





EDUIDT SUBJECTS

DESCRIPTION, WAY OF TEACHING AND APPLICATION OF IDT

MODELLING AND SIMULATION	LEVEL: BACHELOR
<p>Students learn theoretical knowledge from the field of modelling and simulation and gain practical skills. During lab works, students deal with practical aspects of design, creation and experimentation with static and dynamic models. Utilising selected simulation tools students create models of various (mostly service) systems, conduct experiments and analyse the outcomes. There is an assignment prepared for each lab work. Seven assignments are focused on development of a museum simulation model. We start with modelling and simulation of simple customer activities (arrival, departure, delay, service, waiting in a queue) and continue with more and more advanced activities (decisions, batching, failures, lunch breaks). The museum simulation model development includes labs focused on input data analysis, output data analysis and experiment evaluation. Students work in small teams on their semester project additionally.</p>	
What activities of IDT can be implemented: All IDT phases	Application of IDT
GIS	LEVEL: MASTER
<p>Students learn how to use IT tools for modelling, storage, editing, analysis and presentation of basic spatial data. They learn how to create spatial data and how to obtain them from available resources. The emphasis is on acquiring knowledge and experiences necessary for practical use of GIS in public and private organizations. Students work individually on their own semester project during the semester.</p>	
What activities of IDT can be implemented: All IDT phases	Application of IDT
OPEN GEODATA	LEVEL: BACHELOR
<p>Students get all necessary information concerning open geodata (vector and raster data). Students work with tools that are used for modelling, representing, and managing basic types of vector and raster open geodata. Students gain experience with work on OpenStreetMap (OSM), QGIS software, Geoserver app. Teacher shows different examples of open geodata. There are different assignments related to the OpenStreetMap project – editing of geodata, creating of new geodata, using of different tools for these activities. Teacher gives short lectures related to open geodata sources. Students can participate in different voluntary events – webinars, mapping parties.</p>	
What activities of IDT can be implemented: Challenge, prototype & test	Application of IDT
DEVELOPMENT OF ADVANCED APPLICATIONS	LEVEL: BACHELOR
<p>The focus of this course is on the process of developing web applications with modern techniques. We concentrate mainly on Java, C# / .NET, Angular, React, and Docker or AWS applications. Primary focus is on preparing applications as microservice architectures that can be easily scaled if needed. After completing the course, student:</p> <ul style="list-style-type: none"> ■ Knows how to use techniques for developing advanced applications, - can work with graphic user interface design ■ Understands the issue of persistent storage of application data and creation of multi-threaded applications ■ Acquires the ability to analyse the client's requirements ■ Design the application architecture and implement it <p>Process is divided in two parts:</p> <ul style="list-style-type: none"> ■ Lectures: - starting with theoretical background of architecture basic principles - presenting new techniques in development of web application. Lectures with invited experts with practice ■ Exercises: - practical example of developing application. Work with modern framework - preparation of example application deployable to cloud 	
What activities of IDT can be implemented: Challenge, prototype & test	Application of IDT

INTRODUCTION TO DATABASE SYSTEMS

LEVEL: **BACHELOR**

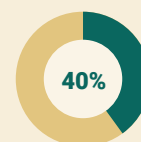
This course brings basic knowledge of developing Python applications, connecting them with the database, and creating the best report solutions. Primary focus is on a management study student who has few informatics skills.

After completing the course, student:

- Acquires basic knowledge of working in a high-level programming language
- Understands the basics of working with databases
- Can design simple tools for preparing materials for reports in the form of tables and graphs
- Will be able to use external libraries designed for data analysis
- Will learn data model analysis techniques and will be able to design commands in the SQL language
- Acquires the knowledge and skills necessary for a manager in a software company

Process is divided in two parts:

- Lecture is only one hour with basic theoretical background
- Exercise is main part of teaching. First part is focused on basic practises to Python language and developing application. After basics, we introduce to applying external libraries for example statistical tools. Second part of course brings knowledge about use of relational database - then we can prepare simple application with database connection. Finally simple application for creating reports from database is prepared.



