SCHOOL OF INNOVATION

INNOVATION
INCUBATION
IMPLEMENTATION

IIT INDORE

Background & Context

Design-centred Innovation is a force multiplier that can help the country move up the value chain, making Indian industry globally competitive. In this context, Ministry of Human Resource Development, Government of India launched the scheme of "National Initiative for Design Innovation (NIDI)" in March, 2014. Scheme envisaged establishment of 20 Design Innovation Centres (DIC), One Open Design School (ODS) and One National Design Innovation Network (NDIN) across the country for promoting the culture of Innovation, Design and Creative Problem-solving. Presently, 20 DICs have been established on Hub-Spoke Model with 64 Spokes. DIC Hubs include 10 Indian Institutes of Technology (IIT), 9 Central/ State Government Universities and a School of Planning and Architecture. ODS and NDIN have been established in IIT, Bombay and Indian Institute of Science (IISc), Bangalore respectively.

Innovation for National Needs has always been a priority at IIT Indore, with several Centres of Excellence established in areas such as Advanced Electronics, Computer and Information Technology, Entrepreneurship Education and Development, Futuristic Defence and Space Technology, Rural Development and Technology, Electric Vehicle and Intelligent Transport Systems, and Adanced Centre for Entrepreneurship. These are in addition to innovative technology development in various departments in accordance with the IIT Indore motto of '*Jnanam Sarvajan Hitay*' – 'Knowledge is for the Betterment of all Mankind'.

The 2016 report on 'Future of Design Education in India' prepared by the British Council and India Design Council talks about the growing impact and importance of Design Education with potential market for Design in India expected to be INR 188 Billion by 2020. Only a fifth of the design market is currently tapped. Recognizing the importance of design and innovation as wealth creators for the nation, the Government of India has offered increased support for Design Education by announcing and implementing initiatives such Design Innovation Centers, Design Education Quality Mark and National Aptitude Test for design.

The School of Innovation at IIT Indore is part of an endeavour to contribute to these initiatives in a leadership role.

Design Centres in other IITs

At present 5 IITs have full Departments of Design (DoD): IIT Bombay, IIT Delhi, IIT Kanpur, IIT Guwahati, and IIT Hyderabad, offering B.Des, M.Des, and PhD programs. Industrial Design Centre (IDC) at IIT Bombay was the first design program in the IIT system started in 1969, which began by offering a 15- months post-graduate DIIT program, which was changed to an M.Des. program in 1981. Design Innnovation Centres (DIC) have been established in IIT Gandhinagar, IIT Roorkee,

IIT BHU, and also at IIT Bombay as part of the IDC School of Design. The number of specializations for various programs differs in various IITs. Several NITs and IISc, Bangalore also have departments of design.

Majority of the projects being done in various DoDs are at product level innovation, rather than system level solutions. Such limitation of project scope to product level innovation, only works to develop capacity building of individual designers, who join various industries as staff designers. Most of the Consultancy and Sponsored Research Projects also remain at product level.

As a result of this the current DoDs in various IITs have primarily become self-sufficient units, separate from other IIT departments, and serve to meet the need of trained design professsionals only. The collective technology ability of IITs is thus not utilized for solving complex problems which need interdisciplinary collaboration.

The Vision for School of Innovation at IIT Indore: Providing Complete Implementable Solutions

The School of Innovation at IIT Indore aims to engage itself on creating value through innovation and providing complete solutions to urgent social problems in identified priority areas. The areas have been chosen from national priorities and those in Mission Mode with the objective of making impact through designing the complete eco-system of the product, and ensuring its implementation on a national scale.

School of Innovation at IITI is seen as an Interdisciplinary and Collaborative Research Environment, making full use of the faculty expertise and capabilities present in various Departments of IITI to focus on formulating complete solutions to urgent and major problems. Teams will be built around identified key problems and themes; and the area of expertise available across various departments, leading to a constant steam of innovations and design solutions in the identified area of focus.

