Proposal to create a Department of Design at IIT Kanpur

1.0 Preamble

Design Program was established as an interdisciplinary program (IDP) at IIT Kanpur in 2002. In 2010 an External Review Committee proposed the realization of a design department retaining its interdisciplinary flavour (Annexure 1). This was further supported and strongly recommended by a second External Review Committee on 28 Feb 2014 (Annexure 2). Prior to this in 2013 ARC critically reviewed the programme and gave it's recommendations to upgrade and strengthen the M.Des curriculum. Industry feedback was also obtained while preparing the ARC report (Annexure 3). Additionally and based on the detailed discussions and recommendations from the National Advisory Committee (NAC) for Design program as constituted by the Director, IIT Kanpur (Annexure 4), the specifics of the Bachelors program in Design (B.Des) is also combined with this proposal. The internal and external feedbacks received till date is consolidated in (Annexure 5).

Design is reaching center-stage in many visionary organizations and recognized today for its ability to inspire and foster customer centric innovation. Currently, India is in a strong position to create design expertise for emerging markets. IIT Kanpur with its global recognition is poised to capitalize on this situation, become a leader in this space, and fortify and advance Indian design into a globally distinctive program.

Design as a field began and evolved into a discipline during the post industrial revolution, in response to the recognition that customer’s preferences and requirements must be included as a crucial element in the creation of mass-produced products. After several flight mishaps during WWII came the recognition that social science perspectives along with engineering must be included in the design of objects, to account for inherent human capabilities and limitations. People centricity evolved thereafter in the field of Design, integrating both of these perspectives. Methodologies emerged to keep people at the center of the design process.

Meeting comforts, convenience, desirability and affordability along with creating differentiated products with reduced risk and rework, and increased customer loyalty and stock value were realized as the benefits of this perspective. Factored into Design education and practice in the context of the product life cycle these criteria result in more robust designs. It also allows for greater predictability in the outcome
as well as minimized costs of unmet needs and undiscovered requirements, post release of a product/service.

The notion of standalone products today is undergoing a sea change and is getting replaced by the notion of an overall experience and an ecosystem created by products and services that form a part of it. Design education serves to provide graduates who can create and manage the design of not just a customer focused product but an overall experience a product creates in the life of its consumers, beyond the design of the standalone product alone. Further, embedded products are proliferating today, where intelligence is built into more and more products.

Design education subscribes to wider possibilities, a people orientation and of greater eventualities. Designers are trained to think out of box to realize ease of use and manufacturability along with business and market angles to an end product. Most organizations value these lateral, broad and strategic thinking skills today. Design draws its width and breadth from many disciplines and integrates all know-hows to realize a customer centric product/service design. This leads to the development of multi-skilled individuals who can contribute to various aspects of any organization.

2.0 Motivation and Rationale

This proposal to establish a Department of Design is aimed at preparing a new crop of designers to meet the design needs and challenges of the country today. Design as a discipline has undergone radical changes and evolution in the past few years. Design is recognized worldwide as an essential component for people centered innovation.

In accordance with global industry trends today, India is excellently poised to contribute significantly by creating global designers equipped to design for emerging product-service ecosystems. This necessitates appropriate structure and education that empowers our graduates to excel and fulfill the challenges and the needs for differentiated products in such contexts.

A vibrant design group is existing at IIT Kanpur. The Design Programme is in existence for more than a decade until today, as an interdiscipliary program. A unique feature of the Design Programme is that it does not have any specific parent
department although faculty members from several departments came together to establish and contribute to this academic endeavor. It is now time to establish a separate Department of Design. Some of the existing faculty members of the institute are willing to be associated full time with the proposed new department.

The student cohort has grown from 10 to 75. Some landmark accomplishments are: faculty participation has grown from 4 to 17 from different departments and disciplines, with 2 full time visiting faculty and 3 adjunct faculty members, collaborations with more than 10 foreign universities and 100% placement in the past 3 years.

3.0 Evolution of Design as a Standalone Discipline

Design as a field began and evolved into a discipline post industrial revolution in the west. This was based on the recognition that customer preferences and requirements need to be included into mass-produced end products. The innumerable flight mishaps during WWII and beyond forced the realization that social science perspectives along with engineering must be included in the design of objects. To account for inherent human capabilities and limitations, fields like ergonomics and human factors engineering emerged. People centricity evolved thereafter in the field of Design, reflecting the capability as well as preference aspects of people. Methodologies evolved that keep users at the center of the process of creation of end products and are currently being adopted and in practice today in many organizations.

Benefits realized are not just limited to meet the comforts, convenience, desirability and affordability factors of the user; but also, create differentiated products, minimize risks of rework and rejects, foster customer loyalty, and increase stock value for the manufacturer. Design education and practice incorporates all these concepts. This results in more robust designs with greater outcome-predictability and minimized costs of unmet needs along with undiscovered requirements, post product-release.

The notion of standalone products today is getting replaced by the notion of overall experience and ecosystem of products and services. Embedded products are in proliferation today, where intelligence is built into more and more products.

A design curriculum should teach students to think of wider possibilities, and promote out of the box thinking. Additionally, they must be trained to think about user
orientation, what-if analysis, ease of use and manufacture, and the business and market angles of an end product. It is these lateral, broad and strategic thinking skills that are being recognized and valued in organizations today. CXO, Chief Experience Officer positions are also increasingly being heard in global corporations.

Design education creates graduates who can manage the design of not just a customer focused product but an overall experience that a product creates in the life of its consumers.

Design as a discipline is a confluence of many disciplines and its strength lies in its breadth and integration. Design takes from applied engineering its scientific, structured and methodological principles; from applied cognitive science its principles of human characteristics and behaviors; from applied computer science its logical approaches and prototyping methods of information products; from applied ethnography its principles to understand deeper user needs, sense of human values and a broader sensitivity of society and culture; from industrial engineering its application of productivity and efficiency; from applied experimental psychology its evaluative approaches with users; from applied art its principles of visual and sensory attributes of products and experiences; from library and information science its application of architecting of large information sets; and from management and economics its financial and business constructs, entrepreneurship and returns on investments made in objects designed.

Thus Design as practiced and taught around the world as a standalone discipline is a left and right brain combination approach that integrates principles and approaches from a wide set of disciplines; which, must necessarily be unified by a common philosophy, process, method and delivery.

4.0 The Proposal

This is a proposal to create a new Department of Design aimed at preparing a new breed of designers. The department will offer the following academic programmes:

1. **Bachelor of Design B.Des** (*Subject to approval by Senate*) with a balanced emphasis on applied engineering sciences, arts, social sciences, business practices and modern design methods through application-oriented teaching. Detailed proposal for the B.Des program is provided in pages 21-42 with course structure as well.
2. **Master of Design M.Des** *(Approved Programme)* with a focus on holistic Design education straddling multi-disciplinary knowledge streams, collaborative and participatory practices, and a balance between the global and local context.

3. **Doctor of Philosophy Ph.D** *(Approved Programme)* to continue inculcating knowledge in specific domains of Design and to train high quality research students and academics of the future.

4. **B.Tech-M.Des Dual Degree** *(Approved Programme)* to prepare postgraduates who serve the needs of industry by being design-led along with the follow-through capability and detail orientation of an engineering mindset.

It should be noted that the focus of the proposed department is in consonance with the National Design Policy [2007] (Annexure 6) and Design Manifesto [2014] (Annexure 7). This specifically calls for “The establishment of Departments of Design in all the IITs and all the NITs as well as in prestigious colleges of engineering and architecture.” It is also in tune with some of the recent Governmental initiatives such as “Make in India” and “Startup India.” However, there exists a serious lack of trained manpower in the area of design. As aptly pointed out by Pradyumna Vyas, Director, NID, “India needs more than 10,000 Designers. We’re producing less than 3000 today”.

**4.1 Vision**

An academic department that offers structure in its physicality yet fluidity in its delivery, empowering its various stakeholders with freedom to follow their inspirations, infusing confidence to address research and societal challenges, remaining grounded in traditional values, technological superiority, and holistic design for all; while maintaining a balance in their duty to their profession, country, company, and a bigger good.

**4.2 Goals**

- Evolve a well-defined core curriculum that creates a strong holistic design foundation for a student body having inherent diversity.
- Build on the existing programme structure to further evolve into a robust platform that allows potential graduates to shape themselves as suits their capabilities, talents, interests and the market.
• Become a leader in preparing design entrepreneurs, leaders and designers for emerging market needs and Indian diversity.
• Evolve a program that caters to the requirements of global design, while maximizing the existing strengths, values, location, and student profile.
• Become an Indian Design hub where global universities, global and local industries come together to collaborate and advance design across geographies, disciplines and cultures.
• Establish upfront, a closely coupled learning with industry.
• Evolve as a space for interdisciplinary research and industrial collaboration for effective business and social design innovation.

4.3 Beliefs

The Design Programme envisions itself as an interdisciplinary space for co-creation of design education, research and people-centric application. We believe in developing a collaborative environment between students, researchers, academicians and business practitioners. We aim at creating a working environment enabling knowledge sharing and experience exchange. Pedagogically, we believe in ‘learning by doing’, experimentation, collaboration and innovation. We aim to foster versatile global designers with integrative thinking and expertise in emerging markets: our designers must be equally capable of working alongside the best in the world as well as delve deep into the hinterlands of India to uncover design insights & solutions, with the ability to create integrated socio-technical solutions around and across real world complexities.

We aim at creating the next generation of designers, design thinkers and design leaders who will conceptualize and develop design solutions for the challenges faced by industry and society. To do so, we foster a passion based and student centric learning culture. We constantly explore creative ways of working and enhancing interaction to support world-class development in education, research and practical application context. We strive to build on designers’ ability to research, discover, invent, innovate, ideate, make decisions, evaluate and lead for the purpose of improving quality of life.

Our curriculum is based upon an interdisciplinary synthesis of design, technology, social sciences and management, while also adhering to the principles of sustainability. The programme inculcates the spirit of creativity, celebrates innovation,
develops an appreciation for human values, fosters craftsmanship, and encourages personal expression leading to evolution of products and services for the betterment of society and people.

4.4 Guiding Principles

- Preserve what works well: The multidisciplinary nature, flexibility, holistic focus, strong technological ties, and grounded values must remain unchanged.
- Build on existing strengths: Processes and systems must be established and formalized to retain and build on existing inherent strengths.
- Need of present and future India: Become the benchmark in design education for global as well as emerging markets.
- Balance of Industry-Academia, Global-Local, Research-Practice and Science-Art aspects: Mould graduates to be the holistic designers we expect encompassing capabilities and a balance of each.
- Collaborative: Shift from creating individualistic to collaborative designers. The academic program must support and emphasize team work on student design projects.
- Exploratory: Individual exploration is a must alongside collaborative work through a convergence-divergence approach to learning.
- Multi-disciplinary: Faculty from different disciplines of Engineering, Sciences, Humanities & Social Sciences, and Management must continue to participate in teaching and research.
- Shape Design Leaders: With emphasis on innovation today, industry looks to designers to often lead the way in realizing product-service systems.
- Holistic Designers: We aim to create complete designers who are people centered, creative and aesthetically oriented, technology conversant with business acumen; yet also paying attention to detail and sporting an inquisitive mind.
- Design Thinkers and Hands on Designers: Coupled with an analytical and creative mind, impart training in skill sets that allow students to be effective hands-on designers.

The proposed Department of Design aims at creating the next generation of designers, design thinkers and design leaders to conceptualize and develop design solutions for the challenges faced by industry and society. To do so, it would seek to foster a passion based and student centric learning culture. It would constantly explore creative ways of working and enhancing interaction to support world-class
development in design education, research and practical application. It would strive to build on designers’ ability to conduct research, ideate, innovate, make decisions, evaluate and lead for the purpose of improving the quality of life.

The proposed curriculum is based upon an interdisciplinary synthesis of design, technology, arts, human values, social sciences, business and management, while also adhering to the principles of sustainability, as shown in Figure 1. The proposed Department of Design aims at inculcating the spirit of creativity, celebrate innovation, develop an appreciation for human values, foster craftsmanship, and encourage personal expression leading to evolution of products and services for the betterment of society and people.

In summary, the proposed Department of Design will contribute to design education
through B.Des, M.Des, B.Tech-M.Des dual degree, and PhD programmes, so that our graduates continue to find excellent employment in a competitive global economy, help establish our reputation as the foremost global program with expertise in design for the emerging economy as well as contribute towards Design research.

5.0 Eligibility and Admission

Proposed Programme

B.Des: Students with 10+2 level PCMB will be admitted through JEE/UCEED (with science background) as per the standard procedure. The total number of seats available would be 15-20 to start with.

Existing and Approved Programmes

M.Des: Students with a bachelor's degree in Engineering, Architecture or Design with marks / CPI not below the specified minimum are admitted through CEED or GATE and an internal entrance examination. The requirements with respect to CEED or GATE scores are in line with those practiced/specified by the Institute. Complete eligibility and admission criteria are present in the PG Manual.

PhD: Students must have a master's degree in Engineering /Technology / Design with marks / CPI not below the specified minimum. Students with a bachelor's degree in Engineering, Architecture or Design (four years programme) with a minimum of 75 percent marks / 7.5 CPI or Master's Degree in Science or an allied area. The requirements with respect to CEED or GATE scores are in line with those specified by the Institute. Complete eligibility and admission criteria are present in the PG Manual.

B.Tech-M.Des Dual Degree The students registered in B.Tech / B.S programmes have an option to change over to the dual degree programme (5 Year degree programmes) provided they fulfil the requisite criteria as prescribed in UGRC and PGRC. The requirements with respect to eligibility are in line with those practiced/specifed by the Institute.

Proposed course structure for the new B.Des programme and the revisions proposed in the existing programmes are enclosed in Annexure 9.

6.0 Faculty available and additional requirements

There are 17 faculty members from the departments of ME, HSS, CSE, AE, IME &
BSBE presently associated with teaching and research in the Design Programme. There are also 3 adjunct faculty members in the areas of User Experience Design, Typography, and Mobility Design.

The following faculty members have expressed their willingness to move full time to the Department of Design.
- Dr. Satyaki Roy (HSS) – Design Thinking, Cinema Studies
- Dr. Deepu Philip (IME) – Design Management
- Dr. Shatarupa Thakurta Roy (HSS) – Design Theory, Visual Communication
- Dr. Mainak Das (BEBE) – Bio Design
- Dr. Ritwij Bhowmik (HSS) – Visual Design, Cinema Studies
- Dr. Shantanu Bhattacharya (ME) – Product Design and Manufacturing

We have to actively pursue the recruitment of new faculty and we hope to add 4-6 faculty members by July 2017 specifically in the areas of Product Design, Interaction Design and Ergonomics. These new-hire faculty will also be expected to develop successful research programs in their areas of expertise, collaborate with faculty in other research clusters of the institute, and contribute to meeting the administrative needs of the department and institute. Further, the existing faculty members in different departments have shown interest to continue their participation in the programme. They are already running courses, which have been incorporated in the proposed course structure. We will strongly pursue the recruitment of new faculty and the setting up of a new Department of Design would significantly boost our efforts.

7.0 Design Departments at other IITs and IISc
Several Design programmes, departments, centers, standalone design institutions and partnered design schools have come up in India in recent years and many others are joining this trend as a result of the recent attention to this profession. Table 1 summarizes them.

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Design being a broad discipline, some schools have chosen emphasis in specific areas such as Visual Communication, Industrial Design, Interaction Design, User-Interface Design, Moving Images, Photography, Design Education, Design Thinking, Design for Wellbeing, Collaborative Design, Urban Environments, Design for Development, Managing Creative, Industries, Space Media and Culture and Mobility Design etc. However, the number of designers still falls short of the number required today.

None other than IIT Kanpur focuses on creating Design thinkers or leaders who we are preparing to be able to derive solutions, make decisions as well as lead amidst complex and ambiguous situations. This we believe is the need of the hour in industry as well as for the Indian entrepreneurial climate of today and we certainly hope to fulfill that need through our efforts. This would be served best by a full-fledged department.

