



# UNESCO Chair on Engineering Education (UCEE)

September 2020

- **Title of the Chair:** UNESCO Chair on Engineering Education, UCEE ([www.ucee.ut.ac.ir](http://www.ucee.ut.ac.ir))
- **Host Institution:** University of Tehran, Iran, ([www.ut.ac.ir](http://www.ut.ac.ir))
- **Date of establishment of the Chair:** April 26, 2014
- **Period of activity under report:** April 2019-April 2020
- **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>)

UNESCO Chair on Engineering Education (UCEE) has carried out various activities and research projects during last year. Although the Covid-19 crisis has led to the cessation of some face-to-face activities and meetings, UCEE has tried its best to focus on improving virtual educational activities.

## 1. Executive Summary

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

This report covers the activity of the Chair for the period of April 2019 to April 2020. Given the specific circumstances during the Covid-19 crisis in the early months of 2020, the main activities and research projects can be summarized as follows:

- **Educational design:** Designing new educational programs for engineering education.
- **Educational Training:** Holding diverse educational workshops for the professional development of faculty members and teaching assistants (TA).
- **Lecture:** Oral and virtual presentations in various areas of engineering, at different universities and professional centers.
- **Research:** Conducting diverse research projects on different areas of engineering education.
- **Publications:** Publishing new book and research articles in engineering education.
- **Contribution:** Active member of:
  - The board of Iran Society of Engineering Education (ISEE)
  - Iran Accreditation Institute for Engineering Education (IAIEE)
  - Center for the Quality Assessment of College of Engineering of University of Tehran
  - Engineering Branch of Academy of Sciences of Iran

- ISEE's branch in University of Tehran
- **Cooperation**<sup>1</sup>: National and international relations with signing memorandum of understandings (MPU's) for joint cooperation with universities, societies and related organizations and associations.

## 2. Activities

### 2-1. Education/Training/Research

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

- Implemented the new graduate program "*Master of Engineering Education*", which is the first of its kind in Iran, and admitted the first group of engineering students in the Faculty of Engineering of University of Tehran in September 2019.
- Designed and implemented a series of workshops in various categories for professional development of faculty members and teaching-learning skills of teaching assistants (TAs) concerning the following purposes. At the end of each workshop/course, a certificate is granted to the participants.
  - A) Being prepared for teaching**
    1. Engineering education
    2. Learning objectives
    3. Course design (**new**)
  - B) Teaching and learning**
    4. Learning mechanism
    5. Active learning
    6. Principles of good practice
    7. Teaching experiences
    8. Educational innovations
    9. TA training
  - C) Educational assessment**
    10. Learning assessment
    11. Learning assessment by rubric
    12. Program accreditation
    13. Curriculum mapping (**new**)
    14. Internal assessment of educational programs
    15. External assessment of educational programs (for assessors)
  - D) Organizing engineering education**
    16. Engineering ethics
    17. Quality management of engineering education (**new**)
    18. Student counseling (for supervisors)
    19. Promoting learning motivation
    20. Challenges of engineering education in Iran
  - E) Engineering training planning**
    21. Teaching engineering design
    22. Online engineering education (**new**)
    23. Preparing educational resources

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<sup>1</sup> <http://ucee.ut.ac.ir/cms/42337>

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

During the report period, several workshops were presented for the professional development of faculty members and teaching assistants (TAs). Some of these workshops were presented in conjunction with Iranian Society of Engineering Education (ISEE) and its branches in some universities, and Centre for Quality Assurance of the College of Engineering, University of Tehran:

- 4 days educational course of “professional development”, for faculty members of the Colleges of Engineering in University of Tehran and several other universities, University of Tehran (September 14-17, 2019).



Four days faculty development educational course, September 2019

- Workshops on TA training (or successful teaching assistantship), for teaching assistants of the Colleges of Engineering, University of Tehran (April 24, October 21 & 23, 2019).



TA training workshop, October 2019

- A workshop on “How to enroll and manage the workshop for TA training (or successful teaching assistantship)”, for faculty members who were interested in and were members of Iranian Society of Engineering Education (ISEE), University of Tehran (24 April, 2019).



