



## **Transforming Engineering Education in India – the IUCEE Way**

### **Who Started IUCEE?**

The Indo US Collaboration for Engineering Education (IUCEE) was founded with the help of the American Society for Engineering Education (ASEE), Pan IIT (organization of IIT alumni), International Federation of Engineering Education Societies (IFEES) and Indian Society for Technical Education (ISTE) with headquarters at University of Massachusetts Lowell (UML). It was conceptualized by over 150 leaders of engineering education and businesses from US and India in 2007. Generous financial contributions and intellectual advice from Desh and Jaishree Deshpande, Sudha and Narayana Murthy, Arjun and Kiran Malhotra and in-kind support from Infosys Technologies have helped initiate the program which is now on the way to becoming a success and financially sustainable.

### **What is the IUCEE Vision?**

The vision of IUCEE is to improve the quality and global relevance of engineering education and research in India with focus on faculty development, student development, curriculum development, as well as improved teaching technologies & research.

### **What is the IUCEE Approach?**

Initial emphasis is on building capacity to improve the teaching quality of faculty in the large number of engineering colleges in India by introducing state-of-the-art concepts of problem based and outcomes based approaches to teaching and learning. This is being implemented with the leadership of experienced Indian faculty in collaboration with US faculty experts. Simultaneously, the culture of research and innovation among these colleges is being enhanced via the resulting networks and collaborations between the US and Indian institutions, thereby increasing the capacity of the Indian institutions to engage in world-class research. These networks are leading to opportunities for US colleges also to benefit via international student recruitment, research collaborations and study abroad opportunities for US students. This approach will enable innovative solutions for addressing crucial problems faced by the world.

### **What has IUCEE Accomplished in Past Four Years (2007–11)?**

The IUCEE process of improving quality of engineering education in India is already under way during the past four years with initial financial support from philanthropic families and in-kind support from the corporate sector. The large pool of engineering educators and entrepreneurs of Indian origin in the US has enabled the momentum to be built and sustained. Each year, international experts from the US travel to India to discuss global best practices in teaching and research in their field with Indian faculty leaders from public & private colleges in one-week workshops at Faculty Leadership Institutes (FLI). Starting 2011, the IUCEE Virtual Academy has been created using technology to enable US experts to conduct live Webinars and MiniCourses on-line from the US to faculty and students all over India. An IUCEE College Consortium has been created in 2010 in order to provide financial sustainability. This Consortium has 46 college members from all over India in 2012.

## **IUCEE Accomplishments in Past Four Years (2007–11)**

- **92 US professors and 24 industry experts gave 124 one-week workshops to ~3,065 Indian engineering faculty at Faculty Leadership Institutes (FLIs).**
  - During 2008 and 2009, 36 professors from US and 10 industry experts have given 46 workshops to 1,165 faculty members, hosted at Global Education Center of Infosys Technologies, Mysore. Indian faculty participants followed up by conducting more than 200 regional workshops, impacting more than 6,000 other faculty and 100,000 students. Videotapes and course materials from US experts used as resources by the Indian faculty.
  - During 2010, an IUCEE Consortium of 22 Colleges hosted 37 workshops by 28 US experts and 5 industry experts for over 1000 Indian faculty at 25 locations all over India, in a regional and semi-sustainable format.
  - During 2011, an IUCEE Consortium of 37 colleges in India conducted 42 workshops all over India in a more sustainable format, with the Consortium colleges paying all the direct costs of the US experts.
  - Estimated total of 10,000 faculty and 2,00,000 students all over India, have been benefitted by these FLIs.
  
- **Networks for collaborations have been created between faculty from over 100 Indian colleges and 30 US colleges.**
  - Significant positive outcomes from the Faculty Leadership Institutes (FLIs) have been demonstrated with over 100 colleges all over India. Some amazing results of radical curriculum revisions resulting from teams of participants at the FLIs have been documented.
  - As a result of improving teaching quality, networks have been created between Indian and US faculty and institutions which are already resulting in a wide variety of research and teaching collaborations.
  - More than 200 US faculty members from over 50 US institutions are interested in participating in IUCEE programs
  
- **The IUCEE Virtual Academy has been created in 2011:**
  - 84 one-hour webinars on teaching, research and general education topics have been conducted on line by US faculty to Indian faculty and students since March 2011
    - 24 Spring IUCEE Webinars, 2011
    - 21 Summer FLI Webinars, 2011
    - 23 Fall IUCEE Global Webinars, 2011
    - 16 Spring IUCEE Global Webinars, 2012
    - These have been viewed LIVE by over 20,000 faculty and students all over India.
    - Recordings of webinars are available on IUCEE portal
  
  - A short course “EPICS: Learning Engineering Design While Meeting the Needs of the Community” was offered by a US expert from Purdue University
    - One Webinar each week for 10 weeks (Aug 9 to Oct 4, 2011)
    - Attended by 20 participants from all over India
  
  - 11 MiniCourses of 10 Webinar Lectures each by US experts have been piloted during Spring 2012.
    - These were viewed LIVE by 4,487 students and 133 faculty at 39 paying host college locations all over India.
    - Interactions between faculty and students with US expert were facilitated
    - Recordings of all the lectures are available in UTube format on the IUCEE portal
  