The focus of all these programmes in IITs and IISc is on the study, invention, and creative use of technologies to create effective, usable, enjoyable experiences with technology through interdisciplinary research in engineering, design, behavioral and social sciences, and to understand the impact of technology on individuals, groups, and organizations. They aim at producing successful graduates who will be capable of leading the changing scenarios of today and tomorrow through thought, innovation and values.

Design departments at these IITs and IISc have helped in producing good quality Designers but there are still very few institutions to cater to much larger needs of the country today, for dynamic, design led strategic thinkers who can also discern the right direction for design. This is also reflected in the Design Manifesto which has
rightly recognized the absence of vibrant design programmes in the country and we certainly hope to fulfill the aspirations of the design community through our efforts. We have built several multi-disciplinary interactions with several other science and engineering departments in terms of teaching, research, and outreach across IIT Kanpur (See Figure 1) that is clearly recognized and we wish to strengthen this further and this would be served best if we have a full-fledged department with core faculty as like any other existing department.

8.0 Present Lacuna with Design Programme, IIT Kanpur

As a ‘standalone’ interdisciplinary program DP experiences several disadvantages due to:

- Not being a full-fledged department limits the possibility of having its own core faculty. Faculty members who are currently associated with DP are expected to meet the minimum teaching load in their parent department. Their ad-hoc arrangement with DP compels the faculty members to take additional academic load by collectively offering a minimum of 6-7 design courses (core + electives) every semester.

- Ideally, foundation courses in design must be taught by core design faculty with formal education and training in design. And, the existing expertise of the faculty must be used to embellish the academic diversity and specialization. However, due to the present ad-hoc arrangement; the participating faculty members spend more time teaching the foundation courses and their expertise is not utilized optimally.

- For several new topics of study in the field of design, introduced in the past six-seven years and for some mandatory foundation courses, the programme has had to depend on the external resources as visiting or adjunct faculty to train the students. This creates considerable scheduling and administrative challenges.

- Faculty focus, responsibility, and accountability get distributed between their parent department and the DP and therefore it gets difficult for them to deliver consistent quality, as a result of being in a perpetual split-focus mode.

- Do not always qualify for funding at par with its capability and potential due to the absence of a core design group.

- Minimal presence in national or international design circuits, conferences, and events.

- Absence of a unified faculty vision due to multiple disciplines delivering individualized and unique representations of design.

- Being part of a Programme rather than a department has an adverse impact among the student body, which was strongly expressed by students during their
interaction with the external review committee of the institute in 2014.

• Perception of its value in the eyes of funding agencies is also negatively impacted due to the absence of core design faculty, despite our excellence in the quality of academics and research.

Due to the constraints outlined above, we have not been able to grow in terms of dedicated faculty participation but our accomplishments bear testimony to our growing contribution to IIT Kanpur over the years. These constraints are temporary and we feel that we can become a strong design hub as needed for this part of the country. Design at IIT Kanpur as an interdisciplinary programme was a successful initiative and it has grown many times since the inception in 2002. Both M.Des and Ph.D Programmes are quite well organized and stable now. A list of student awards and achievements, placement, international collaborations and entrepreneurial initiatives are presented in Annexure 8.

9.0 Distinguishing characteristics of Design as a discipline

Design as a discipline has certain distinguishing characteristics and unique strengths, which may come to bear in shaping this unique department:

• Design Education at M.Des level is both broad and as well as deep.
• In this age of information, design as a field has increased in breadth rapidly.
• Markets seek design thinkers and leaders, who can chart directions for engineering and business development.
• Industry expects more mature and holistic design professionals today than in yesteryears, as not just ‘doers’ but also strong ‘thinkers’
• Requires holistic education covering diverse areas of engineering, arts, social sciences and business.
• Students must be taught the balances between business, technology, design and human values, as well as between global and local perspectives.
• Design is interdisciplinary in its nature and approach, which is contrary to the traditional learning mind sets of incoming students. A conducive and stable environment is necessary for ensuring a smooth transition to this mind set.
• Intensive and interactive collaboration between students, multiple instructors and within students over multiple projects is required to prepare for the above expected role with confidence.
• Experiential learning with a people centric approach is an inherent part of our
design pedagogy.

- The design curriculum must focus on learning by doing, getting one’s hand dirty, just like the tradition of IIT Kanpur
- The focus of design training today is shifting from skill acquisition to an overall understanding of multiple knowledge domains and cutting across disciplinary silos. DP at IIT Kanpur strives to inculcate such ideals into our student community.
10.0 Our Graduates

• An important issue, in the Indian context, concerning the students from this program is to ensure job security for them. We have had a strong track record in placements since inception in 2002. We got 100% placements between 2012 - 2015 consecutively. Our graduates are hired by IT industry as well as organizations with a focus on print and media, product design, visual communication, and automobile.
• We have our fair share of alumni launched start-ups.
• Some have pursued research in Design towards a PhD and eventually opted for an academic career.

Alumni Association of Design Programme, IIT Kanpur, is conceived as an organization to enable our alumni to keep in touch with existing students of Design Programme. The students benefit from the skills, resources, and contacts of the alumni. The objectives include collaborative initiatives in research, student projects, workshops & seminars, summer training and job placement.

11.0 Plan of action, road map and expected benefits

By virtue of Design being an interdisciplinary programme within IIT Kanpur, IITK has gained much because of the unique way in which Design has been structured, capitalizing on the collective strengths of multiple perspectives, programmes and experiences coming from several departments. Several projects have been and are being undertaken in this manner. Design Innovation Centre (DIC) sponsored by the MHRD is one such example (Annexure 10). With the recent emphasis on Design, we expect this to spread to and engage other departments at IIT Kanpur as well in such projects. It is hoped that such interactions will bring greater multi-disciplinarity to the academic programme as well as to research activities at IIT Kanpur in general. However, we feel the need to take such cross disciplinary, cooperative ways of working to its next logical level in a structured way that benefits all departments in today’s professional and educational climate of collaborative learning and work. And this would be possible in the best way through a formal department.

An important aim we have is to educate and empower graduates to become strong thinkers and leaders who will be able to chart a course based on their deep expertise in humanizing technology and striking the right balance of technology, business and customer centricity. That is where we expect IITK designers to be differentiators and also to make a strong mark in the market with their expertise either as employees or as entrepreneurs.

There is also considerable global interest in design for the emerging market. DP at IITK has been progressively engaging in design outreach activities and focus on rural and local cultural as well as purely Indian products and markets in surrounding geographical proximity. Along with our recent academic partnerships with universities
in Europe and US, this puts us in a strong position to build capability as leaders in emerging market design expertise.

The design community in the country maybe slow to taking a longer-term view of the kinds of professionals India and the world will need in the years ahead. At IIT Kanpur, however, we have strategized, envisioned and defined the proposal today to take up these challenges and we have also defined appropriate steps required in the previous section.

An underlying and overriding goal and plan of the proposal is employability of graduates of this programme. While employability has been satisfactory for M.Des students, we expect that to not just continue but grow in accordance with the changing demand for designers now and in the near future by industry. The PhD programme has already been appropriately launched to groom scholars in accordance with our methods and philosophies who may take on the mantle of the next generation of faculty and researchers in Design. The proposed B.Des. program will also further benefit the M.Des. and PhD programmes by helping establish and deliver to the different tiers of designers that are progressively being required in India and the world today.

Significant opportunities for multidisciplinary research collaboration already exist between Design faculty and faculty from other programmes and disciplines. This multi-disciplinary environment, which we propose to preserve in all aspects of our proposal, has the potential to greatly enhance research, and benefit all our graduates of IIT Kanpur and society at large. We strongly believe that the IITK system has the potential to build a strong and the most modern graduate programme in Design, with an emphasis on creating global designers with Indian sensibilities, and to become the leader in design expertise for the emerging market. IIT Kanpur has a national character and an international presence in most areas of teaching and research. It is the right time now therefore, to add the extremely contemporary and relevant Department of Design to the existing strength of the Institute as an equally important element, and to strengthen its brand further as well as give the right message about the importance and value of Design at the highly acclaimed technology institute of IIT Kanpur.
Figure 3 represents the proposed road map and a future plan of action. The plan is to move the existing B.Tech-M.Des Dual Degree, M.Des and PhD programmes to the new Department of Design and strengthen them further before commencing the B.Des Programme in July 2017 with an intake of 15-20 students. The present focus will be in recruiting core faculty with an intake of 15 students and faculty strength of
8-10 to start with. We hope to grow the faculty strength to about 15 through new hires apart from visiting/adjunct appointments by the time the courses of the B.Des Programme is expected to begin in the second half of 2018. We would hope to continue growing the faculty strength through time as the programmes and department stabilize.

The integrated B.Tech-M.Des. Programme is the need of the hour and with formation of department and dedicated core faculty, this initiative could be made fully operational. We believe IIT Kanpur is in a unique position to train such postgraduates who serve the needs of industry by being designers with the engineering follow-through capability as well as engineers with greater sensitivity towards the needs of consumers.

By virtue of Design being an interdisciplinary programme within IIT Kanpur, IITK has gained much because of the unique way in which Design has been structured, capitalizing on the collective strengths of multiple perspectives, programmes and experiences coming from several departments. Several projects have been and are being undertaken in this manner. However, we feel the need to take such cross disciplinary, cooperative ways of working to its next logical level in a structured way that benefits all departments in today’s professional and educational climate of collaborative learning and work. And this would be possible in the best way through a formal department.

Design Program has been instrumental in initiating and leading several global collaborations with leading universities from overseas. These are opportune and already being used as launch pads to extend this collaboration with other departments at IIT Kanpur as well. We expect this phenomenon to be strengthened with the formation of a department. Fourteen students in last two years from M.Des and PhD participated in various workshops in Finland, Sweden and US to work in collaborative student design projects. The PDP (Product Development Project) organized by Aalto Design Factory, Finland, the ME310 (Sugar Network Project) organized be Stanford University or the TedMINT organized by KTH, Sweden are examples for such collaboration. Design workshops at DP of IITK in 2015 have been attended by the students from PUJ, Columbia, St. Gallens, Switzerland, KTH Sweden, Aalto University, Finland, Tongi University, China, Waseda University, Shinjuku, Japan and many other international universities.
Significant opportunities for multidisciplinary research collaboration already exist between students, participating faculty and faculty from other programmes and disciplines. This multi-disciplinary environment has the potential to greatly enhance research, realizing products, and benefit our graduate students at IIT Kanpur and society at large. We strongly believe that the IITK system has the potential to build a strong, contemporary and world class graduate programme in Design with an emphasis on global sustainability. IIT Kanpur has a national character and an international presence in most of the areas of teaching and research and a department in a leading, contemporary and strategic field like Design today is conspicuous by its absence at an institute of the stature of IITK.
The Bachelor of Design (B. Des.) degree is a four-year degree that exposes students to major aspects like products (industrial design), communication (graphic design) and the design of physical and digital environments. Design Studies is a rigorous course of studies for students who want to explore design in all of its possibilities. The curriculum emphasizes the importance of designing for the interactions between people, the built (designed) world and the natural world (environment). The proposed undergraduate program in design is aimed to enable students to obtain all around knowledge of Design and customize their learning as well. The first three semesters introduce students to all basic areas of design specialty and provide them with the flexibility to adjust their path as their interests become clearer. In order to ensure students are well grounded in design fundamentals, all students are required to complete core courses in Design studios, drawing and visual studies, building technology, liberal studies and history, design computing, sustainable design and technology, design management, prototyping, etc.

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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institute Core (IC)</td>
<td>124</td>
</tr>
<tr>
<td>Department Compulsory (DC)</td>
<td>108</td>
</tr>
<tr>
<td>UGP 2 and UGP 3</td>
<td>015</td>
</tr>
<tr>
<td>Department Elective (DE)</td>
<td>036</td>
</tr>
<tr>
<td>Open Elective (OE)</td>
<td>054</td>
</tr>
<tr>
<td>SO/ ESO</td>
<td>040</td>
</tr>
<tr>
<td>HSS (Level-I)</td>
<td>022</td>
</tr>
<tr>
<td>HSS (Level-II)</td>
<td>027</td>
</tr>
<tr>
<td>Total</td>
<td>426</td>
</tr>
</tbody>
</table>

REMARKS:
1) UGP-2 (DES) and UGP-3 (DES) are departmental compulsory courses for B.Des students.
2) UGP-1 & UGP-4 are optional and do not count towards DE/OE credits.
3) 15 credits of UGP-2 and UGP-3 and 36 OE credits may be waived from the minimum B.Des requirements for students opting for dual degree in DOD itself.*
4) Up to 36 OE credits may be waived from the minimum requirements for students opting for either Dual Degree or Double Major programme.
Department of Design
Course Template for B.Des-M.Des

B.Des-M.Des Category – A (From the same department)

<table>
<thead>
<tr>
<th>Semester VII</th>
<th>Semester VIII</th>
<th>Semester IX</th>
<th>Semester X</th>
</tr>
</thead>
<tbody>
<tr>
<td>DE PG-2 [09]</td>
<td>DE PG-5 [09]</td>
<td></td>
<td></td>
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<tr>
<td>DE PG-3 [09]</td>
<td>DE PG-6 [09]</td>
<td></td>
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<tr>
<td>/ OE PG-1 [09]</td>
<td>/ OE PG-2 [09]</td>
<td></td>
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<tr>
<td>27</td>
<td>27</td>
<td>36</td>
<td>36</td>
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</table>

MINIMUM CREDIT REQUIREMENT FOR POST GRADUATION:

<table>
<thead>
<tr>
<th>PG Component</th>
<th>54</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M.Des Thesis Component</td>
<td>72</td>
<td>Credits</td>
</tr>
<tr>
<td>Total</td>
<td>144 Credits</td>
<td></td>
</tr>
</tbody>
</table>

REMARKS:

1) UGP-2 (DES) and UGP-3 (DES) are departmental compulsory courses for B.Des students but not for the B.Des-M.Desc (DOD) students provided they join the B.Des-M.Des Dual Degree Programme before the commencement of the 7th Semester. Such B.Des-M.Des Dual Degree students have to take 18 credits of DE-PG instead of 15 credits of UGP-2 and UGP-3.

2) UGP-1 & UGP-4 are optional and do not count towards DE/OE credits.

3) 15 credits of UGP-2 and UGP-3 and 18 OE credits may be waived from the minimum B.Des requirements for students opting for dual degree in DOD itself.

4) Up to 36 OE credits may be waived from the minimum requirements for students opting for either Dual Degree or Double Major programme.
### DEPARTMENT COMPULSORY COURSES

<table>
<thead>
<tr>
<th>COURSE NO</th>
<th>COURSE NAME</th>
<th>CREDITS</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>DES 101</td>
<td>INTRODUCTION TO DESIGN</td>
<td>11</td>
<td>FULL SEMESTER</td>
</tr>
</tbody>
</table>

This course will deliver the basic understanding of Design to the students. Few of the methodologies such as group activities, investigating how anything works, design thinking etc. will be introduced to have a better understanding of the design ecosystem. The students will undergo through projects in various ways (theory and lab) to understand the semantics of various principles of design.

<table>
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<tr>
<th>COURSE NO</th>
<th>COURSE NAME</th>
<th>CREDITS</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>DES 102</td>
<td>DESIGN METHODS</td>
<td>05</td>
<td>HALF SEMESTER</td>
</tr>
<tr>
<td>DES 103</td>
<td>DESIGN PROBLEM SOLVING</td>
<td>05</td>
<td>HALF SEMESTER</td>
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</table>

These half semester courses aim to impart the design thinking using various methods which will expose students for need identification, design problem description, contexts and scenarios, brainstorming, idea generation, analysis and evaluation.