A workshop on “How to develop and present a workshop for TA training”, April 2019

- A workshop on “Program Accreditation, based on ABET standards”, for faculty members of Iran University of Science and Technology (10 July, 2019).



The workshop on “Program Accreditation, based on ABET standards”, 10 July 2019

- A workshop on “Mechanism of internal assessment of engineering programs”, for representatives of seven universities, applying for accreditation, Iran Accreditation Institute for Engineering Education, IAIEE (19 December, 2019).



The workshop on “Mechanism of internal assessment of engineering education programs”, December 2019

At the end of each workshop/course, a certificate was granted to the participants.

### 2-1-3. Research

Several research projects were carried out by the Chair during the report period. The results of these projects were presented to the Chair’s steering committee. The 19 members of this committee represent different fields of engineering at the College of Engineering of the University of Tehran. The steering committee approved the results of the following research projects during its monthly meetings. Most of these approvals were implemented at the College of Engineering of the University of Tehran and were also posted on the website of the Chair to be used by other universities.

Title of research projects carried out by the Chair during the report period are:

- On the occasion of the 10<sup>th</sup> anniversary of the establishment of the Iranian Society of Engineering Education (ISEE):
  1. “*Ten outstanding innovations in engineering education*”; by Dr. Abbas Bazargan, member of the Strategic Council of UCEE
  2. “*An Investigation on the barriers of quality assessment in engineering education*”; by

Dr. Abbas Bazargan, member of the Strategic Council of UCEE

3. *“Ten outstanding actions done in the last decade to promote engineering education in Iran”*; by Dr. Hossein Memarian, the Chair holder

- **Educational Suggestions:**

1. Teaching and learning mechanism
2. Flipped learning
3. Innovation station
4. Literacy: past, present and future

## 2-2. Conference/Meeting

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

- Participated in the activities planned by the Iranian Society of Engineering Education (ISEE) in occasion of its 10<sup>th</sup> anniversary (started: 15 May, 2019).
- Established the branch of Iranian society of Engineering Education (ISEE) in University of Tehran (30 June, 2019).
- Introduced UCEE activities in the 27<sup>th</sup> Annual International Conference of the Iranian Society of Mechanical Engineers and the 7<sup>th</sup> Conference of the Thermal Power Plant Industry to (30 April, 2019).



27<sup>th</sup> Annual International Conference of the Iranian Society of Mechanical Engineers, April 2019

- Participated in the virtual joint meeting of UNESCO Chairs of the University of Tehran (12 May, 2020).



The joint meeting of UNESCO Chairs of the University of Tehran, May 2020.

- Participated in the opening ceremony of UNESCO Chair on Popularization of Science; National Research Institute for Science Policy (13 January, 2020).
- Participated in the round table meeting “Innovation in engineering education: challenges and prospects” held in the 6<sup>th</sup> International Conference on Engineering Education in Iran (20 December, 2919).
- Submitted a call for sharing teaching-learning experiences in engineering education, special for engineering faculty members; (November, 2019)
- Awarded prize to the winner of the 3<sup>rd</sup> competition of Post-Tomorrow Ideas in Civil Engineering competition (?? & December, 2019)



Third competition of Post-Tomorrow Ideas in Civil Engineering ?? & December, 2019

### 1-2-2. A selection of international conference presentations by the Chair

A representative of UNESCO Chair on Engineering Education participated in the “The second Malaysia-UNESCO Cooperation Program (MUCP) expert synthesis meeting”, Malaysia (23-24 September, 2019)





The second Malaysia-UNESCO Cooperation Program (MUCP) expert synthesis meeting

23-24 September, 2019

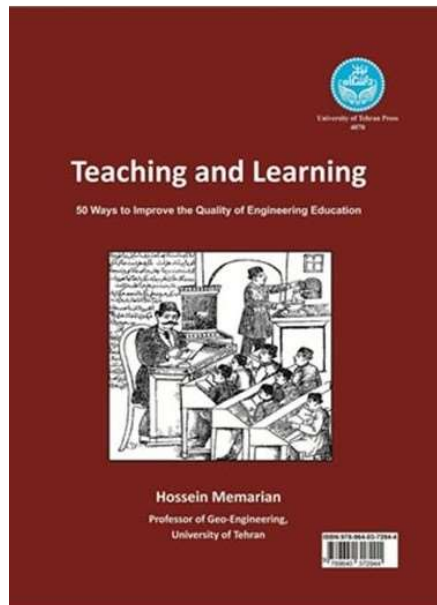
### **2-3. Interuniversity Exchange/Partnerships**

