



PROGRESS REPORT

- **Title of the Chair:** UNESCO Chair on Engineering Education, www.ucee.ac.ir, ucee@ut.ac.ir
- **Host Institution:** University of Tehran, www.ut.ac.ir
- **Date of formal establishment of the chair:** 26 April 2014
- **Period of activity under report:** April 2015 to April 2016
- **Report established by:** Hossein Memarian UNESCO Chairholder for Engineering Education, and Professor of Geo-engineering, University of Tehran, <https://rtis2.ut.ac.ir/cv/memarian/?lang=en-gb>

1. Executive Summary

The primary initiative in launching UNESCO Chair on Engineering Education was started in 2010. This Chair was founded officially on April 26, 2014 in 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 2015 to April 2016. The main activities and research projects performed in the mentioned period can be summarized as follows:

- **Accreditation:** Publishing guidelines and offering advice for internal assessment and supervising the external assessment of engineering programs of different universities.
- **Research:** Conducting diverse research projects on different areas of engineering education.
- **Educational design:** Designing new courses and educational programs for engineering education.
- **Publications:** Publishing research articles in different areas of engineering education.
- **Lecture:** Oral presentations in different universities and professional centers, in various areas of engineering education.
- **Training:** Holding diverse educational workshops for the professional development of faculty members and teaching assistants.
- **Contribution:** Active member of the boards of directors 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 and Engineering Branch of Academy of Sciences of Iran.
- **Cooperation:** National and international relations with signing memorandum of understandings (MOU's) for joint cooperation with universities, societies and related organizations and associations.

- **Establishment:** Designing and maintaining the bilingual website of the UNESCO Chair on Engineering Education (ucee.ut.ac.ir).

More details of the chair activities can be found in our bilingual website (ucee.ut.ac.ir).

۲. Activities

2-1. Education/Training/Research

i. Education (Course design)

- Re-evaluating BSc final project (capstone course) of engineering programs, and publishing its textbook. This proposal, after endorsement of the strategic council of the chair (September 16, 2015) was approved by the educational committee of the Faculty of Engineering (March 7, 2016) to start running.
- Designing a new graduate program “Masters of Engineering Education”. This program which is the first of its kind in Iran, was approved by the strategic council of the chair (February 17, 2016) and forwarded to the Faculty of Engineering for further actions.
- Designing a series of workshops for professional development of faculty members and teaching-learning skills of teaching assistants:
 ۱. **Preparing educational objectives**
 ۲. **Learning-teaching styles**
 ۳. **Teaching experiences**
 ۴. **Measuring learning outcomes**
 ۵. **Accreditation of Engineering Programs**
 ۶. **Preparing educational materials**
 ۷. **Deficiencies of Iran Engineering Education**
 ۸. **Standard Engineering Education**
 ۹. **Engineering Ethics**
 ۱۰. **Successful Teaching Assistantship**

ii. Training (Workshops)

During the report period, several workshops are presented for the professional development of faculty members and training of teaching assistants (TA). These workshops are presented in conjunction with the Centre for Quality Assurance of the College of Engineering, University of Tehran. At the end of each workshop, a certificate is granted to participants.

۱. **Mechanism of internal assessment of engineering programs**, for managers and representatives of College of Science, University of Tehran (January 1, 2015)
۲. **Mechanism of internal assessment of engineering programs**, for managers and representatives of K. N. Toosi University of Technology (January 29, 2015)
۳. **Teaching experiences**, for faculty members of the College of Engineering, University of Tehran (May 6, 2015)

- ۴. **Mechanism of internal assessment of engineering programs**, for managers and representatives of School of Metallurgy and Materials Engineering, College of Engineering, University of Tehran (July 4, 2015)
- ۵. **Successful teaching assistantship (TA)**, for teaching assistants of the College of Engineering, University of Tehran (October 11, 2015)
- ۶. **Successful teaching assistantship (TA)**, for teaching assistants of the College of Engineering, University of Tehran (October 14, 2015)
- ۷. **Mechanism of internal assessment of engineering programs**, for managers and representatives of K. N. Toosi University of Technology (November 23, 2015)
- ۸. **Mechanism of internal assessment of engineering programs**, for managers and representatives of College of Science, University of Tehran (January 18, 2016)
- ۹. **Learning and teaching styles**, for faculty members of the College of Engineering, University of Tehran (February 2, 2016)
- ۱۰. **Preparing educational objectives**, for faculty members of the College of Engineering, University of Tehran (February 17, 2016)
- ۱۱. **Measuring learning outcomes**, for faculty members of the College of Engineering, University of Tehran (February 29, 2016)
- ۱۲. **Successful teaching assistantship (TA)**, for teaching assistants of the College of Engineering, University of Tehran (March 2, 2016)
- ۱۳. **Learning and teaching styles**, for faculty members of the College of Engineering, University of Tehran (March 3, 2016)
- ۱۴. **Successful teaching assistantship (TA)**, for teaching assistants of K. N. Toosi, (March 9, 2016)



2015/10/11



2015/10/14



2016/03/02



2016/03/09

Selected workshops for teaching assistants



2015/05/06



2016/02/02



2016/02/17



2016/02/29

Selected workshops for faculty development

iii. Research

Several research projects were carried out by the chair during the report period. The results of these researches were presented to the chair's strategic council. The 15 members of this board represent different fields of engineering at the College of Engineering of the University of Tehran. Strategic council approved the following research projects during its monthly meetings. Most of these approvals are implemented at the College of Engineering of University of Tehran and also are posted on the website of the chair to be used by other universities.

