UNESCO Chair on Engineering Education (UCEE)

Annual Report 2022-2023

- **Title of the Chair:** UNESCO Chair on Engineering Education, UCEE (https://ucee.ut.ac.ir & enged.ir)
- **Host Institution:** University of Tehran, Iran, (www.ut.ac.ir)
- **Date of establishment of the Chair:** April 26, 2014
- **Period of activity under report:** April 2022-April 2023
- **Report composed by:** Hossein Memarian, UNESCO Chair holder for Engineering Education, and Professor of Geo-engineering, University of Tehran, (https://profile.ut.ac.ir/en/~memarian)

- **The third confirmation of the UCEE activities:** In a letter dated 19 Dec 2022 to the Chancellor of the University of Tehran, the United Nations Scientific, Cultural, and Educational Organization (UNESCO), renewed the validity of the Agreement of the UNESCO Chair on Engineering Education, at the University of Tehran (ID 1057), for another four years, until 31 Dec. 2026.

1. Executive Summary

The primary initiative for launching the UNESCO Chair on Engineering Education (UCEE) started in 2010. The Chair was officially founded on April 26, 2014, at a ceremony, in the presence of UNESCO Director General, **Ms. Irina Bokova**, and the president of the University of Tehran. The first annual report of the Chair was presented in May 2015.

The following report covers the activities of the Chair from April 2022 to April 2023. The main activities and research projects of the Chair during the report period can be summarized as follows:

- **Educational design:** Designing new courses and educational programs for engineering education.
- **Educational Training:** Holding educational workshops and courses on Engineering Education.
- **Lecture:** Conducting oral and virtual presentations in various areas of engineering education, at different universities and professional centers.
- **Research:** Conducting research projects in different areas of engineering education.
- **Publications:** Publishing new books and research articles in engineering education.
- **Contribution:** Being active members of engineering education-related societies and institutions.

2. Activities

2-1. Education/Training/Research

2-1-1. Education (leading to certificate)

Continuing the implementation and management of the new graduate program "Master of Engineering Education", which is the first of its kind in Iran. The fourth group of applicants was admitted to this program in September 2022.

2-1-2. Training (short-term)

2-1-3. Research

The Chair carried out several research projects during the reporting period. The results of these projects were presented to the Chair's Steering Committee. During its monthly meetings, the steering committee approved the results of the following research projects. Most of these projects were implemented at the College of Engineering of the University of Tehran. They were also posted on the website of the Chair as "Educational Suggestions" to be used by other universities.

Educational Innovations (Small-Scale Research Projects)

The investigations and research were completed in the reporting period and were promoted and posted on the website of the Chair under the general title of educational innovations (as noted by our slogan: small steps for a better future). Besides, one of the goals of the UNESCO Chair in Engineering Education is to observe findings and innovations in various aspects of engineering education and share them with academic colleagues and other interested parties.

1. **Iran Institute for Accreditation of Engineering Education (IIAEE):** How and through what organizations are the nation's engineering education programs validated and accredited? https://enged.ir/cms/113162
2. **Course alignment:** How do we ensure that the activities we do to design a course, prepare its resources, and present it in class will achieve the course's learning objectives? https://enged.ir/cms/113160
3. **Self-regulated learning:** What is self-regulated learning? What steps does the self-regulated learning cycle consist of? How can we empower students and faculty to take responsibility for their learning? https://enged.ir/cms/113105
4. **Identifying learning styles:** How can we Identify our learning style? How can that help with learning? https://enged.ir/cms/113095
5. **Evaluating the effectiveness of the educational program:** What is the logic model of education? How can the effectiveness of an educational program be measured using the logic model? https://enged.ir/cms/113082
6. **Universal Design for Learning (UDL):** What does Universal Design for Learning (UDL) mean? What are the principles of inclusive learning design? https://enged.ir/cms/113076
7. **Preparation for teamwork:** Why do so many student teamwork fail? What information does the Johari window provide? https://enged.ir/cms/113075

8. **UNESCO goals for education:** What are the goals and achievements of the UNESCO Chair on Engineering Education? https://enged.ir/cms/123239
9. **Questions and answers and learning:** What type of questions and in what delivery format can increase students' motivation to learn and lead to active learning? https://enged.ir/cms/123219
10. **Soft skills and employment:** It is known that "An individual's expertise and educational qualifications invite them to an employment interview. However, what determines the final selection of a person among many job applicants is the set of their competencies and skills". https://enged.ir/cms/113187

Supervising Engineering Education MSc theses (successfully defended)

1. The pathology of e-learning in the context of engineering education and developing a novel instructional design framework for blended learning.
2. Design of an engineering faculty development program in the area of teaching and learning.
3. Predicting university classrooms' mode of instruction in the post-Covid world with the help of data mining approaches

