

World Future Energy Summit 2014

Q&As

Masdar Institute of Science and Technology is an independent, research-driven graduate-level university focused on advanced energy and sustainable technologies. Established on the principles of environmental preservation and human capital development as outlined by the late Sheikh Zayed bin Sultan Al Nahyan, the Founding Father of the UAE, Masdar Institute exemplifies an unparalleled commitment by the Emirate of Abu Dhabi to take a leading role in the search for viable solutions that address today's energy challenges.

Masdar Institute is mandated to develop human capital in science and technology as well as R&D capacity with emphasis on advanced and sustainable technologies on issues of importance to the UAE and the region. Through industry and government sector collaborations, Masdar Institute has further intensified and expanded research areas to contribute towards obtaining clean energy solutions through innovation.

Serving as a key pillar of innovation and human capital, Masdar Institute also remains fundamental to Masdar's core objectives of developing Abu Dhabi's knowledge economy and finding solutions to humanity's toughest challenges such as climate change.

Collaboration with Massachusetts Institute of Technology (MIT), the founding partner, enables Masdar Institute to adopt a comprehensive approach and focus on research that is distinctive. Such an offering is a necessary ingredient for faculty and students to flourish within a unique learning environment at the heart of Masdar City in Abu Dhabi – an emerging global hub for future energy.

1) What is Masdar Institute's vision?

- To be a world-class graduate-level institution, seamlessly integrating research and education to produce future world leaders and critical thinkers in advanced energy and sustainability.
- To position Abu Dhabi as a knowledge hub and engine for socioeconomic growth.

2) What is the mission for Masdar Institute?

- To establish and continually evolve interdisciplinary, collaborative research and development capability in advanced energy and sustainability.
- To educate students to be innovators with the breadth and depth necessary to grow technology and enterprise regionally and globally.

3) How does Masdar Institute contribute to Masdar's wider objective?

Masdar Institute aspires to achieve full alignment of its research and development goals with those of its partner organizations including Masdar and other Abu Dhabi companies, various government entities and academic institutions in the UAE, across the region and worldwide.

This yields world-class capabilities in research and development that supports demonstration and deployment. As well, this alignment expedites human capital development and offers broader and richer educational opportunities to future generations. Always our focus is on areas of direct importance to Abu Dhabi and the region.

4) What are the Master's academic streams Masdar Institute is offering at present?

Currently, we offer eight MSc programs and a PhD program. They include:

- MSc Electrical Power Engineering
- MSc Engineering Systems and Management
- MSc Computing and Information Science
- MSc Materials Science and Engineering
- MSc Mechanical Engineering
- MSc Microsystems Engineering
- MSc Water and Environmental Engineering
- MSc Chemical Engineering
- PhD in Interdisciplinary Engineering

5) .What are the new departments and why were they set up?

Masdar Institute has grouped the eight Master's programs under four departments – the Department of Electrical Engineering and Computer Science (EECS), Department of Engineering Systems and Management (ESM), Department of Mechanical and Materials Engineering (MME) and the Department of Chemical and Environmental Engineering (CEE). The regrouping has provided adequate room for faculty development and evaluation. Following this, the number of faculty is expected to reach 120 across the four departments, enabling better distribution, co-advising and more populated courses for the students.

6) What are the iCenters and why are they set up?

Masdar Institute has launched five Institute Research Centers (iCenters) – Institute Center for Innovation and Entrepreneurship (iInnovation), Institute Center for Energy (iEnergy), Institute Center for Water and Environment (iWater), Institute Center for Microsystems (iMicro) and Institute Center for Smart and Sustainable Systems (iSmart). This is expected to consolidate all the existing research activities and support the next phase of growth as a research intensive regionally-focused but globally-recognized university.

7) What are Masdar Institute's values?

Commitment and passion: Committed to the goals of Abu Dhabi's leadership in transformation and diversification of the economy; passionate about educating leaders for a knowledge economy

Creativity and Initiative: Creativity in our academic programs, research, student support and other operations; encourage and reward initiative among faculty, staff and students

Diversity: Cultivate and embrace diversity as a critical source of creativity, innovation and insight especially for complex global issues of advanced and sustainable technologies

System thinking: Plan, operate and optimize the institute with a fundamental orientation of systems thinking; use the formidable global challenges of energy, water and climate change as our guide

Sustainable development: Maintain a fundamental focus on sustainability in our academic and research programs, while fostering a commitment to sustainability

Relevance: Strive to have our academic programs and R&D agenda to be consistent with major issues facing the world as well as issues relevant to local and regional industries and government.

8) What are the admission criteria at Masdar Institute?