- Recognizing students in the Dean's List, which is a list of students recognized by the dean of each school of engineering for their academic achievement during a term. This guideline was approved by the strategic council (December 18, 2013) and the College of engineering (February 8, 2016) and implemented.
- New procedure and guideline for assessment of faculty members' teaching abilities. This research project was approved by the chair's strategic council (January 14, 2015) and college of engineering (February 8, 2016) and was implemented.
- Redesigning the bachelor degree final project (capstone course) of engineering programs (March 7, 2016)
- Designing a new "Master of Engineering Education program" for Iran higher education system (February 17, 2016)
- The challenges of teaching assistants in engineering programs (underway)
- The role of published research papers in promotion of faculty members (underway)

- Comprehensive program for professional development of faculty members of engineering schools (underway)

2-2. Conferences/Meetings

i. Key Conferences and Workshops hosted by the Chair

1. Afghan-German-Iran educational seminar

Holding a one-day educational seminar on "Development of mining and geological education curriculum in Afghanistan to meet current and future needs of the industry". Faculty members from Germany, Afghanistan and Iran attended this meeting. Organizations such as DAAD and GIZ from Germany, Geological Survey of Iran and the School of Mining Engineering of University of Tehran has been supporters of this program. This seminar which aims to develop mining and geological engineering education at universities in Afghanistan was held on School of Mining Engineering of University of Tehran on September 10 of 2015.

The chairholder presented the range of workshops, training course and other services that the chair can conduct to promote teaching-learning skills of faculty members in mining and geology programs of Afghanistan universities. This Afghan-German-Iran collaboration will continue in future.



Afghan-German-Iran educational seminar

۲. Advisory Board Seminar

A half a day seminar on “engineering education in Iran” was held (January 11, 2016). The seminar was attended by members of the advisory board of the chair to gain consultation in the area of macro engineering education and to establish links between the chair and other related centers. The members of the advisory board are pioneer professors in the fields of engineering and pedagogy and experts from industry. The representatives from the following organizations attended this meeting.

- General Secretary of the UNESCO National Commission
- Engineering branch of Academy of Science of Iran
- Iran Society of Engineering Education (ISEE)
- Iran Accreditation Institute for Engineering Education (IAIEE)
- Mining Engineering Organization of Iran
- Road, Housing and Urban Development Research Center
- University of Tehran Center for Quality Assurance
- Iranian Journal of Engineering Education
- Dean of University College of Engineering
- Quality Assurance Center of Faculty of Engineering
- Representative form collaborative centers with signed MoU.
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Advisory board seminar

۲. **Workshops:** Chair also hosted 14 educational workshops which were listed in previous sections of this report.

ii. Conferences with active collaboration and participation of the chairholder

Active collaboration with the 1st international and 4th national conference of engineering education, 9-10 September 2015, Shiraz University, Shiraz, Iran: Two papers were presented in this conference by the chairholder. In a keynote paper entitled “Increasing the role of design in engineering education of Iran”, Dr. Memarian presented certain approaches for further attention to this important feature of engineering education. In the second paper, entitled “UNESCO Chair on Engineering Education”, the chairholder covered topics on introducing objectives, structure and scope of activities of the UNESCO Chair on Engineering Education.

iii. A selection of conference presentations by the Chairholder and colleagues

- Panelist of the roundtable about accreditation in higher education, in 2nd National Conference and 9th Symposium on Quality Assurance in Higher Education, **May 13-14, ۲۰۱۵**, Farhangian University, Tehran
- Presentation by the chairholder at the Geological Survey of Iran entitled, “Mining Engineering Education in Iran”, in occasion of the Mine Week, **۲۴ May ۲۰۱۵**.
- Presentation by the chairholder, entitled “engineer and engineering in modern world” in the opening ceremony for the 1000 new students of Faculty of Engineering, University of Tehran (23 Sept 2015).
- Presenting lecture entitled "Mechanisms of internal evaluation of engineering education programs" presented at the Faculty of Mining Engineering, University of Tehran, (November 30, 2015).
- Active collaboration and presenting paper in the national conference on “rethinking and foresight in the Iranian teaching and learning system, in view of the rapid contemporary global changes” which was organized by UNESCO national commission (February 22-23, 2016).
- Lecture by the chairholder entitled “the main deficiencies of Iran engineering education” and also roundtable panel about “crisis of computer engineering education”, in the 21st Computer Engineering Conference of Iran, Tehran, **March 9, 2016**.

