unibz

Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

Syllabus

Descrizione corso

Titolo insegnamento	Growth Mindset
Codice insegnamento	25555
Titolo aggiuntivo	
Settore Scientifico-Disciplinare	
Lingua	Inglese
Corso di Studio	Corso di laurea magistrale in Imprenditorialità e Innovazione
Altri Corsi di Studio (mutuati)	
Docenti	dr. Silvia Sanasi, Silvia.Sanasi@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/47276 dott. Cristina Maria Gangai, CristinaMaria.Gangai@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/50466
Assistente	
Semestre	Primo semestre
Anno/i di corso	1
CFU	14
Ore didattica frontale	Module 1 – 36 hours Module 2 – 48 hours
Ore di laboratorio	Module 1 - 16 hours Module 2 - none
Ore di studio individuale	-
Ore di ricevimento previste	Module 1 - 18 hours Module 2 - 24 hours
Sintesi contenuti	M1: This project-based course introduces students to design thinking and prototyping as key tools for developing a growth mindset in the context of entrepreneurship and innovation

	management. Working in diverse teams, students tackle real-world challenges by designing and testing new product or service ideas. They will learn and apply the design thinking process alongside core principles from other foundational approaches to innovation and entrepreneurship, such as Design Sprint and the Lean Startup method. Due to the highly interactive, team- and project-based nature of the course, attendance is mandatory (min. 75%) M2: The course introduces students to the fundamentals of programming using Python, with a focus on syntax, control structures, and logical reasoning. It also covers essential topics in computational complexity and classical algorithms for solving problems such as sorting, recursion, and combinatorial optimization. The course is designed not to train professional programmers, but to foster a problem-solving mindset and a structured approach to thinking, particularly valuable for future entrepreneurs and project managers.
Argomenti dell'insegnamento	Course Topics – M1: -Design thinking: Definitions and origins -Design thinking process: Emphathize & discover -Design thinking process: Define - Problem framing & reframing -Design thinking process: Ideate & sketch (incl. Design Sprint method, Value Proposition Canvas, Customer journey map, Service blueprint) -Design thinking process: Testing & Experimentation (incl. Lean Startup method) -Pitching an innovation project -Real-world case studies - Digital and physical prototyping Course Topics – M2: 1. Introduction to Programming with Python: Basic syntax and program structure. Variables, data types, and operators. Input/output and simple scripts 2. Control Structures and Logical Reasoning: Conditional statements (if, if-else, nested conditions). Loops (for, while) and iteration strategies. Logical operators and Boolean reasoning 3. Functions and Problem Decomposition: Defining and calling

	functions. Parameters, return values, and scope. Modular programming and code reusability 4. Data Structures for Problem Solving: Lists, tuples, and strings. Sets and dictionaries: properties and use cases. Iterating over structured data 5. Algorithmic Thinking: Problem analysis and step-by-step reasoning. Designing algorithms using flowcharts 6. Foundations of Computational Complexity: Time and space complexity: intuitive introduction. Big-O notation and growth rates of functions. Practical comparisons of algorithm efficiency 7. Classical Algorithms: Sorting algorithms (e.g., Bubble Sort, Merge Sort). Searching strategies (linear search, binary search). Recursion: principles and applications (e.g., factorial, Fibonacci) 8. Combinatorial Optimization and Graph Problems: Introduction to optimization problems (e.g., Knapsack problem). Shortest-path algorithms (e.g., Dijkstra’s algorithm)
Parole chiave	M1: Design thinking, innovation, problem framing, ideation, prototyping, experimentation M2: Algorithms, Python programming, time complexity, problem-solving.
Prerequisiti	M1: None. M2: General logical reasoning skills, Basic knowledge of mathematics (e.g., arithmetic, simple algebra, sets)
Insegnamenti propedeutici	
Modalità di insegnamento	M1: Lectures, laboratory activities, company visits, groupwork, individual reflection. In-person attendance is mandatory (min 75%) M2: The course combines lectures with interactive exercises, coding practice in Python, and problem-solving sessions.
Obbligo di frequenza	M1 Design Thinking & Prototyping - 75% mandatory presence
Obiettivi formativi specifici e risultati di apprendimento attesi	
Obiettivi formativi specifici e risultati di apprendimento	M1: By the end of the course, students should: - Understand the basic principles of the Design thinking approach

