



Industrial Decarbonization through CCUS value chains

 Short Program |  3 Days |  English

 University Mohammed VI Polytechnic – Benguerir Campus

UM6P



Executive Education Science & Technology



The Executive Education Science & Technology (Exed S&T) program at Mohammed VI Polytechnic University (UM6P) supports executive leaders in Morocco and Africa in their development goals through diverse training programs led by recognized experts. Focused on science and technology domains such as digital, sustainable development, mining, renewable energy, Industry 4.0, and more, these courses enable participants to gain advanced knowledge and develop unique expertise in the market. This is achieved through a favorable, flexible, creative, and stimulating learning environment that encourages practical application through business cases.

Centered around science and technology, these programs align with UM6P's pedagogical project, bringing it closer to the realities of professionals. They also rely on high-quality multidisciplinary scientific research.

An Ecosystem for Research, Innovation, and Real-Scale Experimentation





Program

Summary

Carbon capture, utilization, and sequestration, CCUS, has the potential to be established as a huge knowledge-based industry incentivized by the need to cut 7% per year to meet the 1.5 °C global warming targets. CCUS is now recognized as a key tool for decarbonizing the hard-to-abate industry (e.g., phosphate, cement, waste-to-energy). Cheap renewable energy is key for enabling the massive deployment of such an industry while maximizing its environmental performance.

In this aspect, Africa is well positioned for accommodating the different value chains of the CCUS industry, given the large renewable energy potential, sequestration and mineralization resource availability, as well as the complementarity with the different priorities of the green hydrogen economy, biogenic energy, and water management. CCUS can boost those priorities, both as an enabler (e.g., use of the captured CO₂ from hard-to-abate industry to produce renewable methanol, jet fuel, green chemicals & fertilizers) and for waste handling. Carbon-negative pathways are also on the rise worldwide, driven by the need to suck CO₂ from the atmosphere, bringing large opportunities in the carbon credit market.

The deployment of CCUS can mitigate the negative impact of the newly established CBAM (Carbon Border Adjustment Mechanism) taxation being applied by the EU on imports, risking reducing African industry competitiveness, through increased costs.

Description

CCUS is a knowledge-based decarbonization pathway dictating acquiring specific engineering skills and a minimum understanding of the correct context (dependence on the hosting industry, geographical, political, legislative, and social).

This material will deliver a comprehensive education program on CCUS value chains for industrial decarbonization with dedicated training by experts to enhance the knowledge, skills, and mindset thinking of participants.

Program



Key Benefits

This is a unique, comprehensive program, blending several disciplines and methods, to assess CCUS value chains for industrial decarbonization purposes within an entrepreneurial mindset aiming to maximize the environmental benefits while maintaining economic and social growth.

Who Should Attend?

Engineers, energy & industrial consultants, environmentalists, geologists, chemists, entrepreneurs,
NB. A minimum master or engineering degree is accepted to enroll in the program.

What you will learn

This education program provides comprehensive material covering the CCUS value chain, addressing all the aspects affecting its industrial deployment (technical, economic, environmental, social, legislative, and financing). It will provide an introduction to the context of decarbonization and the role CCUS will play, as well as introduce the audience to the different technologies and CCUS pathways with the link to the targeted CO₂ industrial source, their involved costs, and environmental performance, then finishing with the required legislation, social & financing frameworks for deployment of such an industry.

The Courses

The program is articulated around six modules:

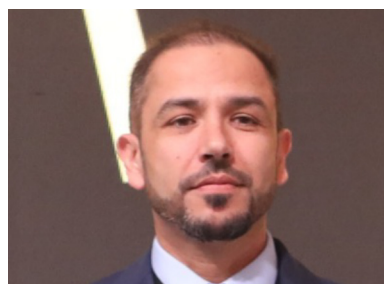
- 1 Carbon accounting, certification, market & Financing
- 2 CO₂ Capture from the different sectors
- 3 CO₂ handling, sequestration & utilisation
- 4 Chemical engineering in CCUS
- 5 Techno-economics of CCUS
- 6 Life Cycle, social, & policy assessments

Speakers



Pr. Abdelghafour ZAABOUT

Prof. Abdelghafour Zaabout is coordinating CCUS research efforts at Mohammed VI Polytechnic University, focusing on hard-to-abate industry decarbonization and carbon-negative energy solutions. He holds a Ph.D. in mechanical engineering (Fluidization) from Aix-Marseille University in France. He has over a decade of deep experience from Norway (Senior Scientist at SINTEF) and the Netherlands (a Postdoc at Eindhoven University of Technology) in development, upscaling, and commercialization of CCUS technologies, through several Norwegian and European projects. His activities covered various low-carbon technologies (e.g., blue and carbon-negative hydrogen production, decarbonization of hard-to-abate industries, Direct Air Capture, Power-to-X, etc.).



Pr. Youssef BELMABKHOUT

Pr. Youssef BELMABKHOUT is a Full Professor of Chemical and Process Engineering for Energy and Environment and Director of Applied Chemistry & Engineering Research Center of Excellence (ACER CoE) at Mohammed VI Polytechnic University (UM6P). He has a Ph.D. in Applied Sciences from the University of Mons (Belgium). Pr. Belmabkhout's doctoral expertise covers various aspects of reactive and non-reactive adsorption. He also holds a Chemical Engineering degree (oil and gas technologies) from the Gubkine «Russian State University of oil and gas in Moscow (Russia). Before he was appointed a professor at UM6P, Pr. Belmabkhout occupied a senior research scientist at KAUST and a few months in ICPET-NRC (Ottawa, Canada). He also held a research associate position in the chemistry department at the University of Ottawa (Ontario, Canada).

Speakers



Pr. Jamal CHAOUKI

Pr. CHAOUKI is full professor at Polytechnique, Montréal. He is an affiliated professor at UM6P.

He has supervised 53 PDFs and 52 PhDs. He published more than 450 articles in refereed journals and more than 320 in different reviewed proceedings and edited 34 books. He has 50 patents on different processes. He is a member of the Canadian Academy of Engineering. He received many awards.

He received the R.S. Jane Memorial Award in 2019 for an exceptional achievement to the field of chemical engineering or industrial chemistry in Canada and in 2020 the “Excellence in Research and Innovation Awards” at Polytechnique. Last year he received the SCI Kalev Pugi Award and Honoris Genius 2021 Innovation from OIQ. He is internationally recognized for his skills in process development and scale-up.

He has created 6 start-ups with his students (the last are Pyrowave and PyroCycle). His work is mainly dedicated to developing processes from waste, biomass, and complex feedstocks to heat & power, fuels, and chemicals.

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