What activities of IDT can be implemented: **Challenge, prototype & test**

Application of IDT

SOFTWARE TESTING BASICS

LEVEL: **BACHELOR**

This course brings students basic knowledge about thinking as software testers. Testing software application is now not dividable part of developing process. We start from analysing tools, design table for reporting testing and bring some best practises of creating good tests.

By completing the course, student:

- Has basic knowledge of testing software systems, planning and management from the tester's point of view
- Knows the methods of design, implementation, and management of tests from the level of the entire system and its specification to the analysis of the code itself (static, dynamic)
- Knows how to create manual and automated tests
- Has the knowledge and skills necessary for the position of a tester in a software company

Process is divided in two parts:

- Lectures focus on basic principles of testing, process of testing, process of managing test process, what is important for creating good tests for what applications and best practises from experts in invites lectures
- Exercise - first of part semester is about process of thinking as tester - students in small teams design reporting tools and process and present to other teams. Second part of semester software tools are presented for creating tests. Finally the application for testing is chosen and sets of tests best fit for selected application are prepared.



What activities of IDT can be implemented: **All IDT phases**

Application of IDT

INNOVATION IN HR

LEVEL: **MASTER**

During the course students learn how to use Design Thinking process and tools in HR topics on real HR projects, that are brought by Czech corporations. They take their HR knowledge and skills from previous subjects and put it to use through Design Thinking. They get to know their customers and their needs in order to present the best solution for the challenges brought up by the sponsors of the projects. Students work in teams and are focused on specific challenge in various topics: Recruiting, Onboarding/Offboarding Employee branding Internal/external communication in the company, etc.

They cooperate (taking basic information about the topic from the company) with employees throughout the semester. Students find customers and interview them to set the basis for ideation part and creating prototypes for testing with the customers in order to present their solution to the companies at the end of semester.



What activities of IDT can be implemented: **All IDT phases**

Application of IDT

GRAPHICAL SYSTEMS

LEVEL: **BACHELOR**

The students learn about two- and three-dimensional procedural modelling, texturing, lighting, rigging, animation and rendering techniques. The most important properties of object hierarchy are discussed. The students gain knowledge and experience how to apply geometric transformations, particle systems, physical simulations. Parallely, parametrization of the models and the discussed methods, basics of scripting, developing and testing of automated solutions are introduced, as well. On each laboratory students learn new techniques in different topics, e.g. with respect to modelling, animation or rendering. It means that every week I explain the new methods first and show them the new corresponding features of the modelling/animator software. Then in the second part of each class, the students can practice these techniques by working on and solving new given tasks alone/in pairs. To finish the course successfully, they have to complete one complex project with documentation and presenting their work focusing on the most important steps of the project.



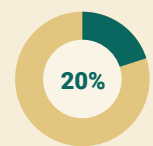
What activities of IDT can be implemented: **Challenge, prototype & test**

Application of IDT

COMPUTER AIDED MATHEMATICS AND VISUALIZATION

LEVEL: **BACHELOR**

Students learn about Vector operations. Using vector operations for solving visualization problems. Relations, functions. Explicit functions, interpolation. Implicit functions and their graphs. Parametric vector functions and their visualization. . Every week I explain the theoretical background of the new methods first and show them the new corresponding features of the software GeoGebra and Matlab. Then in the second part of each class, the students can practice these techniques by working on and solving new given tasks alone. For this course there is no project work/assignment, the students need to pass two practical tests by checking how they can use the previous software knowledge acquired.



What activities of IDT can be implemented: **Challenge**

Application of IDT

BIG DATA ANALYSIS

LEVEL: **BACHELOR**

The basic concepts and techniques the students gain knowledge and practice during the course are: Big Data applications and examples. Data Representation Techniques. Every week I explain the theoretical background of the new methods first and show them the new corresponding libraries and packages of Python. Then in the second part of each class, the students can practice these techniques by working on and solving new given tasks alone. For this course there is a project work the students need to complete with documentation to present and explain the results of all the methods to be applied during the data processing.



What activities of IDT can be implemented: **Challenge, brainstorming, prototype & test**

Application of IDT

3D PRINTING AND MODELLING

LEVEL: **BACHELOR**

During the course the basic principles of 3D printing technologies, requirements of 3D printable models, settings and functionality of slicer programs are discussed through illustrative samples.

