

Research Projects with 12 ECTS in the Contextual Studies for the academic year 2024

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*Due to unpredictable events some contents may still
change at short notice.*

*We therefore ask you to always work with the current
version accessible via the homepage.*

What is Contextual Studies?

The master's degree programmes at Vorarlberg University of Applied Sciences (FHV) build on the following three essential elements:

1. Core studies:

The compulsory fundamental subjects in core studies establish the specialist academic skills and support your professional competences.

2. Specialisation studies:

In the chosen field of specialisation, you will enhance and specialise – depending on the degree programme – your professional access based on your interests and career goals.

3. Contextual Studies:

In a selection of more than 40 modules, you cross the boundaries between:

- Disciplines and schools of thought (interdisciplinarity),
- Cultures, languages and countries (internationality) and
- Current knowledge and the future (research and development).

Your degree programme takes you through all three basic elements. This process allows you to deepen and broaden your skills while letting you incorporate your personal interests in your programme of study.

Opportunities for research and development in Contextual Studies

You like to work independently and pursue open and challenging questions? Do you have curiosity? Would you like to experience what good research practice is like and what research work feels like in the run-up to your master's thesis?

Then a Research Project in Contextual Studies could be a unique opportunity for you.

With the willingness to do independent scientific work, you can follow your curiosity – coached by our experts – in our research institutions and acquire valuable know-how in a Research Project.

In the process, you will gain experience and skills that you can put to good use later on: in your master's thesis or perhaps even in a dissertation that you might consider later.

By choosing a Research Project from the Contextual Studies, you are contributing to the fulfilment of at least one of the 17 global Sustainable Development Goals (SDGs) adopted by the United Nations in accordance with the [2030 Agenda for Sustainable Development](#).

Organisational aspects

The Contextual Studies comprise 10% of your master's programme, i.e. 12 ECTS.

You can ...

... choose a one-year Research Project totalling 12 ECTS from the present offer OR

... [fill up these 12 ECTS with 3 or 6 ECTS modules here under "Further documents"](#).

In the 1st semester of your master's programme, you find out about [the electives offered in the Contextual Studies](#) and choose modules **totalling 12 ECTS**. In this way, you design your individual path through the Contextual Studies.

Please contact the lecturers, listed in each case, if you have any questions regarding content, or the [administration of the Contextual Studies](#) if you have organisational questions.

Like the modules with 3 or 6 ECTS, the Research Projects take place in the 2nd and 3rd semester.

For a Research Project, you complete 6 ECTS per semester, receive a grade in each semester and graduate after one year.

Language

In general, a good knowledge of English is required. The project language (German/English) depends on the topic of your project and will be agreed with your supervisor.

Time Windows

The working and contact times will be coordinated with you individually, taking into account the respective requirements of the research institutions.

In the **intensive training week from 14 to 17 October 2024**, you will present your **research status** to the house public or, in the social sciences, you will present your research status as a research team.

Your presence during the entire training week is indispensable for a lively discourse on all interim results of the 2024 Research Projects.

Criteria of choice and information transfer

In addition to your personal criteria for choosing a Research Project in the Contextual Studies, you can browse this offer according to interests and also study the descriptions of the courses offered on your A5 portal.

Filter our module offer according to your #interests

Open the search window of this document (press [Ctrl] + [F]) and filter by (subject) terms that are of interest to you or with # in the first place for the terms below.

#Creativity	#Organisation and Cooperation	#Communication
#Health	#Cultural Awareness	#New Technologies
#Innovation	#Interrelationships and Interaction	

Learn more about the individual Research Projects

You can find additional information on the Research Projects (teaching and assessment methods, learning outcomes, ...) in the course descriptions **on your A5 portal under "Course catalog"**. Select "Summer semester 2024" and "FAS-KON: Contextual Studies" as the "Study program".¹

Are you interested in a Research Project?

Then we invite you

on 16 October (from 10-12 h) and on 17 October 2023 (from 9 to 12 h) in room U3 30

to the presentation of the research status of the current six projects of the year 2023 from the research areas Social Sciences, Micro Engineering, Business Informatics and Digital Factory.

For details see [programme](#).

Access is open to the public on a space-available basis.

Do you have any questions?

Make an appointment with [Sabine Frick](#).

¹ The descriptions of the Research Projects for the winter semester 2024/25 generally correspond to those of the summer semester 2024. They will be available on the A5 portal from 16.2.24.

How to register for a Research Project

Send a letter of motivation (content: Who am I? Why am I interested in research in this field?) to the contact person(s) of the research project you are interested in.

The application deadline is from 15.09. to 15.10.2023.

After the **personal interview**, your interview partner will inform you whether your research project has been accepted or rejected.²

From 5 November 2023, you will find your enrolment in the Research Project under your other subjects on the A5 portal ("Grades").

With 12 ECTS, your Contextual Studies is complete.

How to withdraw from the Research Project

If it is necessary to withdraw from a chosen Research Project, inform the supervisor and the administration of the Contextual Studies as soon as possible via kontextstudium@fhv.at.

Remember that your Contextual Studies with 12 ECTS are part of your master's programme and a timely change to modules with 3 or 6 ECTS is required.

Eight Research Projects in Contextual Studies

A Research Project with a workload of 12 ECTS covers the entire Contextual Studies. You do not need to choose any other modules.

The 12 ECTS are distributed with 6 ECTS each over the summer and winter semester. Each semester is completed with a grade.

You can find out more about the research institutions of the FHV and their fields of activity at: [Research at the FHV](#).

You can find more information on the Research Projects of the Contextual Studies in the [FHV Inside](#).

² In case of a rejection, you will have the opportunity to choose between our 3 or 6 ECTS modules on your A5 portal **until Sunday, 29.10.2023**. You can find out how this works in the [FHV Inside](#) under the tab "Course selection".