2-2. Conference/Meeting

2-2-1. Conferences/organizational activities undertaken by the Chair

1. Webinar: **"How to improve the quality of Iran's engineering education programs?"**. The webinar was held By Professor Hossein Memarian (UCEE Chairholder), on 15 February 2023 at the 86th meeting of the UCEE Steering Committee
2. Webinar: "**The roles and expectations of university leadership**," by Professor Mahmoud Nili Ahmadabadi (former president of the University of Tehran). The webinar was held on 21 December 2022 during the 85th meeting of the UCEE Steering Committee.
3. Webinar: **"Past, present, and future of teaching assistant training at the Faculty of Engineering, University of Tehran"** by Dr. Ramtin Khosravi on 21 December 2022 at the 85th meeting of the UCEE Steering Committee.
4. Webinar: **"Analysis of online engineering education during the COVID-19 crisis and a proposed blended learning design framework for the future"** by Sama Ghoreishi (MSc thesis research report) on 19 October 2022 at the 84th meeting of the UCEE Steering Committee.
5. Webinar: **"Designing a professional development program for engineering faculty members in teaching and learning"** by Sara Mosavi Sadr (MSc thesis research report) on 19 October 2022 at the 84th meeting of the UCEE Steering Committee.
6. Webinar: "**Effective teaching to achieve deep learning by combining face-to-face and online methods**"; by Dr. Seyed Omid Fatemi, on 17 August 2022 at the 83rd meeting of the Steering Committee of the UCEE.
7. Webinar: "**What can be done for the future of basic sciences and engineering**?" by Professor Ali Rejali, on 15 June 2022 at the 82nd meeting of the UCEE Steering Committee.

8. Webinar: **"Universal Design for Learning (UDL)"**, by Dr. Hossein Memarian, on 18 August 2022 at the 83rd meeting of the UCEE Steering Committee.

9. Webinar**:** "**Necessity of accreditation in engineering education and its mechanism**", by Professor Hossein Memarian (UCEE Chairholder) in Noshirvani University, on 25 April 2022. About 70 faculty members of this university attended this webinar.

10. Webinar: **"Mechanism for improving the quality of engineering education in Iran",** by the chairholder at the Engineering Education Evaluation Committee, Iranian Society of Engineering Education (ISEE), on 7 January 2022.

11. Panelist: **"Beneficiaries of the quality assurance (QA) and evaluation system in higher education", UCEE Chairholder,** at the Conference on Quality Evaluation in Academic Systems on 9 November 2022.

12. Lecture: **"Why humanitarian engineering?"** by Dr. Mehdi Kolahi, on 19 April 2023, during the 87th meeting of the UCEE Steering Committee
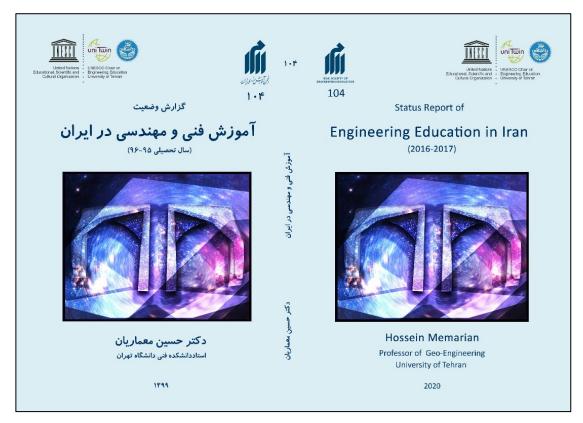
2-3. Interuniversity Exchange/Partnerships

- Iranian Society of Engineering Education branch, in the University of Tehran: Based on an agreement between the Iranian Society of Engineering Education (ISEE), and the UNESCO Chair on Engineering Education (UCEE), the Steering Committee of the UCEE was appointed as the branch of the Iranian Society of Engineering Education (ISEE) at the University of Tehran. The elected board members of the ISEE branch, are Dr. Arash Bahrami, Dr. Ramtin Khosravi, Dr. Banafsheh Zahraei, and Dr. Hossein Memarian.
- Board members of the Iran Society of Engineering Education (ISEE);
- Board members and Iranian Institute for Accreditation of Engineering Education (IIAEE),
- Center for the Quality Assessment of the College of Engineering of the University of Tehran,
- Associate member, Engineering Branch of the Academy of Sciences of Iran.

2-4. Publication

2-4-1. Books

− The electronic version of the book "**Engineering Education in Iran (2016-2017)**", is released on the web. This book, which is written by the chair holder, provides a historical context, spanning more than eight decades since the dawn of higher education in Iran. It details the evolution of engineering education, reflecting the population growth and the increasing interest in higher education in the country, which has led to much demand from applicants for each educational opportunity.

2-4-2. Article

Memarian Hossein, 2023. **Designing a multi-modal approach for evaluating the educational performance of faculty members**, 8th Iran Society of Engineering Education conference (ISEE 8), University of Science and Technology, Tehran, November 15 and 16, 2023.

3. Future Plans and Development Prospects

3-1. Current Investigations and Research:

Continuing the current educational, research, and collaborative activities

- How to increase the role of creative thinking in engineering education.
- Developing online courseware for engineering faculty development
- …

Appendix

1. Human Resources:

The Chair structure consists of the Steering Committee, the Board of Advisors, and the Office of the Chair.

Steering Committee: The role of this committee is to propose the general guidelines and monitor the macro policy of the Chair, by regular monthly meetings. Over 20 members of this committee (including 12 full professors) represent different fields of engineering at the College of Engineering, University of Tehran.

Advisory Board: The purpose of the advisory board is to provide consultation in the area of macro engineering education and to establish links between the UNESCO Chair on Engineering Education and other related centers at national, regional, and international levels. The members of the advisory board are pioneer professors in the fields of engineering and pedagogy and experts from industry.

Chair Office: Technical staff and secretary.

2. Financial Resources

* Almost all the research projects and activities of UCEE are based on Volunteer work.

Financial contributions (specified amounts in U.S. dollars)

- Host Institution: University of Tehran: $ 800
- NGO: Fanni Foundation (supports of College of Engineering, University of Tehran): $3000
- Honorariums received by the Chair holder for presenting courses, workshops, and lectures: $ 900

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