The students get to know 3 modelling softwares: TinkerCAD, SolidWorks, OpenSCAD. By the end of the semester, student can use at least one modelling program at the basic-intermediate level to design 3D printable models. New topics can be introduced with some slides, sample models and 3D printed version of them. All teaching aids are available in an E-learning course via weekly sections. My 3D printing experience is published in a blog: <https://3dben-printelodik.blogspot.com/>

Students have to work on different tasks every laboratory and there are some extra optional tasks to improve their knowledge and experience. There is an online "theoretical" test in the end of the semester. There are modelling tests on practice time. By the end of the semester the students create their project from the idea, through modelling steps and slicing of the designed model..



What activities of IDT can be implemented: **Challenge, brainstorming, prototype & test**

Application of IDT

DESCRIPTIVE GEOMETRY

LEVEL: **BACHELOR**

The course is one of the basic subjects in Engineering education. Descriptive geometry is a branch of geometry in which the three-dimensional spatial objects are represented on a plane using one of projecting methods. In Monge's method of representation the top and front views of an object are recalled, associated and this figure is suitable for constructions to solve some geometric problems like representation of new items, intersection of some objects and metrical problems.

This subject is one of the traditional classes, the initial figures and some help are collected to the Exercise booklet.

Because of number of weekly classes, there are some topics in addition for Architect students: Shadow construction, Basics of Axonometry and Perspective representations.



What activities of IDT can be implemented: **Challenge**

Application of IDT

COMPUTER-AIDED MODELLING

LEVEL: **BACHELOR**

The course deals with computer aided 2D representation and 3D modelling, which are the basics in engineering communication. AutoCAD software is used to create 2D technical drawings based on basic drawing elements (line, circle, arc, polygon etc.) and their geometric relations, their intersection, extension with given dimensions. Organizing the drawing elements to layers and annotation are also discussed.

For 3D modelling, we use Solidworks 3D CAD design and analysis software which is definitely for design solid models based on 2D profiles (2D sketches) using available 3D features (e.g. extruded, revolved, swept Boss/Base). The designed parts can be combined with Boolean operators to get more complex 3D shapes. Based on some pre-designed parts, Assembly and Drawing SW documents can be also created..



What activities of IDT can be implemented: **Challenge, brainstorming, prototype & test**

Application of IDT

3D PRINTING AND MODELLING

LEVEL: **BACHELOR**

The students study about the 3D printing technologies, especially about the FDM since the faculty has FDM printers. They also get to know some modelling software products (TinkerCAD, SolidWorks, OpenSCAD) and design models that match the criteria of 3D printability. Basics of 3D scanning is discussed and they can try our 3D scanner too. By the end of the course each student completes their project work consisting of designing and slicing the model and documenting the work. A successful project work proves that they can go through the steps from planning an object till printing it. The half of the classes is about teaching new knowledge, that is why I explain the most important things than I show the modelling steps too (students are working with me). In the remaining time the students work on their own on additional tasks related to the new knowledge which aims to deepen the acquired knowledge. In the second half of the semester they can work on their project work, thus the classes are similar to consultations. Some students can demonstrate their project for others.

If the students are interested then we visit the Biomechanical Research Lab where they can see 3D printers using additional printing technologies. I also recommend them online webinars, following websites with news from the world of 3D printing..



What activities of IDT can be implemented: **All IDT phases**

Application of IDT

BASICS OF GIS

LEVEL: **BACHELOR**

The students study the basic principles and concepts of geographic information systems through working with an open source (such as QGIS) software. By the end of the semester the students become familiar with working (vector and raster) spatial data including performing analysis on data and publishing the result maps on a webpage. ---- Concepts, principles, task types are discussed first which is followed by putting them into practice. First tasks are done together, then students work alone on further ones to deepen their knowledge. Uncompleted task is homework. Students can ask questions any time during the class.



What activities of IDT can be implemented: **All IDT phases**

Application of IDT

DATA VISUALIZATION

LEVEL: **BACHELOR**

The goal of the course is to show how data can be turned into effective views and diagrams which results in recognizing hidden information, supporting decisions, revealing relationships among the data. Designing dashboards and stories are also discussed. By the end of the semester the students can select appropriate view types matching the goal of the visualization and can build effective dashboards. ----- Basic concepts, design principles are introduced first, then some sample tasks are solved together. After discussing a unit, complex tasks are solved. The students take two tests (creating charts, dashboards to answer questions) to get a grade. Slides, online official materials are available.