Research Project: Micro Engineering

Size matters! – The miniaturisation of mechatronic, optical and biological systems is an industrial megatrend.

"There's plenty of room at the bottom" was the title of a lecture given by physicist Richard Feynman at the California Institute of Technology on December 29, 1959. In this presentation he gave numerous examples of how technology could function on a microscopic level. He concluded that because of the limitation of signal propagation by the speed of light, a computer should be as small as possible to enable high computing power. He suggested miniaturising computers so that the connection between switching elements, i.e. the "cables", should have a diameter of 10-100 atomic layers. He also recognised that essential mechanisms of biology, such as the development of mutations, can be directly observed by improved electron microscopes. In this presentation, Richard Feynmann announced two prizes of 1,000 US dollars each: for the first motor with a volume of less than $1/64$ inch³ that rotates and for reducing the size of the page of a book by a factor of 25,000 so that it can be read with an electron microscope. This was the birth of nanotechnology.

„As part of the Research Project: Micro Engineering you will conducting research at the limits of the possible in the scope of microtechnological sensors and actuators, photonic applications and dynamics to improve the world of tomorrow!“

In the Research Centre for Microtechnology we are engaged in Micro-/Nano-biosensors, as well as manufacturing processes for micro- and nanostructures, e.g. material processing with ultra-short pulsed lasers or modern lithography processes. In addition, we devote ourselves to the design of miniaturised integrated optical components for data transmission in modern optical networks or components for medical applications, as for example optical coherence tomography, as well as the numerical simulation of surface acoustic waves and their application in microfluidics.

With this module we offer you the opportunity to immerse yourself in a group of researchers and in the world "at the bottom" for part of your studies. In discussions and in constant exchange with our research team, you will familiarise yourself with a topic, acquire the necessary basic skills and develop your research question from a specific task. At the end of each of the two semesters, you will receive a grade for the "Research Project: Micro Engineering", which is equivalent to the grading of courses from your curriculum.

You can work on following topics:

1. Numerical simulation of surface acoustic waves and its application in microfluidic

Surface acoustic waves (SAW) are special waves that travel along the surface of a material. If properly designed, they allow the handling of microfluid droplets such as pumping, mixing, splitting, or jetting. Some SAW designs might even clean the surface. Many designs for generating an SAW exist.

Research tasks:

In this work different existing and new designs will be benchmarked in a numerical comparison using Comsol Multiphysics. This will help improving the efficiency of SAW devices and allowing for more functionality and accurate handling of droplets.

2. Passive optical components

In modern fiber optic networks, optical signals are used, instead of electrical signals, to transmit information. This is known as DWDM (Dense Wavelength Division Multiplexing). The advantage of this new technology is that different information channels (different wavelengths) can be used for data transmission. The more wavelengths you use, the more you can increase the transmission capacity of the networks.

The functionality of such an optical system is largely determined by passive optical components, such as optical multiplexers/demultiplexers, which are required to combine/split the different wavelengths. In addition to high-speed internet, passive optical components are also used for example in medical technology, where photonic chips are used in medical diagnostics.

Research tasks:

- a) If you enjoy programming, we offer you the opportunity to develop new innovative photonic tools. These will be then used in the design of such passive optical components.
- b) Do you enjoy creating new ideas? Your creativity is required when designing passive optical components.

3. Laser material processing with ultra-short pulse-lasers

Ultra-short pulse lasers are novel laser sources that emit pulses with a duration of only a few 100 femtoseconds. As a result, the energy input into the workpiece is much faster than the heat transport, so that brittle materials such as silicon or ceramics can be processed almost without thermal damage. This enables, for example, the production of novel actuators made of piezoceramics or the functionalisation of any material by structuring the surface.

Research tasks:

We can offer numerous current problems in the field of laser material processing and are always open to own topics. The work essentially consists of programming and searching for suitable parameters with our laser processing system, analysing the processed samples with a scanning electron, atomic force or Raman microscope and testing the functionality or comparing it with a model. If you like hands-on work and are interested in the latest production and analysis technologies, you are in exactly the right place with us.

4. (Bio)sensors

At the Research Centre for Microtechnology, for more than 10 years research has been conducted on the development, production, and characterisation of novel sensors. Current projects include the detection of blood clotting factors, pesticides, and the THC content of cannabis plants. The sensors manufactured at the Research Centre for Microtechnology convert the biological-chemical measurand into a measurable electrical or optical signal. By combining these sensors with appropriate microfluidics, a complete lab-on-a-chip is created.

Examples of possible tasks:

- a) Characterisation of the biosensors using electrochemical measurement methods
- b) Collaboration in the production of the biosensors
- c) Development, simulation, and production of microfluidic systems
- d) Development of an oxygen sensor for monitoring photosynthesis activity in algae or on a plant leaf

We offer you the freedom to take part in our research activities on your own responsibility and with the possibility of personal design. As a participant, we therefore expect you to have an interest in science and the ability to work and ask questions independently.

Please send your application with a written expression of interest to the e-mail address given in the Factbox. Your message to us contains your interests and your access to scientific research in short and free form. The selection is made based on this letter and a related selection interview.

A prerequisite for taking this course is the willingness to continue the "Research Project: Micro Engineering" started in the summer semester in the following winter semester. The aim is to complete the Research Project within the framework of a master's thesis.

