



JOINT SUMMER SCHOOL PROGRAM RESILIENT COASTAL CITIES CHALLENGES, SOLUTIONS, AND FUTURE OPPORTUNITIES



7 – 10 September 2025







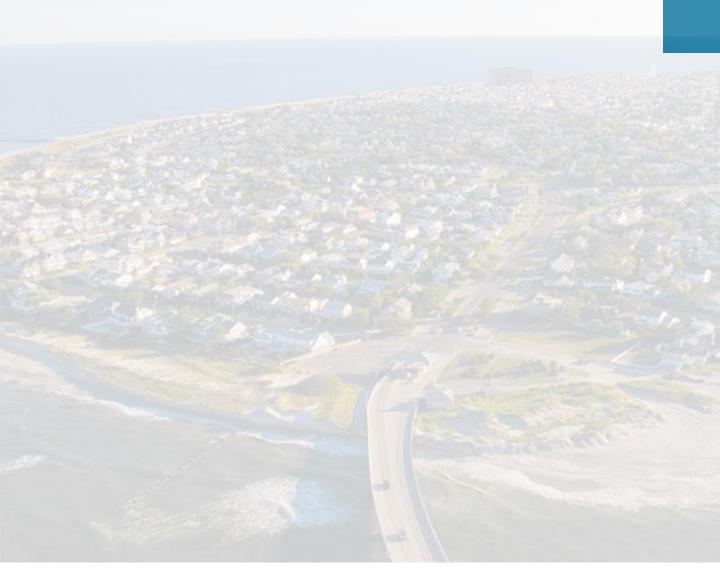










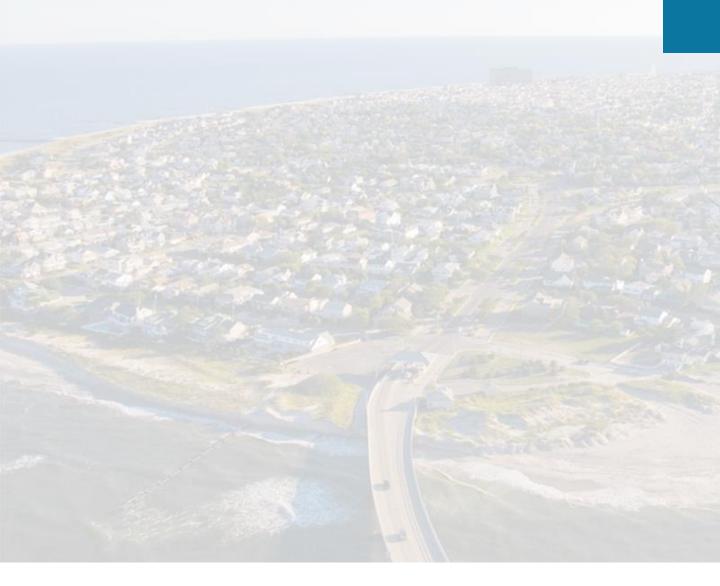


WELCOME MESSAGE

We are delighted to welcome students to this unique Summer School that combines engineering education with urgent real-world challenges. Coastal resilience is a national priority, and this program reflects our commitment to empowering students with the skills and mindset needed to design sustainable futures

This Summer School offers an exceptional opportunity to bring together young engineers, researchers, and practitioners from diverse disciplines to address the pressing issues facing our coastal cities. We look forward to inspiring collaboration, innovation, and knowledge exchange."





ABOUT THE ORGANIZERS

Benha University (BU)

Benha University is one of Egypt's leading public universities, with a strong tradition of academic excellence and societal engagement. BFE; Benha Faculty of Engineering promotes multidisciplinary learning, research, and innovation to address contemporary challenges in Egypt and beyond.

Egypt-Japan University of Science and Technology (E-JUST)

E-JUST is a unique university model that integrates advanced Japanese educational practices with Egyptian innovation priorities. Through its programs in sustainable architecture, smart cities, and environmental engineering, E-JUST fosters creativity, applied research, and global collaboration.





PROGRAM OVERVIEW

Introduction

Coastal cities are increasingly vulnerable to climate change, sea level rise, and rapid urbanization. The Summer School explores the concept of resilience—the capacity of cities to anticipate, adapt, and thrive in the face of challenges.