What activities of IDT can be implemented: **All IDT phases**

Application of IDT

SCIENTIFIC WORK DESIGN

LEVEL: **BACHELOR**

Basics of scientific work principles, procedures, tools, scientific writing etc. Outcome: Students can apply basic scientific work procedures and methods/ tools especially in creative projects and processes. In presentations during the seminar content is introduced, students partly develop their own content and then the theories, methods and tools are applied by students in practical exercises. During the course they develop an own scientific research project and apply all the content related to this project. At the end of the seminar students compile a scientific document summarizing all their results in one workbook.



What activities of IDT can be implemented: **All IDT phases**

Application of IDT

SUSTAINABILITY DESIGN PROJECT

LEVEL: **BACHELOR**

Creative design project with a focus on sustainability, sustainable design methods and tools, research, ideation, detailed design, visualizations and mock-ups, models, prototypes and user testing, sustainability assessment, sustainable business models.

Outcomes: Students have applied sustainability design methods and tools in a real-life design project. Documentation and presentation of results, project management, project plan and schedule. Project based learning: Students are introduced to sustainable design methods and tools and apply these to a real-life project, often in cooperation with companies or other external cooperation partners.



What activities of IDT can be implemented: **All IDT phases**

Application of IDT

SOCIAL DESIGN: METHODS AND STRATEGIES

LEVEL: **BACHELOR**

Definitions Social Design in historical context, approaches and strategies, methods and tools of Social Design, testing of these approaches in exercises, comprehensive sustainability assessment of Social Design solutions. Outcome: Students are familiar with social design definitions, methods and tools and have applied them in short practical exercises. In presentations during the seminar content is introduced, students partly develop their own content and then the theories, methods and tools are applied by students in practical exercises. At the end of the seminar students write a thesis and present their result, as well as compiling a document summarizing all their results in one workbook.



What activities of IDT can be implemented: **All IDT phases**

Application of IDT

USER EXPERIENCE DESIGN


LEVEL: **BACHELOR**


Subject: amongst others, Basics of Design Thinking and creativity techniques for innovation Outcome: Students can apply Design Thinking in User Experience context to create corresponding solutions (products etc.) including interaction concepts. For preparing a thesis to pass the course, students also have, amongst others, to work through our Design thinking and Innovation Management textbook/ lecture notes (internal code UXD-03) over the semester: they complete practical or theoretical tasks that a tutor corrects.





What activities of IDT can be implemented: **All IDT phases**


Application of IDT


MANAGEMENT OF DIGITAL TRANSFORMATION	LEVEL: MASTER
<p>Subject: amongst others, innovation, e.g. by means of Design Thinking Outcome: ...Students create services for digital business models by means of methods like amongst others Design Thinking. For preparing the final examination in the course, students also have, amongst others, to work through our Design thinking textbook/ lecture notes (internal code DETIH-01) over the semester: they complete tasks that a tutor corrects. In the final course examination, they answer questions on the Design Thinking method.</p>	
What activities of IDT can be implemented: All IDT phases	Application of IDT


RESEARCH	LEVEL: MASTER
<p>Subject: amongst others, applying scientifically-proven methods like Design Thinking for research</p> <p>Outcome: Students create paper, poster and thesis on computer science-related topic by means of methods like, amongst others, Design Thinking. During the semester, students create a poster, a thesis and a presentation they have to defend in a workshop (like a scientific conference) for passing the course: they are supported by a personal tutor. In the workshop, they answer questions on the method (can be Design Thinking) and outcomes.</p>	
What activities of IDT can be implemented: All IDT phases	Application of IDT


