

Degree programme	Type	Course
Management of Smart and Sustainable Cities	OB	2

Contact lecturer

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Prerequisites

There are no specific prerequisites. However, students are expected to have basic previous knowledge of sustainability, circular economy, urban systems, digital technologies or project-based work will be useful but is not required.

Objectives

General Objective: The main objective of the course is to provide students with the theoretical concepts, practical tools and managerial skills required to design, plan, manage and evaluate projects in the field of smart and sustainable cities.

Theoretical Objectives: The course approaches project management as a key competence for urban transformation. Smart and sustainable city projects are not only technical interventions; they are complex socio-technical processes that involve infrastructures, technologies, institutions, citizens, environmental impacts, financial constraints, stakeholders and long-term governance challenges.

For this reason, the course connects project management fundamentals with future studies, planetary boundaries, doughnut economics, urban metabolism, circular economy, bioeconomy, sharing economy, impact evaluation, stakeholder theory, risk management and leadership. The course also introduces environmental and social justice as central dimensions of urban projects, asking students to consider who benefits from a project, who bears its costs, which territories are affected, and how value is distributed across communities and ecosystems.

The course pays particular attention to the territorial dimension of projects. Students will reflect on the relationship between city, region and bioregion, and will be introduced to regenerative development and design as an approach that connects project management with place-based ecological, social and cultural regeneration. This perspective helps students understand projects not only as isolated interventions, but as part of wider urban, regional and ecological systems.

Practical Objectives: Students will apply project management tools and methods to define project objectives, scope, deliverables, activities, costs, risks, stakeholders, impacts and implementation strategies. The course will develop their capacity to use tools such as stakeholder mapping, Theory of Change, Work Breakdown Structure, Gantt chart, PERT, risk matrix, impact indicators, dashboarding, collaborative digital tools and prototyping methods.

Project Objective: A central question of the course is: what kinds of projects, infrastructures and governance models are needed to support just, smart, circular and regenerative urban futures within planetary boundaries? The practical part of the course will be based on a group project. Students will choose between two territorial scales: the UAB campus as a living lab, or Barcelona and its metropolitan area. They will identify a challenge in one or more specific sectors and develop a complete project proposal including project design, cost estimation, impact evaluation, stakeholder mapping, risk analysis, communication strategy and a small prototype, mock-up or demonstrator.

Learning outcomes

- CM13 (Relate the knowledge and skills acquired with those provided by other technicians in interdisciplinary urban teams.) Relate the knowledge and skills acquired with those provided by other technicians in interdisciplinary urban teams.
- SM18 (Develop basic planning and planning instruments in the context of urban management.) Develop basic planning and planning instruments in the context of urban management.
- SM19 (Develop business projects related to the management, equity and sustainability of cities by applying elements of technological innovation.) Develop business projects related to the management, equity and sustainability of cities by applying elements of technological innovation.

Contents

THEORY

1. Future studies, urban transitions and sustainability paradigms

- i. Future studies, scenario thinking and visions of sustainable urban futures
- ii. Planetary boundaries, doughnut economics, urban metabolism and environmental justice
- iii. Industrial revolutions, smart cities and the shaping of the urban environment
- iv. Growth, post-growth, degrowth, circular economy, bioeconomy and sharing economy approaches to urban development

2. Project management: fundamentals, tools and urban applications

- i. Project management fundamentals: definition, structure, phases and types of projects
- ii. Project planning, organisation and execution: scope, deliverables, milestones and resources
- iii. Project management tools: project charter, WBS, Gantt chart, PERT, RACI matrix and dashboards
- iv. Projects vs infrastructures: megaprojects, natural megaprojects, and post-growth infrastructures

3. Impact evaluation, social value and decision-making

- i. Theory of Change: inputs, activities, outputs, outcomes and impacts
- ii. Types of impact: direct, indirect and induced impacts; social, environmental and economic impacts
- iii. Impact evaluation methods: input-output tables, Life Cycle Assessment, cost-benefit analysis and geospatial evaluation
- iv. Decision-making under complexity: Multi-Criteria Decision Analysis, integrated value and sustainability indicators