Objectives

- •Understand the environmental, social, and economic challenges facing Egyptian coastal cities.
- •Explore concepts of urban resilience and climate adaptation.
- •Develop sustainable engineering and design-based solutions.
- •Highlight career and research opportunities in coastal resilience, climate change, and smart urban planning.

Relevance to SDGs

The Summer School contributes to several United Nations Sustainable Development Goals (SDGs), including:

- •SDG 4: Quality Education
- •SDG 9: Industry, Innovation and Infrastructure
- •SDG 11: Sustainable Cities and Communities
- •SDG 13: Climate Action
- •SDG 14: Life Below Water
- •SDG 17: Partnerships for the Goals boratian.



Relevance of the Summer School Theme to the SDGs and Egypt Vision 2030:

The Summer School on "Resilient Coastal Cities: Challenges, Solutions, and Future Opportunities" is strongly aligned with the United Nations Sustainable Development Goals (SDGs) and with the strategic directions of Egypt Vision 2030.

First, the program directly contributes to **SDG 4: Quality Education** by providing participants with advanced, practice-oriented learning experiences that combine theory with real-world challenges. Through interactive workshops, group projects, and exposure to international perspectives, the Summer School enhanced knowledge and skills necessary for future leaders in sustainable urban development.

The emphasis on technological innovation and infrastructure resilience links to **SDG 9: Industry, Innovation and Infrastructure.** Participants explored the role of smart technologies, sustainable materials, and innovative planning approaches to strengthen the adaptive capacity of coastal cities while supporting sustainable economic growth.

Central to the theme is **SDG 11: Sustainable Cities and Communities**, as the program investigated strategies to design, plan, and manage coastal cities in ways that make them safe, inclusive, and resilient. Addressing sea-level rise, urban flooding, and coastal erosion directly supports the global ambition to ensure sustainability at the urban scale.

Given the direct relationship between coastal risks and global warming, the theme aligns strongly with **SDG 13: Climate Action**. Through scenario-based learning and exploration of green infrastructure, participants engaged in proactive approaches to mitigate greenhouse gas emissions and adapt to climate-induced hazards.

The ecological dimension was also integral, linking to **SDG 14: Life Below Water** and **SDG 15: Life on Land**. Resilient coastal cities cannot be achieved without protecting marine and terrestrial ecosystems. The program highlighted the importance of integrated planning that safeguards coastal biodiversity, reduces pollution, and balances urban growth with ecological preservation.

Finally, the school embodied the spirit of **SDG 17: Partnerships for the Goals**, by fostering collaboration between Egyptian and Japanese institutions, engaging faculty and students from diverse backgrounds, and creating an international platform for dialogue on shared sustainability challenges.

From a national perspective, these goals resonate with **Egypt Vision 2030**, particularly its environmental dimension (climate adaptation, natural resource protection), social dimension (improving quality of life and equity in urban environments), and economic dimension (promoting sustainable infrastructure, innovation, and the Blue Economy along Egypt's coasts). The theme of resilient coastal cities thus reflects not only a global agenda but also Egypt's strategic vision for sustainable and inclusive development.



















With the increasing impacts of climate change and rapid urbanization, sustaining and protecting coastal cities has become one of the most pressing global challenges. Rising sea levels, coastal erosion, flooding, and environmental degradation threaten not only ecosystems but also the livelihoods, housing, and infrastructure of millions of people worldwide. In response, many nations, supported by the United Nations and international organizations, are developing innovative strategies to build resilient and adaptive urban environments. These efforts align with the UN Sustainable Development Goals (SDGs), particularly those related to sustainable cities and communities, climate action, life below water, and global partnerships.

Against this backdrop, the Resilient Coastal Cities Summer School aims to provide an interdisciplinary and international learning platform for students and young professionals from various fields of engineering and related disciplines. The program focuses on understanding the environmental, social, and economic challenges facing coastal cities and exploring sustainable solutions through innovation, design thinking, and collaboration.

This Summer School offers participants the opportunity to engage with experts, researchers, and practitioners, to explore case studies, conduct field visits, and develop applied solutions that can support the resilience of coastal cities in Egypt and beyond. It fosters dialogue across disciplines—architecture, civil engineering, environmental engineering, energy, mechanical, and electrical engineering—reflecting the integrated approach required to address the complexity of coastal resilience.

