Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Syllabus
Course description

Course title	Growth Mindset **M1 Design Thinking and Prototyping** **M2 Algorithmic thinking Coding**
Course code	25555
Scientific sector	MODULE 1 – ICAR/13, MODULE 2 – ING-INF/05
Degree	LM 77 Master in Entrepreneurship and Innovation
Semester and academic year	1st semester 2023-2024
Year	1
Credits	14 (6 first MODULE, 8 second MODULE)
MODULEear	Yes

Short Description	**MODULE 1** Design Thinking is two decades old now. And in all these years we have understood something. The DT is not the solution to all problems. Why then is it increasingly popular? Communication agencies, personal coaches, big consulting groups why today everyone "does" Design Thinking? And even when the C-levels try to avoid it, perhaps by investing in another evocative name, they always find the same old story: post-it, games, the magic 4 steps taken from a manual written maybe on the other side of the world 20 years ago. Because being creative and innovative is the dream of every company. And when the company can't do it, because it is blocked by a thousand clutches, an automatic innovation distributor is ready at every corner, selling it ready-made at a low price. "Doing" Design Thinking becomes as easy as installing an app. But The DT is not an app to install. It's a new operating system. I will try to show through international case studies and lectures how Design Thinking is the perfect way to face complexity and to bring value to the companies. The competition is high. The rates are lowered. The quality as well. It becomes a war of meaningless terms that feeds on itself. **MODULE 2** This is a programming course particularly focused on coding and on how data are organized and handled by computers. Starting from the very basics of Python programming the students will get to learn the

	techniques for dealing with data, efficient algorithms, data structures and agent models. The course is strongly focused on practice, consisting in very short theoretical sessions followed by several examples, exercises and assignments. An overview of blockchain technology is introduced for its innovative potentialities as well as an example of advanced programming. This course gives future entrepreneurs and innovation managers a clear idea of how computer algorithms work, a knowledge which can help them better plan company's developments and potential innovations, in particular in the technological sector. Moreover, programming abilities gives access to job opportunities in the software development sector.
Total lecturing hours	**MODULE 1** – 36 hours, **MODULE 2** – 48 hours
Total lab hours	16 (MODULE 1)
Total exercise hours	0
Attendance	**MODULE 1** Required at least 75% **MODULE 2** A continuous and regular attendance is suggested, but not required. Intermittent attendance is strongly discouraged: for non-attending students additional video material which covers the entire course is available
Prerequisites	**MODULE 1** not foreseen **MODULE 2** English understanding and reading at level B2. A basic course in computer science covering basic Microsoft Windows, file handling, Internet usage, Excel or a similar data organization program at good level.
Course page	**MODULE 1** not foreseen **MODULE 2** www.paolocoletti.it/algorithmicthinking

Specific educational objectives	The course refers to the basic educational activities and belongs to the scientific area of Economics. The course is designed to catch the idea that: Design is more than a feeling: It's analytical leadership more than a product: It's user experience more than a department: It's cross-functional talent more than a phase: It's continuous iteration

	The course is designed to acquire at the same time programming skill and a deep idea on how computers behave and usually handle problems. An overview of current blockchain technology complements the course.

MODULE 1	Design Thinking and Prototyping
Lecturer	• Vittoria Magrelli vittoria.magrelli@unibz.it • TBA
Scientific sector of the lecturer	SECS-P/08
Teaching language	English
Office hours	please refer to the lecturer's timetable
Lecturing assistant	None
Teaching assistant	None
Office hours	18
List of topics covered	Design Thinking Definitions, Methods and Application – product and service design, Business Model Canvas, personas, Empathy map, Customer Journey, Creative Tools, Prototyping, Process modelling
Teaching format	Frontal lecture and a project work

MODULE 2	Algorithmic thinking Coding
Lecturer	Paolo Coletti Office E 203 Paolo.Coletti@unibz.it www.paolocoletti.it
Scientific sector of the lecturer	ING-INF/05
Teaching language	English
Office hours	please refer to the lecturer's timetable
Lecturing assistant	None
Teaching assistant	None
Office hours	24
List of topics covered	Basic Python programming, typical algorithms and data structures, computational complexity, agent models. Cryptocurrencies and blockchain technology.
Teaching format	Frontal lectures in standard classroom with examples and exercises. Students use their own notebook or a computer borrowed from the library and then repeat the lesson at home with the help of provided videos and do home assignments, which will be corrected and commented together in the next lesson.