- The Chair-holder and Dr. Ramtin Khosravi, member of the strategic council of UCEE, were invited to teach the first course of TA training workshops (or successful teaching assistantship) for teaching assistants of the Colleges of Engineering, Sharif University of Technology (2 October, 2019). More than 600 TAs participated in those workshops.
- The Chair-holder gave a lecture on "The role of supervisors in engineering education", in the gathering of Sharif University of Technology engineering supervisors (9 October, 2019)
- The Chair-holder participated in the gathering of engineering faculty members of KNT University of Technology (7 May, 2019). The presenters shared their innovative educational experiences to improve the quality of education.

### **2-4. Publication**

#### **2-4-1. Book**

Memarian H. 2019. Teaching and Learning: 50 Ways to Improve the Quality of Engineering Education, 313 pp. (<http://ucee.ut.ac.ir/cms/112914>)



#### 2-4-2. Journal Articles (refereed)

- Memarian H. 2019. Faculty development for Iranian engineering education programs. “Design and implementation of Master of engineering education program”, Academy of Science of Iran, No. 85. pp 1-21.

#### 2-4-3. Multimedia Materials (Video):

- Lectures presented in the round meeting held in the 6<sup>th</sup> International Conference on Engineering Education in Iran by Dr. Hossein Memarian, the Chair holder and Dr. Abbas Bazargan, member of the Strategic Council of UCEE. (20 December, 2019).



The round meeting held in the 6<sup>th</sup> International Conference on Engineering Education

- Updated and maintained the bilingual website of the UNESCO Chair on Engineering Education ([ucee.ut.ac.ir](http://ucee.ut.ac.ir))
- Promoted UCEE activities through publishing the fourth and fifth electronic newsletters (<http://ucee.ut.ac.ir/cms/42334>)



#### 2-4-4. Cooperation with UNESCO Headquarters, Field Offices

- Active participation in the “The Second Malaysia-UNESCO Cooperation Program (MUCP) Expert Synthesis Meeting”, Malaysia, 23-24 September, 2019
- Active participation in the joint meeting of UNESCO Chairs of the University of Tehran, 12 May, 2020

### 3. Future Plans and Development Prospects

- Cooperation with universities and related centers to expand the process of accreditation of engineering education in Iran
- Supporting research projects on challenges of engineering education
- Defining prizes for the best research projects on engineering education
- Holding training courses and workshops for professional development of faculty members and teaching assistants (TA)
- Promoting the process of retraining engineers employed in industry and seeking industry collaboration to promote the professional engineer (PE) program in the country
- Designing and implementing new educational courses and workshops
- Presenting educational and research advice and services to universities, organizations and industry
- Expanding the activities of the Chair to the neighboring countries and others in the region, with the aim of establishing the “Regional Center for Engineering Education”
- Establishing links with related international centers and other UNESCO Chairs, in order to exchange the findings
- Planning to join the world conventions in the area of engineering education (e.g. Washington Accord).
- Implementing “International Master of Engineering Education” program for international applicants in September 202
- Issuing the first report on monitoring the situation of engineering education in Iran

## Appendix

### 1. Human Resources:

The Chair structure consists of the steering Committee, board of advisors and the office of the Chair holder.

- **Strategic Council:** The role of strategic council is to propose the general guidelines and monitor the macro policy of the Chair. The 18 members of this council (including 12 full professors) represent different fields of engineering at the College of Engineering, University of Tehran.
- **Advisory Board:** The purpose of advisory board is to provide consultation in the area of macro engineering education and to establish links between 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. (<http://www.ucee.ut.ac.ir/cms/42311>)

- **Chair Office:** Technical staff and secretary.

## 2. Financial Resources

Financial contribution and specify the amount in U.S. dollars

- Host Institution: 35000 \$
- NGO: 4000 \$

## 3. Space

- A 120 square meter office, with three personnel

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