<p>FACTBOX</p> <p>Contact</p> <p>Do you have any questions and want to know more about this Research Project?</p> <p>For more information, please contact:</p> <p>Dana Seyringer dana.seyringer@fhv.at</p> <p>I will gladly arrange an appointment with you or name suitable colleagues for your supervision.</p>	Module name	„Research Project: Micro Engineering“
	Interests	#Interrelationships and Interaction
	SDGs	Which of the 17 goals for sustainable development is particularly promoted depends on your choice of task.
	Time windows	Individually arranged appointments. Presentation during the intensive training week in October 2024 (14.-17.10.)
	ECTS points	12 (6 per semester)
	Max. no. of attendees	5
	Further characteristics e.g. trips, expenses, extra time outs, etc.	For possible visits to recommended events (e.g. conferences etc.), the travel expenses or participation fees are paid individually.
Application	Please send your written expression of interest (content: Who am I? Why am I interested in research in this field?) by 15 October 2023 to dana.seyringer@fhv.at . Students will be selected for the Research Project based on a personal interview.	

Research Project: Computer Science

How secure is my IT environment?

Do you use a variety of devices such as desktop PCs, tablets and smartphones? Are you confronted with various applications, apps and online tools on a daily basis, both at home and at work? Are you wondering how you can shape your private IT and your company's IT environment more securely? Do you think IT security should not only be used as a buzzword for dull meetings, but also should be actively implemented and standardised? Have you ever wondered how to create and perform risk assessment for IT security? If you answered one or more of these questions with Yes, this module is just right for you.

In this scientific and applied module „Research Project: Computer Science“ we look at IT security in the context of the human-technology-process.

Technology: You can implement one or more technological measures to achieve a defined security goal.

Human: You understand, that safety measures are only successful if the person in front of the machine is able to use them.

Process: You see information security management as an integrated process – both in private and enterprise environments.

Current innovative research topics, in particular Digital Transformation and the Internet of Things (IoT), offer companies, especially SMEs, opportunities to remain competitive and increase sales.

In 2014, the Chief Executive Officer John Chambers of the networking hardware supplier Cisco Systems famously stated that the Internet of Things (IoT) alone is a 19 trillion-dollar opportunity. Numerous initiatives, (research) projects and training programmes at international, European and regional level are currently dealing with Digital Transformation, i.e. the change from traditional business activities, processes and competences to fully or partially digitised models and organisational forms in which significant innovation can be achieved quickly and from a strategic perspective also in the long run. Digital Transformation is a motor for various processes in our modern society and ultimately aims at transforming traditional, rigid ways of thinking to strategically shape the future according to given goals with the help of ICT (Information and Communication Technology). Unfortunately, however, IT security is usually a topic that receives little to no attention.

Most of the technological tools for the Digital Transformation and IoT already exist. Cloud and Big Data are considered to be enablers for increased efficiency, sustainability and generally increased profits. Standards and key technologies for smart devices and network technologies contribute to the real-time networking of people, machines and companies. Artificial intelligence helps predicting anomalies in production and conserve resources. Self-control initiatives improve efficiency in the workplace as well as intelligent production methods. All these technologies are already a reality and are advanced constantly by both SMEs and mayor companies.

This creates challenges for IT security. In particular, researchers and companies must develop data models that allow secure data exchange across company borders while at the same time ensuring the privacy of companies and private individuals.

Especially sensor data from IoT, as well as data from smart business processes generated due to the Digital Transformation are of specific interest. However, it is not always easy to decide which information can be shared with whom, how and under what circumstances. Wherever data exchange is automated, decision-making is even more difficult.

In this module, you select one or more of the following IT security topics based on which you then develop interesting research questions (in cooperation with our coaches of the research centre):

1. IT security in Industry 4.0 environments
2. Industrial Internet of Things (IIoT) and security
3. Data anonymisation, especially for Big Data applications
4. Trusted Computing (e.g. TPM or trust zones)
5. Methods and technologies for attack detection, monitoring and incident response: SIEM, SOAR, IDS or comparable
6. Simulation of cyber attacks: Cyber Range, simulation games
7. Blockchain and innovative applications
8. Cryptology protocols for e-mail communication and instant messaging
9. Secure data models
10. Automated, cryptologically secured, actor-based data exchange
11. Structures of secure (ad hoc) networks for IoT
12. Methods for assessing the Technology Readiness Level (TRL)
13. Secure IT methodologies for SMEs
14. Information Security Management Systems
15. BSI Basic Security
16. Security management with ISO 2700x

The Research Project deals with current crosscutting topics of computer science (encryption, data models, privacy, IoT, SCADA, IT networks) and business management (TLR, support of SMEs, risk assessment, reliability & resilience).

FACTBOX

Contact

Do you have any questions and want to know more about this Research Project?

Please contact us for further information:

Armin Simma

armin.simma@fhv.at

oder

Martin Dobler

martin.dobler@fhv.at

Module name

„Research Project: Computer Science“

Interests

#New Technologies

#Interrelationships and Interaction

SDG



Resilient infrastructure

Time windows

Individually arranged appointments.

Presentation during the intensive training week in October 2024 (14.-17.10.)

ECTS points

12 (6 per semester)

Max. no. of attendees

2

Further characteristics

e.g. trips, expenses, extra time outs, etc.

For possible visits to recommended events (e.g. conferences etc.), the travel expenses or participation fees are paid individually.

Application

Please send your written expression of interest (content: Who am I? Why am I interested in research in this field?) **by 15 October 2023** to armin.simma@fhv.at or martin.dobler@fhv.at.

Students will be selected for the Research Project based on a personal interview.

Research Project: Business Informatics

Self-control and Digital Transformation in production and logistics environments: A paradigm shift for tomorrow's industry

Numerous initiatives, (research) projects and courses at international, EU and regional level are currently dealing with the so-called Digital Transformation, i.e., the change from traditional business activities, processes, and competences to fully or partially digitised models and forms of organisation where significant innovations can be achieved in the short term and from a strategic perspective also in the longer term. Digital Transformation is an engine for various processes in society – including industry – and ultimately aims to move away from traditional, rigid ways of thinking to strategically shape the future according to given goals with the help of ICT (information and communication technologies).

