



# Gujarat Technological University

**International Conference on:**

**Infusing Design Thinking in**

**Engineers' Mindsets across Industries**

and

**Building a Spine of Design Engineering Courses in  
Academia**

**Endorsed By: India Design Council**



**Important sessions on:**

1. Panel Discussion on Need of Design Thinkers in industries
2. Panel Discussion on Strategies, Best practices and next practices to build Design Spine in academia
3. Presentation on learning from Design experiments in GTU in pedagogy, process & its inferences.
4. Panel discussion on - How GTU should further develop its Design Spine interventions?

**Dates: 4<sup>th</sup> – 5<sup>th</sup> January, 2016**

**Time: 10:00 am onwards**

**Venue: GTU Auditorium, Chandkheda, Ahmedabad**

**Registration is mandatory and free on first-come-first-serve basis.**

Please register through the online link: <https://goo.gl/OPI7Nk>

For further information, kindly visit conference webpage: <http://design.gtu.ac.in/>  
For any query, please contact: Prof. Karmjitsinh Bihola on Email: [ap\\_karmjitsinh@gtu.edu.in](mailto:ap_karmjitsinh@gtu.edu.in)

## Infusing Design Thinking in Engineers' Mindsets across Industries & Building a Spine of Design Engineering Courses in Academia

***“Engineering is about design under constraints”***– The National Academy of Engineering, USA

“**Make in India**” and “**Start-up India, Stand-up India**” are designed to rejuvenate the innovation and entrepreneurship culture and to create new jobs for the youthful nation. Some analysts say that India is a country of prototypes rather than products with innovation. Even though many persons, educated in India, have made a mark in the top-most technology companies of the world, our technical educational system is said to produce engineers, who are unable to design new products. Even after the success of Mangalyaan, after the amazing reputation, gained by India’s IT industry and after many Indian companies have acquired a multi-national status, our technologists in engineering and pharmaceutical fields are said to be working at primary levels of technology and are said to lack world-class design capabilities.

Dr. Vishal Sikka, who joined as the CEO and MD of INFOSYS on 12<sup>th</sup> June 2014, is on a mission to transform infoscions into Design Thinkers. He said, “You need to .....use design thinking to break out of how we have thought in the past. ...Turn on the education machine in a massive way to teach design thinking.” He started by taking his executive team to Stanford for a week where they participated in classes designed to teach this very ideal. So far, 30,000 employees of INFOSYS have taken the one-day innovation workshop.<sup>1</sup>

IIT Council issued a Design Manifesto<sup>2</sup> on 15<sup>th</sup> January 2014. The manifesto advocated building of a Design spine in Engineering education.

In June 2014, Dr. Anil Kakodkar submitted a report to the Ministry of Human Resource Development for rejuvenation of Higher Technical Education at NITs. The report proposes the building of a Design Spine for the undergraduate engineering programs for developing competencies in creative thinking, problem solving and teamwork.

We feel that State Technology Universities have to play a crucial role for inculcating design thinking and design driven innovation approaches among engineering students. Such engineers will be able to bring innovation to Indian industries and businesses and make the “Make in India” and the ‘Start-up India’ dreams successful.

<sup>1</sup><http://techcrunch.com/2015/05/16/infosys-ceo-on-mission-to-transform-his-company-into-design-thinkers/> dated May 16, 2015

<sup>2</sup><https://www.iitsystem.ac.in/mhrdinitiatives-uplo/febb0bc223f491.pdf> dated January 15, 2014

**DESIGN THINKING at GTU:** GTU has introduced a three credit Design Engineering subject based on globally accepted Design Thinking Methodology in every semester during the 2<sup>nd</sup> and the 3<sup>rd</sup> year of undergraduate engineering programs across all the streams of engineering in 120 Colleges across the State. The program, which was introduced in academic year 2014-15 in the 3<sup>rd</sup> Semester, has been taught to more than 90,000 engineering students in both the 3<sup>rd</sup> and the 5<sup>th</sup> semesters during 2015-16. This intervention at GTU is unique in terms of its scale and depth.