Ultimately, the Summer School strives to empower a new generation of engineers and leaders who are capable of shaping sustainable coastal futures. It serves as a hub for knowledge sharing, creative problem-solving, and partnership building, highlighting opportunities for research, innovation, and career development in the vital fields of climate adaptation and resilient urban development.



JOINT SUMMER SCHOOL RESILIENT COASTAL CITIES CHALLENGES, SOLUTIONS, AND FUTURE OPPORTUNITIES



JOINT SUMMER SCHOOL

RESILIENT COASTAL CITIES CHALLENGES, SOLUTIONS, AND FUTURE OPPORTUNITIES

DAY 01

7:00 – 7:30

Gathering of students at the Faculty of Engineering, Benha University, and departure towards New Alamein City.

12:00 – 1:30

Arrival at the New Alamein City Authority headquarters and attendance of a lecture on the planning and development of New Alamein City.

1:30 - 2:00 | Break.

2:00 – 4:00

Field tour of major projects in New Alamein City, including the Beachfront Towers and North Square Mall.

4:00 – 5:00

Departure to the Egyptian Japanese University of Science and Technology (E-JUST) for accommodation.

5:00 onwards

Arrival at E-JUST campus, lunch, housing arrangements, and preparation for the next day's activities.



JOINT SUMMER SCHOOL

LECTURE ON

THE DEVELOPMENT OF NEW ALAMEIN CITY

DAY 01

Overview of the Lecture

As part of the Summer School program, participants had the opportunity to attend an insightful lecture delivered by **Eng. Ahmed Ibrahim**, the Head of the New Alamein City Authority, Ministry of Housing, Utilities and Urban Communities.

The lecture provided a comprehensive introduction to the concept of new urban communities in Egypt, shedding light on their national role as drivers for balanced urban growth, economic development, and regional integration. In particular, the session highlighted the planning vision and implementation strategies of **New Alamein City**, one of the flagship projects on Egypt's northwestern coast.



The presentation began with a broad overview of the rationale for establishing new cities, emphasizing their importance in reducing urban congestion, creating job opportunities, and fostering sustainable regional development. It then moved to an in-depth discussion of the master planning framework of New Alamein City, outlining its unique urban form, zoning strategy, and integration with surrounding territories.

A major focus of the lecture was the **technical and environmental challenges of marine works** in coastal areas. These included the complexity of shoreline protection, infrastructure resilience in saline conditions, and the innovative engineering solutions adopted to ensure safety and durability. The speaker also highlighted the **added value of waterfront development**, not only as a recreational and aesthetic asset, but also as a critical economic driver that enhances tourism, investment, and real estate opportunities.

The discussion further addressed **structural and maintenance challenges** that coastal cities typically face, with reference to international standards and local adaptations. Attention was drawn to long-term sustainability measures, including environmental safeguards, regular monitoring, and the integration of green building principles.

By the end of the session, participants gained a clearer understanding of how New Alamein City is envisioned as a model of sustainable coastal urbanism. The project illustrates how Egypt is leveraging its natural assets and strategic location to establish a new generation of cities that balance social needs, economic growth, and environmental stewardship. Importantly,

This lecture was particularly relevant to the Summer School theme, as it allowed students to connect theoretical knowledge in architecture, planning, and engineering with real-world applications in one of the country's most ambitious development projects.





Field Visit to New Alamein City

Following the lecture, participants were invited to join a guided field visit organized by the New Alamein City Authority. The tour offered students a first-hand experience of the city's most prominent development sites and allowed them to directly observe the scale and ambition of the ongoing projects.

One of the main highlights of the visit was the **iconic beachfront towers**, which stand as a landmark of New Alamein City's modern skyline. The group was introduced to the architectural vision behind these high-rise structures, their advanced construction technologies, and the way they are designed to redefine the urban and touristic character of the Mediterranean coast. Students were particularly interested in the engineering solutions adopted to address the challenges of building tall structures in a coastal environment exposed to wind loads, humidity, and saline conditions.



