

**Proposal for the Establishment
of the new
Department of Design**

**submitted to
BERP**

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Preamble

According to the Oxford dictionary the concept of “design” was used in 1588 for the first time. Its definition reads as *a plan or scheme devised by a person for something that is to be realized*. When one looks for a contemporary definition of design one realizes that it is not easy to define the same. However one of the most widely used definitions says “design” is *an activity that responds to human needs, maintains the world and leads to an executable work, developed through a reciprocal action of thinking and making. It is an activity that may be individual or collaborative, spontaneous or evolutionary, original or borrowed, which results in the creation of meaningful and material order* [1]. In a broad sense it points towards what Nobel laureate Herbert Simon calls it as *the transformation of existing conditions into preferred ones*. Irrespective of the definition used, there can be no doubt that **design has had enormous impact on human lives in the past and has been a vehicle for social and economic progress for many countries. It is important that design finds appropriate place and attention in our curriculum and academics.**

Realizing the increasing importance of design in economic, industrial and societal development and in improving the quality of products and services, the Government of India had come up with National Design Policy after consultative process with industry, designers and other stakeholders [2]. The **National Design Policy released in 2011 recommends establishment of departments of design in all the Indian Institutes of Technology (IITs) and National Institutes of Technology (NITs).**

MHRD took a major initiative a couple of years back to come up with "Design Manifesto" which is considered as one of the guiding documents for taking design education to next level [3]. The manifesto was presented and accepted in one of the IIT council meetings held in 2014. It advocates that design must be seen as an epistemological concept, not just a technical, or even a cognitive or perceptual training involving a limited skill set. **Design Manifesto strongly recommends that design education needs to be structured within Central Funded Technical Institutes (CFTIs) in a way that enables it to be anchored as an autonomous field of study in a centre/department** and also to percolate design thinking into their various disciplines, areas of expertise and resources.

India is moving fast towards establishing itself as knowledge driven economy. Government too has launched multiple initiatives such as *Start-up India, Digital India, Make in India, Accessible India* and others. It is clear that these initiatives cannot succeed unless **Design in India** is strengthened. Country’s ability to develop successful designs and designers is a key requirement and foundation for above mentioned programmes. IIT Delhi’s initiative to establish Department of Design in country’s capital would be a big leap in this direction and pave the way for strengthening design education across the country.

IIT Delhi went through a scrupulous internal and external review process two years back and outcomes of which have mandated the institute to arrive at renewed vision, mission and strategy. **The review committee laid a special emphasis on the need for incorporating design thinking in our curricula and also on translating design outcomes into products and services for the benefit of society.** One can see this happening all over the world wherein institutes and universities have made necessary changes in their curricula to offer new set of courses/programmes in *design* in general,

and *product design* in particular, to address grand challenges facing our society. It was felt that this need can be better addressed by creating a new department of design at IIT Delhi.

IIT Delhi presently offers M.Des. (Master of Design Programme) a post graduate programme specializing in industrial design and has produced design professionals who have contributed immensely to country's design needs. There is an urgent need to strengthen and scale this effort by offering multiple courses and programmes in a sustainable manner. Whereas M.Des. programme has done very well in terms of knowledge dissemination and to some extent in terms of new knowledge creation, the next major challenge is to channelize this towards *knowledge application* building products and solutions for the benefit of people/society/industry.

Various departments/centers/schools of the institute have had a long tradition of working towards engineering design and product realization involving faculty and students. Science, technology and innovation activities across the institute require strong design ecosystem to succeed. Similarly the intellectual roots of design which extend into the arts, humanities, sciences, engineering and management contribute to the theory and practice of design enabling more effective design practice. Present engineering design implementations often lack inputs such as human factors, interaction design, aesthetics etc. On the other hand faculty and students pursuing industrial design too overlook engineering/technology inputs in their solutions. **Given the strengths of IIT Delhi on both engineering and design fronts, the proposed new department would provide a platform to promote integration of engineering and industrial design.** Creation of department of design is a win-win situation for all entities of the institute.

