

5. IMaREC CURRICULA

IMaREC offers a Master of Engineering Degree M.Eng. in "Resource Efficient Cities". The program structure consists of 3 phases, as shown in Figure (2).

M.Eng. in Resource Efficient Cities (REC)

FIRST PHASE Core Courses (12 credit hours)	<p>Generic Knowledge</p> <ol style="list-style-type: none"> 1. City System and Urban Metabolism 2. Resources Economics and Management 3. Regulations and Institutions 4. Research Design and Methodology 						
SECOND PHASE Elective Courses (18 credit hours)	<p>Students study 4 courses (12 Credit Hours) from any of the specialized tracks with maximum 2 courses from the specific track, one course (3 Credit Hours) from the cross cutting courses (Methods and Tools), in addition to the Integrated Project course (3 Credit Hours), which is obligatory for all students.</p> <ul style="list-style-type: none"> • Specialized Tracks <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #f4a460;">1st Track: City Infrastructure</th> <th style="background-color: #f4a460;">2nd Track: Integrated Planning and Building Design</th> <th style="background-color: #f4a460;">3rd Track: Management and Governance</th> </tr> </thead> <tbody> <tr> <td style="background-color: #f4a460;"> <ol style="list-style-type: none"> 1. Water Management 2. Energy Management 3. Waste Management 4. Urban Agriculture 5. Sustainable Urban Mobility </td> <td style="background-color: #f4a460;"> <ol style="list-style-type: none"> 1. Sustainable Urban Form 2. Resource Efficient Buildings 3. Urban Ecology and Landscape 4. Smart Cities 5. Industrial Metabolism </td> <td style="background-color: #f4a460;"> <ol style="list-style-type: none"> 1. Governance and Participation 2. Regional Development and Circular Economy 3. Public Services Provision </td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Cross Cutting Courses <ul style="list-style-type: none"> o Methods and Tools <ol style="list-style-type: none"> 1. Geographic Information System (GIS) and Spatial Analysis 2. Life Cycle Assessment 3. Empirical Social Research 4. Energy flows in Building and Urban Areas 5. Renewable Energy Technologies Modeling 6. Water Networks Modeling o Integrated Project 	1 st Track: City Infrastructure	2 nd Track: Integrated Planning and Building Design	3 rd Track: Management and Governance	<ol style="list-style-type: none"> 1. Water Management 2. Energy Management 3. Waste Management 4. Urban Agriculture 5. Sustainable Urban Mobility 	<ol style="list-style-type: none"> 1. Sustainable Urban Form 2. Resource Efficient Buildings 3. Urban Ecology and Landscape 4. Smart Cities 5. Industrial Metabolism 	<ol style="list-style-type: none"> 1. Governance and Participation 2. Regional Development and Circular Economy 3. Public Services Provision
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THIRD PHASE	APPLIED RESEARCH (6 CREDIT HOURS)						

M.Eng. Study Program = 36 Credit Hours
Total of 10 courses (30 Credit Hours) + Applied Research (6 credit hours)

Figure (2): IMaREC Study Program Structure

6. HOW TO APPLY?

- Application will be online through the Faculty of Engineering <http://portal.eng.asu.edu/postgraduate/interprograms/listAll>
- Admission rules, tuition fees and required documents are announced on the webpage.
- Semester exchange in one of the 4 partner universities is possible either through funded scholarship or on a self-finance base.

7. CONTACT

ASU IMaREC Coordinator:



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 Ain Shams University
 Cairo, Egypt

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IMaREC.info@eng.asu.edu.eg

For more information, visit: <https://eng.asu.edu/IMaREC>

IMaREC Partners

Technology Arts Sciences TH Köln TH Köln (University of Applied Sciences)
 Cologne, Germany



Autonomous University of San Luis Potosi
 San Luis Potosi, Mexico



Kenyatta University
 Nairobi, Kenya



Universitas Gadjah Mada
 Yogyakarta, Indonesia

Supported by:

CNRD Centers for Natural Resources and Development

CNRD webpage: <http://www.cnrd.info/>

DAAD Deutscher Akademischer Austauschdienst
 German Academic Exchange Service

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 LOCAL-LEVEL CENTRES FOR
 INNOVATION, TRADE AND DEVELOPMENT

Federal Ministry
 for Economic Cooperation
 and Development



CNRD

Center for Natural Resources
 and Development



1. ABOUT IMaREC

IMaREC is jointly developed by 5 universities partners under the umbrella of the global **CNRD-Exceed Network of excellence** of universities, including Ain Shams University, Egypt; TH Köln University of Applied Sciences, Germany; Autonomous University of San Luis Potosi, Mexico; Kenyatta University, Kenya, and Universitas Gadjah Mada, Indonesia.