  - **IUCEE - Classle Partnership in 2011** has resulted in the creation of the IUCEE Campus on Classle.net
    - All recordings of the 84 individual Webinars and 110 MiniCourse Webinars of the IUCEE Virtual Academy are available for easy viewing in UTube format

- Planning is in progress for making these actively used by large numbers of students and faculty all over India as part of the IUCEE Virtual Campus.
- **IUCEE web-portal launched in 2009 (<http://iucee.org/iucee/index.php>)**
  - All course materials from the FLI workshops, courses and webinars offered by US faculty since 2008 are available on portal
  - Portal provides a forum for interactions and collaborations among the US and Indian engineering education community.

### **What is the IUCEE College Consortium?**

During 2010, a consortium of colleges was formed to enable IUCEE to become financially sustainable. Fees for membership in this consortium partially cover the costs of IUCEE. Membership provides access to all the IUCEE programs and resources as well as to the IUCEE Global experts. The IUCEE College Consortium created in 2010 with 22 college members has increased to 37 members in 2011 and 46 members in 2012. Members receive special assistance in establishing collaborations with US experts and MOUs with US colleges as well opportunities for publicity and branding at various global forums.

### **Membership Model for 2012**

IUCEE thanks the Consortium colleges who were members in 2010 and 2011 and appreciates their patience while IUCEE is learning to manage a Consortium of Colleges.

Based on experience gained from the first two years, annual fees for membership in IUCEE College Consortium for 2012 has been set at \$ 1,000 for new as well current members. The Membership Fee has to be deposited with University of Massachusetts Lowell (details will be specified at enrollment time). IUCEE hopes that all colleges interested in benefitting from IUCEE programs will become members. IUCEE has reasonable expenses to be covered while providing these services. IUCEE believes that colleges benefitting from IUCEE programs realize the value of the IUCEE programs and will be willing to pay for these services.

### **Benefits of membership in IUCEE Consortium**

#### General Benefits:

- IUCEE branding opportunities for college website and brochures, on IUCEE portal and various IUCEE forums;
- Affiliation with IFEEES (International Federation of Engineering Education Societies); access to special programs such as International Conferences, Global Webinars and Global Student Programs.
- Regular advisory consultation with IUCEE Executive Director;
- Personal notices of all IUCEE activities; access to IUCEE materials from previous FLIs;
- Contacts with over 200 US Experts and their Institutions; short visits by US experts;
- Facilitation of collaborations with US colleges including MOUs, Centers of Excellence, twinning programs, faculty and student exchanges, visits to US universities

Specific Program Benefits: With help of IUCEE facilitation, Consortium members can access the following, based in its own strategic priorities for improving its engineering education:

- Short workshops or courses for faculty and/or students by US experts travelling to India (Faculty Leadership Institute, FLI); Member Host Institution in India pays costs and may recoup part of its investment through fees for outside participants. Four options for conducting FLIs are given below.
- Webinars and short courses on-line by US experts, Indian experts and Industry Leaders relevant for faculty and students on relevant topics conducted regularly.
- Advising by US faculty as Research Co-Guides for faculty pursuing PhDs.
- Opportunities for US faculty or Indian faculty from Member Institution to spend a semester or more at other's college, collaborating in research and teaching.
- Advice from US experts in hosting International Conferences or Seminars

- Advice from US experts on Improving Academic Curriculum in existing programmes or for starting new programmes.
- Advice from US experts on Improving Academic Infrastructure, including assistance in setting up Centers of Excellence and special laboratories for improving teaching and research
- Advice in connecting with potential US colleges interested in twinning programs (such as 2+3 BS/MS and 4 +1 MS degree programs).
- Advise Member Institutions with Strategic Planning for enhancing quality of academics, including contacts with US experts for Advisory Boards
- Facilitate Student Networking with each other, faculty and industry experts using a unique on-line platform (Classle.net)

#### **What are IUCEE Plans for 2012 and Beyond:**

- Continue the successful Faculty Leadership Institutes (FLIs), modified so that consortium colleges may either host a US expert by themselves or share costs with other consortium colleges; broaden offerings so US expert can conduct one or two-week workshops directly for students.
- Continue to offer Global Webinars; select and publicize the Webinars so that faculty and students will get maximum benefit; encourage industry participation.
- Expand IUCEE Virtual Academy for delivering Mini-Courses and Mini-Lecture series by US experts directly to students and faculty in India, via Webinars
- Build the PhD Co-Guide Program in order to make it more effective
- Facilitate formation of more collaborations between US and Indian institutions

#### **What is a IUCEE Faculty leadership Institute (FLI)**

US experts conduct workshops at various locations all over India to groups for Indian faculty from colleges over India. The objective is to assist the Indian faculty with latest teaching and research in their fields. IUCEE has been conducting Faculty Leadership Institutes (FLI) since 2008. Several options are available for a Consortium College to host an FLI. Recently FLIs have been modified to enable students also to participate.

