



Unite! VECP on Architecture Engineering

is a Virtual Exchange Credit Program (VECP) in [Unite! – the University Network for Innovation, Technology and Engineering](#). Students in Architecture and Civil engineering from Aalto-yliopisto and Technical University of Darmstadt can select one or more online courses offered by the other universities and gain credits.

- **Level:** Master of Science in Architecture/ Civil Engineering
- **Period:** starting autumn/winter 2022
- **Language of instruction:** English
- **Mode of Instruction:** Virtual

Topics: Architecture, Engineering, Digital Design and Construction, Sustainability, Advanced Manufacturing, Energy Efficiency, Parametric Design, Structural Design

Summary of Courses offered

When reading the course information below, please pay attention to the different academic calendars, day and hour of the course and the course requirements. If you have questions on whether the course fits your study plan, please contact your professors or an academic advisor at your home institution.

| University | Lecturer | Course Name | Credits | Time Frame | UNITE! Student Numbers |
|--------------------------------------------|-----------------------|-----------------------------|---------|---------------------------------------|------------------------|
| Technische Universität Darmstadt (Germany) | Oliver Tessmann (DDU) | Computational Design Basics | 5 | Winter Semester (October to February) | 7 Unite! students |
| | Ulrich Knaack (ISM+D) | Facade Technologies 1 | 6 | Winter Semester (October to February) | 5 Unite! students |
| Aalto University | Toni Kotnik | Parametric Design | 3 | Winter Semester (October to February) | 12 Unite! students |

Workload/ Prerequisites/ Course Literature: For the courses listed above please consult both the detailed course description and web link. Some courses have special prerequisites, please check the weblinks which provide information about literature required and further assessment guidelines and exams. Please contact the course professors if you require more information.

Application information

Students apply at the home institution until **June 28th 2022** for courses in autumn/winter 2022.

- [Application information for students from Aalto University](#)
- [Application information for students from TU Darmstadt](#)

The applications will be processed at the home institution and the students will be nominated to the host institution. You will receive information about the second application to be filled-in at the host institution after the nomination. After successful application at the host institution, you will be enrolled at the host institution. You will have to register for the selected courses before the semester starts.

Contacts for the Architecture Engineering Pilot

Aalto-yliopisto

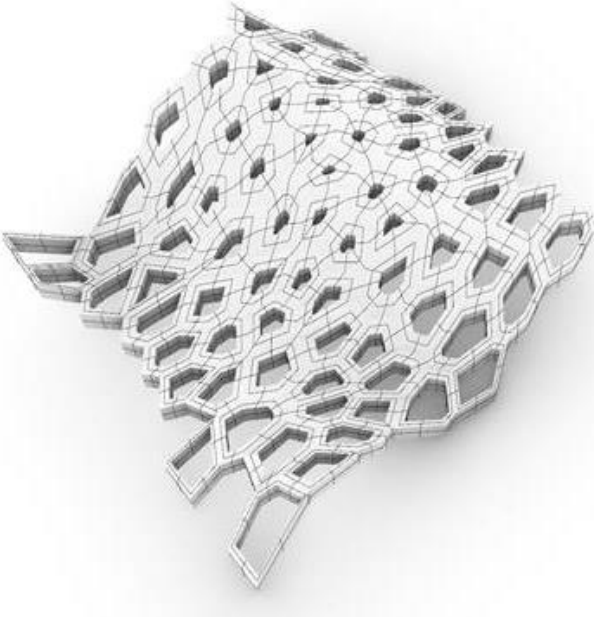
Vilma Jokinen, Unite! course coordinator, Aalto University vilma.1.jokinen@aalto.fi

TU Darmstadt

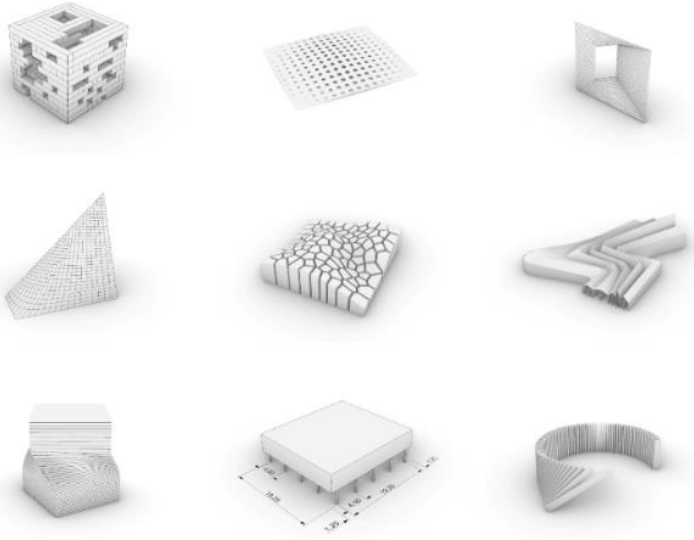
Marisa Könitz, Unite! VECP coordinator, unite-vecp@zv.tu-darmstadt.de

Architecture Valentina Visnjic Lang: visnjic@architektur.tu-darmstadt.de
 Civil Engineering: Dr. Regine Sauerwein: international@bauing.tu-darmstadt.de