2-3. Partnerships/ Collaborations

۱. Presenting a successful engineering education program and training graduates with necessary skills to carry out effective jobs in the industry require consultation and collaboration with all the beneficiaries in engineering education. UNESCO Chair on Engineering Education creates an opportunity for the exchange of ideas and findings among these centers by signing MOUs with the beneficiaries of the engineering education. During the 2015-2016 report period, MOU is signed with the following institutions:

- K. N. Toosi University of Technology, Iran
- UNESCO Chair on Natural Disasters Management
- UNESCO Chair on Water Reuse

۲. Starting a trilateral cooperation (Germany, Afghanistan and Iran) to promote the educational abilities of Afghanistan mining and geology faculty members (described in more detail in part 2-2 of this report).

2-4. Publications

i. Journal papers

Memarian H., Shirban L., Shekarchizadeh M., 2015. Developing teaching-learning skills in teaching assistants of engineering programs, Iranian Journal of Engineering Education, Academy of Science of Iran, V. 17, No. 65, pp. 59-78.

ii. Conference Papers

- Memarian H. 2015. Increasing the role of design in engineering education of Iran, 1st International and 4th National Conference on Engineering Education, Shiraz University, 12 pp.
- Memarian H. 2015. UNESCO chair on engineering education. 1st International and 4th National Conference on Engineering Education, Shiraz University, 9 pp.
- Memarian Hossein, Future study and rethinking engineering education, National Conference on “Rethinking and foresight in the Iranian teaching and learning system, in view of the rapid contemporary global changes”, (February 22-23, 2016).

iii. Website

Launching the bilingual website the Chair (September 16, 2015). This website (ucee.ut.ac.ir) aims to create constructive relationships with faculty members, universities and other research institutes at national and international level.

2-5. Cooperation with UNESCO Headquarters, Field Offices

Participating in the meetings held by Iranian National Commission for UNESCO

- Attending the meeting with Flavia Schlgel, UNESCO Assistant Director General in natural science, national commission of UNESCO office and present a brief progress report (May 18, 2015).
- Meeting with the ambassador and permanent representative of the Islamic Republic of Iran in UNESCO (Paris headquarter) and the Secretary General of national commission for UNESCO and the heads of UNESCO chairs and regional centers (Aug10, 2015).
- Participating in the opening ceremony of UNESCO Chair on teachers as lifelong learners, Farhangian University (September 7, 2015).
- Member of the organizing committee of the National conference on “Rethinking and foresight in the Iranian teaching and learning system, in view of the rapid contemporary global changes” (February 22-23, 2016)
- Meeting with the Director and the representative of UNESCO's cluster office in Tehran *Ms. Esther Kuisch Laroche* and discussing the ways of collaboration on the following education activities in the regional countries (September 22, 2015)
 - a) Developing a "Regional Network of Research in Engineering Education", between engineering universities in the region.
 - b) Holding master of “educational evaluation”, for the applicants from the countries in the region.
 - c) Holding "workshops", to promote professional abilities of faculty members in the region



Meeting with the director and the representative of UNESCO's cluster office in Tehran.

2-6. Others

Awards

Certificate of merit and award from University of Tehran International festival. UNESCO Chair on Engineering Education was selected as one of the top successful international activities of University of Tehran (May 2, 2015)



Presenting award to the chairholder

۳. Future Plans and Development Prospects

Predicted five-year action plan for UNESCO Chair on Engineering Education (2014-2018)

۱. Cooperation with universities and related centers to expand the process of accreditation of engineering education programs
۲. Supporting research projects on challenges of engineering education
۳. Defining annual prizes for the best research projects on engineering education
۴. 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.
- ٦. Collaboration for design and participation in launching educational courses, including master's degree program, in engineering education.
- ٧. Presenting educational and research advice and services to universities, organizations and industry.
- ٨. Expanding the activities of chair to neighboring countries and others in the region, toward establishing the "Regional Center for Engineering Education".
- ٩. Establishing links with related centers and UNESCO chairs at international level, in order to exchange the findings.
- ١٠. Planning to join the world conventions in the area of engineering education (e.g. Washington Accord).

Appendix:

i. Human Resources

The chair structure consists of strategic council, board of advisors and the office of the chairholder.

Strategic Council: The role of strategic council is to propose the general guidelines and monitor the macro policy of the chair. The 15 members of this council (14 full professors and 1 associate professors) represent different fields of engineering at the College of Engineering, University of Tehran.

Advisory Board: The purpose of advisory board is to gain 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.

Chair office: Technical staff and secretary

ii. Financial Resources (annual)

- University of Tehran 35000 \$
 - Office space rent (12000 \$)
 - Office staff salaries (16000 \$)
 - Other (7000 \$)

Professor Hossein Memarian
UNESCO chairholder for Engineering Education
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Office of UNESCO Chair on Engineering Education,
Unit 1, First Floor, No. 429,
Between Vesal and Qods Streets, Taleghani Avenue,
Tehran, Iran
Tel. 88992215
Fax. 88953188
E-mail: ucee@ut.ac.ir
Website: ucee.ut.ac.ir