In addition to these sites, the visit provided valuable insights into the broader urban fabric of New Alamein City, illustrating how residential, commercial, and recreational zones are integrated into a cohesive master plan. Students were able to appreciate how infrastructure development, landscape design, and public spaces contribute to shaping the city's identity as both a year-round urban settlement and a premier coastal destination.

Overall, the field visit was an invaluable component of the Summer School experience, as it bridged the gap between theoretical learning and practical exposure. By engaging directly with ongoing construction and urban projects, students gained a deeper understanding of the opportunities and challenges of building sustainable coastal cities in Egypt.





RESILIENCE TOWARDS CLIMATE CHANGE IMPACTS

10:30 - 10:50

Opening Session

Prof. Sameh Nada - Prof. Zeinab Feisal

11:00 - 11:50

Introduction to Workshop Topic:

"Resilient Coastal Cities"

Prof. Dr. Zeinab Feisal

12:00 - 12:50

Urban Resilience: Concepts, Indicators, Applications

Dr. Rasha Mahmoud Gaber

13:00 - 13:50

Waterfront Development and Urban Resilience in Alexandria:

Navigating Post-Colonial Countries

Dr. Pakinam Hassan

14:00 - 15:00

Lunch Break

15:00 - 17:00

Working Groups: Discussions and Research on Challenges of

Egypt's Northern Coastal Zones





Opening Session

Prof. Sameh Nada - Prof. Zeinab Feisal

The Summer School commenced with an official opening session hosted at the Egypt-Japan University of Science and Technology (E-JUST).

Prof. Sameh Nada, Vice President of E-JUST, delivered a welcoming address to the students, introducing them to the university's vision, mission, and unique academic environment. In his remarks, he highlighted the importance of international collaboration and interdisciplinary approaches in addressing the pressing challenges of resilient coastal cities. His words set a positive and inspiring tone for the program, encouraging participants to actively engage in the upcoming sessions. Following his address, **Prof. Zeinab Feisal**, Dean of Benha Faculty of Engineering, Benha University, expressed her sincere appreciation to Prof. Nada and the university administration for their generous support and for hosting the program. She emphasized the value of this joint initiative in providing students with both academic knowledge and practical exposure, and acknowledged the vital role of E-JUST in ensuring the success of the Summer School.







JOINT SUMMER SCHOOL RESILIENT COASTAL CITIES CHALLENGES, SOLUTIONS, AND FUTURE OPPORTUNITIES

Day Two Activities

Following the opening session, the academic program of the Summer School began with a series of lectures and interactive discussions that introduced students to the core concepts of resilience in coastal cities.

The 2nd day started with an introductory lecture by **Prof. Zeinab Feisal**, who warmly welcomed the students and set the tone for the entire program by presenting the workshop theme: "Resilient Coastal Cities." In her comprehensive talk, she introduced the concept of **resilience** not only as a theoretical framework but also as a practical tool for understanding how cities can withstand and adapt to the pressures of climate change. She explained that resilience in coastal contexts goes beyond protecting against immediate hazards such as sea-level rise or extreme weather events, and extends to creating urban systems that are flexible, adaptive, and capable of recovering quickly from shocks.



Prof. Zeinab emphasized that resilience integrates **environmental**, **social**, **and economic dimensions**, and therefore requires multi-disciplinary approaches. She illustrated how resilience thinking can guide urban planners, architects, and engineers in designing sustainable solutions that safeguard vulnerable communities while enhancing the quality of urban life. Through case examples and references to international best practices, she highlighted how resilience has become central to global urban development agendas, linking it to the United Nations Sustainable Development Goals.

Furthermore, she outlined the **objectives of the Summer School**, making clear that the program was designed to strike a balance between **academic learning** and **applied teamwork**. Students were encouraged to approach the theme from both analytical and creative perspectives, engaging in group work that would allow them to test ideas, propose innovative solutions, and reflect on the real-world challenges faced by coastal cities. This opening lecture served not only as an academic foundation but also as an inspirational call for students to actively contribute to envisioning resilient futures for urban environments



LECTURE ON Urban Resilience: Concepts, Indicators, and Applications" Dr. Rasha Mahmoud Gaber

Overview of the Lecture

The second lecture, delivered by **Dr. Rasha Mahmoud Gaber** under the title "Urban Resilience: Concepts, Indicators & Applications", provided the students with a comprehensive framework for understanding resilience in urban contexts. She began by situating the discussion within the reality of rapid urbanization, describing the phenomenon of the **urban turn**, where unprecedented population growth in cities worldwide has magnified the complexity of urban systems and their exposure to risks. Against this backdrop, she outlined how cities today face an array of **shocks**—such as natural disasters, floods, and extreme climate events—as well as **chronic stressors**, including congestion, pollution, and social inequalities. These challenges, she argued, have prompted the global emergence of **urban resilience** as a vital concept in both academic discourse and urban policy-making.