IIT Delhi constituted a committee to prepare a blue print for establishment of department of design. The committee met number of times and also had a day long brainstorming session July 16, 2016 which was attended by design experts from industry and academia. The committee and attendees of the workshop felt that the establishment of department of design at IIT Delhi is a timely and much needed initiative and is **great opportunity to position the institute at the forefront of a small number of teaching and research institutions that are transforming the way design is taught and practiced around the world and in India.**

Changing Role of Designers in Contemporary Times

Design as a body of *tacit* knowledge has always been present in society since time immemorial. It is this body of tacit knowledge that artisan groups shared and evolved over generations of practice. However, with advent of technology being a powerful tool to improve quality of life and greater adoption of *science* and *scientific ways* in society, successively, greater emphasis has been laid on systematic *discovery and understanding* of natural phenomena than encouragement for individualistic and creative leaps to address a perceived problem. Technology has further encouraged specializations of knowledge leading to an explosion in the complexity levels of applied knowledge of sciences. However, this over emphasis on need for *specialists* led to a dearth of *generalists*. Generalists, who could combine the useful concepts from science, use the prevalent technologies and creatively combine them in opportunistic ways to solve a perceived problem at

hand. It was to academically address the problem of need for *generalists* that design as a discipline in its modern form emerged in the Europe post world war II and has spread to the globe including India.

The approach of IIT Delhi should be to **create new leaders in design who can see big picture as generalists but have demonstrated ability to go into details as a specialist does**. This does not prevent some people to take path of specialists to understand intricacies of some specific areas of design. This can be best accomplished by designing curricula which is generalist in nature and trains the students in problem solving skills and allows interested students to opt for specializations in their final year of study at bachelors and masters level.

Today's designers require a new kind of training that goes beyond the traditional apprenticeship and practice-based programs associated with most academic design programs in the past. **Designers are not mere service providers but now often hold senior-level management positions in industries**. Design has come to play an important role in the strategic planning of corporations in general, plans for innovation and development of new products and solutions in particular. In other words design is now central to many major corporations and encompasses more than the issues, technologies, and agents involved in creating and using products, artifacts, processes, and built spaces. Design education in the past has put too much emphasis on either skills only or on thought process only [4]. **Many industries now look for people with combination and desire to hire students with great aptitude who are very good at acquiring new skills and also adapting their existing skills to the new requirements of any given job**.

Continuously expanding role of designers is imposing new demands on designers and their training. Designers not only produce new products and solutions meant for users but are expected to co-create them immersing in environments where they are used. Designers are required to have a global perspective on their work and to investigate and articulate the principles and methodology behind the designs through systematic research, inquiry, theory and experimentation. They are expected to communicate their findings and contribute to new knowledge creation. **In the present times industry values "design thinkers" more than "designers"**.

Present approach to design education puts high emphasis on design of physical products. Product is often not a solution for a given problem. Effective solution may lie in a system level design, design of a process or policy design. Moreover many new business models rely on replacing products with PSS (Product Service Systems). **Design education should include system level thinking and design of new systems and processes apart from design of physical products**. For example designing a vehicle is product design exercise whereas addressing transportation related problems and issues is more generic which may or may not involve design of physical products. Both are important in the context of design education. Further, the proposed department being located in the capital of the country can take advantage of opportunities which it offers in contributing towards design of public policies.

In our prevailing system there is no formal mechanism for students to interact with outside world. **New mechanisms for students to immerse in field activities and opportunities to interact freely with working professionals, freelancers, NGOs and industry need to be created**. Equally important is to **bring design specialists and resource people on campus as adjunct/visiting/guest faculty who**

bring a great value to design education and promoting design eco-system. The proposed department will create formal mechanisms for this bidirectional mobility to happen and sustain.

Objectives of Department of Design

The proposed department of design is expected to fill many gaps in prevailing exiting academic climate of the institute. Following are some major objectives of the proposed department.

1. Imparting high quality design education to produce industry-ready and socially conscious design professionals
2. Create new leaders in design among both faculty and students.
3. To inculcate design thinking among students and faculty across the campus.
4. Advancing knowledge through high impact research in the area of design.
5. To promote, nurture and advance the culture of design and innovation in the institute leading to significant contributions and breakthroughs impacting quality of human life.
6. Playing major role in addressing some of the grand challenges facing our society/country by designing and delivering products/solutions through multi-disciplinary teams.
7. Contribute to creation of intellectual property and entrepreneurial ecosystem in the institute and country.
8. Contribute to betterment of institute campus ambience using design as a tool.
9. To build flagship programmes in the area of design which can be replicated in other institutes/universities in our country.
10. To promote increased interactions/collaborations with institutes/organizations worldwide working in this area design education and research.

Academic Programmes and Courses

The new department will offer undergraduate and post graduate programmes and courses in design based on three core principles namely inclusiveness, creativity and empathy. Department will emphasize on a scientific, research-based, interdisciplinary approach to design at all levels. The curriculum will stress on fundamental principles of design and design processes, with close attention to the aesthetic, historical, cultural and philosophical issues associated with design. Whereas many design schools are struggling to do well and survive due to lack of technology related inputs, IIT Delhi should leverage its existing strength in science/technology to build a world class design program. Following programs are planned to be offered and strengthened in next five years.