The syllabi of Design Engineering programs, at GTU, have been crafted with expert inputs from academicians, practitioners and volunteers in the field of design. This two day conference will help evolve the courses through critical inputs from academicians, practitioners and researchers.

Recently many large Indian industries and organizations working in the areas of manufacturing, ICT, Logistics and Public systems have strongly advocated that design thinking and allied tools add value to the kind of HR that they need to run 21<sup>st</sup> century enterprises, which face global competition and which need continuous innovation. GTU while developing its academic program has taken into account these needs and has blended the design spine in the program in such a manner that it becomes a win-win situation for both academia and industry.

**THE CONFERENCE:** GTU is hosting the two day conference which will bring academia, industry, public policy makers and design practitioners on the same platform. GTU has involved nearly 2,000 Engineering Faculty Members across its affiliated colleges to deliver the Design Engineering courses. We are keen to share some of the observations by the instructors which they have codified during their teaching process during this two day seminar. One of the key objectives of this conference is to seek inputs from design experts of national and international repute about the spine of Design Engineering courses as well as our efforts at introducing design thinking into the entire degree engineering program at GTU. While we have planned an exclusive session for the Faculty Members who are responsible for the design engineering courses in the country, we have another session in which industry experts will participate in discussions to share their needs.

At the end of this two day program, a panel discussion will be held to develop strategies and a set of recommendations for building Design Spine into the engineering degree programs at State Technological Universities. GTU Innovation Council (GIC) has pioneered in setting up innovation culture on a large scale. GIC has developed **Student Start-up Support System (S4), a Co-Working Space and an Incubator** to support the spin off ideas. We are confident that through this conference, the idea of Design Thinking will gain a greater traction and the 'Design Spine', at GTU, will become even more effective.

**Note:** At each session, we plan to have an eminent Design Expert to chair the session. We are approaching various persons for chairing the sessions and for participation as Panel Members. Wherever we get the confirmation, we shall be adding the names on our web-site.

## Program Itinerary:

<b>DAY-1 (04-01-2016)</b>			
No.	Session	Theme	Timings
1	Registration & Breakfast	9.00 am – 10.00 am	
2	Session-1	Inauguration & key note speech	10:00 am - 12:00 am
3	Networking Tea break	12:00 am - 12:15 am	
4	Session-2	Panel Discussion on Need of Design Thinking Skilled Workforce in industries and Strategies to Leverage them	12:15 am - 01:15 pm
5	Lunch Break	01:15 pm - 02:30 pm	
6	Session -3	Panel discussion on Strategies, Best practices and next practices to build design spine in academia <i>Chairperson: Prof. P V M Rao, IITD</i>	2:30 pm - 05:00 pm

<b>DAY-2 (05-01-2016)</b>			
1	Session-1	Presentation on learning from Design Experiments in GTU in pedagogy, process and its inferences. Session Chair /Co-chair (6 presenter / faculty with 10-12 minutes each) Initial and observatory comment by Session Chair and Co-chair	10:00 am - 12:00 pm
2	Tea break	11:00 am - 11:15 am	
3	Session-2	Presentation on learning from Design Experiments in GTU in pedagogy, process and its inferences. (4 presenter / faculty with 10-12 minutes each) Initial and observatory comment by Session Chair and Co-chair	12:00 pm - 1:30 pm
4	Lunch Break	01:30 pm - 02:30 pm	
5	Session-3	Panel discussion on Way forward: How GTU should develop its Design Spine interventions in next semesters?	2:30 pm - 4:30 pm
6	Session-4	Concluding session: Valedictory speech	4:30 pm - 5:00 pm

## ABOUT THE SPEAKERS

Dr. Amaresh **Chakrabarti** is Professor and Chairperson, Centre for Product Design and Manufacturing, Convenor, Indo-US CoE on Design of Sustainable Products, Services and Mfg Systems, Convenor, Innovation, Design Study and Sustainability Laboratory (IdeasLab), Indian Institute of Science, Bangalore, INDIA. The book on 'Impact of Design Research on Industrial Practice: Tools, Technology and Training' and on 'An Anthology of Theories and Models of Design: Philosophy, Approaches and Empirical Explorations', edited by him jointly with U. Lindemann and L.T.M. Blessing respectively are in print.