IMaREC targets to qualify graduates and professionals who are involved in planning, design, management and operation of cities with competences and skills that enable them to deal with real-life problems and respond to current pressing challenges in cities using an integrated approach, given the principle of city as a system of all sectors to provide the basic functions for its inhabitants on all scales.

2. IMaREC CONCEPT

Many cities of the global south suffer from key pressing challenges such as continuous population growth, severe energy crisis, water poverty issues, inadequate urban mobility, inefficient waste management, social disparity and inequality, and increasing level of pollution. Education and research respond to such challenges mostly by disciplinary approaches to technical or socio-economic solutions, but often lack a deliberate and integrated approach to the city as a system. Therefore, IMaREC targets to respond to these challenges from an integrated view of engineering, social sciences, economics and governance, where resource efficiency and sustainable consumption and production patterns are key aspects – tackling energy, water, transportation systems, food supply, urban design, resilience and much more. Additionally, the use of advanced and information technology to optimize the operations of cities is addressed through the concept of **“Smart Cities”** included in IMaREC. In terms of didactics, IMaREC adopts active learning approaches such as Problem Based Learning (PBL) and Enquiry Based Learning (EBL), among innovative approaches for students’ centered learning approaches.

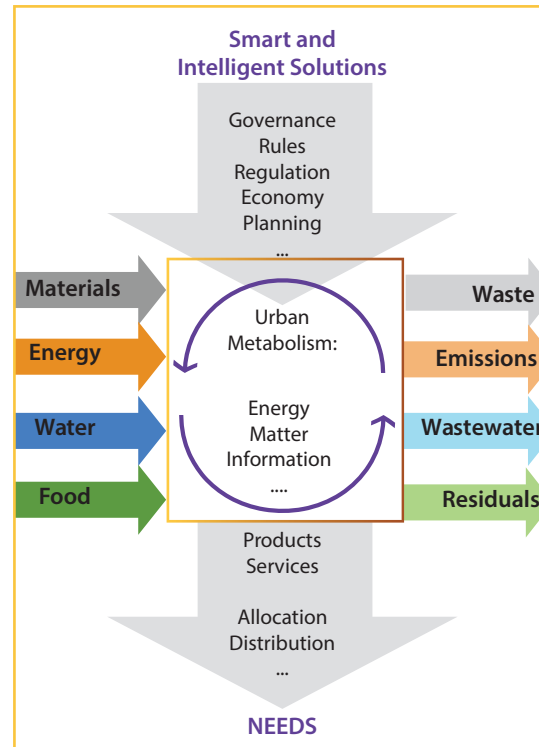


Figure (1) Simplified model of Urban Metabolism - IMaREC

IMaREC aims at directing education and research towards achieving progress to the Sustainable Development Goals (SDGs):

- **Goal 11 “Make cities and human settlements inclusive, safe and sustainable”**, along with other SDGs such as,
- Goal 6 “Ensure availability and sustainable use of water and sanitation for all”,
- Goal 7 “Ensure sustainable energy for all”, and
- Goal 9 “Promote sustainable infrastructure and industrialization and foster innovation”.

This concept comes also in line with the UNEP Initiative launched after the Rio+20 summit in Brazil, 2012: **“The Global Initiative for Resource Efficient Cities.**

3. IMaREC AIMS

- Contribute to the recognition of the role of resource efficiency for social equity, environmental protection and the overall sustainability of the city system.
- Equip graduates from different disciplinary backgrounds with the required knowledge and skills to deal with pressing challenges in cities from a deliberate and integrated approach to the city as a system.
- Provide knowledge to utilize and manage cities’ resource efficiency to balance environmental and social challenges with future demands.
- Provide insight into patterns of user demands and behaviour and how they affect the technology-environment interaction in the energy, water, food, waste, traffic and building sectors and thus the urban metabolism at large.
- Identify cross-sectoral efficiencies in the expanded nexus debate e.g. energy savings in the water sector, water efficiency in the food production, material vs. energetic use of waste.
- Support the local production potentials for natural resources, e.g. urban agriculture, water production (RWH), renewable energy potentials in the built environment.
- Distinguish simulation and modelling techniques as well as information technologies, e.g. “Smart City”.

4. WHO CAN APPLY?

Graduates and professionals from all Engineering disciplines can apply to enroll in IMaREC:

- Architectural Engineering (Architecture, Urban Planning, Urban Design, Landscape Architecture, Fine Arts, ...)
- Civil Engineering (Water and Sanitation, Waste, Transportation, Construction,...)
- Electrical Engineering (Energy, Power, Information Technology, Communication, ...)
- Mechanical Engineering (Energy, Production, Industry, ...)