4. Risk management, finance and stakeholder governance
 - i. Risk identification, classification, prioritisation and mitigation strategies
 - ii. Financial reasoning: budgets, income statements, interest rates and discounting the future
 - iii. Stakeholder theory, stakeholder mapping, stakeholder salience and environmental conflict
 - iv. Governance of commons, social justice, integrated value and public value creation
5. Project manager, leadership and management methodologies
 - i. The project manager: roles, responsibilities, managerial functions and professional skills
 - ii. Leadership styles, communication, teamwork and conflict management
 - iii. Management methodologies: waterfall, lean, agile and collaborative approaches
 - iv. Project communication, reporting and final pitch
6. Region, bioregion and regenerative project design
 - i. Region, bioregion and place-based project management
 - ii. Regenerative development and design: from sustainability to regeneration
 - iii. Human and non-human agency, hyperobjects and long-term responsibility
 - iv. Natural megaprojects, ecological infrastructures and nature-based solutions

PRACTICE: GROUP PROJECT

Throughout the course, students will work in groups to develop a project proposal related to smart and sustainable cities. The final project will be based on the identification of a real sustainability challenge and the design of a feasible, impact-oriented and well-structured project response. In addition to the written proposal and oral presentation, each group will develop a small prototype, mock-up or demonstrator connected to their project idea. Students will choose one of two territorial scales:

Option 1: UAB Campus as a living lab: Students may identify a challenge within the Universitat Autònoma de Barcelona campus and propose a project that contributes to making the campus smarter, more sustainable, circular, inclusive and resilient.

Option 2: Barcelona and the metropolitan area: Students may identify a challenge in Barcelona or in the wider metropolitan area and propose a project addressing a specific urban sustainability problem.

In both options, students must identify a challenge related to one or more specific sectors. Possible sectors include organic waste, food systems, textile waste, circular fashion, urban heat island, green infrastructure, nature-based solutions, sustainable mobility, energy communities, building retrofitting, water management, climate adaptation, urban biodiversity, public space regeneration, digital platforms, biomaterials, circular bioeconomy and citizen participation.

PRACTICE: CLASSROOM EXERCISES

1. Three Horizons and future visioning
2. Urban metabolism and sectoral challenge mapping
3. Stakeholder mapping
4. Integrated value mapping

5. Theory of Change
6. Work Breakdown Structure and Gantt chart
7. PERT and project dependencies
8. Risk management matrix
9. Cost and impact estimation
10. Multi-Criteria Decision Analysis

PRACTICE: IT AND DIGITAL PROJECT TUTORIALS

1. Dashboarding with AI tools
2. GitHub and collaborative project management
3. No-code web applications, for example AppSheet
4. Maker spaces and open labs, including biomaterials and circular materials
5. Open data and urban project prototyping

Learning activities and methodology

Title	Hours	ECTS	Learning outcomes
Practical classes/Theoretical classes	45	1.8	
Preparation and study of the theoretical and practical contents	90	3.6	
Individual tutories	7.5	0.3	

Theoretical classes: Lectures on the concepts of the syllabus, with participation and intervention of the assistants.

Classes of resolution of case studies and real examples: Resolution of problems corresponding to the subject by the assistants. Discussion about the solution strategies, their analysis and their execution.

Preparation of papers and reports: Case studies that will be raised and solved by the people enrolled in the subject individually or in groups, from which they will make a report (written and / or multimedia).

We will work in a participatory and experimental way in groups and individually.

Annotation: within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continuous assessment activities

Title	Weight	Hours	ECTS	Learning outcomes
Theory evaluation (partial exams)	50%	4	0.16	CM13, SM18, SM19
Final group work (Design Thinking)	30%	0.5	0.02	CM13, SM19
Practical work in the classroom and reports	20%	3	0.12	CM13, SM18, SM19

Evaluation Criteria

This subject/module does not provide for the single evaluation system.

The contents of this subject will be evaluated continuously through partial exams and evaluations of the practical part reports:

- Theory evaluation (partial exams): 50% (25% + 25%)
- Final group work (Design Thinking): 30%
- Practical work in the classroom and reports: 20% (10% attendance + 10% practical work)

To pass the subject it will be necessary to obtain a 5 as a weighted global grade and a 3 out of 10 of each evaluation activity to be able to do average. Non-participation in any of the specific activities will be valued with a zero. MH = 10.

A student will be considered as "not evaluable" if he / she does not participate in any of the evaluation activities.

At the end of the course the professor will publish the final grades and the day, time and place of review of the exam. In case of a grade lower than 3.5, the student will have to redo the subject in the next course.

There will be a re-evaluation for those students who have not passed the subject and their final grade is equal to or greater than 3.5. The professors of the subject will decide the modality of this re-evaluation. In case of overcoming the re-evaluation, the final grade will be 5.