Learning outcomes	**MODULE 1** The project will be based on the 3 pillars of the Design Thinking: Empathy, Strategy and Prototyping. Where with Empathy we mean how you look at people, how you identify the needs, how you get insights through understanding them. With strategy understanding the business model, process, and culture of the company (the client). And Prototyping which is the doing part of design thinking. **MODULE 2** Knowledge and understanding: • knowledge of programming skills • knowledge and understanding of data structures • knowledge and understanding of algorithms • basic knowledge and understanding of potential uses of blockchain Applying knowledge and understanding: • ability to organize and restructure data • ability to determine the complexity of algorithms Making judgments: • ability to choose the adequate tools or techniques while coding • ability to determine the difficulty level for data handling Communication skills: • ability to expose the problems with algorithms Learning skills: • ability to use online help systems to further expand program usage
Assessment MODULE 1	Assessment on a project work The starting point for the project work will be one of these: People (e.i. sustainability, aging, health and wellness...) Business (e.i. potential of a brand, business model, a new category of products...) Technology (e.i. technological unlock product driven, capability driven...) I will share the idea that in a company when it's time to develop a new product the starting point of the project could anywhere in an organization. But then through Design Thinking you need to connect the intuitions with the others two words converging towards the people. The final goal that will be asked to the students will be to design meaningful experiences for the people, through new products/services. • No exam for non-attending students.

Assessment MODULE 2	1. Practical assessment on Python programming 2. Written and practical assessment on algorithms, computational complexity and agent models 3. Written assessment on blockchain technology As optional replacement for points 1 and 2, constant assignments and midterm to test student's skills.
Assessment language	English
Evaluation criteria and criteria for awarding marks	**MODULE 1** The evaluation will be an average of the different project work steps: STEP 1- analysis STEP 2- market STEP 3- concept STEP 4 - prototototyping STEP 5 - user test STEP 6 -next steps **MODULE 2** Grade is the weighted average of the three exam's parts (or the corresponding midterms), based on the number of lessons' hours. File handling and severe basic computer errors count negatively on the final grade. Particular emphasis is given to solutions which are optimal, efficient, versatile and extensible. Active contributions to the course in class or via email count positively towards the final grade.

Required readings	**MODULE 1** Suggested Bibliography for the project based course 1. Verganti R. Overcrowded: Designing Meaningful Products in a World Awash With Ideas, Hoepli 2017 2. Heskett J. Design. A Very Short Introduction. Oxford University Press 3. Tomás Maldonado. Disegno Industriale : Un Riesame. 2. ed.. Milano: Feltrinelli; 1992. 4. Cuffaro D, Zaksenberg I, David Laituri. The Industrial Design Reference + Specification Book. Rockport. Quayside Publishing Group; 2013. 5. Francesco Zurlo. Le Strategie Del Design. Disegnare Oltre Il Prodotto. Libraccio Editore; 2012. 6. Erik Brynjolfsson AM. La Nuova Rivoluzione Delle Macchine. Lavoro e Prosperitá Nell'era Della Tecnologia Trionfante. Feltrinelli; 2017. 7. Erik Brynjolfsson, Andrew McAfee. The Second Machine Age : Work, Progress, and Prosperity in a Time of Brilliant Technologies. New York: W. W. Norton & Company; 2014.

| | 8. Paola Antonelli. Talk to Me: Design and the Communication Between People and Objects. Museum of Modern Art; 01 edizione (15 agosto 2011).; 115AD. 9. Kim Colin DS, Hecht S. Usefulness in Small Things: Items from the Under a Fiver Collection. Rizzoli Intl Pubns; 01 edizione. New York, NY: Rizzoli; 1201. 10. Bill Moggridge. Designing Interactions. Cambridge, Mass. [etc.9: MIT Press; 2007. 11. Amber Case author., Safari an OMC. Calm Technology. 1st edition.; 2015. 12. Amber Case. Calm Technology: Designing for Billions of Devices and the Internet of Things. O'Reilly Media; 1 edizione.; 2220. 13. Amber Case. An Illustrated Dictionary of Cyborg Anthropology. CreateSpace Independent Publishing Platform (2014). 14. Golden Krishna. The Best Interface Is No Interface: The Simple Path to Brilliant Technology. Voices That Matter. New Riders,; 2015. **MODULE 2** • Videos on Python programming, available on www.paolocoletti.com/algorithmicthinking • Videos on blockchain technology, available on www.paolocoletti.com/algorithmicthinking |
| **Supplementary readings** | |