Four major areas of focus have been chosen based on urgent unmet needs, and areas of specialization already available in IIT Indore. The areas of specialization are: **Urban Systems, Educational Technologies, Healthcare Systems, and Sustainable Energy Systems.**

Musashino Art University – Japan's oldest and the most prestigious Art & Design University has an Institute of Innovation in its Ichigaya, Tokyo campus, with a dedicated focus on innovation.

Urban Systems

The rate of urbanization is growing steadily in India, with over 40% of the population now living in urban areas. This has posed several challenges as much of the migration is from rural area, with new population not used to living in cities. New urban settlements are coming up around new areas of employment opportunities; as well as there is migration to existing metros, which are under-equipped to handle this steady influx.

The main challenges are providing adequate housing, low-cost transportation, water and electricity, schools, hospitals, business and leisure areas, waste management, safety and security of citizens; in addition to providing a pleasant living environment. The unplanned growth creates its own problems, further complicated by cultural differences and social norms of the incoming population with the existing culture.

The Urban Systems specialization will bring about an understanding of all the aspects of urbanization with an integral understanding of the phenomena, including urban planning and urban systems design, thus creating professionals who both have a capacity to study and understand the problems of urbanization, and also help propose solutions integrating new technology possibilities at both system and component level.

Education Technologies

With one fourth of India's population being under 10 years old (about 350 million children), the problems of educating them have a staggering dimension. The 'Right to Education Bill' guarantees every child quality education as a fundamental right, and this goal cannot be met with physical infrastructure-based learning. There is simply not enough financial allocation for primary education, to create well-equipped school buildings and provide printed books to all students in time.

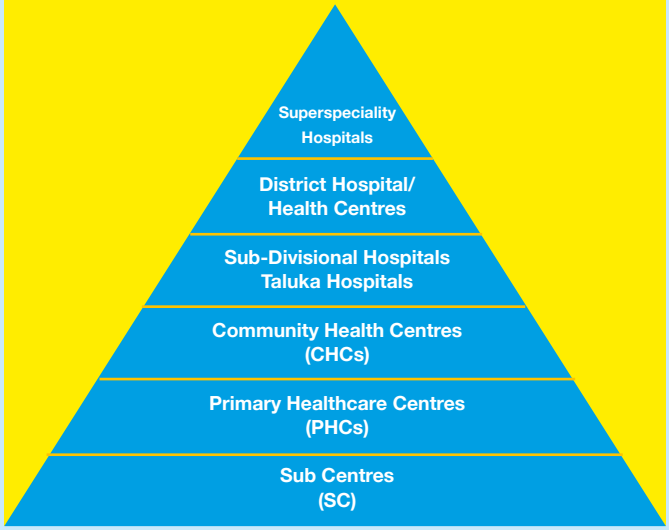
The focus in the Ed-tech specialization will be to develop well-integrated solutions based on ICT. New models beyond the conventional schooling will have to be developed. From digital content creation in different languages, to distributing it on a mass-scale, through a robust distribution system, which delivers the same quality of education regardless of the physical location of student, is what is required. Fortunately, many State Governments are already implementing such solutions on large scale. The need is to integrate such solutions and refine them; and come up with many more possibilities, including self-learning and local community-run learning environments.

Healthcare Systems

Major challenges to healthcare in India include a significant lack of healthcare facilities, particularly in rural regions, with many primary health centres lacking essential equipment and resources. There are insufficient number of qualified doctors and nurses, leading to inadequate healthcare delivery; which in-turn is due to lack of enough medical colleges, and with only a fraction of those who would like to study medicine getting admission to medical colleges. Difficulty for people in rural areas to access healthcare due to geographical barriers and limited transportation options is another major issue. High cost of healthcare, makes treatment unaffordable for many individuals. Lack of awareness about health issues and preventive care practices further aggravate the health issues among the population. Uneven quality of care, Focus on Curative Care, Gender Disparities, Medical Inflation, Poor Governance and Monitoring; are other problems which need addressing.

Like Education, Healthcare is another area where digital solutions provide a ray of hope, with possibilities like 'Remote Healthcare' and 'Anytime, Anywhere' quick healthcare an achievable goal with the right digital and hybrid solutions.