The module "Research Project: Business Informatics" gives you an insight into (applied) research. This Research Project offers two topics: Self-Control in industry and Artificial Intelligence / Machine Learning. In Self-Control in industry the ongoing Research Projects in the Research Centre Business Informatics JIDEP and Data Sharing Framework for SMEs are considered, and you can take an in-depth look at the completed Research Projects iCargo and 4STEPS. In the area of Artificial Intelligence, topics from the ongoing projects Josef Ressel Center for Robust Decisions and Evolutionary Global Optimisation, as well as findings from completed projects (such as BayAut DataKMU) are considered.

The Research Project deals with Digital Transformation topics, such as automated data exchange between company partners, intelligent ICT-based production methods, Internet of Things (IoT) or ICT-based optimisation of workplaces (VR, RFID, intelligent schedules etc.). Within the area of AI/ML, the question is how these applications can be realised or supported by Neuronal Nets and how new innovations can be generated in this way. In addition, methods and current research focuses of the self-control of production and logistics processes are considered. Self-Control requires the real objects (trucks, containers, material) to have information about their state and must be able to derive decision for the subsequent steps with the process. The embedding of such self-control processes in Enterprise Resource Planning systems (ERP), such as SAP or the open-source alternative Odoo, round off the Research Project.

The digital twin of a product, often also called a 'product avatar', is used as a superordinate research approach as the basis for modelling machine and product data models. Based on these models, approaches from the areas of Supervised Learning or Reinforcement Learning are used to derive decisions. Of particular interest is the explainability of the decision to end users.

The Research Project deals in both areas with current cross-cutting topics from production (from unique production to intelligent equipping of machines), logistics (digital logistics marketplaces, logistics services and multimodal transport chains), ICT (IoT, VR, ERP, Big Data, data modelling), business process modelling (integration in ERP systems, handling real-time data) and business models (servitisation).

This course is an introduction to (applied) research and an ideal starting point for continuing your investigations in a demanding master's thesis. If you are also interested in a further dissertation at a university later on, this research year can already be a valuable preliminary work for your path.

The given topic is didactically prepared and taught in two parts.

As a first step, the lecturers will address key topics and research results and convey them in impulse lectures. Subsequently, the topic is prepared in a workshop and the underlying research questions and economic intentions are worked out together. The aim is to understand the thematic motives of the Research Project and to be able to independently understand and evaluate targeted applied research, especially from a business and innovation-driven perspective.

In a second step, you as a student are encouraged to work independently in certain areas. The sub-areas result from the research questions worked out in the first step. The independent development takes place in close consultation with the coaches. If necessary, the development can also take place in the Research Centre Business Informatics (BI). The aim is to teach you about everyday research (acting, testing, failure etc.) and at the same time to allow an in-depth study of the research topic.


Finally, the research topic will be presented within the course and other Research Projects of the Contextual Studies.

In the context of this Research Project, there is also the possibility to aim for a scientific publication (conference or journal) in cooperation with the BI.

Another special feature is the close contact of the research centre with research and industrial partners. As part of the BI projects, you can contact research partners and business at events.

In this Research Project, you are a research partner who we take seriously. For us, this means that we will support you as best we can in all crucial points. At the same time, you should bring along some helpful preferences in your own interest: The curiosity to pursue research questions with scientific methods; an independent way of working, especially in the formulation of relevant research questions; an active exchange with those people who support you in your work and active participation in the elaboration of the content. If you choose the topic of artificial intelligence, basic programming skills are required.

The prerequisite for participation is an application to the coaches of the Research Project in advance and an accompanying discussion before the start of the course to be able to define possible topics and interests.

<h2>FACTBOX</h2>	Module name	„Research Project: Business Informatics“
	Interests	#New Technologies #Organisation and Cooperation
Contact Do you have any questions and want to know more about this Research Project? Please contact us for further information: Jens Schumacher jens.schumacher@fhv.at Martin Dobler martin.dobler@fhv.at Steffen Finck steffen.finck@fhv.at .	Time windows	Individually arranged appointments. Presentation during the intensive training week in October 2024 (14.-17.10.)
	ECTS points	12 (6 per semester)
	Max. no. of attendees	4
	Further characteristics e.g. trips, expenses, extra time outs, etc.	For possible visits to recommended events (e.g. conferences etc.), the travel expenses or participation fees are paid individually.
SDG  Sustainable industrialisation	Application	Please send your written expression of interest (content: Who am I? Why am I interested in research in this field?) by 15 October 2023 to jens.schumacher@fhv.at , martin.dobler@fhv.at and steffen.finck@fhv.at . Students will be selected for the Research Project based on a personal interview.

Research Project: Digital Factory

Research: What will digitally networked production systems look like in the future?

Have you always wanted to know what is really behind the buzzword Industry 4.0? Did you know that more and more companies are developing a digital strategy but often lack the necessary internal know-how? Have you heard the buzzword "big data" and would you like to know how you can add value to it? Do you also find it surprising that most companies grossly underestimate the effort required for digitisation? Do you want to acquire knowledge and skills to develop and implement processes, systems and procedures for the digital age? Do you want to use self-learning algorithms and artificial intelligence to improve industrial systems? Do you want to experience how a digital factory works and contribute to its further development? Or would you like to expand your knowledge in the use of collaborative robots?

In the module "Research Project: Digital Factory" you are integrated into the team of the research area "Production of the Future". You can pursue these or similar questions independently on the basis of current tasks and are accompanied by our specialists

The Digital Factory at the FHV is a Research Project that can depict the process of digitally networked and digitally controlled goods production. It includes real size parts of a real factory as well as miniature and simulation models. The model factory represents a continuously digitised value-added chain, from the web shop and product configurator, through modular and automated design, the control and monitoring of production plants and material flow, quality assurance, incoming and outgoing goods, right up to customer support and service of the product until the end of the product life cycle. As example scenarios exemplary products are manufactured, which consider above all aspects of the local industry. Production is mainly based on mechanical processing, the production and integration of electrical and electronic components, as well as manual or robot-assisted assembly processes.