Dr. P. V. Madhusudhan **Rao** is Professor, Mechanical Engineering Department, IIT Delhi. He teaches and does research in product design and manufacturing. He was a Visiting Professor at Stanford University during March to May 2012.

Dr Devdas **Shetty**, Dean School of Engineering and Applied Sciences, Professor of Mechanical Engineering, University of the District of Columbia, Washington DC, USA; Dr. Shetty's book on 'Product Design for Engineers' has been published by Global Engineering in 2015.

## A FEW MORE DETAILS ABOUT DESIGN THINKING AT GTU

GTU started its journey of introducing Design Thinking into its syllabi at a joint meeting of the Expert Committees of all the Branches of Engineering on 2<sup>nd</sup> February 2012, when the task of designing the new syllabi was initiated. GTU had invited some external experts to address the meeting. Prof P.V.M. Rao of IITD delivered a talk through skype. GTU set up the Post-graduate Centre for Industrial Design – OPEN DESIGN SCHOOL and created the first document, defining its role.

GTU's Syllabus Committees started introducing Design Thinking into all its syllabi. Professor N J Rao (Retd) of IISc and Professor C Amarnath (Retd) of IITB during their visit, provided highly useful advice to GTU.

GTU organized a 4-day Workshop for Faculty Members on "Creativity & Design and Design Driven Innovation" on 27th – 28th April 2013 and 4th -5th May 2013. The workshop was led by Mr. Rohit Swarup of International Innovation & Research Foundation (IIRF) for Gujarat Technological University (GTU). The objective was to introduce design thinking and other creative approaches for innovation to the Faculty Members (<http://www.gtu.ac.in/circulars/13Jul/3072013.pdf>).

The new syllabi were implemented from August 2013. A document on the work of Open design School was published at <http://files.gtu.ac.in/circulars/14SEP/25092014Centre%20for%20Industrial%20Design.pdf>.

GTU organized a Design Session as a part of 2-day Seminar on Universities of the 21<sup>st</sup> Century on 8-9 January 2014. Experts in Design Engineering from all over the country were invited to present their views on how Universities could permeate design thinking into the whole of the engineering syllabi. Prof C. Amarnath–IIT Bombay, Prof. Amaresh Chakraborty –IISc, Bangalore and Prof. Manohar Swami accepted our invitation.

Prof C Amarnath gave sample problems on 9th February, 2014

On 9<sup>th</sup> August 2014, GTU organized workshop on "Changing Characteristic of Engineering Education". Prof P.V.M. Rao (IIT, Delhi) delivered the workshop – (Report on

<http://files.gtu.ac.in/circulars/14SEP/25092014Workshop%20on%20bridge%20by%20pvm%20rao%20august%202014.pdf>)

On 22<sup>nd</sup> November, as a part of the 2-day National Workshop on Innovation and Entrepreneurship of 21-22 November 2014, a session on the syllabus for the spine of Design Engineering courses was organized with Dr. N. M. Bhatt, Dean for Post-graduate Studies at GTU and Chairman of the Syllabus Committee for Degree Engineering program and Professor Bhaskar Bhat from IITGN as the Resource persons.

The first course of Design Engineering was offered during the academic year 2014-15 starting in August 2014. Mr Yash Saxena of OpenFuels conducted a Workshop for Faculty Members on ideas of empathy, ideation, product development and Business Model. ([http://files.gtu.ac.in/circulars/14SEP/25092014\\_01.pdf](http://files.gtu.ac.in/circulars/14SEP/25092014_01.pdf) ).

