

CHANGE MANAGEMENT IN CIVIL ENGINEERING INFRASTRUCTURES

Description of the project

Recent world events have radically changed the vision of the future of the planet, redefining development priorities and bringing socio-economic and environmental sustainability issues back into focus. As a result, Civil and Environmental Engineering is undergoing a deep transformation, which will also materialise in new projects for civil infrastructures addressing the socio-economic and environmental sustainability criteria set as priorities by the National Recovery and Resilience Plan (PNRR). In this context, the digital transition enables new product-process tools to be employed in civil and environmental engineering. This results in a radical change of management paradigms for civil and environmental engineering infrastructures, starting from the management companies' organisational structure, promoting innovation in the world of related engineering companies. Higher Education Institutions are therefore required to guide this change by developing and implementing innovative approaches for infrastructures management in engineering education, interpreting rather than undergoing the change. New concepts of ecological, energy and digital transition are to be implemented into the research training to support engineers' traditional problem-solving activities, coupled with the "civil-industrial" sector to support its managerial transition, i.e., change of internal management processes of the related companies.

The PhD in Change Management in Civil Engineering Infrastructures (CMCEI), therefore, stands as a link between academic innovation paths and institutional and industrial stakeholders, with the aim to address issues related to ecological, energy and digital transition, as well as sustainability approaches for civil and environmental engineering infrastructures. This will be tackled through a multidisciplinary approach covering diverse CUN areas (Area 01 - Mathematical and Computer Sciences; 04 - Earth Sciences; 08 - Civil Engineering and Architecture; 09 - Industrial and Information Engineering) and several European Research Council sectors: PE1 Mathematics, PE8 Products and Processes Engineering; SH7 Human Mobility, Environment, and Space.

Course objectives

The CMCEI PhD Course has the strategic objective to focus on advanced technical and scientific training, aiming at both training a new generation of researchers to lead the future ecological, energy and digital transition and, simultaneously, incorporating the elements of change in terms of innovation, business models and processes, that are needed to achieve technological progress and sustainability objectives. Therefore, the aim is to create new figures of highly educated researchers and engineers who can deal with the complexity of technical-scientific issues in view of managing innovation and the change taking place in civil engineering infrastructures.

The academic prestige and the technical expertise incorporated in DICATECh - the largest Department in the Polytechnic University of Bari - are internationally recognised. Currently, DICATECh is facing the challenge of combining the strong technical design tradition in teaching and research with the urgent need to address the PNRR priorities. Furthermore, public and private stakeholders in the Civil and Environmental area are transforming to face the rapid social and economic changes, which increasingly require new skills in the management of innovation processes, the transition towards new business models and redesigning existing processes to support the implementation of business plans from the short (operational) to the long term (strategic). This process is driven by the need to control the quality of public investment with a focus on social and economic as well as environmental sustainability to accomplish the strategic needs of the PNRR.

Being aligned with the cultural plan of DICATECh, the CMCEI Doctorate fits well as a third level of education in the new Civil Engineering supply chain, integrating the concepts of ecological, energy and digital transition

with the already mentioned management transition. This is perfectly coherent with the implementation of the research prospects outlined in the National Research Plan, valorising the opportunities provided by the PNRR.

On a national and international scale, the research themes the Doctoral Program will deeply investigate are reflected in many of the objectives of the United Nations 2030 sustainability agenda. At the local level, they are perfectly aligned with the objectives of the Puglia Region Smart Specialization Strategy.

Expected occupational and professional opportunities.

The CMCEI Doctorate is aimed at creating a professional figure with high technical-scientific skills capable of managing in an integrated way the technical, economic, financial and social needs of planning, design and management of civil infrastructures, in the high complexity context that is increasingly characterizing future scenarios.

Therefore, the skills provided will enable highly innovative technical-scientific research activities to be carried out at universities, research institutions and public and private companies. Future PhD students will have the opportunity to hold roles of high responsibility in national and local government agencies for the Environment, Territory and Civil Infrastructures as high-level officials, as well as managers of large companies dealing with Civil Engineering. The advanced training provided can allow also the activity of chartered engineer, individually or in partnership, in national and international contexts, with high levels of competence and innovation.

Based on these elements, training activities will be aimed at guaranteeing a solid basic technical and scientific preparation, which will be followed by specialized interdisciplinary training. There will also be specialized training courses in specific SSDs if the doctoral student, consciously, intends to pursue a future as researcher at universities, public or private research bodies.