Dr. Rasha defined **urban resilience** as the capacity of cities and human settlements to **resist**, **adapt**, **transform**, **and "bounce forward"** after experiencing disruptions. She emphasized that resilience is not merely about returning to the pre-crisis state but about leveraging crises as opportunities for transformation and innovation. In this sense, resilience becomes a proactive strategy for ensuring the **continuity and efficiency** of essential urban systems—whether physical, infrastructural, socio-economic, or institutional.

The lecture then delved into the **key qualities and characteristics of resilient cities**, highlighting adaptability, inclusivity, flexibility, redundancy, and the capacity for rapid recovery. Dr. Rasha presented the main **dimensions of resilience**—environmental, physical, social, economic, and governance—linking each to specific **indicators** that help assess a city's level of resilience. She explained how these indicators operate across different **levels of resilience**, ranging from the household and community scale to the metropolitan and national scales, and stressed the importance of integrated assessment tools for guiding urban planning and policy decisions.

In the final section, Dr. Rasha introduced the **strategy of resilience interventions**, describing how cities can move from assessment to action. She outlined pathways for embedding resilience into urban development, such as nature-based solutions, infrastructure upgrades, community engagement, and policy reform. To ground these ideas in practice, she concluded with two **case studies**: **Medellín**, **Colombia**, where resilience was fostered through innovative public transport systems and social urbanism, and **Teresina**, **Brazil**, where resilience strategies focused on flood management and participatory urban governance.

Her lecture offered the students both theoretical depth and practical insight, reinforcing the idea that resilience is a dynamic, multi-scalar, and context-specific process. It set the stage for later discussions and workshops, equipping participants with conceptual and analytical tools to critically examine resilience in coastal cities.



LECTURE ON "Waterfront Development and Urban Resilience in Alexandria: Navigating Post-Colonial Countries."

DAY 02

Dr. Pakinam Hassan

Lecture Overview

The lecture shed light on the unique context of Alexandria as a historic coastal city, where the interplay between heritage, development, and resilience creates both opportunities and challenges for sustainable urban futures. Dr. Pakinam began by situating Alexandria within the wider framework of post-colonial cities, emphasizing how historical legacies and inherited planning systems continue to shape patterns of urban growth and waterfront use. She explained that the city's identity is strongly tied to its waterfront, which has historically functioned as a cultural, economic, and social interface, but is now under pressure from rapid urbanization, climate change impacts, and competing development interests.



The lecture explored the tension between **heritage conservation** and **urban development**, noting that while preserving Alexandria's architectural and cultural assets is critical for resilience and identity, development pressures often prioritize short-term economic gains over long-term sustainability. She highlighted how resilience in this context requires innovative governance strategies that reconcile these competing demands, ensuring that the waterfront remains both functional and culturally significant.

Dr. Pakinam also discussed how **urban resilience frameworks** can be adapted to post-colonial contexts, where institutional capacity, governance structures, and socio-economic inequalities present particular constraints. She pointed out that resilience strategies in Alexandria must integrate not only environmental and infrastructural concerns, but also **historical memory, cultural values, and community aspirations.**

By presenting examples from Alexandria's ongoing development projects, she illustrated the risks of overlooking resilience principles—such as exclusionary waterfront redevelopment or inadequate responses to coastal risks—and contrasted them with more inclusive approaches that leverage heritage as a resource for sustainable growth. Her lecture encouraged the students to think critically about how resilience is contextual, and how cities like Alexandria can "navigate" their colonial pasts while charting new development pathways.