A relevant undergraduate degree in the fields of science, engineering or information technology

A minimum CGPA of 3.0 (on a scale of 4.0) or equivalent (2nd class upper in the British system)

A minimum GRE Quantitative score of 155 (700 on the old scale)

A minimum TOEFL score of 91 (Internet based) or equivalent paper/computer based TOEFL, or a minimum academic IELTS score of 6.5.*

Application forms can be downloaded from <http://www.masdar.ac.ae/admissions>

Students can send all relevant information including their application forms, CVs, transcripts and basic information to info@masdar.ac.ae for possible consideration. Alternately, they can also use admissions@masdar.ac.ae

The Masdar Institute website offers adequate information on the various eligibility criteria for enrolling into any of the eight Master's programs and the PhD program.

Other instructions and guidelines are available on the website.

9) Can you give details on the September 2013 student intake?

In September 2013, the total number of enrolled students across all the academic programs reached 417; they hail from 58 countries;

The first batch of scientists and engineers received their Master's degrees in June 2011, which comprised 70 graduates in five academic programs;

The graduation of second batch of scientists and engineers in May 2012 included 54 graduates in seven Master's programs;

A total of 90 students of 2013 Class received their degrees in eight Master's programs in June 2013

The number of UAE nationals increased by more than 15% over the previous year; females represent 55% of all Emirati students.

10) What does Masdar Institute aim to achieve?

Student body is expected to grow to 600 - 800 over the next five years;

Further expand our contribution to the R&D drive with consistent support from the country's leadership;

Reach out to government and industry as our major stakeholders to strengthen our role in human capital building;

Continue to focus on projects and initiatives relevant to Abu Dhabi and the UAE;

Expand already established collaborations with government and private sector organizations as well as academic and research institutions globally;

Identify new ways to drive the culture of innovation and entrepreneurship in Abu Dhabi.

11) What is the composition of Masdar Institute's faculty?

Masdar Institute has 82 faculty members from over 20 countries, enabling students to benefit from a unique range of insights and experiences;

Masdar Institute faculty are graduates from leading international institutions including MIT, Stanford University, University of California – Berkeley, University of Michigan, Korea Advanced Institute of Science and Technology, University of Waterloo, Oxford University, Cambridge University and Harvard University

12) What does Masdar Institute aim to achieve in the next 12 months? And what were the achievements in 2013?

- Masdar Institute has one patent already issued, with 25 active patent applications pending and over 50 invention disclosures are outstanding;
- These are in addition to papers in 375 peer-reviewed journals, 196 conference proceedings, 19 book chapters, two full books and one trade publication.
- The 'UAE Solar Atlas' developed by the Research Center for Renewable Energy Mapping and Assessment (ReCREMA) at Masdar Institute in collaboration with the IRENA received the "Technology of The Year" award at the Middle East Solar Awards (MESA) 2013. Officially launched during the World Future Energy Summit in January 2013, the UAE Solar Atlas was made publicly available to the international community through the Global Atlas online portal that was developed by IRENA.
- Dr Fred Moavenzadeh, President, Masdar Institute, was named the Education CEO of the Year 2013 by the Gulf Business Industry Awards that aim to recognize the most successful businesses and leaders from various sectors.
- Research staff etched a silicon wafer for the first time in the UAE, marking the beginning of a new phase in advanced technology learning and innovation. With the etching of silicon wafer, the Masdar Institute Fabrication Facility has entered the operational phase.
- Two faculty members achieved a pioneering breakthrough in developing a novel membrane that can operate in an 'in-situ' cleaning system for desalination purposes. A patent application has been filed for the technology
- Three students successfully completed a semiconductor chip design using GlobalFoundries 65nm process, the first GlobalFoundries tape-out from the Middle East and North Africa (MENA) region. The 65nm wafers, taped-out at Masdar Institute, were finished processing at GlobalFoundries later.
- Two UAE national female students – Shaikha Al Zaabi and Noura Al Dhaheer – published a research paper in the prestigious 'The International Journal of Advanced Manufacturing Technology'. The paper identifies the principal barriers to implementing sustainable supply chain management (SSCM) in the fasteners manufacturing industry.
- Contribution of a PhD student and Research Assistant at Masdar Institute, towards finding the best solar cells for the Phonesat' project during his internship at NASA's Ames Research Center was rated among 'Top 100 Technology Projects' by 'Popular Science' Magazine.
- A PhD student also developed 'UltraSmart', an integrated device that can turn a smartphone into a powerful multipurpose tool for engineers and scientists at a cost of only US\$10. The 'UltraSmart' project was one of the four winners in the Intel Business Challenge Middle East & North Africa 2013 regional finals ceremony held in Abu Dhabi..

13) Do you offer scholarships or stipends?

Masdar Institute offers full scholarship.

