO, OGC, buildingSMART)
- to understand the fundamental differences between CityGML and IFC
- to categorize 3D building and city models at the interface to BIM
- to evaluate the application of common 3D software solutions according to different problems
- to create a 3D modeling of the urban context (terrain, buildings, infrastructure) and an adequate visualization that complies with standards
- to prepare and transfer the data for further interdisciplinary processes (for example, in the module “Development of Old Buildings - Building in Existing Contexts Project” in the Architecture Department)

Test Performance: Exam or portfolio review in accordance with Section 11 Para. 1

Requirements: none

Duration: 1 semester

is only offered in winter semesters

Building Information Modelling 5 ecp / 150h

The following content will be communicated to the students:

- Building history and the socio-cultural significance of the building industry in the course of time
- Building culture, current potentials and challenges
- Effects of digital change on the construction industry (Smart Cities, AR/VR, BIM standard, 3D capture, rapid prototyping, etc.)
- Phases and sections of construction projects (project development, awarding/competition procedures, technical building services and facility management)
- BIM-compliant 3D modelling and visualization based on a concrete example of a building survey
- Interdisciplinary work and the exchange format IFC

Aim of the Module

The students will be able to:

- to understand the cultural-historical and social significance of construction
- to recognize the potentials and challenges of the digital change in the building industry
- to have an overview of the entire life cycle of buildings in the project development, planning and construction process
- to use the current BIM-compliant software for object-related 3D modelling
- to create a digital 3D object documentation of an object
- to understand the multidisciplinary BIM approach with the IFC interface
- to identify the role of the surveyor in a BIM-based project and work in such projects
- to work cooperatively across interdisciplinary boundaries in a structured and self-reliant manner in group exercises and present the results together

Test Performance: Exam or portfolio review in accordance with Section 11 Para. 1

Requirements: none

Duration: 1 semester

is only offered in summer semesters

CC /0A = **Complementary courses, open for all, 4 - 6 ecp,**
forms of teaching: lecture/seminar/block course/exercise/workshop

CC_GerI0 = **German: 5 ecp/ lecture/seminar/exercise**

We do offer German courses on several different levels. As we do have only very few incomings that speak German, the A1-course is normally the course with the most participants.

CC_ERB2 = **Refresher course English B2: 5 ecp/ lecture/seminar/exercise**

Students will learn fundamental English vocabulary necessary for success in both their studies and later in professional life. They will improve their reading, writing and speaking skills in English and familiarize themselves with cultural aspects of the Anglo/American working world.

CC_BCB2 = **Business Creativity B2: 5 ecp/ lecture/seminar/exercise**

Overall Assignment – Create your own Business Idea – Leading points:

- a) WHAT? – product/ idea of concept
- b) WHERE? – distribution on market (regional, national, global)
- c) To WHOM? – target group
- d) HOW create awareness? – marketing strategy
- e) COSTS?! – pricing/ strategy – low-cost or high-cost strategy

Students should already possess a good command of the English language (B2). In this course students will get an insight into basic business fundamentals, such as Marketing, Branding, Company Structures, Target Groups, Pricing, and they have to make BUSINESS themselves. Due to small idea checks and presentations they have to come up with a business idea and answer the above mentioned questions. Teamwork is essential, because they will have to work in groups and turn their idea into reality. At the end they have to present their final idea and their product in front of a jury.

Learning Agreement - Architecture

The ECTS (European Credit Transfer System) is the foundation for your individual study program and workload.

30 – 32 ECTS credits (ecp) is the maximum workload you can opt in for. We will always try to place you in your desired courses, however, due to possible late failures (the lecturer is ill...), timetable overlaps, the initially selected subject does not meet your expectations, the course is overbooked or whatever reason you may think of, we cannot guarantee that every course is feasible during your stay.

If this is the case it will be a matter of exceptional changes after arrival.

Detailed briefings for the current subject topics and the timetable will only be released during the induction week, earliest two weeks before the semester starts.

Learning Agreement **EU students:**

If you are an Erasmus+ student, you are obliged to use a **digital learning agreement**. Please contact the coordinator of your home university and ask her or him, how to proceed. Within the scope of EWP (Erasmus Without Paper), the digital Learning Agreement is implemented in the workflow your home university uses.

Do not use the attachment!

Learning Agreement **NON-EU students:**

If you are from a Non-European university, please download the form ([LA_Non_EU](#)).

- Fill in table A with the courses you want to take at Hochschule Mainz (max 30 – 32 ecp)
- and fill table B, with the courses you want to have recognized after return.
- Sign it.
- Have it signed by your coordinator and upload it to Mobility Online (cc by email to kathrin.krechel@hs-mainz.de)