**Course description (topics)**

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<tr><td colspan="5">Title of the course:<br>Interaction Design Basics: Computational Design Principles</td></tr>
<tr><td colspan="5">Tutors of the course , contact details:<br>Agoston Nagy, stc@binaura.net, +36304809295</td></tr>
<tr><td>Code:<br>M-ID-101-COMP-DESIGN-PRINCIPLE</td><td>Related curriculum (programme/level):<br>Research & Innovation Interaction Design MA</td><td>Recommended semester within the curriculum:<br>2023/24/1 // 1st</td><td>Credit:<br>2</td><td>Number of class hours: 24<br><br>Student working hours: 36</td></tr>
<tr><td>Related codes</td><td>Type: (seminar/lecture/class work/consultation, etc.)<br>Class Work, seminar</td><td>Can it be an elective course?<br>No</td><td colspan="2">In case of elective what are the specific prerequisites:<br>-</td></tr>
<tr><td colspan="5">Course connections (prerequisites, parallels):<br><br>The subject is only considered completed, if the following courses are also completed:<br><br>Fogarasy_Interaction Design Basics: Discussing Design, 2 credits<br>Fogarasy_Interaction Design Basics: Fundamentals of Product Design, 2 credits<br>Csertán_Interaction Design Basics: Mastering IxD – The Human Aspect, 5 credits<br>Leube_Interaction Design Basics: Design Anthropology, 2 credits<br>Leube_Interaction Design Basics: Design Ethnology, 2 credits</td></tr>
<tr><td colspan="5">Aim and principles of the course:<br><br>The aim of the course is to equip students with the knowledge, skills, and perspectives needed to create novel and efficient solutions using computational techniques, while also considering the larger systems they are a part of. The course will encourage students to think creatively and critically about design problems, prepare them to work collaboratively with other designers, engineers, and stakeholders to develop and implement computational design solutions in real-world contexts, also it will invite them to explore the ethical and social implications of computational design, and to consider how these concepts can contribute to more sustainable, equitable, and resilient systems.</td></tr>
<tr><td colspan="5">Learning outcomes (professional and general competences to be developed):<br><br>Knowledge: Critical understanding of computational design with a systems thinking approach<br>Ability: Planning interactive systems built on the techniques of computational design, including algorithms, parametric design, optimization, simulation and artificial intelligence<br>Attitude: Independent, analytical reasoning, with a focus on aesthetic qualities and visual clearance</td></tr>
<tr><td colspan="5">Topics and themes to be covered in the course:<br><br>- systems thinking: understanding how the different parts of a system work together and how changes to one part of the system can affect the whole.<br>- generative design:involving algorithms to generate multiple design options automatically based on a set of parameters or constraints.</td></tr>
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- parametric design: involving design systems that can be manipulated through a set of variables or parameters to produce a range of outcomes.
- optimization: involving algorithms to evaluate design solutions and determine the best outcome based on specific criteria, such as cost, energy efficiency, or aesthetics.
- simulation: involving computational tools to simulate physical phenomena, such as airflow, light, or structural loads, to test and refine design solutions.
- artificial intelligence: learn from data and perform tasks that typically require human intelligence, such as pattern recognition, decision-making, and natural language processing

Course structure, nature of the individual sessions and their timing (in case of several teachers' involvement, please indicate the distribution of their teaching input:

In most classes, the course events will be structured as the following:

0. recap
1. theoretical introduction to the actual topic
2. Q/A
3. hands-on session (workshop setup, group work using modern web technologies)
4. wrap-up

Students will share their impressions, insights and giving feedback to each other

Students' tasks and responsibilities:
presence and active participation in offline discussion and online channels

Learning environment: classroom & online

Assessment:
active participation on the classes
aesthetic qualities of the practical work

Requirements to be met:
presentation (visual introduction of the class work)

Method of assessment:
practical demonstration

Recommended Literature:

Joshua Noble: Programming Interactivity, O'Reilly, 2009
John Maeda: How to Speak Machine, Penguin Publishing Group, 2019
Patrick Hebron: Machine Learning for Designers, O'Reilly, 2016
Hartmut Bohnacker, Benedikt Gross, and Julia Laub: Generative Design: A Practical Guide Using Processing, 2012
Casey Reas and Chandler McWilliams: Form+Code in Design, Art, and Architecture, 2010
Jaron Lanier: Who owns the future? HarperCollins Publishers, 2014
Barabási László: Network Science, Cambridge University Press, 2016
Ville-Matias Heikkilä: Permacomputing, http://viznut.fi/texts-en/permacomputing.html
Julian Oliver et al: The Critical Engineering Manifesto, https://criticalengineering.org

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| Other information:<br>On Wednesdays between 11.30am-12.50am in room B_106 |
| Recognition of knowledge acquired elsewhere/previously/validation principle:<br>- |
| Out-of-class consultation times and location<br>- |