M.Des. (Master of Design)

Institute presently admits 20 students from engineering and architecture backgrounds for M.Des. programme which is of two years duration. These students are admitted through an evaluation process based on performance in CEED (Common Entrance Examination in Design) and written test/interview. The specialization of present M.Des programme is industrial design. Institute would

like to scale the intake to 50 students in coming years offering the programme in more than one majors for students to choose.

Apart from scaling, M.Des. programme will be strengthened in multiple ways including:

- Strengthening foundation and core courses offered during first year of the programme.
- Providing more choices to students in terms of courses and projects offered.
- Joint projects with students of science/engineering/management/humanities to address multi-disciplinary design issues
- Option to pursue multi-semester projects building over previous ones
- Strengthening projects leading to deliverables like fully functional prototypes/patents/technology transfer/spin-offs.
- Enhancing collaboration with industry/society through joint projects.
- Summer and semester long internships for students to work jointly with industry and on community projects in both rural and urban settings.

Courses and Minor Area in Design for B.Tech. Students

Present generation of students have shown great aptitude for design and design thinking. Department of design would like to offer a new *minor area in Design* for interested students at B.Tech. level. Students opting for this minor area are expected to do a few core courses and stipulated elective courses in area of design to qualify for minor area requirements. In some cases students can opt to do design courses to earn design/practical experience (DPE) units if not minor area itself. Post graduate design programmes in other departments such as Applied Mechanics and Mechanical Engineering can benefit from core and elective design courses offered from department of design.

B.Tech. and M.Des. Dual Degree

IIT Delhi admits large number of undergraduate students every year. Some of these students would like to pursue masters programme and career in Design. To provide opportunity for such students, department will offer optional Dual Degree in the form of M.Des. Students opting for this choice are expected to successfully complete minor area in Design followed by other requirements to earn M.Des degree. It is expected that such an option will provide opportunity to interested UG students to take their ideas/innovations to market ready products and solutions combining strengths of technology and design.

B.Des. (Bachelor of Design)

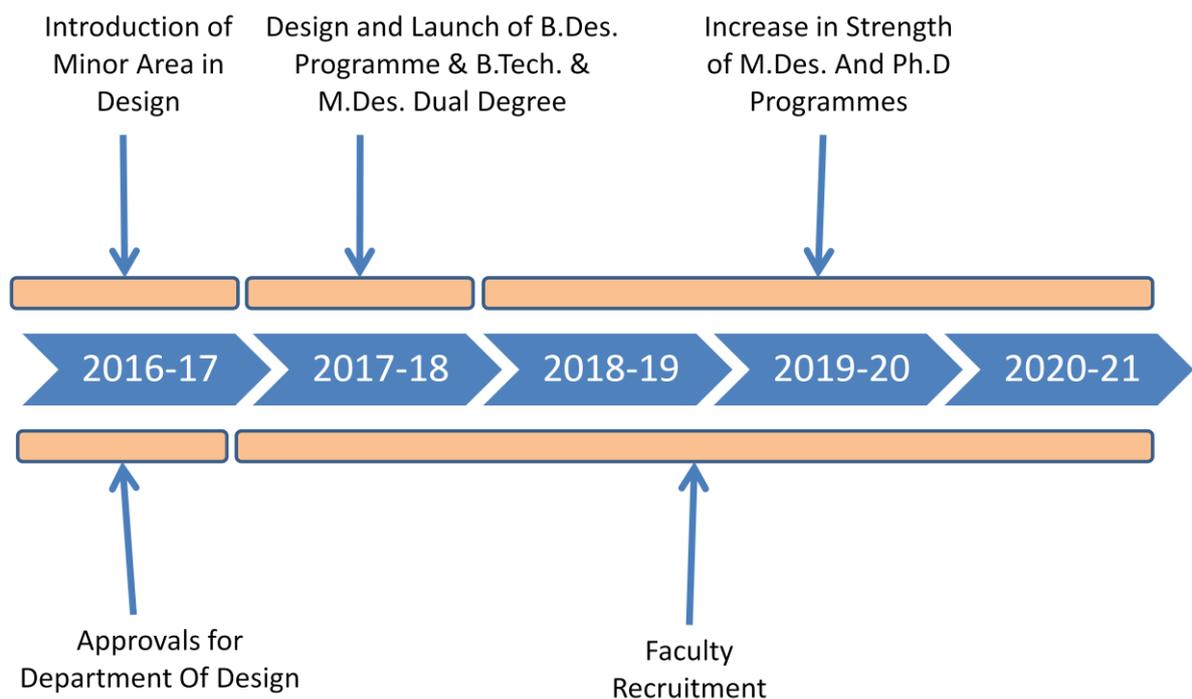
One of the programs this new department will offer is Bachelor of Design (B.Des.). Presently two IITs (IIT Guwahati and IIT Bombay) offer undergraduate degrees in Design apart from NID. These students are admitted through a separate admission test namely UCEED (Undergraduate Common Entrance Examination for Design). In this programme apart from fundamentals of design, students will be trained in understanding, identifying and validation of user needs, process of ideation and creation of new products and solutions, development of mockups and functional prototypes, leading