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<tr>
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<th>COURSE NAME</th>
<th>CREDITS</th>
<th>DURATION</th>
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</thead>
<tbody>
<tr>
<td>DES 104</td>
<td>ELEMENTS AND PRINCIPLES OF VISUAL DESIGN</td>
<td>9</td>
<td>FULL SEMESTER</td>
</tr>
</tbody>
</table>

This course introduces the principles and elements of design and requires students to apply them to the design of simple web page or interface layouts. Rationales are developed to defend and support design decisions. The course introduces numerous theoretical constructs that enable its audiences to primarily understand the nature of visual medium and eventually develop a visual vocabulary to decode visual messages with a semiotic approach. The knowledge is instrumental in visual analysis, critical art appreciation, theoretical and practical art and design endeavors. Visual design basics such as rhythm, composition and space, scale and proportion, harmony, color theory, balance, unity, Gestalt principles, visual analysis will be explored for different mediums (web and print.)

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<tr>
<th>COURSE NO</th>
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<th>CREDITS</th>
<th>DURATION</th>
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</thead>
<tbody>
<tr>
<td>DES 105</td>
<td>VISUALIZATION AND REPRESENTATION TECHNIQUE (2D)</td>
<td>6</td>
<td>FULL SEMESTER</td>
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</tbody>
</table>
This course introduces basic sketching and drawing techniques such as perspective drawing, figure and ground translation, storyboarding for explanation, product conceptualization and representation, diagramming for clarification, real life product and visual semantics. Examples would include collecting few texture samples from nature on a paper and then representing the same through a pattern or tessellation.

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<th>DURATION</th>
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</thead>
<tbody>
<tr>
<td>DES 106</td>
<td>VISUALIZATION AND REPRESENTATION TECHNIQUE</td>
<td>6</td>
<td>HALF SEMESTER</td>
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<td>(3D)</td>
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</table>

This course aims to understand the 3 dimensional space around us. Topics such as Organic forms and Inorganic forms, Rectilinear and Curvilinear forms, Lines in space, Space composition in the 3d space, balance and beauty, proportion, abstraction will be introduced to the students. Students will also undergo with few material exploration sessions where they would be instructed to visualize and represent forms with Plaster of Paris, wood, Acrylic, Metals, etc. which would enhance their prototyping skills as well. Students will be evaluated on the basis of assignments and classroom participation.

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<th>COURSE NO</th>
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</thead>
<tbody>
<tr>
<td>DES 107</td>
<td>MATERIAL EXPLORATION FOR DESIGN</td>
<td>05</td>
<td>HALF SEMESTER</td>
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</tbody>
</table>

This course will cover classification and identification of materials, physical and chemical properties of materials, manufacturing processes (extrusion, rapid prototyping etc.) where the students will understand the types of materials and how do they impact the form, functions, usability of a product. Students will also get an exposure by attending 4I laboratory sessions where they will introduced to the CNC machines, 3D Printers, Laser scanning, PCB machines, water jet cutting machines and Electric discharge machines.

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</thead>
<tbody>
<tr>
<td>DES 108</td>
<td>DESIGN ANTHROPOLOGY</td>
<td>05</td>
<td>HALF SEMESTER</td>
</tr>
<tr>
<td>DES 109</td>
<td>DESIGN ETHNOGRAPHY</td>
<td>05</td>
<td>HALF SEMESTER</td>
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</tbody>
</table>

Design Anthropology will introduce the students to the key site of cultural production and the changing contemporary society. Concepts of collaboration, intervention and co-creation will help understand the students that how design practitioners participate
in the multidisciplinary design where team works towards concrete solutions for problems that are sometimes ill defined. Design ethnography will enhance the ability of the students to sense the real world sociability of a setting through detailed descriptions of activities of the social actors within specific contexts. Students will learn the concepts of empathy, ethnographic research methods with some field works.

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<tr>
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<th>DURATION</th>
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</thead>
<tbody>
<tr>
<td>DES 110</td>
<td>COMPUTING FUNDAMENTALS FOR DESIGN</td>
<td>09</td>
<td>FULL SEMESTER</td>
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</tbody>
</table>

Computing fundamentals for design will help the students to develop a foundational computing and information literacy skills, technologies involved in the digital and electronic world, programming languages (C, Java, HTML, CSS, openGL, processing, C#), etc. where they would evolve as a professional intellectual capable in dealing various paradigms of new media such as Augmented reality, Internet of things, wearable technology etc. Students will be evaluated on the basis of classroom participation and group assignments.

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</thead>
<tbody>
<tr>
<td>DES 111</td>
<td>PSYCHOLOGICAL PRINCIPLES IN DESIGN</td>
<td>05</td>
<td>HALF SEMESTER</td>
</tr>
<tr>
<td>DES 112</td>
<td>HUMAN BEHAVIOUR AND COGNITION</td>
<td>05</td>
<td>HALF SEMESTER</td>
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</tbody>
</table>

Scientific principles of psychology will be discussed in this course. The primary focus will on the psychological behaviors, interactions, memory etc. where students will get an exposure to, how we develop and evolve as an individual within a system. Special topics such as function of a brain, memory, learning, control systems, emotion etc. will get covered. Students would do some actual experiments with the help of current technological tools in the lab such as eye tracking machines, psychological experiment tools, participant observation lab etc. where they will understand the functioning of the psychological phenomenon in a society. Projects will include multidisciplinary approach such as Interface psychology, embodied interaction etc. to better understand a variety of topics.
This course focuses on the ergonomic design of systems keeping particular attention to the psychological human needs. This multidisciplinary course will introduce the students to some of the principles of human factors, Anthropometric Measurements, common workplace postures, common workplace motions, anticipating actions, Universal design considerations etc. Workshops and field trips will be conducted to experience the world of ergonomics or a set of rules around us.

This course aims to provide students with a broad perspective and understanding of various research methods applied in the real world. This course asks the students to think why, what, when, where, who, how of the problem statement. This course explains the characteristics of different research methods, theoretical assumptions behind each, and how they fit in the real contexts. This course provide an overview of the epistemological setting of the various research methods and their design research interpretations as well as explaining the differences, similarities and overlaps between them. Practical workshops will be organized which will get evaluated at the semester end.

Students will get introduced to the fundamentals of tools and techniques involved in prototyping methods. For visual communication lab, student’s tools like Photoshop, illustrator, Corel draw, lithography, print media tools, ink and color mixers will be introduced with the help of lab technician. Interaction Lab would include tools like micro-controllers, motors, servos, actuators, usability testing, eye tracking, interface testing tools, programming languages, GUI mockup software’s etc. Students will be supervised with the help of a lab technician.
Product Design Lab will provide various materials (clay, PoP, wood, acrylic, metals, alloys, etc.), various machineries (3D printer, 3D scanner, mechatronics tools etc.) and a huge space where various prototypes can be developed and tested.

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<th>COURSE NO</th>
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<tbody>
<tr>
<td>DES 116</td>
<td>PROTOTYPING LAB 02 (program specific)</td>
<td>09</td>
<td>FULL SEMESTER</td>
</tr>
<tr>
<td></td>
<td>Programs include—</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Visual Communication, Interaction Design, Product Design</td>
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In this laboratory work students will undergo an end term project where they will get evaluated on the basis of the quality of prototypes.

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</thead>
<tbody>
<tr>
<td>DES 117</td>
<td>DESIGN FOR SOCIAL INNOVATION</td>
<td>09</td>
<td>FULL SEMESTER</td>
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</table>

In this course, students who seek fulfillment from working towards a bigger good, will work with the intent of creating social impact by addressing major challenges facing businesses, governments, society and humanity. They would undertake projects in both the formal and informal sector to address issues such as water, sanitation, economic empowerment, access to financial services, nutrition, health and environmental impact. Students would also learn how to create impact and change among underserved and disadvantaged communities. The needs of this target group would be addressed through principles of design for social innovation, founded in design thinking. It would often necessitate the creation of not just products and services, but also the entire system. It would involve extensive and deep field research and participatory design with the local community. It would call for a systemic approach to design that also encompasses criteria such as business models, funding strategies, distribution and service. They would learn how to realize the important role design has to play in these sectors and how to become partners and facilitators of such changes.
DEPARTMENT ELECTIVES

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<th>COURSE NO</th>
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</thead>
<tbody>
<tr>
<td>DES 118</td>
<td>DESIGNING PEOPLE MACHINE INTERACTION</td>
<td>09</td>
<td>FULL SEMESTER</td>
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</tbody>
</table>

Human-computer interaction is an interdisciplinary field that integrates theories and methodologies from computer science, cognitive psychology, design, and many other areas. The course is intended to introduce the student to the basic concepts of human-computer interaction. It will cover the basic theory and methods that exist in the field. The course will unfold by examining design and evaluation. Case studies are used throughout the readings to exemplify the methods presented and to lend a context to the issues discussed. The students will gain principles and skills for designing and evaluating interactive systems. Among the topics studied are the design and evaluation of effective user interaction designs, including principles and guidelines for designing interactive systems. Additionally, much emphasis is given to the development process for user interaction designs as an integral, but different, part of interactive software development. User interaction development activities include requirements and task analysis, usability specifications, design, prototyping, and evaluation. It is a goal of this course to help students realize that user interface development is an ongoing process throughout the full product life cycle, and developing the human-computer interface is not something to be done at the last minute, when the "rest of the system" is finished.

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<tbody>
<tr>
<td>DES 119</td>
<td>EXPERIENCE DESIGN</td>
<td>09</td>
<td>FULL SEMESTER</td>
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</table>

This course will research the design and way humans interact with technology which keeps augmenting their capabilities directly or indirectly. The content would focus on the state of art of the technology in the present and future. Special topics would include human senses and optic technology, computer vision, bionic technology such as EEG, ECG, brain computer interface, tactile technology, motion technology (gyroscopes and accelerometers) etc. Students will be evaluated on the basis of the assignments and classroom participation.

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</thead>
<tbody>
<tr>
<td>DES 120</td>
<td>MEDIA EXPLORATIONS AND APPLICATION IN DESIGN</td>
<td>09</td>
<td>FULL SEMESTER</td>
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</tbody>
</table>

The course aims to facilitate the understanding of connection between design, media and technology, where it involves...
familiarization with communication and tools of communication along with media and changing technologies. Also, potential of technology and its impact on society, media artifacts and convergences, new applications, etc. also forms part of the course. With multiple and interdisciplinary focus on visual, audio and new media, the course will explore the examples of design in campaigns, journalism and advertising. It will also explore the influence of technology in various media like in print, radio and web.

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</thead>
<tbody>
<tr>
<td>DES 121</td>
<td>DESIGN OF INFORMATION SYSTEMS</td>
<td>09</td>
<td>FULL SEMESTER</td>
</tr>
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</table>

This course will introduce the students on the practice of presenting the information in a way that reduces human effort in understanding it. Students would learn the concepts of planning, analysis, design, implantation and maintenance of an information system. Topics would cover the areas of information architecture, hierarchy sorting, card sorting, basic statistics for information systems, interface design, colors, shapes etc.

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<th>DURATION</th>
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</thead>
<tbody>
<tr>
<td>DES 122</td>
<td>SERVICE DESIGN</td>
<td>09</td>
<td>FULL SEMESTER</td>
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</table>

We live in a global service economy. The percentage of people employed in services has steadily increased in every developed country, exceeding 80% in the US in 2010. In 2011, an estimated 79.6% of the US GDP was created by the services sector. Emerging economies have similarly seen explosive growth in the percentage of their workforce employed in the provision of services, as trends as offshoring and outsourcing become more prevalent. This course explores how leaders design service models, and systems to manage employees and customers, to consistently deliver exceptional and profitable services. We will explore services that create value for external and internal customers, and delve into how globalization has expanded the choices organizations have.

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<tbody>
<tr>
<td>DES 123</td>
<td>DESIGN FOR FUTURE</td>
<td>09</td>
<td>FULL SEMESTER</td>
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</table>

In this course students will learn different approaches to interpret the future. Topics such as Pataphysics, fiction based prototyping (utopian and dystopian fiction), scenario prediction, brainstorming sessions etc. Students would try to attempt to evaluate futures in terms of their longer term consequences. Students will get evaluated on the basis of a group project.
<table>
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<tr>
<th>COURSE NO</th>
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<th>CREDITS</th>
<th>DURATION</th>
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</thead>
<tbody>
<tr>
<td>DES 124</td>
<td>DESIGN FOR TANGIBLE, EMBEDDED AND NETWORKED TECHNOLOGIES.</td>
<td>09</td>
<td>FULL SEMESTER</td>
</tr>
</tbody>
</table>

This course encapsulates many of the central themes of embodied making, how embodied making and tangible artefacts contribute to learning during the design process. This course will sensitize students to spatially aware computational devices, internet of things, psychology of embodied interactions etc. Students will get evaluated on the basis of assignments and a final project.

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<tbody>
<tr>
<td>DES 125</td>
<td>DATA ANALYSIS AND DESIGN</td>
<td>09</td>
<td>FULL SEMESTER</td>
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</table>

This course introduces students to the appropriate database design techniques using Entity relationships diagrams and normalization techniques. Students will design and analyze the complex databases, then store, maintain and retrieve data using commercial relational database management tools. This branch falls under the category of computer science and design students will get equipped to solve the real world digital commercial systems.

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<th>DURATION</th>
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</thead>
<tbody>
<tr>
<td>DES 126</td>
<td>DATA VISUALIZATION</td>
<td>09</td>
<td>FULL SEMESTER</td>
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</table>

This course will introduce students to the field of data visualization. Students will learn basic visualization design and evaluation principles, and learn how to acquire, parse, and analyze large datasets. Students will also learn techniques for visualizing multivariate, temporal, text-based, geospatial, hierarchical, and network/graph-based data. Additionally, students will utilize Processing, D3, R and ggplot2, and many other tools to prototype many of these techniques on existing datasets.

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</thead>
<tbody>
<tr>
<td>DES 127</td>
<td>VISUAL COMMUNICATION</td>
<td>09</td>
<td>FULL SEMESTER</td>
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</table>

In this course students will learn to present data in way that yield insight and understanding. Topics would cover visual semiotics, visual semantics, icons, symbols, sign, signage, colors, logos, infographics, differences in the visual culture etc. Introduction to elementary graphic programming on two dimensional vector graphics will also be included. Data visualization vocabulary with
more sophisticated methods, including hierarchical layouts and networks will provide a better understanding on this subject.

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</thead>
<tbody>
<tr>
<td>DES 128</td>
<td>DESIGN FOR PRINT MEDIA</td>
<td>09</td>
<td>FULL SEMESTER</td>
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</table>

This course will give students an insight about the design and production of print materials. During this creative and concept development course students will get an exposure to the world of graphic design, typography, history of advertisement, commercial offset printing, image correction and manipulation, catalogs, campaign development and production, brochures and ads etc.

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<th>DURATION</th>
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</thead>
<tbody>
<tr>
<td>DES 129</td>
<td>TOPICS IN MOTION PICTURE</td>
<td>09</td>
<td>FULL SEMESTER</td>
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</tbody>
</table>

Topics in motion pictures require a combined practical and theoretical approach for realizing the creative media in its totality. The proposed course would offer students the opportunity to acquire a range of transferable and practical skills in film and television productions. Concise and brief history of motion pictures; Analysis and a general approach to the criticism of film and television media; Approach and methods in these forms of media productions; Overview of the digital media arts field with an emphasis on technological developments and their integration in art research and production. Students would be introduced to contemporary and historical directions, key concepts and methodologies through seminar lectures, research presentations, practical exercises and a final project. Classes would be supplemented with viewing a range of productions, individual and group critiques, presentations, demonstrations and practical exercises to explore traditional and modern methods and explore both technical and creative approaches to the medium. The course will also include short workshops supported by specialized professionals in the related fields.