INNOVATION MANAGEMENT	LEVEL: MASTER
<p>Educational objectives:</p> <ul style="list-style-type: none"> ■ Understanding of the important concepts of innovation management; can explain the various innovation types ■ Can define what constitutes an innovation process and innovation management and can adjust these to industry sectors ■ Learn various methods to support an innovation strategy that is oriented towards a corporate strategy. They know the early phases of the innovation process up to the market launch and the related methods and techniques for process design ■ Insight into success factor research and can identify the success factors for innovative strength ■ Know the planning steps in the innovation process and can explain different process models with examples. They can define standardized process workflows and typical organization forms. They can describe current approaches to innovation management and justify their use. <p>As we are a distance learning university, the knowledge is taught in the form of study booklets 2x2 hours online review for exam preparation.</p>	
What activities of IDT can be implemented: All IDT phases	Application of IDT

SERVICE ENGINEERING & DESIGN	LEVEL: BACHELOR
<p>Content: Basics of Service Engineering, Process models for the development of services in the company, Basics, methods and tools of Design Thinking, 6 phases of the Design Thinking process, Tools of Design Thinking, Design Thinking in the organization</p> <p>Educational objectives (regarding DT):</p> <p>The students know the basics, methods and tools of Design Thinking, Understanding the thinking attitudes underlying Design Thinking. They will:</p> <ul style="list-style-type: none"> ■ Know know why empathy with potential users is the core element of Design Thinking ■ Recognize the potential of mistakes when it comes to learning more about users ■ Be able to explain why it is important to allow for ambiguity and why a heterogeneous team and the right space are key elements for successful design thinking ■ Be able to apply their knowledge and understanding to problem solving in their own professional and private contexts and make scientifically sound decisions and critically reflect on the consequences of their actions 	
What activities of IDT can be implemented: All IDT phases	Application of IDT

INTERCULTURAL TRAINING AND TUTOR IN PROJECTS		LEVEL: BACHELOR
<p>The objectives of this course are to understand what is an intercultural approach to better adapt, collaborate in a complex and international world. Methodology: From cultural to intercultural : deceneration perception, How we SEE the world, the Other.</p> <p>Interpretation: get to know one's own values and to accept cultural relativity.</p>		
What activities of IDT can be implemented: All IDT phases		Application of IDT

INGENEERS STUDENTS TRAINING		LEVEL: MASTER
<p>Offer students of IMT Atlantique a new learning space, the Fablab, in which they can develop and deepen technical (hard) skills but also and especially soft skills, which are very important in collaborative work and collective production. Through projects proposed by the teaching team, by students individually or collectively, or co-constructed with them.</p>		
What activities of IDT can be implemented: All IDT phases		Application of IDT

SCIENTIFIC MEDIATION		LEVEL: OTHER
<p>The main objective of scientific mediation is to make science accessible to as many people as possible. Our actions, which are totally in line with this objective, come in different very complementary forms:</p> <ul style="list-style-type: none"> ■ setting up and interactive animation of scientific stands in different fields ■ Development of educational resources for the class, which deal with very diverse themes ■ Ttraining of teachers in science education based on investigation and the development of skills in pupils ■ Accompaniment in class of teachers in the implementation 		
What activities of IDT can be implemented: All IDT phases		Application of IDT

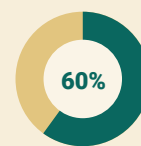
TELECOMMUNICATIONS EQUIPMENT AND SUBSYSTEMS		LEVEL: MASTER
<p>In the first part of the subject students learn how to analyse and design antennas for 5G communications. Some students have previous knowledge about antennas, but others do not. Therefore, in the first theoretical lessons the basic radiation parameters of antennas are reviewed from a practical point of view and the most typical antenna topologies for mobile applications are introduced. Students also attend some practical lab sessions in which they learn to use CST Microwave Studio, that is the electromagnetic simulation software that they will later need to develop their antenna design projects in teams of four. After four weeks, the teams have to deliver a project memory that may include the theoretical background and applications of the antenna, electromagnetic modelling and optimization, final design and fabrication proposal using recycled materials. Each team of four students works in a different antenna topology. The works are also presented orally at the end of the semester. Students come to the laboratory four hours a week to independently develop teamwork. Each team completes an activity report after each work session that the teacher uses to monitor the progress of the projects. The teacher is always in the lab with the students during the teamwork sessions in order to guide the teams and to answer questions.</p>		
What activities of IDT can be implemented: Challenge, prototype & test		Application of IDT

TFG/TFM

LEVEL: **BACHELOR**

This is the final project the students need to prepare as the end of their studies. It must be professionally oriented. The students have to solve a real work engineering problem and provide the evidences of their work. They have to prepare a final report including: Abstract, Introduction, Objectives, Methodology, Development and results, Specifications, budget, plans, technical diagrams, materials, equipment, etc. (if applicable), Conclusions and proposals for future work, References and Appendices (if applicable). They also have to perform a viva presentation in front of a panel which will evaluate the work.