Detailed List of Courses offered from 2022/2023

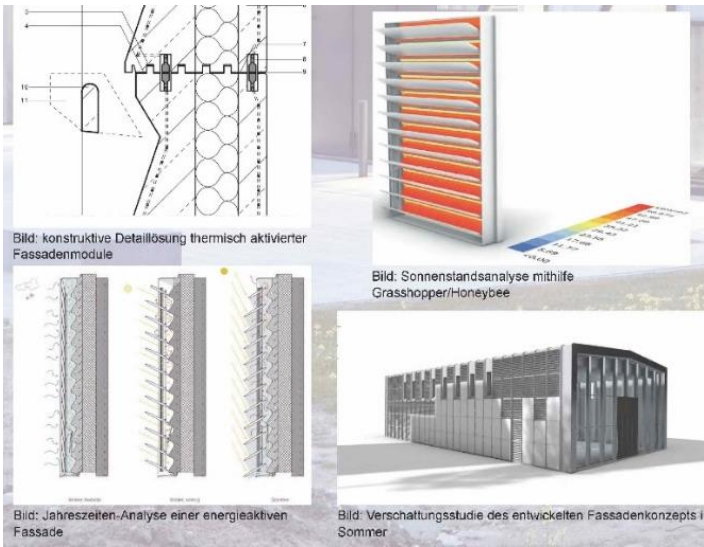
| Module: | Module Number | Credits | Effort | Self Study |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------|--------|------------|
| Parametric Design | ARK-E2515 | 3CP | 81 Hrs | 45 Hrs |
| <p>The course is an introduction into fundamental concepts of parametric design thinking in architecture and landscape architecture using Grasshopper (Rhinceros plug- in). The course covers basics of geometry of curves and surfaces, NURBS-geometry and mesh geometry as well as data handling. It is taught as intense one-week long workshop at the beginning of the summer teaching period. Basic knowledge of parametric design thinking, the transformation of concepts into geometric operations and the implementation of these operations in a graphic scripting editor.</p> <p>Requires: Knowledge of Rhinceros (basic knowledge NURBS curves surfaces).</p> | | | | |
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| Lecturer | Prof Dr Toni Kotnik |
| Course dates (TBC) | January -February / Period 3 (6 weeks) |
| Times (TBC) | 9.1. – 26.2.2023, TBC |
| Delivery Method | Moodle |
| Assessment/Exam | Assessment is based on the evaluation of the exercises and the final design exercise. Participants need to submit successfully two Homework Exercises provided during the course and apply the skills to a small design exercise at the end of the course. 15 h of input lecture 20 h of exercise work. Re-submission of Exercises possible in consultation with teacher. |
| Language | English |
| Contact and Weblink | toni.kotnik@aalto.fi |
| | https://oodi.aalto.fi/a/opintjakstied.jsp?html=1&kieli=6&Tunniste=ARK-E2515&Ajankohta=12-01-2021 |

| Module: Computational Design Basics | Module Number 15-01-0354/ 15-02-6466 (FM B) | Credits 5 CP | Effort 150 Hrs | Self Study 120 Hrs |
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| <p>The course introduces students to the tools and methods of computational design. Students will be introduced to 3d modeling techniques with Rhinoceros, parametric and algorithmic design with Grasshopper, and scripting with Python. The course is thought as an introduction to the different tools used in computational design, and it is beneficial particularly for students interested in continuing their research in the field of digital design and fabrication.</p> |  | | | |
| Lecturer | Prof. Dr.- Ing. Oliver Tessmann | | | |
| Course dates (TBC) | Mid. October to Mid. February | | | |
| Times (TBC) | Thursdays, 15.00-16.30 | | | |
| Delivery Method | Moodle | | | |
| Assessment/Exam | After introduction to all the tools, students will be asked to develop a personal project, applying the learned tools in one of these four areas: digital fabrication, discrete modelling, generative design, environmental modelling, followed by an exam. | | | |
| Language | English | | | |
| Contact and Weblink | tessmann@dg.tu-darmstadt.de https://www.dg.architektur.tu-darmstadt.de/fachgebiet_ddu/index.en.jsp | | | |

https://www.architektur.tu-darmstadt.de/media/architektur/2019_studieren/downloads/5/fb_15_allgemein/semesterbooklet/vergangenes_semester/Semesterbooklet_WS21-22_01.10.2021.pdf

New booklet will be online by September 26 2022

| Module: Façade Technologies 1 | Module Number 13-M4-M002 | Credits 6 CP | Effort 180 Hrs | Self Study 120Hrs |
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| <p>In view of the national and international climate targets, energy-efficient and energy-flexible facades play an increasingly important role. One current topic is "energy-active facades", which maximise the use of regenerative environmental heat for room air conditioning, while minimising the use of fossil fuels and complex heating and cooling technology. In addition to the lecture, a workshop will be held in which the students will develop a facade mockup which provides for thermal activation on both the outside and inside of the facade in order to absorb heat energy, store it temporarily and release it again at a suitable time. The design, construction and energy performance of the facade system are evaluated. As a tool for the design of the energy-active, inhomogeneous component in COVID-19 teaching, the participants use CAD program and a multiphysics tool for the analysis of heat storage capacity and transfer.</p> |  <p>Bild: konstruktive Detaillösung thermisch aktivierter Fassadenmodule</p> <p>Bild: Sonnenstandsanalyse mithilfe Grasshopper/Honeybee</p> <p>Bild: Jahreszeiten-Analyse einer energieaktiven Fassade</p> <p>Bild: Verschattungsstudie des entwickelten Fassadenkonzepts i Sommer</p> | | | |
| Lecturer | Prof. Dr.-Ing. Ulrich Knaack | | | |
| Course dates (TBC) | 1 st October to 18 th February | | | |
| Times (TBC) | Wed. 13:30 – 15:00 | | | |
| Delivery Method | Zoom and Direct Email | | | |
| Assessment/Exam | The exam consists of an oral presentation | | | |
| Language | English | | | |
| Contact and Weblink | knaack@ismd.tu-darmstadt.de | | | |

https://www.ismd.tu-darmstadt.de/studium_und_lehre_ismd/master_vorlesungen_ismd/fassadentechnik_i/fassadentechnik_i.en.jsp