The Digital Factory is part of the Collaborative Research Center Production of the Future, which is currently under construction and deals with the diverse aspects of digital networking in industry (Industry 4.0). The focus is not on the development of the actual production processes themselves, but on the digital networking of existing systems, optimisation using data analysis and the integration of new "digital" technologies (e.g. 3D printing, collaborative manufacturing) and business models. Research and development topics range from mapping digital production processes in the form of demonstrators (automation technology) or simulations, data analysis based on specific problems from industry (data science) to product and variant development optimised for digital production, or the development of a cloud layer for the digital merger of smaller companies into a large virtual factory.

Due to the interdisciplinary character of the work and subject areas of the Digital Factory, we can offer a wide range of tasks and adapt them to your individual interests within the scope of the possibilities. We therefore look forward to receiving applications from a wide variety of fields of study (computer science, mechatronics, mechanical engineering, electrical engineering, WING, business administration and InterMedia/design).

Current topics cover the following areas:

- Data acquisition and analysis in the digital factory (SCADA layer)
- Production control systems in the digital factory (MES layer)
- Cloud-based manufacturing (cloud layer)
- Digital Twin
- Predictive maintenance
- Application of self-learning methods and artificial intelligence (AI) to solve industrial tasks
- Optimisation of production processes using data analysis (Prescriptive Analytics)
- Modular product development and design for digital production
- Development of and investigations on simulation models (production, economic processes, business models, logistics)
- Development of a demonstrator for a digital factory
- Collaborative robotics, physical human-machine interaction
- Cyber security, cyber range, intrusion detection and pentesting

Tasks are continuously adapted to the current research topics and are also oriented to the current cooperations with companies and academic partners.

If you are interested in deepening your knowledge of one or more aspects of the Digital Factory in a self-reliant manner and in working with a young, motivated team on the development of the Digital Factory of FH Vorarlberg, we look forward to a personal discussion in which we will gladly exchange further information and discuss further details of the Research Project.

FACTBOX	Module name	„Research Project: Digital Factory“
	Contact	
	Do you have any questions and want to know more about this Research Project?	
	Please contact us for further information:	
	Robert Merz robert.merz@fhv.at	
	Ralph Hoch ralph.hoch@fhv.at	
	Interests	#New Technologies #Interrelationships and Interaction
	SDGs	Which of the 17 goals for sustainable development is particularly promoted depends on your choice of task
	Time windows	Individually arranged appointments. Presentation during the intensive training week in October 2024 (14.-17.10.)
	ECTS points	12 (6 per Semester)
Max. no. of attendees	4	
Further characteristics e.g. trips, expenses, extra time outs, etc.	For possible visits to recommended events (e.g. conferences etc.), the travel expenses or participation fees are paid individually.	
Application	Please send your written expression of interest (content: Who am I? Why am I interested in research in this field?) by 15 October 2023 to robert.merz@fhv.at and ralph.hoch@fhv.at . Students will be selected for the Research Project based on a personal interview.	

Research Project: Human-Centred Technologies

Would you like to find out during your master's degree which ideas are successful in improving people's quality of life? Maybe even with ideas that you contribute yourself?

Technologies have always played a central role in business, engineering, social work, health and design. In the broadest sense, technologies are all resources that a person uses to achieve his or her goals. Social innovations are a prerequisite, a concomitant or a consequence. In any case, in this research project you put people and their needs at the centre.

In the module "Research Project: Human-Centred Technologies" you explore innovative technologies for people in different areas of life (e.g. work, education, leisure) with the aim of having a positive impact on health, knowledge transfer and the environment.

Together we will develop a research question from the following research areas that matches your interests and skills. In the first semester, you can design concepts and/or prototype solutions with our support - and maybe even develop your own idea further. In the second semester, we will plan with you which pilot study you will conduct in order to answer your research question. In this way, you will not only gain valuable experience in the exchange with other applied research projects, but also make a scientific contribution to the following research areas:

1. Technologies for health and well-being

Health and well-being are critical determinants of quality of life and are relevant in leisure, work and health care. Technologies are used to achieve impacts for better and more equitable health. They are used in a demand-driven way to build awareness, promote personal responsibility and behaviour change, and improve living conditions. They support individuals, families, organisations and communities and relieve heavily burdened health systems. Through optimisation of technology on the one hand and empowerment on the other, sustainable approaches to care can be created.

In the project from this topic area, you will research technical possibilities with the help of which administrative processes can be optimised, diagnostic and therapeutic possibilities improved, diagnostics facilitated, therapy and care supported and preventive measures accompanied and used in a more targeted manner. With innovative ideas, you will support different actors within and outside the health system in promoting, maintaining and restoring health and well-being. The aim is to transfer promising technologies into selected areas of health care and to adapt these solutions on the basis of needs. You will be able to evaluate their effectiveness through continuous monitoring and assess the technology impact in advance.

Since important factors influencing people's health also lie outside the traditional health care system, such as in the workplace, in educational institutions and at home, you can address with the research project all people who directly use these technologies (such as patients, employees, relatives or carers), but also those who want to provide technologies, promote their use and enable their use.

Contact:

katrin.paldan@fhv.at (Health scientist)

alison.themessi-huber@fhv.at (Nursing scientist)

walter.ritter@fhv.at (Computer scientist)

2. Technology-enhanced learning experiences

Positive learning experiences are important for individual approaches to learning and motivation to learn. Learning technologies are much more than just the implementation of learning/teaching concepts aimed at quick learning success. For many, past school and education histories are associated with negative experiences such as test anxiety and pressure to perform, which they do not want to expose themselves again. This is why they are sceptical about educational offers from the very beginning. Older learners doubt their learning competence and do not trust themselves to learn new things, especially if this is to be done through new, modern media technologies.