For this particular case, I will focus in the TFG/TFM which each year are related with the ICT applications of the Telecommunications Museum. Each student has a supervisor who proposes and manages the student's work. The projects begin with a bibliographic research of the state of the art, then the learning of the specific tools required, the development of the results and the assessment tests, which can be by simulations or in laboratory. If the project implies the development of an application which can be used by general public, usability tests are also required.



What activities of IDT can be implemented: **Challenge, brainstorming, prototype & test**

Application of IDT

SOCIAL NETWORKS

LEVEL: **MASTER**

The course offers students the opportunity to acquire knowledge and skills in the interdisciplinary field of social networks. Students will acquire theoretical knowledge about the structure and processes in social networks, as well as practical knowledge and skills about application of social networks or achieving individual user or business goals.

Learning Outcomes are:

- Explain the role and importance of social networks in today's society
- Distinguish between social networks with respect to their structural properties and processes that occur in them,
- Differentiate methods for analysis of social networks
- Use appropriate tools for analysis of social networks
- Apply social networks to achieve individual user or business goals
- Design information and communication systems based on social networks.

The subject consists of 5 main components: Lectures, Seminars, Presentation, Project and Laboratory. The first few lectures are introductions to the field of social networking by the lecturers through a presentation. After that, every other lecture is structured in such a way that each student has to give a presentation. Each presentation is given by 2 students who analyse the assigned scientific article. In addition to the presentation, they must submit a seminar paper on the topic of a critical review of the assigned article. Students must also complete a project assignment, which is worth the most points and takes the entire semester to complete. As part of the project assignment, they work with other students in a group of 3 to 5 people. They also have 2 laboratory exercises as independent assignments.



What activities of IDT can be implemented: **All IDT phases**

Application of IDT

DEVELOPMENT OF DIGITAL APPLICATIONS

LEVEL: **MASTER**

Digital applications, which include web applications and applications for mobile devices such as smartphones and tablets, are one of the fundamental technologies that today's business world relies on, regardless of industry or location. The objective of the course is to familiarize students with the process of application development, focusing on the development of digital applications (web applications and applications for mobile devices) characterized by execution in the Internet environment. Students will learn the life cycle of digital application development and gain hands-on experience in creating digital applications.

Learning Outcomes are:

- Understand the role of digital applications in digital marketing.
- Identify stakeholders in the process of developing digital applications.
- Analyse the specifics of applications used in the Internet environment
- Apply the life cycle of digital application development
- Create a digital application

The subject consists of 3 main components: Lectures, Project and Presentation All lectures, which last 2 hours, are given by lecturers. After each lecture, lecturers hold a 1-hour seminar session in which students have to work in a team (2-3 students) and practically apply the knowledge acquired in the oral lecture. In addition, they are given a project assignment at the beginning of the semester in which they must work in a team of 3-5 students. The end product of the project assignment is to go through the entire process of digital application development.



What activities of IDT can be implemented: **All IDT phases**

Application of IDT

HUMAN FACTORS IN COMPUTING

LEVEL: **BACHELOR**

Introduction to the field of ergonomics, analysis of human-machine interaction and user capabilities, limitations & health risks, understanding the concept of Universal Design and accessibility in daily life and in the development of accessible software solutions for the web and mobile platforms, understanding assistive technology and augmentative and alternative communication, emerging technologies (AR, VR, holographic technology) in service of assistive technology and understanding the importance of multidisciplinary research in this field.

Lectures (provided by experts in different fields relevant to the specific topics), Seminars and workshops, practical tasks related to the analysis and implementation of the knowledge, partial e-learning – guided research within e-course activities, independent assignments – for reflection on the topic of the lecture, multimedia and Internet – analysis related to the lecture topics.



What activities of IDT can be implemented: **All IDT phases**

Application of IDT