**Option 1:** One US expert conducts a 5-day workshop (for faculty or students) at host college, which pays a fee (\$ 5,000) to IUCEE directly; IUCEE takes care of paying the travel and honorarium for US expert. Host college needs to arrange for good quality boarding and lodging for the US expert for the six nights. Host college may invite faculty from other colleges with fee payment and IUCEE will assist in publicity among other colleges.

**Option 2:** One US expert conducts two workshops of 2.5 days each (for faculty or students) at two different colleges, each college needs to pay a fee (\$ 2,750) to IUCEE directly; IUCEE takes care of paying the travel and honorarium for US expert. The two colleges need to arrange for good quality boarding and lodging for the US expert for the six nights, as well as arrange for domestic travel. Host college may invite faculty from other colleges with fee payment and IUCEE will assist in publicity among other colleges.

**Option 3:** One US expert conducts a 10-day workshop (primarily for students, with host college faculty assisting and observing) at consortium college; host college pays a fee (\$ 7,000 in 2012) to IUCEE directly; IUCEE takes care of paying the travel and honorarium for US expert. Host college needs to arrange for good quality boarding and lodging for the US expert for the six nights.

#### **What is a IUCEE Webinar ?**

US and Global Experts conduct Webinars on-line from their own location using “GoTo Meeting” Technology. Topics may be on research or teaching or engineering education and are selected based on experts available and interest among faculty and students in India. Faculty and students from all over India participate by logging in on-line. IUCEE facilitates the process. Global expert makes presentation on a computer desktop, which is visible to participants on their own computers; these can be projected on screens in classrooms in India, with speakers, to reach large number of students in classrooms; Participants can send questions by texting or by voice; Global expert will respond

to questions by voice to all participants simultaneously; Webinars are recorded and recordings made available to participants on IUCEE portal; IUCEE staff person facilitates each session and assists Global expert and participants.

### **What is a IUCEE Virtual Academy ?**

The concept of the IUCEE Virtual Academy is for Global faculty experts to deliver Mini-Courses directly to students and faculty in classrooms in India using the on-line Webinar approach.

- Mini-Courses can be on topics relevant to undergraduate students (to supplement teaching by their own faculty), post graduate students and faculty (on advanced and emerging topics and research)
- Mini-Courses delivered by the Virtual Academy will facilitate interactions of Global experts with students and faculty to transform their curriculum as well as teaching/learning process and research to global standards
- Colleges participating in India will be able to establish long term relationships with Global experts resulting in wide range of benefits including research guidance and collaborations, establishing centers of excellence, faculty and student exchanges with colleges of the Global experts, joint degrees, as well as international conferences.

### **What is a Research Co-Guide ?**

A large number of US faculty have expressed willingness to help advise Indian faculty pursuing PhD degrees. The IUCEE portal provides information about these experts. Indian faculty can approach these experts and work out individual arrangements for seeking advice. IUCEE will facilitate.

### **How to use the IUCEE web-portal ? (<http://iucee.org/iucee/index.php>)**

Register as User under "Registration" on top of the page using above link (if college is not listed, register college); you will receive an approval email within 24 hours from Portal Manager, Sridhar Nori: [sridharn18@gmail.com](mailto:sridharn18@gmail.com)

**Below is the left column on IUCEE Portal Home using above link**

## **Program categories**

-  [IUCEE College Consortium](#)
  - Links under this give information about the Consortium, list of consortium members and their priorities for 2012.
  - [Consortium Membership](#)
  - [2010 Consortium Colleges](#)
  - [2011 Consortium Colleges](#)
  - [2012 Consortium Colleges](#)
-  [Faculty Leadership Institutes \(FLI\)](#)
  - Links under this give details of all the FLIs conducted in the past including their course materials as well as those planned
  - [2008 FLI](#)
  - [2009 FLI](#)
  - [2010 FLI](#)
  - [2011 FLIs](#)
  - [Potential 2012 FLIs](#)
  - [Confirmed 2012 FLIs](#)
-  [Webinars](#)

- Links under this give details of all Webinars conducted so far including their recordings as well those planned
- [2011 Spring Webinars](#)
- [2011 FLI Webinars](#)
- [2011 Special Webinars](#)
- [2011 Fall Global Webinars](#)
- [2012 Spring Global Webinars](#)
- [IFEES Spanish Webinars](#)
-  [IUCEE Virtual Academy](#)
  - Links under this give details of the Virtual Academy and the proposed pilots and courses
  - [2011 Pilot Virtual FLI](#)
  - [2011-12 Sem 2 Pilots](#)
  - [Introductory Lectures Delivered](#)
  - [IUCEE VA Pilot MiniCourses 2012](#)
-  [Advising](#)
  - Links under this give details of US experts available for Research Co-Guiding and Advise on Curriculum Reform
  - [Research Co-Guide](#)
  - [Curriculum Reform](#)
  - [Accreditation](#)



#### [All Courses ...](#)

- The link below is where you can apply for courses that are open for enrollment



#### [Apply for Courses](#)

#### **Who to contact for additional information about IUCEE ?**

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