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<tbody>
<tr>
<td>DES 130</td>
<td>HISTORY OF ARTS</td>
<td>09</td>
<td>FULL SEMESTER</td>
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</table>

This course will introduce to the history of western and Indian arts. Theoretical concepts will start from the prehistoric to the renaissance; rococo to the modern arts will be covered. Indian art history and handicrafts will also be covered. A sociological perspective would be presented to the students so that they will sensitize to the world of arts.
This course introduces students to the world of types with graphics. This course will give an overview to the psychological, technical aspects and aesthetical aspects of the typefaces. Topics would include anatomy of typefaces, classification of typefaces, history of typography, typography in Indian languages, typeface semantics etc. Students will be evaluated on the direct type related design projects.

This course is about the communication of ideas through the type and images and the creation of the images. Graphic design part will cover the media design such as magazines, publicity material, posters and advertising along with the packaging, TV/FILM titles etc. whereas illustration module will be about the creation of images through various techniques, sketching, drawing, painting, collage, character creations, advertising, packaging, animations etc. Students will build a portfolio at the end of the course.

This course will cover the design, prototyping and evaluation of the user interfaces to computers. Methods will be introduces to evaluate the interface quality. Topics will cover visual and auditory perception, memory, mental models, interface metaphors, input and output devices, interaction styles, user centered design principles, interface evaluation methods, user observation, benchmarks and experiments. Students will get to conceptualize and design working prototypes using some basic programming languages.

The course will cover the visual communication design principles, expressive typography, user and context studies and branding strategies. To learn various methods of creating branding identity products such as logos, posters, ad design and campaigns, greeting cards, and more which will be useful for personal and/or commercial publication. Students will develop career and
communication skills in the area of graphic arts communication areas of research/communication, project management and collaboration, design, and professional print production using graphic design tools.

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<tr>
<td>DES 135</td>
<td>BIO MIMETICS</td>
<td>09</td>
<td>FULL SEMESTER</td>
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The course is based on the belief that nature is the oldest, sustainable engineering school. The core philosophy of the course will be to motivate, inspire and train young minds to explore the vast, unexplored world of bio-mimetics, which is an interdisciplinary field in which principles from engineering, chemistry and biology are applied to the synthesis of materials, synthetic systems or machines that have functions that mimic biological processes. Biomimetic designs could be used in energy harvesting, water purification, architecture, resource conservation, food production, prosthesis and regenerative medicine.

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<tr>
<td>DES 136</td>
<td>DESIGN OF BIO ENERGY</td>
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<td>SYSTEMS</td>
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This course aims at exploring the different bio-energy systems to meet the future needs for green and clean energy for the human race. It will cover the four aspects of bioenergy viz., biofuels (Converting biomass into liquid fuels for transportation), bio-power (Burning biomass directly, or converting it into a gaseous fuel or oil, to generate electricity), bio-products (Converting biomass into chemicals for making products that typically are made from petroleum), bioenergy materials (Biomaterials which have the potential to convert heat or light to electricity).

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<td>DES 137</td>
<td>OPEN SOURCE AGRICULTURE</td>
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<td>AND FOOD SECURITY</td>
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This course aims at addressing the challenge of global food security. Within the field of food security research, particular focus will be on sustainable agriculture and food systems that could better address local, regional, national and/or global food and nutritional insecurity. Further the idea will be expose the students to agricultural, ecological, environmental, nutritional, and socioeconomic sciences, public health and policy decisions influencing the sustainable growth.
There is an acute need within our nation to develop bio-medical instrumentation that could carry out diagnostics and therapeutics at the same time with very less human intervention and thus miniscule chances of error. Further miniaturization has a great role to play in such devices. This course aims at giving an insight into some fundamentals related to design and development of devices with hands on modules where such devices and instrumentation can be realized. Such a course can be an enabler of progress in indigenized technologies as the devices that may come out from this course may have translational possibilities.

Currently our nation needs translational simplistic engineering solutions in hospitals and hospital management. The medical products and services are too expensive and unaffordable if they are sourced from foreign companies. It is very important for product designers to focus on the actual need statement and provide low cost solutions to aid medical practices through the nation. A very good example can be the area of dentistry where lack of cost effective infrastructure is the main reason for providing parity between the skilled practitioners and the huge patient needs. This design course aims at providing a design challenge based learning experience where with field survey and practice, solutions will be developed for different healthcare sectors.

The courses approached towards design from a cultural perspective in Indian context. It covers the characteristic ancient, medieval and modern India and the prevailing design trends. It is to examine the influence of religion, language and art on the society and trace the nature of change caused by climate change, urbanization, ideological shift, educational policies, technological empowerments and common livelihood. It adapts the established methodologies of cultural research to connect the facts into narratives in order to achieve a comprehensive understanding of Indian design heritage.
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<tr>
<td>DES 141</td>
<td>SUSTAINABILITY OF THE INDIAN CRAFTS</td>
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The course aims to study Indian traditional craft practice to realize the present day interest in the field. It scrutinizes the potential source of survival of a cultural legacy like Indian craft and envisions its relevance in the contemporary cultural margin. The course comprises of understanding materials and their use, technology as tools, value addition and related ethical factors, preservation, restoration, archiving and other modes of knowledge preservation. The course includes literature survey, field visit, research and documentation to formulate sustainable design solutions.

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<tr>
<td>DES 142</td>
<td>INCLUSIVE DESIGN</td>
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To provide an introduction to the inclusive design of information and communication technologies and practices and equip students with the necessary theoretical and technical background to engage in well informed, in-depth critical analysis of inclusive design of information systems and services and to apply rudimentary inclusive design methods.

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<tr>
<td>DES 143</td>
<td>HISTORY OF DESIGN</td>
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The course will cover Modern movement and school of thoughts in the history of design, from Art and Craft Movement, Modernism, Bauhaus, Postmodernism, HfG Ulm, etc. It will also explore the Design in India after independence.

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<tr>
<td>DES 144</td>
<td>COLLABORATIVE DESIGN METHODS FOR NEW PRODUCT DEVELOPMENT</td>
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This course will focus and aims to develop the interdisciplinary skills required for successful product development in today’s competitive marketplace. Engineering, iSchool, Business, Industrial Design, etc. students join forces on small product development teams to step through the new product development process in detail, learning about the available tools and techniques to execute each process step along the way. Each student brings his or her own disciplinary perspective to the team.
effort, and must learn to synthesize that perspective with those of the other students in the group to develop a sound, marketable product. Students can expect to depart the semester understanding new product development processes as well as useful tools, techniques and organizational structures that support new product development practice. Although the course focuses on the application of these principles to new product development, they are more broadly applicable to innovation in general – of products, services, organizations, business strategies and governmental policies.

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<tr>
<td>DES 145</td>
<td>STATISTICS FOR DESIGN RESEARCH</td>
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This course develops ideas for making decisions based on data. Major topics include: data displays and summary statistics for quantitative and qualitative variables; correlation and simple regression for pairs of variables; probability to deal with partial and uncertain knowledge; the law of large numbers; the normal distribution and the central limit theorem; statistical inference based on standard errors, confidence intervals and statistical hypothesis tests. The course does not dwell on the details of computation - its main focus is on understanding a few deep concepts and interpreting data and the results of statistical analysis.

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<tr>
<td>DES 146</td>
<td>DESIGN FOR RURAL INNOVATION</td>
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Built on the basic premise of a people centered design approach, this course will have emphasis on users from the rural setting, on compassing their particular need and wants. Contrary to repositioning products designed for the urban consumers, this course will take a ground up approval in eliciting and understanding needs of rural users and creating design that fit rural India. Application and Integration of technology into design in service of the significant market of rural India would be one of the emphases in the course.

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<td>DES 147</td>
<td>REVERSE ENGINEERING</td>
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Reverse Engineering (RE) has become an important Engineering task to obtain knowledge about engineering device or system. RE is an effective learning technique if other “solutions” are available on the market. Applying reverse engineering methodologies
allow engineers to disassemble and re-assemble of the device, taking care to document, test, analyze and report on the study of its function. This course introduces students to Reverse Engineering Methodology through practical projects.

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<tr>
<td>DES 148</td>
<td>PACKAGING DESIGN</td>
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The course will cover the overall aspects of Packaging Design like Branding, material exploration and Form development. It will also explore the emerging idea of Sustainable consumption. This course will also familiarize students with package design and manufacturing. Lectures and labs will cover aesthetics, marketing, and brand identity as well as sustainability and the implementation of commercial and governmental regulations.

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<tr>
<td>DES 149</td>
<td>PRODUCT DESIGN PROTOTYPING</td>
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Product Design and Development is a hands-on course that covers modern tools and methods for product design and development. Students work on multiple projects in which teams of management, engineering, and industrial design students conceive, design and prototype various physical products. Class sessions are conducted in workshop mode and employ cases and hands-on exercises to reinforce the key ideas. Topics include identifying customer needs, concept generation, product architecture, industrial design, and design-for-manufacturing.

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<tr>
<td>DES 150</td>
<td>FINITE MECHANISM AND MOVEMENTS</td>
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Mechanisms are realized by connecting rigid links or members through joints in order to accomplish a desired force and/or motion/power transmission. Mechanisms are an inherent part of any system which satisfies an engineering need. A product designer should have a very good idea of motion or power transfer possibilities and therefore must be aware of Mechanisms. This course is intended to provide an in-depth knowledge about Mechanisms and their functioning, kinematics and needs in engineering systems.
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<tr>
<td>DES 151</td>
<td>ADVANCED MATERIALS AND APPLICATIONS IN DESIGN</td>
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Materials have been a vast domain of study in almost all disciplines of engineering. However need for advanced materials were intensified by the requirements of the mobility sector. In particular the significant breakthrough that this subject experienced was due to requirements generated from the aero-space and automotive industries. The design of materials satisfying the high strength, light weight criteria became the need of the day. Today advanced materials and science of their formulation is a very big domain and applications span to almost all walks of life. This course is intended to provide a firm glimpse to product designers about the possibilities that exist in intelligent material design to serve specific product needs.

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<tr>
<td>DES 152</td>
<td>DESIGN OF EMBEDDED SYSTEMS</td>
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Embedded systems are dedicated systems with computational power that are hidden inside an otherwise engineering system with mechanical or electrical capabilities. Today embedded systems like controllers find application in any sophisticated engineering systems. It becomes very important for a product designer to have basic knowledge in the embedded systems area particularly looking at the societal need for intelligent products. This course is intended to give designers basic modules on embedded system design and fabrication.

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<td>DES 153</td>
<td>ADVANCED MANUFACTURING AND PROCESSES</td>
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The course covers details of the advanced machining theory and practices, advanced machining processes, advanced metal forming processes, advanced welding processes and advanced foundry processes.

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<td>DES 154</td>
<td>DESIGN MANAGEMENT</td>
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Design management encompasses the ongoing processes, business decisions, and strategies that enable innovation and create effectively-designed products, services, communications, environments, and brands that enhance our quality of life and provide
organizational success. Deeply, design management seeks to link design, innovation, technology, management and customers to provide competitive advantage across the triple bottom line: economic, social/cultural, and environmental factors. It is the art and science of empowering design to enhance collaboration and synergy between "design" and "business" to improve design effectiveness. The scope of design management ranges from the tactical management of corporate design functions and design agencies, including design operations, staff, methods and processes—to the strategic advocacy of design across the organization as a key differentiator and driver of organizational success. It includes the use of design thinking—or using design processes to solve general business problems.

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<td>DES 155</td>
<td>SYSTEM APPROACH TO DESIGN</td>
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This course provides a practitioner-oriented definition of systems, including the importance of observer dependence and context, and ideas of meta-systems, subsystems; philosophical foundations, human dimensions, value systems and associated optimization/sub-optimization, casuistry, aspects of life-cycle project management, and economic decision making; inquiring systems; key aspects of human learning organizations, systems thinking, and systems modeling; qualitative tools for the systems practitioner, including various graphical tools; and the multiple perspectives aspect of the systems approach, both "horizontal" and "vertical".

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<tr>
<td>DES 156</td>
<td>APPLIED EXPERIMENTAL DESIGN</td>
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This course is planned for those interested in the design, conduct, and analysis of experiments in the physical, chemical, biological, medical, social, psychological, economic, engineering, or industrial sciences. The course will examine how to design experiments, carry them out, and analyze the data they yield. Various designs are discussed and their respective differences, advantages, and disadvantages are noted. In particular, factorial and fractional factorial designs are discussed in greater detail. These are designs in which two or more factors are varied simultaneously; the experimenter wishes to study not only the effect of each factor, but also how the effect of one factor changes as the levels of other factors change. The course will be elementary in terms of mathematics. The course includes a review of the modest probability and statistics background necessary for conducting and analyzing scientific experimentation. With this background, we first discuss the logic of hypothesis testing and, in particular, the statistical techniques generally referred to as Analysis of Variance. A variety of software packages are illustrated, including
Excel, SPSS, JMP, and other more specialized packages.

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<td>DES 157</td>
<td>DESIGN ANALYTICS</td>
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Product/service development is the process of identifying, designing, building, and marketing a product or service for consumers. Availability of plethora of data – both organized and un-organized – require specific tools/techniques for its analysis. For product developers to be effective, they must understand their customers' needs and wants, the competitive landscape, and have the ability to optimize cost, time to market, and quality of the product. A good idea does not ensure the success of the idea as a viable product. To address all these problems, analysis of data to test/verify relevant hypotheses related to such decisions help to realize the product/service idea.

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<td>DES 158</td>
<td>FINANCIAL ENGINEERING FOR DESIGN</td>
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<td>HALF SEMESTER</td>
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This course offers an analysis of advanced pricing models for products/services. It aims at reviewing the main models and modeling techniques used in practical applications, understanding their applicability and limitations, and at building an integrated framework allowing students to: 1) decide what stochastic factors (e.g., volatility, jumps, one or more interest rate factors, default intensities) should be incorporated in a reasonable pricing model for a given product/service; 2) formulate a consistent model incorporating the chosen factors; 3) calibrate the model using market data; 4) price the derivative and identify a hedging strategy. To allow sufficient flexibility in the choice of the pricing model, the class will not place any special emphasis on closed-form valuation formulas, relying instead on the full generality a ordered by the martingale approach to asset pricing as numerically implemented by Monte-Carlo simulation.

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<tr>
<td>DES 159</td>
<td>DESIGN ETHICS AND PROFESSIONAL PRACTICE</td>
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This course will prepare student to effectively manage the increasing demands on designers today. It would enable them to confidently and effectively navigate the practical environs of industry as project-ready professionals. It will empower students rapidly integrating their unique design talent into the corporate and the organizational culture. This course will also teach them to
ethically and effectively handle the responsibilities placed upon designers today in addressing the technological needs but the greater needs of people and of bigger good.

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<td>DES 160</td>
<td>CHANGE MANAGEMENT IN DESIGN</td>
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In this dynamic world businesses need to continuously change to deliver new services to customers, reduce costs of existing services or create an entirely new paradigm of business itself. Getting such changes implemented is a challenge. There are several cases where companies fail to achieve the desired change! They fail to get acceptance, they fail to get adoption and their grand vision remains unfulfilled. The problems are traced back to human nature, to why employees will not implement a change even though it appears a definitely better way to do business, and how bosses fail to address the micro-environment around impacted employees. The course will help the student to understand the challenges in getting significant changes made in organizations learn Organization Change Management (OCM) techniques, discuss case scenarios where OCM techniques played a greater role in ensuring successful implementation of product/service ideas, build your personal confidence that you know how to get the job done.