In the project from this topic area, you can make the benefits of education visible and tangible. With new possibilities in the processing of digital data (e.g. artificial intelligence), you will be able to support people in school, companies (vocational training), medical or also community-social education scenarios (life-long learning) during every phase of life. You can develop technology-supported solutions to increase learning motivation and success. By combining didactic approaches (such as gamification, serious games, collaboration, smart objects) with technologies (such as mobile applications, virtual and augmented reality, bio-feedback), you will be able to create memorable learning experiences. Your research approach may include AI-enhanced learning environments, novel visualisation and interaction capabilities in virtual and augmented reality, digital collaborative learning scenarios such as MOOCs and cooperative multimodal learning systems. You can also explore situational sensory data collection, virtual tutors, cognitive optimisation of learning experiences and immersive or game-based learning environments.

Contact:

guido.kempter@fhv.at (Psychologist)

andreas.kuenz@fhv.at (Media designer)

patrick.jost@fhv.at (Computer scientist)

FACTBOX

Contact

Do you have any questions and want to know more about this Research Project?

Please contact me for further information:

Guido Kempter
guido.kempter@fhv.at .

Module name	„Research Project: Human-Centred Technologies“
Interests	#Health #Communication #New Technologies #Innovation
SDGs	
	Human health
	Lifelong learning
	Climate protection
Time windows	Individually arranged appointments. Presentation during the intensive training week in October 2024 (14.-17.10.)
ECTS points	12 (6 per semester)
Max. no. of attendees	6
Further characteristics e.g. trips, expenses, extra time outs, etc.	Costs incurred in the course of jointly defined projects are covered by the research centre "Human-Centred Technologies".
Application	Please send your written expression of interest (content: Who am I? Why am I interested in research in this field?) by 15 October 2023 to the contact person corresponding to your desired topic. Students will be selected for the Research Project based on a personal interview.

Research Project: Energy Technology

Research: EnergyTechnology@FHV – The technical implementation of Energy Autonomy 2050

Solar energy instead of coal power plants. Heat pump instead of oil heating. Electric cars instead of combustion engines. In the media hype surrounding the energy transition, don't you wonder how we intend to realise all this technically, how much it will cost us and how the many ideas can be implemented in practice? Then the Energy Research Centre is the right place for you. We are looking at the technical implementation of energy autonomy in 2050 and want to provide important impetus for Vorarlberg, but also for other regions worldwide.

In the module "Research Project: Energy Technology" you can tackle problems independently, find solutions and thus actively participate in the Energy Autonomy Vorarlberg 2050.

Will there be one process with which we will supply more than 420,000 people in Vorarlberg and ten billion people worldwide with energy in 2050? We at the Energy Research Center do not think so. Therefore, we are not looking for a single big solution, but try to identify, implement and optimise suitable solutions for different applications and conditions. We are convinced that only the use and interaction of different technologies will give us a realistic chance of meeting the challenges of future energy supply. We are currently working on the following questions, among others:

1. What role will thermal energy play in the increasingly digital energy world?
2. Can we store excess energy in physicochemical structures and thus compensate for energy bottlenecks in renewable energies?
3. How do we have to build the electricity grid of the future and how must the producers and consumers in it behave so that the light does not suddenly go out?
4. Which energy sources will we use in the future and which new energy systems will exist?

If you want to help to shape the energy autonomy in 2050 and are interested in energy-related issues in these areas, then you've come to the right place. We give less importance to your master's discipline than to your specific interest in energy technology, independent work, creativity in solving problems and the will to learn new things. With this module you can actively research and make a difference during your master's degree.

We offer you a motivated and dynamic team, interesting insights into current Research Projects and the opportunity to acquire your own energy technology methods and knowledge.

We would be happy to work with you to define a suitable topic with a focus that matches your interests and skills. We are open to all master's programmes, as complex energy technology issues can only be solved on an interdisciplinary basis.

Therefore, we do not only address the technical, but all master's disciplines, as we always have problems for non-technical disciplines, e.g.:

1. **InterMedia MA:** How can we visualise 2D images of individual layers of an energy storage system as a 3D structure and thus optimise the properties of an energy store?
2. **Business MA:** Which screws do we have to adjust such that we can store CO₂ of industrial flue gas economically in ice structures?
3. **Computer Science MA:** What must an algorithm look like that turns on intelligent consumers, such as the washing machine, at the right time and thus stabilises the power grid?

Are you interested in the module "Research Project: Energy Technology"? Then please send a curriculum vitae and a short letter of motivation to the head of the Energy Research Centre, Markus Preißinger. Convince us in your letter of motivation that you are interested in energy technology issues, that you are motivated to support us in research and that you are the student we are looking for!

The selection is based on this letter and a subsequent selection interview.

Prerequisite for this course is the willingness to continue the "Research Project: Energy Technology", which started in the summer semester, in the following winter semester. The aim is to complete the Research Project as part of a master's thesis.

<h2>FACTBOX</h2>	Module name	„Research Project: Energy Technology“
	Interests	#New Technologies #Interrelationships and Interaction
Contact Do you have any questions and want to know more about this Research Project? Please contact me for further information: Markus Preißinger markus.preissinger@fhv.at .	SDG	 Reliable, affordable, sustainable and contemporary energy
	Time windows	Individually arranged appointments. Presentation during the intensive training week in October 2024 (14.-17.10.)
	ECTS points	12 (6 per semester)
	Max. no. of attendees	6
	Further characteristics e.g. trips, expenses, extra time outs, etc.	For possible visits to recommended events (e.g. conferences etc.), the travel expenses or participation fees are paid individually.
	Application	Send a short letter of motivation with a CV by 15 October 2023 to: markus.preissinger@fhv.at Students will be selected for the Research Project based on a personal interview.