attesi (ulteriori info.)	to innovation - Acquire the ability and tools to empathize with users and beneficiaries - Develop critical thinking to frame and reframe user problems - Design innovative solutions building on user research and insights - Rapidly prototype a solution and test it with users - Conduct an innovation project (i.e., new product, service, or system) from start to end - Work collectively in heterogeneous teams and distribute workload M2: By the end of the course, students will: -Understand the basic principles of programming and algorithmic thinking. -Apply control structures, functions, and data structures in Python to solve simple computational problems. -Analyze the efficiency of algorithms using fundamental concepts of computational complexity. -Implement and evaluate classical algorithms such as sorting, recursion, and combinatorial optimization. -Develop logical reasoning and structured problem-solving skills transferable to entrepreneurial and managerial contexts.
Modalità di esame	M1: The evaluation is structured around the following components: -Project work (in teams) on an innovation project addressing the project challenge -Individual written reflection (3 short individual essays submitted at the beginning, middle and end of the course) -In-class participation: active engagement in class and in project reviews M2: Exam Structure The final M2 assessment is structured into three modules: Module 1 – Computer-based written exam on Python syntax: programming exercises in Python. This module may be completed

	during the course as part of a mid-term test. Module 2 – Paper-based written exam on computational complexity and recursion: exercises and multiple-choice questions. This module may also be completed during the course as part of a mid-term test. Module 3 – Paper-based written exam on fundamental computer science algorithms. This module must be completed exclusively during the official exam session. During the official exam session, students are therefore required to complete Module 3, together with any of the first two modules not successfully completed during the mid-term tests.
Criteri di valutazione	M1: The evaluation is structured around the following components: -Project work (in teams) on an innovation project addressing the project challenge -Individual written reflection (3 short individual essays submitted at the beginning, middle and end of the course) -In-class participation: active engagement in class and in project reviews M2: Assessment is based on correctness of code and answers, clarity of reasoning, and appropriate use of algorithms and complexity analysis. Grade is the weighted average of the exam's modules, based on the number of lessons' hours. The overall exam mark will be determined by the assessment of the two modules (M1+M2), using proportional weights based on the respective module credits, to calculate the final grade for the Growth Mindset course
Bibliografia obbligatoria	M1: The following readings constitute the core upon which the course is built. Specific readings will be provided as bibliography for each class. • Bland, D. J., & Osterwalder, A. (2019).¿*Testing business ideas: A field guide for rapid experimentation*. John Wiley & Sons. • Brown, T. (2009). *Change by Design: How Design Thinking*

	Transforms Organizations and Inspires Innovation. Harper Collins. - Knapp, J., Zeratsky, J., & Kowitz, B. (2016).¿*Sprint: How to solve big problems and test new ideas in just five days*. Simon and Schuster. - Osterwalder, A., Pigneur, Y., Bernarda, G., & Smith, A. (2015).¿*Value proposition design: How to create products and services customers want*. John Wiley & Sons. - Verganti, R. (2009).¿*Design driven innovation: changing the rules of competition by radically innovating what things mean*. Harvard Business Press. M2: There is no traditional textbook for this course. The learning material is created and developed during the lessons in the form of a course handbook. This handbook is built on a set of lecture notes (Jupyter notebooks), which are progressively completed during class together with the instructor. Students are expected to actively contribute by adding code, explanations, and personal notes, thus creating a customized and evolving resource that supports both in-class learning and individual study.
Bibliografia facoltativa	M1: The following readings constitute additional readings upon which the course is built. Specific readings will be provided as bibliography for each class. Blank, S. (2020).¿*The four steps to the epiphany: successful strategies for products that win*. John Wiley & Sons. Liedtka, J., Chen, E., Foley, N. & Kester, D. (2024).¿*The experimentation field book: a step-by-step project guide*. Columbia University Press. Martin, R. L. (2009).¿*The design of business*: *Why design thinking is the next competitive advantage*. Harvard Business Press. Osterwalder, A., & Pigneur, Y. (2010).¿*Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons. Ries, E. (2011). *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses.* Crown Business. Thiel, P. & Masters, B. (2014).¿*Zero to one: notes on start ups, or*

	how to build the future. Random House. Thomke, S. H. (2020).¿*Experimentation works: The surprising power of business experiments*. Harvard Business Press. Verganti, R. (2017). *Overcrowded. Designing meaningful products in a world awash with ideas.*¿MIT Press. M2: For those interested in further reading or deepening their understanding, the following books and web resources are are recommended (but not required):: • Horstmann C.S., Necaise R.D. (2019). *Python for Everyone.* John Wiley & Sons • Wirth, N. (1986). “Algorithms and data structures”. Prentice-Hall. • Official Python documentation: https://www.python.org/doc/
Altre informazioni	M2:The course makes use of Anaconda and Jupyter Notebook as the main tools for coding practice and exercises.
Obiettivi di Sviluppo Sostenibile (SDGs)	Buona occupazione e crescita economica, Istruzione di qualità

Modulo del corso

Titolo della parte costituente del corso	Design Thinking and Prototyping
Codice insegnamento	25555A
Settore Scientifico-Disciplinare	ICAR/13
Lingua	Inglese
Docenti	dr. Silvia Sanasi, Silvia.Sanasi@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/47276
Assistente	
Semestre	
CFU	6