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<td>DES 161</td>
<td>INFORMATION SECURITY SYSTEM DESIGN</td>
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This course offers a comprehensive study of the principles and practices of computer system security including operating system security, network security, software security and web security. Topics include common attacking techniques such as virus, trojan, worms and memory exploits; the formalisms of information security such as the access control and information flow theory; the common security policies such as BLP and Biba model; the basic cryptography, RSA, cryptographic hash function, and password system; the real system implementations, with case study of UNIX, SE-Linux, and Windows; network intrusion detection; software security theory; web security; legal and ethical issues in computer security. The learning outcome is students shall be able to understand what are the common threats faced today, what are the foundational theory behind information security, what are the basic principles and techniques when designing a secure system, how to think adversarial, how today's attacks and defences work in practice, how to assess threats for their significance, and how to gauge the protections and limitations provided by today's technology.
The Review Report

A review of the
Design Programme
Indian Institute of Technology, Kanpur
The external review committee members:

Prof. G.G. Ray (Indian Institute of Technology, Bombay)
Prof. Amarendra Kumar Das (Indian Institute of Technology, Guwahati)
Prof. Debkumar Chakrabarty (Indian Institute of Technology, Guwahati)
Prof. Amaresh Chakrabarty (Indian Institute of Science, Bangalore)
Prof. Avinash Shinde (Indian Institute of Technology, Guwahati)
Prof. Kalevi Ekman (ADF, Aalto University, Helsinki)
Prof. Carl Michael Johannesson (KTH Royal Institute of Technology, Stockholm)
Mukul Goyal (Designwise India Pvt. Ltd)
Bipin Gupta (Infosys Limited, Pune)
Section 1: Our Understanding
1. The Design Programme at IIT Kanpur currently offers Masters in 4 specific areas -
   a. Interaction Design
   b. Visual Communication
   c. Engineering Design
   d. Product Design
2. All of the above four disciplines are offered as courses during the Masters Programme, though not as a specialization.
3. Currently, the Masters of Design is being run as a Design Programme, and not as a full-fledged Department. Not being a full-fledged department limits the possibilities in having its own core faculty; which is why the Design Programme has to rely solely on faculty from other disciplines to run its courses.
4. There is a definite need to introduce certain foundation courses in the Design Programme.
5. The Design Programme plans to offer yet another Masters course which will be in Bio Design.

Section 2: The Agenda
The agenda of this external review committee is to formally review the working of the Design Department at Indian Institute of Technology and its infrastructure, its standing in the industry and the academia alike, if found appropriate, recommend its conversion to a full-fledged Department of Design within the Institute of Design, Kanpur.

Section 3: The Review Committee Recommends
While at the campus of Indian Institute of Technology, Kanpur, on December 14th, 2013, the review committee went through multiple presentations from faculties and head of the Design Programme. Based on the details about the programme, its agenda, its purpose, direction and intentions in promoting the design education that was presented, the review committee observed that the initiative proposed by the Indian Institute of Technology, Kanpur is a welcome one - for the opportunities it presents for those working with Design at various universities in India and abroad, as well as with a range of other enterprises.

1. The Design Programme at IIT Kanpur currently does and in future will attract talented students of both genders - students who are inquisitive and seek their own paths. Guided by expert teachers from different disciplines, all with an interest in design, these students will be able to increase their contacts with the academic world, and business as well as society. The students and teachers will also form bridges to other disciplines within IIT, Kanpur.
2. Visual Design and Communication, Product Development, Manufacturing and Product Design operations - all of these constitute a firm base for the educational platform of the proposed Department of Design.

3. Within the future Department of Design, it is important that there are teachers from different disciplines that work in a cohesive manner in the spirit of the institution. That is to say they should apply a process-oriented approach consistent with the nature of design, foster the ability to work from a holistic point of view - without losing sight of the details, and stimulate the inquisitiveness in students.

4. During their career as designers, the students will often have to communicate and cooperate with people working in many different areas. It is therefore important that the Department of Design students are encouraged to meet those studying other engineering disciplines, behavioral science, economics and management, to take just a few examples, and preferably also be given the opportunity to collaborate with them in short-term and long-term projects.

5. After the basic studies (i.e. in form, visualization and communication, design processes, product design, aesthetics and ergonomics) it would be desirable to allow students to specialize in different tracks, such as machine design, material science and tactility, biomechanics/human factors, and bio-design.

6. Collaboration with industry is important in evaluating the students' work from a real-world perspective, and in expressing the potential and relevance of their implemented solutions. Adjunct faculty from industry would be a valuable component for design students, both in terms of product development and industrial design.

7. To run a successful vibrant M.Des. course and eventually run a really design oriented Research/Doctoral program as well, setting up of a Department of Design is the first requirement and the review committee welcomes this positive initiative of IIT Kanpur.

8. To really call the M.Des. program, a designer’s program, the department must have a course structure with pure design core courses such as form studies, design methodology, design semantics, creativity, innovation, visualization techniques, illustration graphic design, ergonomics etc. to name a few.

9. To impart the design core courses, there is a strong need for qualified faculty that is dedicated to the Department of Design and the design students.

10. All design projects should be relevant to design where students can explore form, function etc. and thus be guided by faculty with design qualification and where needed, faculties from other discipline can co-guide these to complement knowledge and expertise.

11. To run design courses, a good infrastructure comprising of studios is a must. Studios are not workshops, where regular basic skill training is given. These are facilities, where
creative mind can design, experiment and fabricate prototypes in different materials as well as mock ups. Essential studios are - ceramic and clay, wood, metal, plastics, paint/powder coating etc. These are to be available 24x7 hours. Requisite staff to manage and maintain these are necessary and should be acquired/recruited.

12. Although, IIT Kanpur presently offers M.Des. without specific specialization till the final academic year, it now enrolls students for product design, communication design, interaction design and product design engineering. It is felt that it should initially stabilize Product Design and Communication Design areas with recruitment of faculty members in these areas and if it can recruit faculty members from Interaction Design, it can offer this discipline. The review committee recommends a step by step strategy where further programmes should be integrated when the two core fields are stabilized at the new department.

13. There is a proposal to start Bio Design as a specialization for M.Des. This is an emerging field and most welcome. Once the Department of Design is established, appropriate faculty members should be recruited in the department exclusively for this purpose. Initially it may start with design courses in Bio design as elective for M.Des. as well as thesis project in this area. This will create real footing for specialization in this area.

14. It would be very beneficial for the whole Institute to make this move to Department of Design. Of course it will help the recruitment of core faculty, but in addition it will give the right message about the importance and value of the not yet fully released potential of design, as an equally important element of the highly acclaimed technology institute that the IIT Kanpur today is.

15. Flexibility may be there where students from other departments may also join and formulate an interdisciplinary learning platform for product Innovation.

16. The curriculum must give strong emphasis on Ergonomics/Human factors for workers and work environment uplift through design intervention. Emphasis must be given on the small scale and the craft sectors based on local demography. Students must be encouraged on real life problem solving projects with cost in mind.

17. The entire course content for the new design program must be re-looked at, where technology, aesthetics & form, commerce, ergonomics, economics, manufacturing etc. are well amalgamated. Emphasis must be given on basic design foundation courses like studies on form, proportion, color, visual balance & harmony, basic ergonomics/human factors, control panel design, people & behavior, communication design, Indian art, design & society and so on.
18. IIT Kanpur possesses strong faculty in engineering disciplines. While they must be involved with the new M.Des. course as appropriate, search and recruitment of new core faculty must be on for the new Department of Design.

19. Equal emphasis must be given on developing Design research facilities as well.

20. The review committee recommends that IIT K formulates a new B.Des. (Bachelor of Design) as soon as possible. Fundamentals of design can be taught only at under graduate level, and not as a condensed course at Masters level. Once the B.Des. course becomes main stream, the M.Des. can become more research oriented.
The Master of Design
(M.Des.) Programme at
IIT Kanpur

Recommendations of the
M.Des. Review Sub-Committee

October 2013
Course Structure: Courses will be of two kinds – discourse-based and project-based. While the former will follow the usual lecture format, the latter will follow an extended interactive session format enabling project-based learning. All courses may follow the modular course format wherein a complete course may be half-semester long. Furthermore, courses may include multiple instructors for separate modules.

Evaluation System: Portfolio evaluation, wherein the portfolio contains all the project-work done by a student for a course, will be the primarily method employed. Portfolio evaluation will be conducted twice during a semester-length course. In addition, one final examination will be compulsory for all courses. The evaluation system is discussed in detail in Section 2.2.

Graduation requirements: The minimum graduation requirement for a regular M.Des. degree is 81 course credits and 63 thesis credits. The student must have a minimum of B grade in 50% of the mandatory course credits and a minimum of D grade in the remaining course credits. See Section 2.7 for more detail.

Admissions: Students will be eligible for admission based on clearing either CEED (with select background at the Bachelors level) or GATE. In addition, top rankers (top 5%) from NITs as well as top Architecture and Design schools may be considered for direct admission. Final admission decision will be based on an internal examination and interview process. Details are in Section 1.6.

1. Introduction

The M.Des. programme was established as an IDP in 2002.

1.1 Historical Overview of the Programme: Rooted in a commitment to introducing students to the world of creativity, the Design programme at IIT Kanpur traces its history back to the growing expertise in Computer Aided Design (CAD), product design, and visual communication within the IITK faculty. The establishment of UNDP-supported National Center on CAD and the collaboration with MIT in the Media Lab Asia project provided the immediate impetus to initiate a programme that would focus on form and function together in the areas of product design as well as visual communication. The establishment of Design programmes at other IITs (Delhi and Guwahati) around the same time also acted as a spur, prompting an IITK team to visit ten well-known Design institutes across the world. This resulted in the proposal for the IITK Design Programme with its USP of interdisciplinarity that clearly marked its difference from existing Design programmes at other institutes within India, including other IITs.

1.2 Strengths and Weaknesses of Existing Programme:

Strengths:
- Strong element of interdisciplinary at the level of curriculum, faculty as well as students
- Strong foundation in Design principles
- Strong interaction with IT industry

Weaknesses:
- Lack of core faculty dedicated to the Design programme
- Delink between theory and practice in some areas
- Curriculum does not chart a clear path of progressive learning
- Curriculum does not take different educational backgrounds of students into account
- Need for greater industry interaction, including possibility of thesis work with industry collaboration
- Severe infrastructural limitations inhibiting project work as well as sustained interaction with faculty / amongst students

1.3 Placement Scenario: Since its inception in 2002, the M.Des. programme has had a strong placement record with most of its graduates joining the IT industry, while many have gone into Product Design, and a few have joined the Automobile Industry. A select few have also decided to pursue research in Design,
leading to a PhD and eventually an academic career.

1.4 Industry Feedback on the IITK M.Des. Programme:
- Employers are looking for both ‘hard’ and ‘soft’ skills in new Design hires. ‘Hard’ skills include usability engineering and testability, human-computer interaction, ergonomics, design elements (forms, colours, textures), applied science and mathematics, sketching and visualisation, graphic and visual communication, knowledge of user/design research methodologies and tools, product development cycle, prototyping tools and techniques, etc. ‘Soft’ skills include presentation and communication skills, Design management, Value Engineering, History of Design, etc.
- While 4-5 years ago, industry was looking for generic design professionals, they are now looking for specific specialisations in new hires.
- Design hires are recruited for two main functions – design researcher (user research before product comes into existence as well as testing and validation of product design) and designer (focusing on conceptualisation, visualisation and prototype realisation).

Further details on Industry feedback are available in Appendix I.

1.5 Vision of the Proposed Programme: Defining Design as a combination of form and function, the Design Programme envisions itself as an interdisciplinary space for co-creation of design education, research and user-centric application. We believe in developing a collaborative environment between students, researchers, academicians and business practitioners. We aim at creating a working environment enabling knowledge sharing and experience exchange. Pedagogically, we believe in “Learning by Doing,” experimentation, collaboration and innovation.

We aim at creating the next generation of designers, design researchers and design leaders who will conceptualize and develop design solutions for the challenges faced by the industry and society. To do so, we foster a passion based and student centric learning culture. We constantly explore creative ways of working and enhancing interaction to support world-class development in education, research and practical application context. We strive to build designers’ ability to research, discover, invent, innovate, ideate, make decisions and evaluate for the purpose of improving the quality of life.

Our curriculum is based upon an interdisciplinary synthesis of design, technology, social sciences and management, while also adhering to the principles of sustainability. The programme inculcates the spirit of creativity, celebrates innovation, develops an appreciation for human values, fosters craftsmanship, and encourages personal expression leading to evolution of products and services for the betterment of society and people.

1.6 Students

The strength of any programme draws largely on the quality of its student body. As an interdisciplinary programme, M.Des. aims at attracting students from diverse backgrounds who exhibit high levels of creativity as well as intellectual ability. To ensure such a student population, we need to have a flexible admission process that attracts the best students from varied educational backgrounds and admits those best suited to our programme through a rigorous selection process.

Admissions: The admission process for M.Des. would be in tune with the proposed system for M.Tech. admissions under the new PGRC. There will be three entry points – GATE, CEED (with B.Des., B.Arch., B.Tech., BE, 4-year BFA, 4-year BS, and integrated MSc as the earlier degree), and top rankers (5%) from NITs and top Institutes of Architecture and Design in the country. In addition, QIP-style industry-sponsored admissions into the M.Des. programme should also be considered. In all cases, the current process of an internal examination and interview would be continued to determine final admission into the programme.

Financial Support: The current mechanism needs to be expanded to provide for various levels of financial support. This can include a) full fellowship, b) full assistantships as presently the case, c) partial assistantship and d) partial/full fee waiver. Industry sponsored/self supported students may also be considered.

1.7 Academic Environment and Infrastructure

An ideal M.Des. programme requires an intensive immersion model that allows for prolonged and sustained interaction between students and instructors, as well as peer interaction amongst students themselves. This
requires:

- Core faculty within the Design Programme to ensure a strong and stable curricular foundation as well as sustained interaction with students.
- Flexibility in overall curricular as well as specific course design wherein multiple modules may be offered in the same semester, with each module being defined in terms of days / weeks of interaction rather than contact hours.
- Teaching spaces that are modeled on studios rather than the rigid distinction between classrooms designed for lectures and laboratories designed for individual project work.
- Labs that are easily accessible at all times to Design students, along with trained lab personnel who can provide the necessary technical help with operating equipment.
- Personal work spaces, with all necessary amenities, that are conducive to more interaction amongst students.

Furthermore, the IITK M.Des. programme, whose distinguishing characteristic is its interdisciplinarity wherein form and function, creativity and functionality, design and technology, are brought together, requires adequate opportunities for collaboration with various departments within the Institute as well as with the Industry. Specifically, this requires:

- Wider advertising of the programme within the institute to ensure greater participation with faculty in the M.Des. programme
- Opportunity to undertake interdisciplinary research in collaboration with Engineering students which will not only lead to collaborative intellectual output, but also enhance the soft skills required by Design students who need to work with engineers in the industry
- Opportunities for Industry interaction through workshops with Industry experts, Industrial tours, and Industrial internships
- Opportunities to participate in cutting edge industrial projects which may translate into thesis work

In addition, to ensure an academic environment conducive to quality research, the following are required:

- State-of-the-art library with extensive Design-specific resources (both physical as well as digital)
- Laboratory and prototyping facilities with regular flow of materials (consumables)
- Comfortable and hassle-free living facilities that are also sensitive to married scholars.
- Personality development through participation in various co- and extra-curricular activities

Promoting Excellence: The Institute must evolve and support mechanisms to promote excellence amongst the scholars via incentives in the form of citations/awards/fellowships/travel support.

2. Proposed Curriculum

The proposed M.Des. curriculum structures the programme within a progressive learning framework going from a basic core common to all students, to a choice of specialisation within three broad areas, culminating in a final thesis.

The compulsory core courses will be taken in the first semester, and will cover the following topics:

- Design thinking
- Design process
- Design principles
- Elements of Design (form exploration, material exploration, colour)
- Design research
- Applied engineering and maths
- Sketching and Visualisation
- Ergonomics
- Professional communication

After completion of the first semester core, students will be expected to choose one of the following specialisations:

1. Interaction Design
2. Industrial Design
3. Visual Communication

The specializations offered by the Design Programme may vary depending on availability of faculty.