Research Project: Gaming Simulation

To shape our future, we are constantly making decisions and taking action. In management and in politics. Nevertheless, after these interventions we are always surprised that their outcome does not meet our expectations. We experience – and often only with a time lag – unexpected twists and crises. Where does this come from? Are the "classical method cases" that management and politics fall back on for their decisions not sufficient?

Today we understand the symptoms and causes of these difficulties better from the perspective of psychological problem-solving research (cf. "Logic of Failure" by Dietrich Dörner). They lie in people's insufficient understanding of how to deal with complex systems. They lie in ignoring the interconnectedness of a system with all its interactions and its capacity for self-organisation.

In the „Research Project: Gaming Simulation“, selected students can deepen their knowledge of this problem in a Research Project by pursuing their own questions and interests in independent work. Ideally, the knowledge gained in the process will flow into a demanding master's thesis in the following semester.

In this one-year Research Project, which already covers the entire Contextual Studies for you, you will acquire all the competences of the modules "Systems Thinking" and "Gaming Simulation, Serious Play, Gamification", which are also included in the module offer. In addition, you will deepen your knowledge by researching your own interests and questions. You will be accompanied by your supervisor Willy Kriz. He will support and coach you, give you tips and be available for your specific questions and for discussions.

Ideally, your work will not only result in a paper, but also in an excellent and well-prepared starting point for your master's thesis, which Willy Kriz can also supervise.

Since the questions aim at the system-competent design of living environments, the "Research Project: Gaming Simulation" results in a broad and interdisciplinary perspective for the development of solutions that are both efficient and humane, and at the same time can be guided by a wide variety of sustainability goals.

The following examples of application areas are only a possible selection and do not claim to be exhaustive:

For example, you can use the research method "Gaming Simulation" (in the tradition of "Analytical Science") to investigate specific topics and theories from your own field in experiments and test corresponding hypotheses. In this way, you gain new insights via these simulation games that expand your subject-specific theory and knowledge building from your core studies.


You can also consider "serious games" as learning games for use in educational and training contexts. In doing so, you support the learning processes of participants by simulating and changing complex system processes (e.g. in organisations). In this case, you will deal with counselling and analysis methods that are used to evaluate options and to develop goals and strategies for organisations. They also include action planning and interventions for changes and improvements in work processes. It also includes learning games used to improve creativity, motivation, performance, attention and retention of employees and customers.

Another possibility is to examine the effectiveness of the tools used – namely learning and simulation games – in the sense of "design science". In doing so, you move into the field of formative and summative evaluation research by investigating these games and their effect (e.g. in education and training programmes) on learning and the acquisition of competences (if necessary, in comparison with alternative methods).

Another application is the possibility of researching the effect of "serious games" and "simulation games" in relation to real decisions in groups and organisations and observing what changes they trigger. Such a research question makes statements about practice-oriented intervention methods and provides insights into their effect in concrete application.

Finally, it would also be possible, for example, to focus on simulation games or related methods themselves (in their capacity as media). In researching the underlying design principles and effect mechanisms in each case, you contribute to improving the understanding of media designs of games. What you gain from this are practice-oriented insights into the design and usability of games as a medium of intervention.

If you feel like and are interested in dealing with these contents and questions outside of your own Research Project, please take a look at the info texts of the content-related modules "**Error! Reference source not found.**" and "**Error! Reference source not found.**" in the [offer 2024 – modules with 3 or 6 ECTS](#).

<p>FACTBOX</p> <p>Contact</p> <p>Do you have any questions and want to know more about this Research Project?</p> <p>Please contact me for further information:</p> <p>Willy Kriz willy.kriz@fhv.at</p> <p>SDG</p>  <p>Application</p> <p>Please send your written expression of interest (content: Who am I? Why am I interested in research in this field?) by 15 October 2023 to willy.kriz@fhv.at.</p> <p>Students will be selected for the Research Project based on a personal interview.</p>	<p>Module name „Research Project: Gaming Simulation“</p> <p>Interests</p> <p>#Communication</p> <p>#Interrelationships and Interaction</p> <p>#Innovation</p> <p>Time windows Summer semester 2024</p> <p>22 February to 18 April on Thursdays from 6 p.m. AND Intensive training week (Blockwoche) from 10.06. to 13.06.</p> <p>AND</p> <p>Winter semester 2024/2025</p> <p>Intensive training week from 14.10.-17.10. (during this intensive training week in October also short presentation of your research topic) AND Intensive training week from 16.12. to 19.12.</p> <p>ECTS points 12 (6 per semester)</p> <p>Max. no. of attendees 3</p> <p>Further characteristics e.g. trips, expenses, extra time outs, etc.</p> <p>The time windows listed above only include the attendance times of the courses „Systems Thinking“ (6 ECTS) in summer semester 23 and „Gaming Simulation, Serious Play, Gamification“ (6 ECTS) in winter semester 23/24.</p> <p>Against this theoretical background, you will pursue your own research topic and open up for a possible master’s thesis.</p>
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Research Project: Social Sciences

On the trace of social phenomena:

What moves people – what are people moving?

What moves you – what do you move?

Who acts how and for what reasons? Who pursues which goals? Which parts of the population have which needs and how are people doing? What circumstances influence human thinking and behavior? What are the consequences for whom? Who are winners, who are losers of social developments? What social tasks are we facing today and in the near future? Who can contribute to maintaining and improving our coexistence and the general quality of life by what means? ...

The Research Group Empirical Social Sciences pursues similar questions by means of empirical social research. We carry out exciting studies on specific topics and target groups on social issues and cooperate with (not only in Vorarlberg) organisations and institutions.

In the module "Research Project: Social Sciences" you can support us and expand your experience in empirical social research. You will work under supervision on a social science Research Project.