In conclusion, Dr. Pakinam stressed that building resilience in Alexandria's waterfront requires a balance between protecting heritage, fostering socio-economic development, and addressing environmental vulnerabilities. Her talk provided a nuanced perspective that enriched the Summer School discussions by linking resilience not only to technical planning but also to cultural identity and urban history.





TEAMWORK TASK

Objective

To ensure that students engage actively with the introductory lectures (climate change, coastal impacts, and urban resilience concepts) and demonstrate understanding through collaborative work.

- Students were divided into **small interdisciplinary groups** (5–6 students per team).
- Each team has been asked to work on a **reflection and synthesis task** based on the lectures.
- Deliverable: a **poster or short presentation (5–7 minutes)** summarizing their key insights.













"RESILIENT STRATEGIES AND APPLICATIONS"

10:00 - 10:50

Group Presentations on Findings from Day 1 Working groups share progress and insights on challenges of Egypt's Coastal Zones.

11:00 - 11:50

From Building to Urban Scale: Green Innovation to Mitigate Climate Change

Prof. Hatem Mahmoud

12:00 - 12:50

Green Grid Revolution in Smart Coastal Cities

Mohamed Ibrahim Zaki Amer

13:00 - 13:50

Modern Trends in Gas Detection for Environmental Applications Prof. Hassan Shokry (E-JUST)

14:00 - 15:00

Egypt's Adaptation and Protection Efforts for Climate Change: Towards Sustainable Coasts and Ports

Dr. Mahmoud Sharaan

15:00 - 16:00

Lunch Break

16:00 Onwards

Case Study: A Proposal for a Smart Resilient Coastal District Working groups with Teaching Assistants at E-JUST HQ





RESILIENCE TOWARDS CLIMATE CHANGE IMPACTS

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JOINT SUMMER SCHOOL

RESILIENT COASTAL CITIES CHALLENGES,
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DAY 03

Day Three Activities

The third day of the Summer School focused on the theme "Resilient Strategies and Applications" and built directly on the foundations laid during the 2nd day.

The 3rd day began with **group presentations**, where each team showcased the outcomes of their discussions from the previous afternoon. Students presented the **sites they had selected** along Egypt's coastal zones and outlined the **key challenges** identified—whether environmental, social, or infrastructural.

This exercise not only demonstrated the students' analytical skills but also set the stage for the day's lectures by linking theoretical knowledge with real-world problems. The presentations encouraged peer learning, as each group became exposed to a diverse range of contexts and issues.



























"From Building to Urban Scale:
Green Innovation to Mitigate Climate Change."
by Prof. Hatem Mahmoud
DAY 03

Lecture Highlight:

Dr. Hatem's lecture addressed the pressing challenges of sustainable architecture and urban design in the context of climate change, with a particular focus on the Egyptian urban environment. The lecture began by outlining the problem of urban sprawl and its consequences, particularly the Urban Heat Island (UHI) effect caused by changes in urban structure, land cover, and metabolism. This phenomenon increases energy consumption, degrades environmental quality, and undermines resilience in cities.



The concept of the **sustainable city** was then introduced. A sustainable city minimizes environmental impacts through well-structured urban planning, promotes efficient resource management, and supports sustainable consumption and production. Ideally, such a city is self-sufficient in energy, integrates green spaces, recycles waste into energy, adopts sustainable transportation, and manages natural resources responsibly. Dr. Hatem emphasized the alignment of these principles with **Egypt's Vision 2030**, which is connected to the UN Sustainable Development Goals (SDGs) and the African Union's Agenda 2063.

A significant part of the lecture addressed **urban morphology**, drawing on Conzen's framework that breaks urban form into land use, building form, plot patterns, and street patterns. The case study of **New Aswan City** was compared with selected districts in Greater Cairo using multiscale analysis (quarter–block–street). Results showed that morphological parameters such as **Sky View Factor (SVF)**, aspect ratio, and orientation play a decisive role in shaping microclimates. For instance, reduced SVF and enhanced shading significantly improved outdoor thermal comfort, while higher SVF values correlated with increased thermal stress.

At the **building scale**, the lecture presented innovative experiments in reusing construction and agro-waste to produce sustainable concrete blocks. Building energy simulations revealed that these blocks achieved an **energy efficiency improvement of up to 9.28%**, reducing electricity consumption for heating and cooling, and generating measurable economic savings for occupants. A prototype "test room" built with these blocks demonstrated superior thermal performance and reduced heat loss compared to conventional construction.