A detailed M.Des. programme template is attached as Appendix II.
To ensure that our students receive maximum benefit from the instruction offered, and have the widest access to resources, flexibility in the programme needs to be maintained, especially with regard to the following areas:

- **Course Structure:** The nature of Design as a discipline requires two kinds of courses – lecture-based courses (as defined by the PGRC) and project-based courses. Both types of courses may be offered as full-semester courses or half-semester modular courses. In either case, each course, while having one instructor-in-charge, may have up to three other instructors with the course being divided into a number of modules of differing lengths (in terms of number of weeks) over its duration of either half or full semester. Project-based courses, which combine theoretical instruction with practical application through mini-projects and assignments, cannot be fit into the mould of either the lecture-based courses or laboratory courses as envisioned by other Masters programmes within the Institute. The credit calculation for both kinds of courses is outlined below.

- **Transfer credits with possibility of joint degrees with other Institutes abroad:** Joint-degree and/or Dual-degree programmes with Institutes abroad would open up the global design industry to our students.

- **Open electives:** To encourage interdisciplinarity at the course-work level, students will be encouraged to take courses in other departments. Students may take 25-35 credits worth of courses as open electives from other departments.

**Internship:** Students will be strongly encouraged to undertake an industrial internship in the summer following their second semester of course work.

**Thesis:** Given the nature of M.Des. thesis work, students will have the provision to take thesis credits starting from the second semester itself. To facilitate interdisciplinary work, students will be encouraged to work collaboratively with students / faculty from various Engineering departments on projects leading up to their M.Des. thesis. Students may also undertake thesis work in collaboration with Industry. To ensure the academic content of such industry-based thesis, the student will be asked to submit a number of thesis proposals which would be evaluated by a panel of Design faculty members before the student is allowed to choose to work on one of them through industry collaboration. Such an undertaking may require relaxation of leave / field work rules for M.Des. students since Industry projects that could lead towards a thesis would need to be six months long, as per Design industry norms. In such cases, students would proceed for their thesis work at the beginning of the fourth semester, and continue through the following summer, which would give them the required six-month period to complete their thesis project in collaboration with industry.

**2.2 Evaluation System:**

Given the project-based nature of Design courses and the need for students to build an extensive portfolio through the M.Des. programme, the evaluation system for M.Des. courses cannot be exclusively based on examinations. Instead, while retaining the requirement of one compulsory final examination, the committee recommends that in addition there be continuous project evaluation, culminating in a Design portfolio for each course at the end of the semester. This mini Portfolio for each course would be evaluated at the end of the semester by a committee consisting of at least one member from amongst the Design faculty apart from the instructor, before whom the student would present her/his portfolio.

**3. Future of the Design Programme:** After much discussion regarding the possibility of introducing new academic programmes, such as an M.Tech. in Design and/or an ‘Executive’ M.Des. programme, it was decided that over the next 5 years, the focus would be on strengthening the existing M.Des. programme in terms of both its academic resources as well as interaction with industry. Core faculty dedicated to the Design programme is a primary need for the former. Recruitment of such faculty, more participation from existing faculty in other departments, and development of lab/studio resources will not only strengthen the existing M.Des. (and PhD in Design) programme, but also open up the possibility of eventually starting a B.Des. programme at IIT Kanpur. With respect to industry interaction, in addition to the various possibilities built into the curriculum described above, Design faculty may also offer short term Design Certificate Courses for Design professionals requiring specific additional skills through the existing CDTE / QIP facilities.
THE KNOWLEDGE & SKILLS REQUIRED BY THEM FOR HIRING DESIGNERS:

COMMON KNOWLEDGE & SKILLS REQUIRED
- Design Thinking
- Design Research Methodology
- User Research Techniques & Tools
- User-Centric Design Process & Methods
- Creative Problem Solving
- Design Elements – Form, Color & Materials
- Sketching and Visualization
- Basic Graphics and Visual Communication
- Basic Ergonomics and Human Factor
- Applied Science and Math Concepts
- Design Management
- Presentation & Communication
- Writing and Documentation

SPECIFIC KNOWLEDGE & SKILLS REQUIRED BASED ON SPECIALIZATION:

INTERACTION DESIGN/UX DESIGN/UI DESIGN
- Human-Computer Interaction
- Usability Engineering (Usability Testing, Heuristic Evaluation)
- Information Design and Data Visualization
- Interaction Design & Information Architecture
- Tangible Interfaces and Interaction Technologies
- Graphics Tools knowledge such as Adobe Photoshop, Adobe Illustrators etc.
- Prototyping Tools such as MS Visio, Dreamweaver, Indigo Studio, Axure, Fluid, Solidify, InVision, HTML, CSS, etc.
- Assessment Tools such as Eye Tracking, Remote UT, Morae, Loop11, Usabilla etc.

PRODUCT DESIGN/INDUSTRIAL DESIGN
- Advance Form Studies and Visualization
- Applied Materials & Processes
- Applied Ergonomics and Human Factors
- Product Detailing including materials, fabrication, molding etc.
- Product Graphics and Packaging
- Eco Design/ Sustainable Design
- Product Planning and Marketing
- Value Engineering
- Visualization Tools such as Autocad 3D Max, Autocad Alias, Rhino, Adobe Photoshop, InDesign, etc.
- Prototyping Tools such as 3D Printing etc.

VISUAL COMMUNICATION/GRAPICS DESIGN
- Creative Visualization
- Information and Data Visualization and design
- Visual Ergonomics
- Branding and Brand Communication
- Animation and New Media tools and methods
- Graphics Tools knowledge such as Adobe Photoshop, Adobe Illustrators, Adobe InDesign, Coral Draw, etc.
- Understanding of Print and Digital Media
Need to prepare a new crop of designers to meet the design needs and challenges of the country today. Design as a discipline has undergone radical changes and evolutions in the past few years. Design is recognized worldwide as an essential component for people centered innovation. In accordance with global industry trends today, India is excellently poised to contribute significantly by providing global designers equipped to design for emerging product-service ecosystems. This necessitates appropriate structure and education that would empower the design graduates to excel and fulfill the differentiating challenges in such context. Design is reaching center-stage in many visionary organizations and recognized today for its ability to inspire and foster customer centric innovation. Presently, India is excellently poised to create design expertise for the emerging market. IIT Kanpur is in an excellent position and location to capitalize on this situation, become a leader in this space, and fortify and advance Indian design into a globally distinctive program. Department of Design must be aimed at preparing designers who are in urgent need for India in the upcoming decade and beyond: global designers with Indian sensibilities.

**USP**

- Multidisciplinary team of faculty from Design, Engineering, Humanities, Social Sciences, and Management to provide depth individually yet great diversity collectively, creating a unique and contemporary approach to design education.
- The interdisciplinary nature is it's USP, which is rare and clearly differentiates it from many other academic programmes in design elsewhere in India. Only a top few institutes around the world offer design education and training with multidisciplinary flavour.
- To offer students a freedom to explore and shape their interests and career paths by providing a large mentor pool and various fields of specialization.
- Captive pool of students from ‘small town’ India with grounding and closer connect to emerging market cultures, attitudes and values.
- Uniquely positioned adjacent to hinterlands of India where grass root opportunities are abundant.
- To foster a learning environment that applies design to identify complex social problems and derives solutions to them in the form of socio-technical innovations.
- Experiential learning with a people centric approach is an inherent part of our design pedagogy.
- The design curriculum must focus on learning by doing, getting one’s hand dirty.
- The focus of design training today is shifting from skill acquisition to an overall understanding of multiple knowledge domains cutting across disciplinary silos.
- To offer a holistic education covering diverse areas for the students to balance between business, technology, design and human values, as well as between global and local perspectives.

**Goals**

- Evolve a well-defined core curriculum that creates a strong holistic design foundation for the student body having inherent diversity.
- Build on the existing programme structure to further evolve into a robust platform that allows potential graduates to shape themselves as suits their capabilities, talents, interests and the market.
- Become a leader in preparing design entrepreneurs, leaders and designers for emerging market needs and Indian diversity.
- Evolve a program that caters to the requirements of global design, while maximizing the existing strengths, values, location, and student profile.
- Become an Indian Design hub where global universities, global and local industries come together to collaborate and advance design across geographies, disciplines and cultures.
- Establish upfront, a closely coupled learning with industry.
- Evolve as a space for interdisciplinary research and industrial collaboration for effective business and social design innovation.
What MUST be the Guiding Principle?

- The multidisciplinary nature, flexibility, holistic focus, strong technological ties, and grounded values must remain unchanged.
- Processes and systems must be established and formalized to retain and build on the above.
- Become the benchmark in design education for global and emerging markets.
- Balance of Industry-Academia, Global-Local, Research-Practice and Science-Art aspects: Mold graduates to be the holistic designers we expect.
- Shift from creating individualistic to collaborative designers. The academic program must support and emphasize team work on student design projects.
- Individual exploration, alongside a collaborative work in a convergence-divergence approach to learning.
- Faculty from different disciplines of Engineering, Sciences, Humanities & Social Sciences, and Management must continue to participate in teaching and research.
- With emphasis on innovation today, industry looks at designers to often lead the way.
- We aim to create complete designers who are people centered, creative and aesthetically oriented, technology conversant, with business acumen; yet also paying attention to detail and sport an inquisitive mind.
- Design Thinkers and Hands on Designers: Coupled with an analytical and rational mind, impart training in skill sets that allow students to be effective hands-on designers.

Infrastructure

- Flexible spaces to inspire creativity through effective, cheerful interiors - Spaces must afford usage in varied ways for the versatility required in design exploration and delivery, as well as be inspiring for lateral thinking and creative work.
- Usability Testing Lab, Prototyping Studio, Ergonomic Lab, Visual Communication Studio, Interaction Design Studio, Rural Design Lab, Education Research Lab, Digital Production Studio, Drawing Studio - Opportunities for participants to co-create in such facilities is state of the art design practice. For potential customers to collaborate is better risk management in the final product.
- Studios that support experiential learning - Designing with our hands is our belief and is what makes us confident three dimensional thinkers and visualizers. Ceramic, clay, wood, metal, plastics, paint/powder coating and digital studios provide the environment to nurture these explorations.
- Collaborative spaces designed for information sharing and exchange - Effective and inviting space design impacts creative collaboration. Participatory design has been established as a key requirement for people centered innovation today. Collaborative spaces are a must for this.
- Dedicated project spaces designed to display work-in-progress and create an immersive work environment - Physical project spaces for all projects underway is part of good design practice today and recognized as crucial to elicit good design by working in such an immersive setting.
- Design of spaces is fundamental to the overall experience of design education. Teaching spaces must be modeled on studios rather than the rigid distinction between classrooms designed for lectures and laboratories designed for individual project work. It must have accessible labs that along with trained lab personnel who can provide the necessary technical help with operating equipment. The facility must also house a state-of-the-art library with extensive physical and digital design-specific resources and prototyping facilities with regular flow of consumable raw materials.

Suggested Courses (areas listed but not restricted to these few)

Core
- Design Methods and Processes
- Design Theory: Principles and Elements
- Design Thinking
- Design Research
- Applied Engineering
- Value Engineering
- Ergonomics
• Applied Materials & Processes
• Sketching & Visualization
• Form Studies
• Professional Communication

**Specialized Streams and Open Electives**
• Design, Culture and Society
• Psychological Principles & Design
• Integrated New Product Development
• Systems Thinking
• Design Management
• Product Detailing: materials, fabrication, molding etc.
• Eco Design/ Sustainable Design
• Product Planning and Marketing
• Human-Computer Interaction
• Usability Engineering
• Interaction Design & Information Architecture
• Information Design and Data Visualization
• Usability Engineering
• Visual Communication and Design
• Video, Film and Photography
• Animation and New Media methods
• Understanding of Print and Digital Media
• Branding and Brand Communication
National Design Policy

BACKGROUND

Strategic importance of design for national and industrial competitiveness is now universally recognised. Value addition through innovations in designs can play a pivotal role in enhancing the competitiveness of both manufacturing and service industries.

2. Realising the increasing importance of design in economic, industrial and societal development and in improving quality of products and services, the Government of India had initiated a consultative process with industry, designers and other stakeholders to develop the broad contours of a National Design Policy. The vision behind initiating a ‘National Design Policy’ is to have a “design enabled Indian industry” which could impact both the national economy and the quality of life in a positive manner.

VISION AND STRATEGY

3. The vision for a National Design Policy envisages the following:
   i. preparation of a platform for creative design development, design promotion and partnerships across many sectors, states, and regions for integrating design with traditional and technological resources;
   ii. presentation of Indian designs and innovations on the international arena through strategic integration and cooperation with international design organizations;
   iii. global positioning and branding of Indian designs and making “Designed in India” a by-word for quality and utility in conjunction with “Made in India” and “Served from India’;
   iv. promotion of Indian design through a well defined and managed regulatory, promotional and institutional framework;
   v. raising Indian design education to global standards of excellence;
   vi. creation of original Indian designs in products and services drawing upon India’s rich craft traditions and cultural heritage;
   vii. making India a major hub for exports and outsourcing of designs and
creative process for achieving a design-enabled innovation economy;

viii. enhancing the overall tangible and intangible quality parameters of products and services through design;

ix. creation of awareness among manufacturers and service providers, particularly SMEs and cottage industries, about the competitive advantage of original designs;

x. attracting investments, including foreign direct investments, in design services and design related R & D; and

xi. involving Industry and professional designers in the collaborative development of the design profession;

The strategy to achieve this vision would focus on strengthening quality design education at different levels, encouraging use of designs by small scale and cottage industries and crafts, facilitating active involvement of industry and designers in the development of the design profession, branding and positioning of Indian design within India and overseas, enhancing design and design service exports, and creating an enabling environment that recognises and rewards original designs.

**ACTION PLAN**

4. The Action Plan for implementation of the National Design Policy will have the following components:

   (i) Setting up of specialised Design Centres or “Innovation Hubs” for sectors such as automobile and transportation, jewellery, leather, soft goods, electronics / IT hardware products, toys & games which will provide common facilities and enabling tools like rapid product development, high performance visualisation, etc. along with enterprise incubation as well as financial support through mechanisms like venture funding, loans and market development assistance for start-up design-led ventures, and young designers’ design firms/houses.
(ii) Formulation of a scheme for setting up Design Centres/Innovation Hubs in select locations / industrial clusters / backward states, particularly in the North East.

(iii) Preparation of a plan for training of trainers and for organising training programmes in specific processes/areas of design and continuing education programmes for practising designers from Design Centres/Innovation Hubs.

(iv) Preparation of a mechanism for recognising and awarding industry achievers in creating a brand image for Indian designs through the award of a India Design Mark on designs which satisfy key design criteria like originality, innovativeness, aesthetic appeal, user-centricity, ergonomic features, safety and eco-friendliness.

(v) Encouraging Indian firms and institutions to develop strategic alliances with design firms and institutions abroad to gain access to technology and know-how improving Indian design.

(vi) Creating mechanisms for sustainable quality improvement in designs in India.

(vii) Laying special focus on upgrading of existing design institutes and faculty resources to international standards, particularly the National Institute of Design (NID) and its new campuses/centres. With a view to spreading quality education in designs to all regions of India, four more National institutes of Design on the pattern of NID will be set up in different regions of the country during the 11th Five Year Plan. The possibility of new models for setting up of such institutes, in keeping with the current economic and educational paradigms, will be explored.

(viii) Initiation of action to seek “Deemed to be University” or ‘University’ under section 3 (f) of the University Grants Commission Act, status for the NIDs, so that they can award degrees of B.Des. and M.Des. instead of just Diplomas as at present.
Encouraging the establishment of departments of design in all the Indian Institutes of Technology (IITs) and all the National Institutes of Technology (NITs) as well as in prestigious private sector Colleges of Engineering and Architecture.

Upgrading quality of engineering design, machinery design, process design, design materials, environmentally sound and socially and culturally relevant designs.

Encouraging the teaching of design in vocational institutes oriented to the needs of Indian industry, especially small scale and cottage industries in primary and secondary schools as well as tertiary educational institutions.

Introducing short term training courses and continuing education programmes by NID and other design institutes targeting on needy sectors and catering to the diverse sectors including agricultural and artisanal sectors.