Evaluation Activities Calendar

The dates of the different evaluation tests (partial exams, exercises in the classroom, delivery of works, ...) will be announced well in advance during the semester.

"The programming of the evaluation tests cannot be modified, unless there is an exceptional and duly justified reason why an evaluation act cannot be carried out. In this case, the student is responsible for the qualifications, after consulting the teaching staff and to the affected students, they will propose a new program within the corresponding academic period." Section 1 of Article 115. Calendar of the evaluation activities (Academic Regulations UAB)

Recovery Process

"To participate in the recovery process the students must have been previously evaluated in a set of activities that represent at least two thirds of the total grade of the subject or module." Section 3 Article 112 ter. recovery (UAB Academic Regulations). Students must have obtained an average grade of the subject between 3.5 and 4.9.

The date of this test will be scheduled in the exam calendar. The student who presents himself and passes it will pass the subject with a grade of 5. Otherwise, he will keep the same grade.

Irregularities in Evaluation/Plagiarism

Notwithstanding other disciplinary measures deemed appropriate, and in accordance with current academic regulations, "in the event that the student makes any irregularity that could lead to a significant variation in the grade of an evaluation act, it will be scored with 0. This evaluation act, regardless of the disciplinary process that can be instructed. In case of several irregularities occur in the evaluation acts of the same subject, the final grade of this subject will be 0." Section 10 of Article 116. Results of the evaluation. (UAB Academic Regulations)

Use of AI

Permitted use: "In this subject, the use of Artificial Intelligence (AI) technologies is permitted as an integral part of the development of the work, provided that the final result reflects a significant contribution by the student in the analysis and personal reflection. The student must clearly identify which parts have been generated with this technology, specify the tools used and include a critical reflection on how these have influenced the

process and the final result of the activity. The lack of transparency in the use of AI will be considered a lack of academic honesty and may lead to a penalty in the grade of the activity, or greater sanctions in serious cases."

Bibliography

REQUIRED

Slides and ppt

OPTIONAL / TO SUPPORT SLIDES

Block 1. Future studies, urban transitions and sustainability paradigms

Raworth, K. (2018). *Doughnut economics: Seven ways to think like a 21st century economist*. Chelsea Green Publishing.

Steffen, W., Richardson, K., Rockström, J., Cornell, S. E., Fetzer, I., Bennett, E. M., ... & Sörlin, S. (2015). Planetary boundaries: Guiding human development on a changing planet. *science*, 347(6223), 1259855.

Meadows, D. (2008). *Thinking in systems: International bestseller*. chelsea green publishing.

Rifkin, J. (2014). *The zero marginal cost society: The internet of things, the collaborative commons, and the eclipse of capitalism*. Macmillan.

Geels, F. W. (2002). Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research policy*, 31(8-9), 1257-1274.

Pearce, D. W., & Turner, R. K. (1989). *Economics of natural resources and the environment*. Johns Hopkins University Press.

Bhatia, S. K., Joo, H. S., & Yang, Y. H. (2018). Biowaste-to-bioenergy using biological methods-a mini-review. *Energy conversion and management*, 177, 640-660.

Morton, T. (2013). *Hyperobjects: Philosophy and Ecology after the End of the World*. U of Minnesota Press.

Lehmann, H., Hinske, C., de Margerie, V., & Nikolova, A. S. (Eds.). (2022). *The impossibilities of the circular economy: Separating aspirations from reality*. Taylor & Francis.

Bocken, N. M., De Pauw, I., Bakker, C., & Van Der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of industrial and production engineering*, 33(5), 308-320.

Geissdoerfer, M., Savaget, P., Bocken, N. M., & Hultink, E. J. (2017). The Circular Economy-A new sustainability paradigm?. *Journal of cleaner production*, 143, 757-768.

Block 2. Project management: fundamentals, tools and urban applications

Project Management Institute. (2021, July). A Guide to the Project Management Body of Knowledge (PMBOK®Guide)-seventh Edition and The Standard for Project Management. Project Management Institute.

Flyvbjerg, Bent. 2014. "What You Should Know About Megaprojects and Why." *Project Management Journal*.

Flyvbjerg, B. (2017). Introduction: The iron law of megaproject management.

Lesutis, G. (2021). Infrastructural territorialisations: Mega-infrastructure and the (re) making of Kenya. *Political Geography*, 90, 102459.