The lecture concluded by underlining the importance of **green innovation at both urban and building scales**. Integrating sustainable urban morphology, energy-efficient construction materials, and climate-responsive design represents a pathway to resilient Egyptian cities capable of mitigating climate change. Dr. Hatem highlighted that continuous experimentation, interdisciplinary research, and policy support are essential to ensure long-term sustainability and resilience in Egypt's new urban generations.



LECTURE ON:

"Egypt's Adaptation and Protection Efforts for Climate Change: Towards Sustainable Coasts and Ports."

Dr. Mahmoud Sharaan

DAY 03

Lecture Highlight:

though contributing minimally greenhouse gas emissions, is highly vulnerable to the impacts of climate change, particularly along its northern coastline and Nile Delta. These low-lying regions face significant risks from sea-level rise (SLR), coastal erosion, extreme weather events. Without adaptation, vast areas could be inundated by 2100, leading to severe environmental, economic, and social consequences. The Nile Delta and Mediterranean coasts host over 40% of Egypt's population, and their shorelines are vital for agriculture, tourism, and industry. Rising seas threaten beaches, lagoons, and coastal infrastructure, while also jeopardizing tourism and fisheries. Sustainable coastal management is therefore a national priority, guided by the principles of environmental, social, and economic balance.



Egypt has primarily adopted the protection strategy—reinforcing coastlines through seawalls, revetments, artificial dunes, and beach nourishment. These measures aim to safeguard existing infrastructure, reduce erosion, and protect communities. Projects such as New Mansoura City and national-scale fish farming also reflect attempts to integrate accommodation strategies alongside traditional defenses.

Ports, crucial for trade and economic growth, face additional challenges. Egypt operates around 53 seaports, many exposed to rising seas, stronger waves, and heavier storms. Alexandria and Damietta ports were studied to assess their vulnerabilities. Numerical modeling and surveys revealed that Alexandria, being directly coastal, is more exposed to wave overtopping, flooding, and structural instability, while Damietta's inland position offers relative resilience. Adaptation measures under consideration include enhancing breakwaters, elevating berths, improving drainage, and adopting cost-effective protective structures.

Research findings stress that adaptation approaches must be site-specific, integrating environmental and socio-economic factors. For Egypt, the protection approach remains the most feasible and effective option, though accommodation strategies can complement it in some contexts. Policymakers, port authorities, and stakeholders must prioritize proactive planning to mitigate risks before damages escalate.

In conclusion, Egypt's adaptation and protection efforts aim to strengthen coastal resilience, safeguard ports, and maintain sustainable development in the face of climate change. By combining structural defenses, regulatory measures, and long-term planning, Egypt seeks to secure its coastlines and ports while protecting the livelihoods of millions.



LECTURE ON:

"Green Grid Revolution in Smart Coastal Cities"

Dr. Mohamed Ibrahim Zaki Amer

DAY 03



The lecture provided insights into renewable energy integration and smart grid systems, underscoring the role of technological innovation in shaping resilient, future-ready coastal cities.

The lecture presented the Green Grid Revolution as a critical foundation for developing smart, sustainable, and resilient coastal cities, capable of addressing the challenges of rapid urbanization and climate change.

Key Points:

The Need for Smart Cities and a Green Grid:

- Driven by the expected doubling of the urban population by 2050, there is an urgent need for smart technologies to improve quality of life, enhance sustainability, and optimize resource management.
- Modern urban life is entirely dependent on a continuous and reliable electricity supply, creating a demand for smarter grids that support **sustainability**, **efficiency**, **and resilience**.

Defining the Smart Grid:

A Smart Grid is an advanced electricity network that uses digital technologies (sensors, communication networks, data analytics) to monitor, manage, and optimize energy flow from source to consumption in real-time.

It efficiently integrates renewable energy sources (e.g., solar, wind), reducing carbon emissions and promoting energy independence.

Challenges and Opportunities:

Challenges: Increased technological complexity introduces vulnerabilities to cyberattacks and system failures, requiring a careful balance between innovation and robust security.