Organising workshops and seminars to create more awareness than at present among industrialists, particularly in small scale and cottage sectors, in different parts of India especially on the intangible aspects of design processes.

Sustaining and strengthening India’s traditional knowledge, skills and capabilities while being sensitive to global heritage so that our shop floor workers, craftsmen and artisans could be engaged in manufacture of innovative products and contemporisation of traditional crafts for broad spectrum of uses and niche markets.

Facilitating the establishment of a Chartered Society for Designers, (on the lines of the Institution of Engineers, the Institution of Architects, the ‘Medical council’, the Bar Council, etc.), to govern the registration of Design Professionals and the various matters relating to standards setting in the profession.

Setting up an India Design Council (IDC) with eminent personalities drawn from different walks of life, in particular industry, whose functions, inter alia, would be as follows: -
- undertake design awareness and effectiveness programmes both within India and;
- act as a platform for interaction with all stakeholders;
- undertake R&D and strategy and impact studies;
- accredit design institutions;
- develop and standardize design syllabi, etc. for all institutions in India imparting design education;
- conduct programmes for continuous evaluation and development of new design strategies;
- develop and implement quality systems through designs for enhancing the country’s international competitiveness;
- coordinate with Government to facilitate simplification of procedures and systems for registration of new designs;
- assist industries to engage the services of designers for their existing and new products;
- encourage design and design-led exports of Indian products and services including outsourcing its design capabilities by other countries;
- take effective steps towards “cradle to grave environment-friendly approach” for designs produced in India so that they have global acceptance as ‘sustainable designs’;
- enable the designers in India to have access to global trends and market intelligence and technology tools for product development and innovations;
- encourage close cooperation between academia and industry to produce proprietary design know-how while encouraging creation of new design-led enterprises for wealth creation; and
- encourage and facilitating a culture for creating and protecting intellectual property in the area of designs.
Design Manifesto
(For a Design Enabled Technical Education)

1. Introduction

Design is a protean, open ended and versatile term, which, over the years, has gathered many dimensions and definitions within the folds of its discourse. The impetus to formulate a manifesto for a pluralistic discourse such as design, comes from the growing critical reflections on modern dominant paradigms of education as embodied in Indian institutions of technical education, specifically the CFTIs, vis-à-vis the demands of a larger developmental paradigm of the state.

Leading institutions of technical education, while striving towards excellence in developing competencies in specialized fields of engineering and technology, are now increasingly concerned with augmenting opportunities for holistic education. This has at least two implications in terms of content and process of education. One, it concedes that the framework of knowledge needs to broaden to include societal aspirations and needs (human agency) besides an understanding of technology (means of production), and that the latter should be able to adequately respond to the former. Two, such a framework of knowledge implies educational processes that are inter-contextual, inter-disciplinary, and encourage the cognitive fusion of intellect, imagination and empathy. This, in turn, compels an interrogation and re-imagining of academic processes and structures, curriculum and pedagogy for enriching the existing design departments as well as the engineering, sciences, architecture, humanities and management streams within CFTIs.

The stimulus for the Design Manifesto comes from this search for a new, inclusive epistemology in institutes of technical education envisioning the following objectives:

1. To reposition the framework of design education to reflect the needs and opportunities of a developing nation,
2. To create a design spine in technical education to encourage a transformative, empowering and equitable society,
3. To assimilate all forms of design thinking across disciplines by collaboratively working on real world problems,
4. To leverage design thinking to steer and enable research in CFTIs that contributes to public policies,
5. To establish frameworks within which Design thinking could permeate across disciplines in CFTIs,
6. To develop an operational framework that enables progressive implementation of design thinking in the CFTIs.

It is hoped that diverse efforts to address and articulate the rich potential of design education, inspired by concerns of a humane and equitable future, will enable institutes of technical
education to grow from schooling for a developing nation to shaping a sustainable civilization. This manifesto is about such a vision for design education.

2. Design education paradigm

At present, the concepts of design are seen as a functionally efficient and experientially satisfying structuring of process and product towards a pre-determined end. However, the objective of a design education and practice should not just be a structurally efficient response to a given problem; it should be transformative in terms of both problem perception and definition in the search of equitable and sustainable solutions. This calls for imagining, planning, preparing and disseminating design education as a holistic entity: as applied knowledge and skill, as theoretical apprehension and underpinning, drawing on the cognitive aspects of science and technology, and the social and anthropological aspects of the arts and humanities. Such an endeavour may require highly porous boundaries between established disciplines and design, and an innovative academic process capable of reflexivity and self-interrogation. What is needed is to position design thinking as a cognitive process central to all disciplines.

The Stanford D-School draws on methods from engineering and design, and combines them with tools from the social sciences and arts for solving real world problems. Real world problems here are based not only on business insights but also for extreme affordability for the world’s poorest citizens. More recently, the Kellogg School of Management’s dual master’s degree programme has paved the way for a confluence of design innovation and management studies, offered by the business school in collaboration with the school of engineering. This convergence bodes well for design education for all and may be the ideal way in the present time to insinuate design thinking across departments—by using existing departmental structures, but also recasting them in new, insistently collaborative structures for design education.

This shifts the locus of design education from being merely instrumentalist (a set of alternative choices of technique/process/form) to something empowering (a correlation between form and function informed by ethical consciousness, aesthetic in experience and productive in its impact). Institutes of technical education need to rethink spaces for such transformative design thinking, which is capable of engaging with and informing policy, reshaping values we live by.

2.1 Designing Education for Development

The enormous potential of design needs to be tapped for imagining and implementing strategies for building systems in the context of markets, governance, social and cultural processes, and knowledge bases. This would advance the cause of equity and justice in ways both individual and environmental, help create dynamic, participatory institutions in a thriving

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1 'Design for Extreme Affordability' is a course offered by the Hasso Plattner Institute of Design through the Graduate School of Business and the School of Mechanical Engineering at Stanford. This multidisciplinary, project-based course is focused on the design needs of the world’s poorest citizens.
democracy, and even, ambitiously, aid the aspiration for a sustainable society and civilization. In the Indian context, grounding and centering of national development goals and challenges in design education and research will provide a powerful impetus to innovation, entrepreneurship and policy systems.

The spur to such design education comes from many sources, a few of which are indicated here, mainly to illustrate the necessity and relevance of revisiting and re-fashioning existing paradigms of design education and the factors that bear critical influence in this process.

i. **Design for equitable negotiation of contested terrains**: Disparity despite abundance in India often makes it difficult to make a tradeoff between opportunities, pushing design into contested terrains. Social dilemmas manifest in Indian design problems, because design decisions are closely shaped not only by a single, well-defined use, but also by the stakes and claims of multiple beneficiaries with conflicting goals for the same resource. Here, design problems are as much about conflict resolution as they are about need fulfillment of a user segment. For a developing nation like India faced with wide disparities of even basic amenities and essential services, design strategies for accessibility and distribution of primary resources can pay rich dividends in the future, both socially and economically.

ii. **Design for enabling Rights-based development policies**: Increasing numbers of laws have been enacted to reduce disparity of access and resources, such as the Right to Information, Right to Education, Right to Food Security and the upcoming Lokpal possibility. Though the population is constitutionally empowered, the country is yet to build resources to make these rights accessible in a meaningful manner. Design efforts concentrating in these areas of constitutional empowerment will play a key role in delivering these targets. If different forms of design and technology are suited to distinctly different forms of social and political existence, then a suitable fit between the two should be sought, compatible with conditions of freedom and social justice. How can we develop innovative technologies that promote a civic culture of democracy? How do we decipher the contribution of a particular device or system to the quality of social and political community? Technology and policy can together create appropriate designs to respond to these new development challenges and opportunities.

iii. **Resilient skillful population**: 90% of the world’s designers work exclusively on products for the richest 10% of the world’s customers. Such a positioning, though significant in itself, overlooks the indigenous system of designing and production of 90% of the world’s customers. After all, design and technology in MSMEs, Cottage industries and crafts has been invented, improvised and maintained by illiterate producers of hardly any means for centuries. This informal sector contributes to 33% of the manufacturing

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output in India. This grassroots intelligentsia has also been credited for inventing a diverse range of products ranging from low-cost washing machines using paddle-power, weaving looms, to gadgets that make you walk on water! Using – while also upgrading – the skills of this 33% for various design and production requirements is a daunting task for any education system, but also one of the most lucrative employable segments of the nation.

iv. Design for tapping the productive potential at the ‘bottom of the pyramid’: It is estimated that India is home to a third of the world’s poor. According to 2010 data from the United Nations Development Programme, an estimated 29.8% of Indians live below the country’s national poverty line. Doing business with a third of the world’s poorest people requires radical innovations in technology and business models. It requires companies to transform their understanding of scale, from a “bigger is better” ideal to an ideal of highly distributed small-scale operations married to world-scale capabilities. In short, the poorest populations raise a prodigious new managerial challenge for the world’s wealthiest companies: selling to the poor and helping them improve their lives by producing and distributing products and services in culturally sensitive, environmentally sustainable, and economically profitable ways.

v. Indian Design often requires forward and backward integration of user operated technologies: The diversity of the Indian design scenario is its boon and bane. It opens up a plethora of opportunities for design intervention but also constrains its use. In India, design and technologies die a slow death because there is always a user segment that has not yet upgraded due to financial, cultural or other impediments. Therefore, a hand-held driller can be used in the same city that runs its factories on Computer Numerical Control (CNC) lathes. If Design has to be inclusive of such varying levels of user abilities, it requires forward and backward integration of technology to maximize its relevance. A good example of this is the rupee symbol that is easy to write by hand or click on the computer. Moreover, it can also be typed on the typewriter – making the design inclusive of old as well as new technologies.

vi. Manu-services or Servicing Manufacturing: Manufacturing is the biggest single investor in design, and spends twice as much on design as it does on R&D. Design is fostered by the strength of the manufacturing sector, which not only reflects on employment in a labour intensive Indian economy but also materializes innovation. Unfortunately, we have not been able to capitalize on either. Lack of innovation in the formal and informal manufacturing sector is a sign of its disconnect with design. Bereft of design, the

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7The $25 Jaipur foot is an excellent example of this idea. Along with the Nano car, it shows that the best design and technologies can be brought to the customers at the bottom of the pyramid.
manufacturing sector has not achieved its full potential in the GDP—a lacuna that can only be filled by the collaboration of technology and design.

As the old boundaries between manufacturing and services are dissolving, manufacturing companies today are involved in a complex ecosystem of tangible and intangible activities ranging from STEM to Supply management, design, and even advertising. They no longer just sell mass-produced products but also make a significant proportion of their revenues from selling services that complement their goods. Service informed understanding of the manufacturing sector or manu-services is a whole new area for design innovation and competitive advantage in a developing country fraught with disparity.

vii. Repositioning Traditional Indian Design: More than fifty years after independence Indian design is still indebted to its traditional design sector for identity within as well as outside India. The traditional design sector contributes significantly to the National exchequer even today. According to the Planning commission report\(^8\), the total handicrafts in 2000-01 registered an annual growth rate of 14.71 per cent in rupee terms. Crafts account for 15 to 20 per cent of the country’s manufacturing workforce, and contribute 8 per cent of GDP in manufacturing. But, despite continuing efforts since independence, the traditional designer in India has remained in oblivion with a skill that is languishing—and has even become extinct in some communities. The hegemony of the mainstream market, a lack of technological and design up-gradation, a long supply chain, the changing preferences of consumers and, sometimes, apathy at policy level decisions has hit this highly skilled and exclusive sector severely\(^9\).

These interpretations of the design environment and its opportunities in India are by no means exhaustive. They are merely indicative of the fact that the Indian design scenario is distinct if not different from its western discourse. Its pedagogy, process and thinking is not a merely a foundation but an agent of change that goes beyond a cosmetic makeover for conspicuous consumption. More pertinently, it enables the industry—manufacturing or service—for a socially, economically and environmentally cohesive growth.

3. Developing a Design spine in Engineering education\(^{10}\)

If design must seriously aim at changing existing situations into preferred ones\(^{11}\), then it must equip students not only with an ability to raise and answer questions that matter in the world

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\(^9\)On the other hand some craft based initiatives have also succeeded. Fabindia has repositioned Indian textiles in the retail market, besides generating employment for 40,000 craftsmen—and this through a capitalist model. NID’s initiative in Co-optex introduced a new range of design series; Dastakar breathed new life in the handloom sector; Delhi Haat has given an alternate marketing channel, boosting entrepreneurship in these communities.

\(^{10}\)“Design Spine” is the phrase used by Dr. Anil Kakodkar in his report.

around us, but also the disposition to do so. Perhaps more importantly, design must be seen as an epistemological concept, not just a technical, or even a cognitive or perceptual training involving a limited skill set. Therefore, Design Education needs to be structured within CFTIs in a way that enables it to be anchored as an autonomous field of study in a Centre/Department, and also to percolatedesign thinking into their various disciplines, areas of expertise and resources.

- As a first step, a Design Action Group, with the Director as Chairman, and the Head of Design Department/School/Hub as Convener should be set up
  - To decide the national development goals in which the Institute could engage, leveraging their own strengths, skills, and local topography
  - To encourage and monitor the activities of the Institute in accordance with the objectives of the manifesto
  - To steer, plan and disburse funds for design activities annually.

- The Design School/Centre/Department can be the nodal hub for executing/facilitating the execution of interdisciplinary projects, and for disseminating core design skills into the education process. Or else a Design Hub with dedicated faculty members and a floating pool of design professionals can be created. The functions of the Design Hub can be the following:
  - To design and teach an interdisciplinary curricula to inculcate design thinking in undergraduate studies of technical departments
  - To facilitate and encourage the engagement of technical departments with real world issues that requires negotiations with multiple disciplines and stakeholders with conflicting interests.
  - To steer research and teaching within the Institute to match the national development goals
  - To create and maintain open source collaborative spaces both virtual and physical for sharing and improvising ideas, tools and worktables for problem solving
  - To assist and expedite the incubation of ideas into products for social or private sector or as data for informing policies.

- Design Chair professors should be appointed for championing and spearheading the process of assimilating design thinking in engineering education.

- New faculty will be needed to introduce and sustain design thinking in the larger educational sphere for all the design initiatives being planned, and new ways will have to be employed for their training and development. Innovative systems should be conceived to make our schools – new and existing – attractive for the design talent that

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is now dispersed and needs to be tracked and brought into the educational mainstream in India.

- The enormous wisdom lying in the hands of the traditional master designers in craft communities, with indigenous architects, metallurgists, natural dye makers and others can and must be tapped not only to preserve traditional knowledge but also to supplement the increasing shortage of experienced teaching staff in most Institutes.
- Design professionals with industry experience must be valued as faculty members. The excessive emphasis on PhDs skews the balance between academic credentials and real-world problem solving experience that is necessary for both engineering and design. We must redress this imbalance if we are serious about transforming design education.
- Senior and retired faculty members from established schools of design may be given the mandate to conduct Teacher training programs to mentor young faculty into Design Education.

- Networks can be established through which experts train students, not necessarily in physical classrooms but partially through virtual classrooms and partially through internships. These centers would be about traditional knowledge dissemination as much as they would be about imparting skills and expertise in cutting edge technology. Running sessions simultaneously at premier institutions as well as within industry, learning residencies in remote parts of the country, city classrooms and village centers, could all create a fountainhead program that allows people to up-skill their knowledge through practical, hands on experience with the best in the industry or in academia per a learner’s requirement rather than the diktat of a degree education. Each learner chooses his or her own path, in a manner of speaking.

- Research projects should encourage, even mandate, inter-disciplinary (intra-institutional) collaborations and exploit cross-institutional strengths across CFTIs.

- Academic linkages with industry and the social sector across domains should be strengthened through participation in live projects. A dedicated position of a facilitator/liaison official to interface between industry and academia can reduce the effort for searching and matching requirements to meet expectations at both ends. This could also be manifested in the form of in-house industrial training within industries/organizations.