Thereafter GTU has organized 32 Faculty Development Programs (FDP) in which more than 2,000 Faculty Members have participated. Each FDP is of 4 days. It attempts to introduce Design Thinking and it provides initial references to the Stanford MOOC course and a few other resources so that the Faculty Member can develop himself/ herself. As Dr Vishal Sikka says, “No matter how immersive the course is, you can’t turn a person into a designer in one day, but the switch can get turned on that you can think and you can see there is a better way and bring learning to what you are doing.” He says it’s about making a grand transformation, and he understands that won’t happen overnight. It takes a very long time with huge rewards and equivalent risks.<sup>1</sup>

These 32 FDPs have been organized by GTU’s Open Design School. Professors Karmjitsinh Bihola, Gagandeep Khanduja and Jaimin Dave have conducted the FDPs with valuable help from Yash Saxena of OpenFuel, Prof Bhaskar Bhatt of SCET Surat, Rohit Radhakrishnan of GIT, Gandhinagar and Devina Kothari of Rajkot. During 2015-16, from August 2015, about 90,000 students have studied Design Engineering 1 (a) and Design Engineering 2(a) at the 3<sup>rd</sup> and the 5<sup>th</sup> semester respectively.

## **INVITATION TO FACULTY MEMBERS TO SUBMIT PAPERS:**

GTU’s Design Team is inviting Faculty Members, who have been involved in the teaching-learning process of Design Engineering (in the 3rd, 4th and 5th semester) to submit the research papers about the introduction of Design Thinking in engineering education.:

The best ten papers on the learning processes in Design Engineering (DE) will be presented on the second day of the Conference by Faculty Members.

Note: For more information regarding Author Registration, important dates, Paper upload, kindly visit: <http://design.gtu.ac.in/>

FACULTY MEMBERS CAN WIN AWARDS for the best papers. The papers may include the following:

- (I) the overall impact of introduction of Design Engineering on engineering education;
- (II) the effect of the pedagogy used in teaching DE on the processes of learning at your institution and your inferences;
- (III) the effect of design thinking on the conduct of other subjects, laboratories and workshops;
- (IV) the cases of significant improvement in some students’ projects by usage of design thinking;
- (V) the suggestions for strengthening the Design Spine at GTU.

<sup>1</sup><http://techcrunch.com/2015/05/16/infosys-ceo-on-mission-to-transform-his-company-into-design-thinkers/> dated May 16, 2015

## Invitation for research PAPERS by Faculty Members (continued from the last page):

The studies can be **both empirical and qualitative studies** based on the interaction of teachers with students and other stakeholders. The presentations by the Faculty Members will inform the experts, present at the conference, about the design thinking environment at GTU so that we can all discuss and plan to evolve our work in Design Thinking and the spine of Design courses to a higher level.



- Thirty (32) Faculty Development Program till 20<sup>th</sup> September, 2015
  - More than 2000 trained faculty members from 120 engineering colleges affiliating to GTU
  - National workshop on *“Understanding International perspective and Methodologies used in Delivering Design Engineering Courses”* by **Prof. Libby**, UPEI, Canada
  - GTU’s Design Team met representatives from universities from Japan, Korea, Singapore, China, Vietnam, Cambodia, Indonesia, Thailand, Malaysia, Laos, Philippines, Brunei and Myanmar on 6<sup>th</sup> June at a Board of Directors’ meeting of APEN at Indonesia. All these 13 universities are working on introducing Design Thinking and Project-based learning in their syllabi. GTU has been appointed as Director for Indian Chapter of APEN.
  - Workshop on *“Integrating Projects and Design into Core Engineering Courses: Enhancing Learning and Preparing Professionals”*. A unique 3-Part course offered by GTU in collaboration with Purdue University, USA expert faculty **Prof. Bill Oakes**, Director, EPICS Purdue University.
  - On 20<sup>th</sup> - 22<sup>nd</sup> August 2015, the Design Team participated in the 3-Day Workshop: 'Exposure to Product Design and Innovation' at IDC, IIT Bombay.
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