Opportunities: Smart grids empower consumers to monitor and control their energy use, enable large-scale integration of renewables, and enhance long-term resource efficiency and cost savings.

Core Technologies and Components:

The revolution is powered by key technologies, including:

- Smart meters and appliances for consumption management.
- Advanced communication networks for data exchange and remote control.
- Sensors and real-time data analytics for proactive monitoring and maintenance.
- Energy Management Systems (EMS) for predicting demand, optimizing distribution, and enabling autonomous grid operation.

Conclusion: The Smart Green Grid is not a luxury but an imperative. It is the essential infrastructure needed to support the sustainable growth of smart coastal cities, ensure energy security, and mitigate environmental challenges in the 21st century.





In the afternoon, the students engaged in an **interactive case study exercise** titled "A Proposal for a Smart Resilient Coastal District." Under the guidance of teaching assistants, groups began drafting preliminary concepts for a district-scale resilience strategy. The task encouraged them to integrate ideas from the day's lectures—covering energy, infrastructure, environmental monitoring, and climate adaptation—into their proposals.

By the end of the 3rd day, participants had gained a clearer understanding of how resilience strategies can be translated into practice. The combination of group presentations, expert lectures, and applied exercises fostered teamwork, critical thinking, and interdisciplinary collaboration—skills that would prove essential in their final outputs.







From Collaboration to Recognition: Showcasing Projects and Awarding Certificates

10:00 - 11:20

Campus Tour at E-JUST: Participants explored the facilities, laboratories, and learning environment of the university.

11:30 - 13:20

Group Presentations: Each team showcased the outcomes of their collaborative work.

13:30 - 14:30

Closing Ceremony: Reflections on the summer school journey. Certificates Distribution: Awarding participants in recognition of their efforts and achievements.





The concluding day of the Summer School represented the culmination of a structured program of academic engagement, collaborative learning, and intercultural exchange. The day commenced with a **guided tour of the Egyptian Japanese University of Science and Technology (E-JUST)**. Participants were introduced to the university's educational facilities, laboratories, and research centers, thereby gaining an overview of the institution's academic infrastructure and its distinctive integration of Japanese pedagogical approaches within the Egyptian context.

Subsequently, the schedule proceeded with the **group project presentations**. Each group presented the outcomes of their collective work, developed over the course of the school. The presentations demonstrated the participants' ability to apply theoretical knowledge to practical contexts, to engage in interdisciplinary problem-solving, and to articulate their findings in a professional manner. The range of topics and the diversity of approaches reflected the richness of the academic dialogue fostered throughout the program.

Faculty members provided constructive feedback, underscoring the strengths of the projects and identifying avenues for further development.

The formal proceedings concluded with the **closing session and certificate distribution ceremony**. This session provided an opportunity to reflect on the overall achievements of the Summer School, to recognize the efforts of the participants, and to highlight the significance of the program in promoting sustainable architectural and engineering practices. The awarding of certificates served as a formal acknowledgment of the participants' commitment and contributions.

In summary, the final day encapsulated the core objectives of the Summer School: the consolidation of knowledge, the demonstration of collaborative outputs, and the formal recognition of academic achievement.





THE CLOSING SESSION: CERTIFICATE DISTRIBUTION CEREMONY







THEMATIC RECOMMENDATIONS EMERGING FROM THE SUMMER SCHOOL

1. Integration of Sustainability Principles in Design Education

Embed sustainability as a core component in architectural and engineering curricula to ensure future professionals adopt environmentally responsible practices.

2. Advancing Green Building Technologies

Encourage research and application of innovative materials, passive design strategies, and renewable energy solutions to mitigate climate change impacts.

3. Urban-Scale Sustainable Strategies

Promote planning and design approaches that extend beyond individual buildings to address neighborhood and city-wide resilience, including green infrastructure and smart mobility.

4. Community-Centered Design

Emphasize participatory approaches in project development, ensuring that local communities' needs and cultural contexts inform sustainable solutions.

5. Knowledge Exchange and International Collaboration

Strengthen academic and professional networks between Egyptian and Japanese institutions to share expertise and foster joint research on sustainability challenges.

6.Policy and Practice Alignment

Advocate for stronger links between academic research, professional practice, and public policy to accelerate the implementation of sustainable urban development.