In addition, Masdar Institute has also entered into collaboration agreements with other local organizations as part of the human development initiatives. For example,

A collaboration agreement in May 2012 with the ICT Fund of the Telecommunications Regulatory Authority (TRA) provides scholarships for 30 UAE national students to study ICT at Masdar Institute;

A landmark deal with Toyota Motor Corporation (January 2012) for a joint program offers annual scholarships to highly-qualified graduate students from around the world to work on projects in the area of technologies for sustainable development, more specifically, to facilitate research on the advancement of low-carbon emission vehicle technologies;

Collaboration with Siemens on a long-term R&D program for Smart Grids, Smart Buildings (SGSB), and Carbon Capture and Storage (CSS) in the form of scholarships and R&D funding;

An agreement with the International Renewable Energy Agency (IRENA) awards up to 20 scholarships annually to talented students across the eight Master's programs;

14) Is Masdar Institute a research-driven academic institution?

Research takes up a major portion of the students' and faculty's time, and ground-breaking research work is currently underway. Integrating education, research and scholarly activities, Masdar Institute prepares students to be innovators, creative scientists, researchers and critical thinkers in technology development, systems integration and policy.

The learning environment seeks to establish and continually evolve interdisciplinary, collaborative R&D capabilities in advanced energy and sustainability.

Some of the research focus areas include Clean, Affordable Energy; Equitable Access to Water; Robust, Healthy Environment; and Sustainable Economic Development with projects covering solar energy, energy efficiency, carbon sequestration, smart grids, waste-to-energy and water. It also has a number of projects with patent pending.

15) Are there any interesting facts about your faculty team, especially in relation to your collaboration with MIT in the US? What is the nature of your collaboration with MIT?

Masdar Institute currently has 81 faculty members from more than 20 countries, enabling students to benefit from a unique range of insights and experiences;

Masdar Institute faculty are graduates from leading international institutions including MIT, Stanford University, University of California – Berkeley, University of Michigan, Korea Advanced Institute of Science and Technology, University of Waterloo, Oxford University, Cambridge University and Harvard University

Our collaboration with the Massachusetts Institute of Technology (MIT) enables us to adopt a comprehensive approach and focus on research that is distinctive, offering the necessary ingredients for faculty and students to flourish within a unique learning environment at the heart of Abu Dhabi – an emerging global hub for future energy. We take an integrative, multidisciplinary approach to research and teaching.

Masdar Institute's full-time faculty spend up to one year at MIT in Cambridge, Massachusetts, working with MIT faculty members on joint research projects – especially topics relevant to Abu Dhabi - and audit graduate level classes that they will eventually teach in Abu Dhabi.

MIT is a primary partner and stakeholder in the creation and the operation of Masdar Institute as a whole. The tie-up with MIT represents various layers.

16) Does Masdar Institute have outreach initiatives or programs?

The **Young Future Energy Leaders (YFEL) program** is a Masdar Institute initiative that aims to empower, educate and inspire students and young professionals. YFEL organizes various activities including participation in local and international events to engage students and encourage them in finding solutions to the challenges of climate change and energy security. YFEL also offers an opportunity to meet and network with students and professionals from around the world.

In addition, an annual **research-based summer internship program** for UAE national university seniors and/or those graduating with science, engineering or computer science as major subjects; these projects focused on areas such as carbon capture and storage (CCS), water recycling, solar energy, applications for healthcare data and power grid systems simulations

Ektashif, a residential program for UAE National graduates that offers students a perfect platform to understand and operate within the cutting-edge laboratory environment at Masdar Institute

17) What are the main features of Masdar Institute Phase 1B?

Following the completion of phase 1B, the Masdar Institute currently has the following facilities:

- 9 open laboratories
- 2 clean rooms
- 13 hi-bay laboratories
- A 90-seat auditorium
- 12 classrooms
- 324 student apartments

18) What are some of the special features at Masdar Institute campus?

A **Personal Rapid Transit** (PRT) system, which transports people via renewable energy powered vehicles

A **Wind Tower** that rises 45 meters above the podium – which is a modern interpretation of the region's most widely-known traditional architectural feature; the tower captures cooler winds and direct them to the open-air public square at its base; it has sensors at the top of the steel structure operating high-level louvers to open in the direction of the prevailing winds and to close in other directions to divert wind down the tower; a polytetrafluoroethylene (PTFE) membrane carries the wind downward, while dehumidifiers and misters at the top add additional cooling to the air; the tower also has LED lighting that displays red light when energy use in the campus becomes excessive and blue when it is acceptable;

Laboratory building structures with air-filled ethylene tetrafluoroethylen (ETFE) cushions that ensure almost no solar gain on the structures and limit the heat radiated to the street;

Residence buildings featuring red sand-colored undulating glass reinforced concrete (GRC) screens that replicate the function of the traditional Arab 'mashrabiya' screens; they provide shade from the sun, thus preventing solar gain on the building walls;

The **Knowledge Center** with domed roof of the center to optimize the building's photovoltaic (PV) energy harvesting, based on its orientation, the inclination of the PV panels, and maximization of the roof's surface area; its windows are shaded to prevent direct sunlight from reaching inside.

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