to product realisation with technology focus. This calls for B.Des. students to work on projects jointly with B.Tech students, a win-win situation for both.

Ph.D.

The evolution of design into a more formal academic discipline is now evident with the emergence of a small but growing number of doctoral programs in design in India and around the world. Presently only IIT Guwahati, IIT Bombay and IISc Bangalore have visible research programs in design and produce only a handful of Ph.Ds in design. There is an urgent need to strengthen research in design in our country. Industry needs many researchers who are trained in traditional, thematic and application areas of design. As design education is scaling up in the country rapidly, faculty who are trained in design research are needed in large numbers to fill faculty positions. The department will address this issue of knowledge creation in design by offering a vibrant Ph.D. programme. The research will be driven both by intellectual curiosity and industrial collaboration, leading to understanding, methods and tools that shape design theory and design practice.

Following table gives a summary of new initiatives and activities proposed as a part of department of design.



Product Design and Translational Activities

Taking an innovative idea from proof-of-concept design stage to market/user/society/industry requires a compelling ecosystem which will be put in place as part of the department’s activities. Technology business incubation units have been playing a key role in promoting entrepreneurial culture. It has been realized that still there exist a wide gap between a successful prototype and a committed business venture. Department of Design can play an active role by promoting an intermediate stage of translational research & development to bridge this gap. In other words, the

department can provide the necessary ecosystem as well as resources to students/faculty to take their ideas beyond a first successful prototype to a pre-production prototype, till they are confident enough to have their own start-up or ready to licence their technology. New courses and activities which department plan to introduce and administer will facilitate this to happen.

The present competitive environment for new product development demands that end users are involved at every stage of product development. Designing products which is *meant for users* is an obsolete thought. Designing products *with user input* is good but not adequate. The worldwide experience has shown that for products to be successful, one need to *co-create them involving users* as a part of development team. This is presently not happening in many of the product building exercises/activities. The department would systematically create such linkages with user groups to facilitate this involvement.

Product development exercises and experiences are meaningful only if they consider market constraints, regulatory constraints, intellectual property requirements, safety constraints, legal/policy constraints and many more. In other words, design and innovation requires inputs from diverse sources and needs to benefit from diverse ways of looking at the problem to be successful. Department of Design's ecosystem would promote such thinking as the faculty would be drawn from multiple disciplines from both within and outside institute.

Department of Design will promote design ecosystem by providing necessary resources/infrastructure/expenses to recognize potential student design projects every year. The model of funding for these student projects can be made scalable with alumni and industry participation in the long run. The projects which have done well in their initial phases and have potential to make it to market/industry/users will be selected for further nurturing, after evaluation by experts from academia and industry. Deliverables like fully functional prototypes/patents/technology transfer/spin-offs will be strongly emphasized in selection of such projects.

Faculty and Staff

As the department has a dual mandate of training students as well as addressing industrial and societal needs to come up with products and solutions, a right mix of faculty from diverse backgrounds is extremely important. **The department will have 30 sanctioned faculty positions apart from joint, visiting and adjunct faculty in large numbers.** Most of the core faculty would be those who have had outstanding achievements with masters and doctoral degrees in design. Rest of the faculty are those who may not had formal degree(s) in design but have demonstrated scholarship in *design teaching, design research* and *design practice*. Multi-disciplinary character of the department is both mandatory and desirable if it has to become leading design department in the world in near future. Creation of new department will help to attract new faculty who would find association with the department both intellectually stimulating and personally satisfying. To be successful, the department will have following four categories of faculty:

Core Faculty in Design

The department will have core faculty significant in number with Masters and Ph.D degree in design specializing in various areas of design such as industrial design, visual communication design, human centered design, interaction design, creativity in design, system design, applied ergonomics, form and aesthetics, animation and game design, urban and architectural design, design management, materials, fabrication and prototyping etc.