"Nothing in its place will stand forever," says Seneca, the Roman philosopher of the first century. Seneca means that things change permanently, even if it seems to take longer. A look in the daily reveals that we can agree with Seneca now more than ever: The global climate is changing massively. On the one hand, birth rates are falling steadily in Europe, and on the other hand we are living longer on average than before. The computer chip not only changes the world of work, but also the way we spend our free time and the products we use. Work cycles are gaining speed, food is becoming cheaper and people around the world are becoming overweight. Jobs are shifting to low-wage countries. People are fleeing (also) to Europe. Public health expenditure is growing. Traditional family systems are changing. Companies and organisations are increasingly looking for specialists of almost all kinds. Church exits are increasing. Lifelong learning is becoming increasingly necessary, not only for academics, in order to be able to keep up professionally throughout their professional life. ... The list of important social developments could be continued.

But it is not only considerable social changes that are the subject of empirical social research. In daily work and private life, a variety of social questions arise on a "medium level of abstraction", often as a consequence. Here are a few examples: How effective is a new training measure for people looking for work? How can young people be encouraged to treat alcohol moderately? How has volunteering developed over the years? How do people want to live in old age – how do they live today? How do clients rate our aid organisation (or our company's customers)? For what reasons do people donate time and money for others – and for what reasons do they not? What can companies do to attract and retain more skilled workers? How can the quality of life of a region be measured and how is it developing? ...

Such questions convey Seneca's knowledge of social change. This applies equally to individuals, social communities, organisations and societies. At the lowest level, minor or major changes present us with new, often crisis-prone challenges. These can be critical life events such as loss of job, separation, death of a close person, witnessing an accident or a natural disaster, experiences of war, the transition to retirement, a serious illness and much more.

At the level of larger sections of the population, for example, a decreasing purchasing power and increasing poverty of so-called "working poor", decreasing physical mobility of older people, loss of social relationships as men or the decline in scientific and mathematical skills not only among Vorarlberg's pupils – to mention just a few current social phenomena.

Organisations also change and thus cause partly intentional and partly unintentional effects on the people working in them and in the social environment, such as mergers, reorganisations or product adaptations. Ultimately, internal and external influences promote social change at the level of societies, for example in the course of legislation or national and international political developments.

The causes and consequences of social phenomena are now assessed differently depending on the point of view. When people judge "from the gut" – i.e. on the basis of personal preferences, experiences, emotions or on the basis of inadequate or distorted data basis – they reach a maximum table reserved for regulars. For they thus represent a subjectively coloured point of view as "true". However, if people proceed analytically and systematically, i.e. collect facts according to valid scientific procedures (but not fake news) or independently research phenomena according to recognised methods and compare findings with others, they are at least a good step closer to "truth". Empirical social research makes an important contribution to this. We from the Research Group Empirical Social Sciences are dedicated to this discipline. We come from a variety of humanities disciplines: Social work, sociology, psychology, education, history and communication sciences.

Using empirical social research, we investigate, describe and evaluate social phenomena on the basis of recognised social science principles and methods. We collect and analyse qualitative and quantitative data that say something about people. For example, we sift through documents, conduct interviews, create surveys, observe human behavior or lead focus groups. From the systematically collected data we derive findings and recommendations on how to deal with the effects of social phenomena. This cannot be regarded as good or bad from the outset, because it always depends on the context in which empirical social research puts its results. The same data can lead to conflicting evaluations. For example, a study on the lives of heroin addicts living on the street could call for the target group to be given the drug under medical supervision in order to decriminalise them. However, it could also be deduced from the same study that more social workers should be hired so that they can introduce addicts to weaning therapies.

Which consequences are derived from the results of empirical social research is therefore always a question of value, despite valid data material. And this is always normative, i.e. cannot be read from empirical data, but is otherwise justified. The scientific community is aware of this and social researchers should be aware of it. This dilemma is also the subject of expert discussions (for example in the discourse on the limits of externally funded contract research). So empirical social research seems to be something of a hammer: We can use it to drive a nail into the wall to hang a picture. But we can also bash someone's head in with a hammer. However, this does not speak against conducting research at all, but rather in favour of conducting ethically sound and methodologically professional research, standing up for one's own results, deriving proposals for action from them and exposing one's own research to discourse.

Let us be clear: based on scientific ethics and methodology, empirical social research offers the opportunity to get to the bottom of diverse social circumstances. Social researchers do not act in a value-neutral but highly professional manner (which includes being aware of their own values and not manipulating social research). With their research they contribute to understanding and describing social change and to shaping it to some extent constructively.

Anyone who finds this interesting and significant should apply for the "Research Project: Social Sciences".



FACTBOX

Contact

Do you have any questions and want to know more about this Research Project?

Please contact me for further information:

Erika Geser-Engleitner
erika.geser-engleitner@fhv.at.

Module name	„Research Project: Social Sciences“
Interests	#Cultural Awareness #Interrelationships and Interaction
SDGs	 Human well-being  Peaceable societies
Time windows	Individually arranged appointments. In the lecture-free period, at the beginning of July, a one-week research camp takes place abroad. Presentation during the intensive training week in October 2024 (14.-17.10.).
ECTS points	12 (6 per semester)
Max. no. of attendees	6
Further characteristics e.g. trips, expenses, extra time outs, etc.	Required: Communicative and social competence, independent working and learning, basic knowledge in statistics, a human-oriented value base. Preferable: Fun with tinkering and discovering. The survey phase takes place in the form of a research camp abroad. The travel and accommodation costs incurred vary depending on where you are staying. They are in the range of approx. 1,000 EUR and are to be borne by the students.
Application	Please send your written expression of interest (content: Who am I? Why am I interested in research in this field?) by 15 October 2023 to erika.geser-engleitner@fhv.at . Students will be selected for the Research Project based on a personal interview.