Levinthal, R., & Weller, R. (2023). Mega-eco projects: a global assessment of large-scale ecological restoration initiatives. *Socio-Ecological Practice Research*, 5(3), 341-361.

Schramm, E., & Savini, F. (2026). Toward post-growth infrastructure: Features, logics, strategies. *Environment and Planning F*, 26349825261425484.

Block 3. Impact evaluation, social value and decision-making

Schoenmaker, D., & Schramade, W. (2023). *Corporate finance for long-term value*.

Serrat, Olivier. 2017. "Theories of Change." In *Knowledge Solutions*.

Laine, Matias, Helen Tregidga, and Jeffrey Unerman. 2021. *Sustainability Accounting and Accountability*. Routledge.

Cottafava, Dario, Laura Corazza, and Deborah Torchia. 2023. "Geo-Spatial Accounting for the Socio-Economic Impacts of Megaprojects." *Environmental Impact Assessment Review*.

Nourelfath, M., Lababidi, H. M., & Aldowaisan, T. (2022). Socio-economic impacts of strategic oil and gas megaprojects: A case study in Kuwait. *International Journal of Production Economics*, 246, 108416.

Siddiqui, O., Ishaq, H., Khan, D. A., & Fazel, H. (2024). Social cost-benefit analysis of different types of buses for sustainable public transportation. *Journal of Cleaner Production*, 438, 140656.

Block 4. Risk management, finance and stakeholder governance

Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. *Academy of management review*, 22(4), 853-886.

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Carroll, A. B. (1991). The pyramid of corporate social responsibility: Toward the moral management of organizational stakeholders. *Business horizons*, 34(4), 39-48.

Ostrom, Elinor. 1990. *Governing the Commons*. Cambridge University Press.

Cottafava, D., & Corazza, L. (2021). Co-design of a stakeholders' ecosystem: An assessment methodology by linking social network analysis, stakeholder theory and participatory mapping. *Kybernetes*, 50(3), 836-858.

Corazza, L., Cottafava, D., Torchia, D., & Dhir, A. (2024). Interpreting stakeholder ecosystems through relational stakeholder theory: The case of a highly contested megaproject. *Business Strategy and the Environment*, 33(3), 2384-2412.

Block 5. Project manager, leadership and management methodologies

Ries, Eric. 2011. *The Lean Startup*. Crown Business.

Osterwalder, Alexander, and Yves Pigneur. 2010. *Business Model Generation*. Wiley.

Schwaber, Ken, and Jeff Sutherland. 2020. *The Scrum Guide*. Scrum.org.

Kotter, John P. 2012. *Leading Change*. Harvard Business Review Press.

Goleman, D. (2005). *Emotional intelligence: Why it can matter more than IQ*. Bantam.

Rose, P. (2010). Transformational leadership and its relationship to adult 4-H volunteers' sense of empowerment in youth development settings. *Journal of Leadership Education*, 9(2), 58-71.

Heinz Weihrich, Mark V. Cannice, and Harold Koontz. 2019. *Management - A Global, Innovative and Entrepreneurial Perspective* (15th edition)

Block 6. Region, bioregion and regenerative project design

Regenesis Group. (2016). *Regenerative development and design: A framework for evolving sustainability*. John Wiley & Sons.

Morton, T. (2013). *Hyperobjects: Philosophy and Ecology after the End of the World*. U of Minnesota Press.

Lyle, J. T. (1996). *Regenerative design for sustainable development*. John Wiley & Sons.

Berg, P. (1991). What is bioregionalism?. *The Trumpeter*, 8(1).

Bebbington, A., Guggenheim, S., Olson, E., & Woolcock, M. (2004). Exploring social capital debates at the World Bank. *Journal of Development Studies*, 40(5), 33-64.

Sayer, J., Campbell, B., Petheram, L., Aldrich, M., Perez, M. R., Endamana, D., ... & Burgess, N. (2007). Assessing environment and development outcomes in conservation landscapes. *Biodiversity and Conservation*, 16(9), 2677-2694.

Bebbington, A. (1999). Capitals and capabilities: a framework for analyzing peasant viability, rural livelihoods and poverty. *World development*, 27(12), 2021-2044.

Software

Course groups and languages

The information provided is provisional until November 30. After this date, you will be able to consult the language of each group through this [link](#). To access the information, you will need to enter the course CODE

Type of teaching	Group	Language	Semester	Shift
(TE) Theory	61	Catalan/Spanish	first semester	afternoon
(PAUL) Classroom practices	611	Catalan/Spanish	first semester	afternoon