Faculty in Product Design & Engineering Design

The department will also have adequate faculty with PhD degree in science/engineering/architecture/management/social sciences/liberal arts who have considerable experience in product realization, teaching design courses, design practice, design research, entrepreneurship etc. Apart from teaching and research, these faculty will participate extensively in cross-disciplinary product design and research activities. In the long run institute would also like to be known for extensive contributions in some thematic areas of design such as vehicle design, textile design, biodesign etc.

Joint Faculty

As design is a collaborative activity requiring skills from diverse areas including science/engineering/management/social sciences, it is not possible for one department to have all required skill sets. Faculty from other departments/centers/schools, who would like to spend considerable time towards teaching/research in design, as well as working on product design projects, can be invited to be joint faculty in this department.

Visiting/Guest/Adjunct Faculty

As design becomes multi-disciplinary and translational in nature, finding successful solutions to present day problems calls for constant engagement and interaction with outside world. Department will have a provision to bring domain experts, design practitioners and design consultants from both India and abroad to campus as guest/visiting/adjunct faculty.

Attraction and retention of outstanding faculty in the department calls for carefully relooking at educational qualifications of faculty applicants and also establishing metrics of faculty assessment different from the prevailing ones. IIT council norms too allow waiving of PhD as minimum qualification for faculty applicants in "industrial design".

The proposed department of design would have technical and administrative staff who would support all design laboratories, design studio, product realization activities, design research and administrative functions. Unique and multi-disciplinary nature of the department calls for recruiting and retaining technical staff who are very different from other departments, centers and schools. To attract bright practicing designers from India and abroad who would like to contribute to design programmes can also be offered short-time and contractual design fellowships.

Teaching Learning Ecosystem and Ambience

The department will have traditional lecture courses, seminar type of courses, short modular courses, studio courses, and projects. Studio courses require students to test and apply the principles and techniques they learned in lectures. Studios, by their very nature, will require students to work under close supervision of faculty. Both individual work and team based projects will be accommodated depending on the nature of course and the way course is planned. Projects will address mixture of futuristic or real-life problems. Internships at industries and those offered by practicing designers will provide an exciting opportunity for students to apply their knowledge in real-life situations and to be confronted with new challenges which can be addressed in the department.

As the design activity requires 'out of box' thinking, the department will help in creating an infrastructure to promote such thinking. Hence it is suggested to have facilities to create the right kind of atmosphere for challenging design abilities of faculty and students. Apart from design research labs, the department labs and studio will provide a conducive space & resources for ideation/brainstorming, computational tools & inventory necessary for concept development and facilities for quick prototyping & testing. A structured environment such as this is necessary to be innovative & effective.

The department should house a collection of high tech engineering materials, prototyping facilities, design cases and design repositories of all kinds for the students to see, explore and use in their design projects. Very often a new material has been known to inspire the design of new products. This is necessary as often students from one discipline may not be aware of the types and properties of materials available across other disciplines. For realisation of ideas, the department is proposed to have a set of facilities which can provide ready to use tools, gadgets, platforms to attempt the initial models of an idea. But above all, the department should provide space for such ideas to take shape in the form of informal settings for exchange of ideas, presentation rooms, exhibition spaces and studio spaces for idea realization.

The department will be equipped with facilities required for, identifying the needs, concept development and visualisation, right from sketching to creating a prototype. As most of the design & innovation is enabled using computational tools, several design tools and software for working in 2D and 3D must be available for real and virtual concept development, product visualisation and virtual product testing. Some new sculpting, prototyping, assembly and testing facilities will be created for carrying out quick design-build-test-modify iterations.

The department of design would bring faculty and students from multiple disciplines together to create a vibrant environment and culture supporting design and innovation of products across the Institute. For example, one can foresee a situation where design students can work with students from science/engineering/architecture/humanities/management/liberal arts etc. to create innovative products and prototypes addressing the multiple perspectives of user needs, engineering details, ergonomic considerations, aesthetic preferences etc.

Conclusions

Multi-disciplinary, concept-to-market and user centred approach makes the proposed department of design a unique and first of its kind in the country. The department will strive to develop a new academic climate & culture for design and innovation. The intention is not only to create new flagship courses & programs but also to impact many of the existing undergraduate and postgraduate programmes in the campus. The creation of department is a focused & synergetic capacity building exercise whose benefits and impact can be seen in the coming years. The department will help in sensitizing a large number of faculty & students to work towards societal/industrial needs and in the long run to build their own sustainable social/business enterprises.

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