Docente responsabile	
Ore didattica frontale	36
Ore di laboratorio	16
Ore di studio individuale	-
Ore di ricevimento previste	18
Sintesi contenuti	This project-based course introduces students to design thinking and prototyping as key tools for developing a growth mindset in the context of entrepreneurship and innovation management. Working in diverse teams, students tackle real-world challenges by designing and testing new product or service ideas. They will learn and apply the design thinking process alongside core principles from other foundational approaches to innovation and entrepreneurship, such as Design Sprint and the Lean Startup method. Due to the highly interactive, team- and project-based nature of the course, attendance is mandatory (min. 75%).
Argomenti dell'insegnamento	
Modalità di insegnamento	Lectures, laboratory activities, company visits, groupwork, individual reflection. In-person attendance is mandatory (min 75%)
Bibliografia obbligatoria	Bland, D. J., & Osterwalder, A. (2019). *Testing business ideas: A field guide for rapid experimentation*. John Wiley & Sons. Brown, T. (2009). *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation*. Harper Collins. Knapp, J., Zeratsky, J., & Kowitz, B. (2016). *Sprint: How to solve big problems and test new ideas in just five days*. Simon and Schuster. Osterwalder, A., Pigneur, Y., Bernarda, G., & Smith, A. (2015). *Value proposition design: How to create products and services customers want*. John Wiley & Sons. Verganti, R. (2009). *Design driven innovation: changing the rules of competition by radically innovating what things mean*. Harvard Business Press.
Bibliografia facoltativa	Blank, S. (2020). *The four steps to the epiphany: successful strategies for products that win*. John Wiley & Sons.

	Liedtka, J., Chen, E., Foley, N. & Kester, D. (2024). *The experimentation field book: a step-by-step project guide*. Columbia University Press. Martin, R. L. (2009). *The design of business*: *Why design thinking is the next competitive advantage*. Harvard Business Press. Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: a handbook for visionaries, game changers, and challengers*. John Wiley & Sons. Ries, E. (2011). *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses.* Crown Business. Thiel, P. & Masters, B. (2014). *Zero to one: notes on start ups, or how to build the future*. Random House. Thomke, S. H. (2020). *Experimentation works: The surprising power of business experiments*. Harvard Business Press. Verganti, R. (2017). *Overcrowded. Designing meaningful products in a world awash with ideas*. MIT Press.

Modulo del corso

Titolo della parte costituente del corso	Algorithmic Thinking and Coding
Codice insegnamento	25555B
Settore Scientifico-Disciplinare	ING-INF/05
Lingua	Inglese
Docenti	dott. Cristina Maria Gangai, CristinaMaria.Gangai@unibz.it https://www.unibz.it/en/faculties/economics-management/academic-staff/person/50466
Assistente	
Semestre	
CFU	8
Docente responsabile	
Ore didattica frontale	48
Ore di laboratorio	-

Ore di studio individuale	-
Ore di ricevimento previste	24
Sintesi contenuti	The course introduces students to the fundamentals of programming using Python, with a focus on syntax, control structures, and logical reasoning. It also covers essential topics in computational complexity and classical algorithms for solving problems such as sorting, recursion, and combinatorial optimization. The course is designed not to train professional programmers, but to foster a problem-solving mindset and a structured approach to thinking, particularly valuable for future entrepreneurs and project managers.
Argomenti dell'insegnamento	Course Topics – M2: 1. Introduction to Programming with Python: Basic syntax and program structure. Variables, data types, and operators. Input/output and simple scripts 2. Control Structures and Logical Reasoning: Conditional statements (if, if-else, nested conditions). Loops (for, while) and iteration strategies. Logical operators and Boolean reasoning 3. Functions and Problem Decomposition: Defining and calling functions. Parameters, return values, and scope. Modular programming and code reusability 4. Data Structures for Problem Solving: Lists, tuples, and strings. Sets and dictionaries: properties and use cases. Iterating over structured data 5. Algorithmic Thinking: Problem analysis and step-by-step reasoning. Designing algorithms using flowcharts 6. Foundations of Computational Complexity: Time and space complexity: intuitive introduction. Big-O notation and growth rates of functions. Practical comparisons of algorithm efficiency

	7. Classical Algorithms: Sorting algorithms (e.g., Bubble Sort, Merge Sort). Searching strategies (linear search, binary search). Recursion: principles and applications 8. Combinatorial Optimization and Graph Problems: Introduction to optimization problems (e.g., Knapsack problem). Shortest-path algorithms (e.g., Dijkstra’s algorithm)
Modalità di insegnamento	M2: The course combines lectures with interactive exercises, coding practice in Python, and problem-solving sessions.
Bibliografia obbligatoria	M2: There is no traditional textbook for this course. The learning material is created and developed during the lessons in the form of a course handbook. This handbook is built on a set of lecture notes (Jupyter notebooks), which are progressively completed during class together with the instructor. Students are expected to actively contribute by adding code, explanations, and personal notes, thus creating a customized and evolving resource that supports both in-class learning and individual study.
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