Public Health Sector Hierarchy in India



Sustainable Energy

The key challenges in transitioning to sustainable energy in India include the high initial cost of renewable sources like solar and wind power, grid integration issues, inconsistent availability of renewable energy, lack of adequate infrastructure, and the need to balance energy demand with rural access, while potential solutions involve government initiatives like the National Solar Mission, promoting domestic solar manufacturing, developing smart grids, and utilizing diverse renewable sources like wind, hydro, and biomass energy to achieve energy security and reduce carbon emissions.

For a vast majority of Indians in rural area, firewood continues to be the main source of energy cooking needs, with the purchasing capacity being very limited, even a subsidised cooking gas cylinder is too expensive.

However, many Government initiatives like the National Solar Mission aim to promote solar energy adoption through financial incentives, subsidies, and capacity building programs. Policies such as encouraging domestic solar panel production through policies like the Production Linked Incentive (PLI) scheme can reduce costs and boost local manufacturing. Utilizing India's favorable wind corridors to develop large-scale wind farms, especially in coastal areas. Hydropower, Biomass Energy, Smart Grid Technology, Energy Storage Solutions; are some of the areas which need innovative solutions to be developed and implemented on the National scale.

Alignment with National Development Agenda and Mission Mode Development Programs

The areas of specialization in the program of the School of Innovation will be aligned to the National Development agenda of the Government of India, and identified Mission Mode projects such a Drinking Water Mission, Renewable Energy, Smart City, Swachchha Bharat Abhiyan, Akshay Urja Solar Mission, Rural Employment Generation, PM Awas Yojana, Operation Digital Board etc. This will allow the Centre to develop key technologies, solutions and approaches which can actually be implemented and contribute to the success of the Missions. The graduates of the Progam would join many of these Mission secretariats, both at the National and State level. The approach will be in accordance with IIT Indore motto as stated in the symbol, where knowledge is seen as benefitting the mankind (*Sarvajanhitay*), placing IITI as an institute providing implementable complete solutions and should result in research and consultancy projects for the School for Innovation.

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The School of Innovation at IIT Indore will be involved in the following activities:

Education
Conducting B.Des., M.Des. and Ph.D. Programs in Innovation and Innovation Management.

Research
Basic Research into Innovation and Innovation Managerment

Practice
Undertaking Sponsored Research and Consultancy Projects including Technology Development, Conducting Field Pilots and Final Technology Transfer packages for implementation in fiel.

It is envisaged as an Interdisciplinary Program with active participation and involvement of faculty members from existing Departments and Centres at IIT Indore. The following have been identified as initial areas of focus:

- **Urban Systems**
- **Education Technologies**
- **Healthcare Systems**
- **Sustainable Energy**

Academic Programs

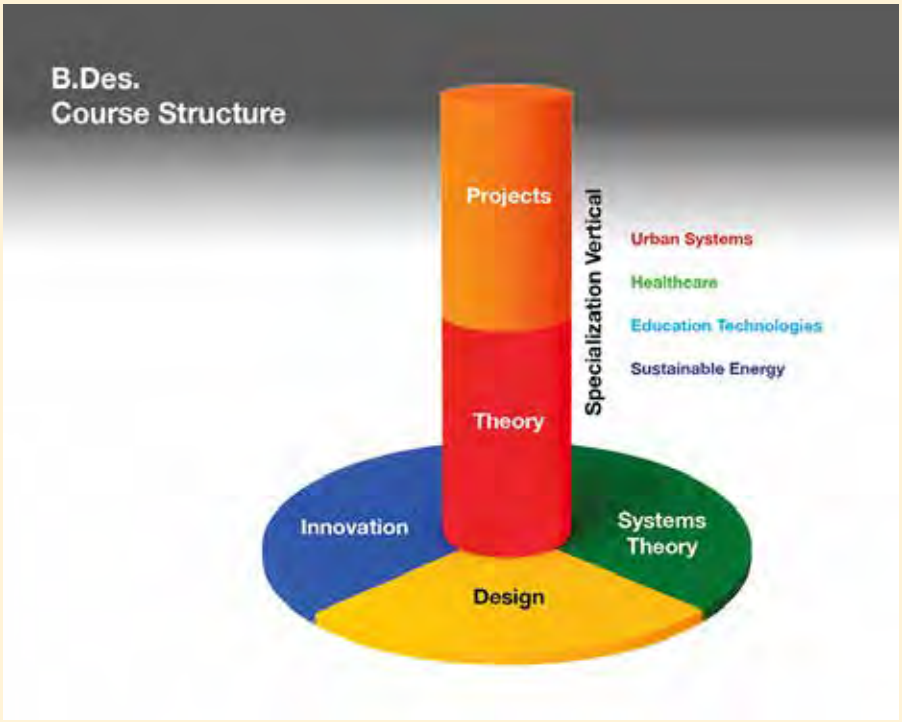
The academic program of the School of Innovation will start from 2025 academic year, with a Bachelor of Design (B.Des.)program to begin with.