- Design incubation Stewardships: Some of the designs arrived by students which have potential to reach people/industry/society should be provided additional resources and mentorship by instituting fellowships specifically for this purpose.

- A core introductory course in Design in the UG curriculum that draws experts from within and outside the Institute to orient the students into design thinking for problem
solving and more pertinently for assisting them to exploring and defining problems in real life contexts. Electives and a Minor in Design should be encouraged. A “Design Spine” would allow students in the engineering programme to select specific design courses (offered as electives) that suit their interests, or complement their needs in theses projects. A “Minor” in design may have additional requirements, including the number of courses taken to qualify for a “Minor” and, perhaps, even a design specialization. BTPs should be steered towards developmental concerns that require a technical input.

3.1 Design Pedagogy

Building desirable frameworks for an inclusive, sustainable, innovative and profitable artificial world in India is fraught with dilemmas between ‘significant’ and ‘necessary’ goals. The aspirations of a steadily developing nation are shaping decision-making between multiple possibilities of growth that juggle between development and its social and environmental costs. The competitive position of Indian design lies in designing a pedagogy that can harness the technological strength of CFTIs to convert our adversities into opportunities for an inclusive growth. Such a design spine can encompass – but is not limited to – the scope of the pedagogy elucidated below.

- **Sitatute engineering problems in an ecosystem:** Many engineering studies are related to a component design of a complex system design solution, for instance, design of a gear or screw of a machine. Here, the screw is the component of a system that could be a machine. As engineering research in India heads towards large-scale complex technological challenges like the LCA, autonomous helicopters, aircraft carriers and such, the specialized core competencies of an engineer no longer suffice. Engineers and designers are increasingly required to be generalists who can innovate across disciplines. In turn, they must also be able to call upon specialists to help ensure that the components developed are appropriate and practical.

  Though system design is more holistic than component design it still does not situate design in its life cycle outside the boundary of the workshop. The ecosystem approach of design not only analyses the life cycle but also enlarges the context of the solution outside the workshop into the stakes of real everyday use, wear and tear, and conflict of interests. It considers not only the conception and manufacturing of a design but also its use, repair, and recycling – frequently referred as the ‘cradle to cradle’13 approach. The ecosystem approach can increase the life of an object in use. Design thinking can open up the ‘system design approach’ in engineering pedagogy to the ‘ecosystem approach’ for wider and longer social, environmental and economic impact.

- **Real-world concerns are design concerns:** Design disciplines need to reflect the developmental concerns of India not only in the projects they undertake but also in

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13Cradle to Cradle design (also referred to as Cradle to Cradle, C2C, cradle 2 cradle, or regenerative design) is a biomimetic approach to the design of products and systems. It models human industry on nature’s processes, viewing materials as nutrients circulating in healthy, safe metabolisms. (Definition source: Wikipedia)
their very conception. From a conservative point of view this may require re-positioning the current disciplines and, from a radical perspective, it is an opportunity for a complete overhaul of design content. Grounding and centering the vision and goals of education on real world concerns is not an entirely new paradigm. Jawaharlal Nehru and Mahatma Gandhi have spoken of it at large. And, in recent years, MIT’s Design for the other 90%, the Center for Frugal Digitals at CIID, Copenhagen, Stanford’s Design for Extreme Affordability are all gearing education towards responsible and empathetic goals that are challenging traditional market driven pedagogies.

- **Embrace collaborative and participatory methods of problem solving that span across disciplines and courses:** The disciplines of Humanities, Management and Technology can and must be brought together (an entry-level understanding of these disciplines is a life-skill, not just a design education requirement). Initially, this could be done by boosting the number and content of an array of courses targeted at the uninitiated – courses that fall under the rubric of Minors in many existing curricular programmes – in order to introduce participatory and critical methods for designing products, systems, policies, then carrying them through into the real world in effective ways to alter social practices and public life. Whether it is slum design or heritage building refurbishment, a resource management system or infrastructural access, actual design situations offer project opportunities that are too large to be conceived and handled by a single person. Solutions depend on the coming together of skills and understandings of a number of people, and from a variety of disciplines. It is not possible to teach all required skills and processes within the design programme.

- **Augment problem based learning with project based experiential learning:** ‘Learning by doing’ does two important things: it allows us to immerse ourselves in the environment in which work is to be done, so we can understand the values and expectations of our (target) society; it enables a fresh look at problems, not only at the ways of defining them, but also at the skill-sets that are required to address freshly analyzed issues. A shift from problem based learning (acquisition of knowledge) to project based learning (application of knowledge), where the projects are grounded in problems outside the workshop and labs in everyday scenarios, will involve students in reality, and reality in education.

**Tinkering Laboratories:** There is a dire need to re-examine the division between the curricular and the extra-curricular, and to encourage the curiosity and involvement that issue from total absorption in a subject of interest. Such immersion is the key to creative learning. So CFTIs must have tinkering laboratories, and these must be situated as autonomously as possible even within current academic structures (including design departments) in an effort to vitalize the notion of inter-disciplinary pursuits and tap into the creativity that ensues through deep involvement. Project based learning encourages students to tinker in an informed manner. Hand skills like origami are a good combination of hand and mind which have found application in cutting edge problems like deploying solar power arrays in a Space Flight Unit or pre-designated crumple zones
in a car to absorb impact during collision. Here, an origami fold moves from craft to contemporary problem solving activity.

**Field Trips and Case Studies:** Immersion in product, service or systemic issues on the ground is critical to design thinking. Case studies and field trips hone and increase the possibility of connecting with issues and people, allow the opportunity to understand and define problems within local contexts, avail of input from affected populations, and seek and refine solutions alongside users. They sensitize the designer to a collaborative search for solutions within a social and cultural context, which also creates a sense of purpose and participation amongst those who benefit from the design, affecting both the efficacy and longevity of solutions.

- **Encouraging analogical problem solving in technical education:** Some engineering problems do use analogical thinking for problem solving. Foremost amongst them is the field of bio-mimetics that uses analogies from the natural world for emerging range of intelligent products that are constantly evaluating themselves vis-à-vis human intelligence and behavior. Use of analogy, metaphor, synectics, word mapping and other such lateral techniques give technological problems an innovative edge. As emerging engineering disciplines become increasingly interdisciplinary, the cognitive process of transferring information or insights from the analogue or source to another particular subject can open doors to interaction, assimilation and innovation in knowledge.

- **Asynchronous teaching platforms for increased accessibility to diverse information:** With the sprouting of internet cafes even in small towns, the idea of knowledge acquisition, dissemination and preservation is changing. As platforms of reading change, classrooms acquire the role of discussion spaces, problem solving arenas, and mentorship interactions, in which students are active partners in constructing, discovering and transforming knowledge. Therefore, design education should be conceived for synchronous and asynchronous platforms of learning.

**National Knowledge Network:** The massive scale, capacity, and flexibility offered by the National Knowledge Network (NKN) should be used to put design courses online, to make distance learning and collaborative project work and enterprise accessible and available to all. A well-executed programme of design education dissemination via the Web can lead to rapid build-up of talent and knowledge in the formal as well as the informal sector.

This network could also include a dynamic and virtual collaborative space through an “open source” platform for design processes and pedagogy. This would make it possible for anyone who sees a relevant design problem to intuitively create an online process that intelligently allows collaboration with experts, collation of appropriate knowledge bases, and creation of joint design solutions.
4. Conclusion

This transformation of the education process in the institutions of technical education based on design pedagogy will require the active participation of all sources attached to education in India. Such a vision engages into design as an overarching framework for steering education and research towards social goals and economic aspirations, making the CFTIs active partners in the development of the country.
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

**ANNEXURE 9**

**List of Student Awards and Recognitions (2007-2016)**

1. **Name of the Student:** Prantik Banerjee, Meera Mangrulkar, Jayesh Pillai  
   **Name of Award:** RGB short film festival, NID  
   **Nature of achievement:** Winner  
   **Year:** 2007

2. **Name of the Student:** Yogesh G Maralkar, Alok Agashe, Payal Chowdhury  
   **Name of Award:** RGB, NID, Design of Waste Disposal System  
   **Nature of achievement:** Winner  
   **Year:** 2007

3. **Name of the Student:** Umang Shah  
   **Name of Award:** Autofest, NIT Surat  
   **Nature of achievement:** Winner  
   **Year:** 2007

4. **Name of the Student:** Stuti Shalini Guria  
   **Name of Award:** UMO Boycott Bad Design Contest  
   **Nature of achievement:** Winner  
   **Year:** 2008

5. **Name of the Student:** Umang Shah  
   **Name of Award:** RE-Kriti, DAIICT  
   **Nature of achievement:** Winner  
   **Year:** 2008

6. **Name of the Student:** Prantik Banerjee and Payal Chowdhury  
   **Name of Award:** Design of Transit System, Pune Festival  
   **Nature of achievement:** 2nd Prize  
   **Year:** 2008

7. **Name of the Student:** Neha Kiran Singh  
   **Name of Award:** WUD  
   **Nature of achievement:** 2nd Prize  
   **Year:** 2008

8. **Name of the Student:** Himanshu Agarwal  
   **Name of Award:** Forum NOKIA, USID Challenge  
   **Nature of achievement:** 2nd Prize  
   **Year:** 2008

9. **Name of the Student:** NA  
   **Name of Award:** Design Challenge, Yahoo R&D, Transportation system for differently abled people  
   **Nature of achievement:** 2nd Runner's Up  
   **Year:** 2008

10. **Name of the Student:** NA  
   **Name of Award:** Design Challenge, Yahoo R&D, Transportation system for differently abled people  
   **Nature of achievement:** 1st Prize  
    **Year:** 2008

11. **Name of the Student:** Umang Shah  
    **Name of Award:** Nokia USID International Design Challenge  
    **Nature of achievement:** 3rd Prize  
    **Year:** 2009
12. Name of the Student: Umang Shah
   Name of award – National Design Challenge
   Nature of achievement – 2nd Prize
   Year – 2009

13. Name of the Student: Alap Shah
   Name of award – UMO Boycott Bad Design
   Nature of achievement – 1st Prize
   Year – 2009

14. Name of the Student: Umang Shah
   Name of award – USID NOKIA Challenge
   Nature of achievement – 3rd Prize
   Year – 2009

15. Name of the Student: Umang Shah
   Name of award – Design Challenge, IISc Bangalore
   Nature of achievement – 1st Prize
   Year – 2009

16. Name of the Student: Prithu Paul, Ankit Kumar
   Name of award – Electrolux Design Contest
   Nature of achievement – Finalist
   Year – 2009

17. Name of the Student: Atul Sultane, Kiran Bajpe
   Name of award – Escorts Tractor of 2020 Design contest, CAD modelling
   Nature of achievement – 2nd Prize
   Year – 2009

18. Name of the Student: Satish Shekhar
   Name of award – Escorts Tractor of 2020 Design contest, CAD modelling
   Nature of achievement – 1st Prize
   Year – 2009

19. Name of the Student: Siddharth Bathala
   Name of award – UNICEF Worldwide Video contest
   Nature of achievement – Finalist
   Year – 2009

20. Name of the Student: NA
    Name of award – Design Challenge, IISc Bangaluru
    Nature of achievement – 1st prize
    Year – 2009

21. Name of the Student: Atul Sultane
    Name of award – Solid works Design Competition for Power Pro
    Nature of achievement – 1st Prize
    Year – 2010

22. Name of the Student: Himesh Singh
    Name of award – USID Gurukul Bad Design Contest
    Nature of achievement – 1st Prize
    Year – 2010

23. Name of the Student: Vikas
    Name of award – USID Gurukul Bad Design Contest
    Nature of achievement – 2nd Prize
    Year – 2010

24. Name of the Student: Madhavan
25. Name of the Student: Satish Shekhar  
Name of award – ICSIR Robot Design  
Nature of achievement – Finalist  
Year – 2010

26. Name of the Student: Rahul, Nishant  
Name of award – SAE Design Challenge  
Nature of achievement – 1st Prize  
Year – 2010

27. Name of the Student: Rahul, Madhavan, Meenakshi, Aravind, Nishant  
Name of award – Nokia Bhasha  
Nature of achievement – 2nd Runners Up  
Year – 2011

28. Name of the Student: Vivek, Richa, Nutan, Abitosh  
Name of award – Nokia Bhasha  
Nature of achievement – Best Developer Award  
Year – 2011

29. Name of the Student: Prasoon Kumar and Vikas Chopra  
Name of award – Packinnova  
Nature of achievement – 2nd Prize  
Year – 2011

30. Name of the Student: Rahul, Saptarshi, Mayukh, Paritosh  
Name of award – Packinnova  
Nature of achievement – 1st Prize  
Year – 2011

31. Name of the Student: Jivtesh, Ekta, Priyanka, Himesh  
Name of award – Samsung Splash India on TV  
Nature of achievement – Runners up  
Year – 2011

32. Name of the Student: Jivtesh, Ekta, Priyanka, Himesh  
Name of award – Samsung Splash India on TV  
Nature of achievement – Runners up  
Year – 2011

33. Name of the Student: Bidisha, Paritosh, Praveen, Saptarish  
Name of award – Samsung Splash India on TV  
Nature of achievement – 1st Prize  
Year – 2011

34. Name of the Student: Himesh Singh  
Name of award – TRAI All India Logo Design Competition  
Nature of achievement – Winner  
Year – 2011

35. Name of the Student: Shanu Sharma  
Name of the Award – Gandhian Young Technological Innovation Award  
Nature of achievement – Winner  
Year – 2012

36. Name of the Student: Mritunjay Kumar and Chirapriya Mondal  
Name of the Award – International Craft Film Festival
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<th>Nature of achievement</th>
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Nature of achievement - 1st Prize
Year - 2015

49. Name of the Student: Sachin and Ashwin
   Name of the Award - SocCon, Techkriti
   Nature of achievement - 2nd Prize
   Year - 2015

50. Name of the Student: Nikhil Jamdade, Toshib Bagde
    Name of the Award - Gandhian Young Technological Innovation Award.
    Nature of achievement - Winner
    Year - 2015

51. Name of the Student: Sachin and Saurav
    Name of the Award - Hackathon, Make in India
    Nature of achievement - 1st Prize
    Year - 2016

**International Partnerships & Collaborations of Design Programme**

- Design Factory, Aalto University, Finland
- KTH University, Sweden
- Stanford University
- University of Melbourne, Australia
- University of St. Gallen, Switzerland

**Placements of M.Des Students**

- Google
- Microsoft
- Croedfire
- Ziffi
- Globant
- Yahoo
- Tata Motors
- Oracle
- Infosys
- Adobe
- NVidia
- Amazon
- InMobi
- Naukri
- Honeywell
- Ibibo Interactive
- SAP
- OLX
- Make My Trip
- Autodesk
- Capital Dynamics
- Bharti Soft Bank
- Hewlett-Packard Company
- Cognizant Technology Solutions
- Research In Motion
- Tata Consultancy Services
• Snapdeal
• Housing.com
• Flipkart
• Myntra
• Dell
• Persistent
• Target
• Caratlane.com
• Vacation Labs
• Global Logic
• Care 24
• Elephant Design
• MoonRaft
• Qualcomm
• Dentsu India
• E-Mantras
• Pencil Sauce
• Tata Elxsi
• LG
• Samsung Research India
• Philips
• Videocon
• Ashok Leyland
• Bajaj
• DC Studio
• Eicher
• Forbes
• Hero Honda
• JCB
• Tata Motors
• TVS

Entrepreneurs

• MonthlyBazaar.in (Nitin Rana)
• Arnium Technologies Pvt. Ltd. (Mayukh Chakraborty)
• AasaanJobs.com (Butool Abbas)
• Almashines (Kapil Dev Advani)
• Enquotism.com (Mayank maheshwari)
• Heritage Foundation (Satyandra K Kushwaha)
• D Cube (Shah Mohammad)
• Red Studio (Ruchin Sharma)
• Indusign (Sushil Narayan)
• Haxo Labs (Vinay Paheljani)