Name	**Principles of Computational Design**	Classroom ☐ Studio or workshop ☐ External venue ☐ Online ☐

Codes **M-ID-101-PRINCIPLES-OF-COMP**

Host **Future School**

Basic info	Type	ECTS	Contact hours	Student work	Course type	Semester	Unit
	Practical	**15**	**48**	**48**	**Mandatory**	**1**	**M-ID-101**

Recommen-dation	**This course is tailored for designer students looking to explore the innovative integration of computational concepts in design principles. Throughout this program, you'll delve into the fundamentals of computation combined with generative artificial intelligence and learn how to leverage it creatively in design. By the end of this course, you'll have a solid understanding of systems thinking, automation and algorithmic process, unlocking new dimensions for creative expression in the field of design.**

Short Description Teachers	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.

Name	Contact information	Short bio	Open hours
Agoston Nagy	+36304809295	coding, algorithmic art, workshops	

Semester schedule	Course scheduling	Weekly class appointments

#	Date	Weekly educational content
1		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.
2		generative design:involving algorithms to generate multiple design options automatically based on a set of parameters or constraints.
3		parametric design: involving design systems that can be manipulated through a set of variables or parameters to produce a range of outcomes.
4		optimization: involving algorithms to evaluate design solutions and determine the best outcome based on specific criteria, such as cost, energy efficiency, or aesthetics.

5		simulation: involving computational tools to simulate physical phenomena, such as airflow, light, or structural loads, to test and refine design solutions.
6		computational principles
7		pattern recognition, decision-making, and natural language processing
8		prompt based systems (LLM)
9		Auto-generated Code & artificial language
10		artificial intelligence: learn from data and perform tasks that typically require human intelligence
11		
12		
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14		
15		

<table>
<tr><td>Requirements and evaluation</td><td>Assignments</td><td>Evaluation criteria</td><td>Deadline</td><td>% in evaluation</td></tr>
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Assignments	Evaluation criteria	Deadline	% in evaluation
10 mins Presentation & Pitching	Active participation on the classes aesthetic qualities of the practical work	10th week	40%
Video documentation (1.5 mins)		12th week	20%
Presenting interactive software as working prototypes	Presentation (visual introduction of the class work) Method of assessment: Practical demonstration, pitching	9-12th week	40%

Compulsory readings

Recommended readings

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

Learnings

Knowledge	Critical understanding of computational design with a systems thinking approach
Skills	Planning interactive systems built on the techniques of computational design, including algorithms, parametric design, optimization, simulation and artificial intelligence

Attitude	Independent, analytical reasoning, with a focus on aesthetic qualities and visual clearance
Responsibility	Making self made decisions in the professional field

Exemption

☒ Exemption from attending and completing the course cannot be granted

☐ Exemption may be granted from the acquisition of certain competencies and the fulfilment of tasks

☐ Some tasks can be substituted with other activities,

☐ A full exemption can be granted

Curriculum connections

Unit	Parallel courses	Course proportion in unit
Befoglaló tantárgy címe	[Ez a kurzus]	
	Másik kurzus címe	
	Harmadik kurzus címe	

Course prerequisites	Is it available as an elective?	Prerequisites in case of elective

Misc. information