It will be a Four Year Full-time program with specializations in Urban System Innovation, Educational Technologies, Healthcare Sytems, and Sustainable Energy Systems.

A two-year M.Des. program and a PhD program will start from 2027, two years after the start of the B.Des. program. It is expected that by then all the infrastructure for the program in will be in place.

B.Des. Program

B.Des. is proposed as a Four-year Full-time program. The first year will be of Foundation Studies common to all students. From the Second Year, it would be possible to choose from one of the four areas of specialization being offered to begin with. More area of specializations can be added later. From third semester onwards, every semester will have common courses required for innovation design competence building, and electives will be from the areas of specialization. Every semester will have a project component, which will also be from the chosen area of specialization. Thus the necessary competence for a particular area of specialization will be built through having taken 7 courses in chosen area of specialization along with 6 projects of various degrees of complexity in the chosen area.



Courses of Study: B.Des. program

1

First Year (Foundation Year)

Semester 1

L: Lecture T: Tutorial P: Practical

Code	Course	Course Structure			Credits
		L	T	P	
SI 101	Design as Problem Solving	2	0	2	3
SI 102	Verbal & Visual Expression	0	0	4	2
SI 103	Design Methodology	2	0	2	3
SI 104	General Systems Thinking	2	1	0	3
SI 105	Understanding Innovation	2	0	0	2
SI 106	Mini Project 1	0	2	6	5
				Total Credits	**18**

Semester 2

SI 201	Design Research	2	2	0	4
SI 202	Problem Understanding	2	0	0	2
SI 203	Graphics & Data Visualization	2	0	2	3
SI 204	Photo & Video Communication	2	0	2	3
SI 205	Design Systems	2	0	0	2
SI 206	Mini Project 2	0	2	6	5
				Total Credits	19

2

Second Year (Specialization through Electives)

Semester 3

Code		Course Structure			Credits
		L	T	P	
SI 301	Systems Approach to Design	2	1	0	3
SI 302	Ideation Techniques	2	1	0	3
SI 303	Innovation Case Studies	2	1	0	3
SI 304	Need Identification	2	1	0	3
	Electives (one to be chosen)				
SI 305	Understanding Urbanization	2	2	0	4
SI 306	Components of Urban Planning	2	2	0	4
SI 307	Understanding Healthcare Systems	2	2	0	
SI 308	Remote Healthcare	2	2	0	
SI 309	Understanding Education	2	2	0	
SI 310	Learning Networks	2	2	0	
SI 311	Understanding Sustainability	2	2	0	
SI 312	Energy Distribution Networks	2	2	0	
SI 313	Research Project	1	0	6	8
		Total credits			24

Semester 4

SI 401	Technology Tracking	2	1	0	3
SI 402	Graphic Communication	2	2	0	4
SI 403	Innovation Incubation	2	0	0	2
SI 404	Project Report Design	2	2	0	3
	Electives (one to be chosen)				
SI 405	Waste Management Systems	2	2	0	4
SI 406	Future Cities	2	2	0	4
SI 407	Healthcare Information Management	2	2	0	
SI 408	Emergency Healthcare	2	2	0	
SI 409	Content Creation & Content Delivery	2	2	0	
SI 410	Learning Assessment	2	2	0	
SI 411	Energy Needs & Renewable Energy	2	2	0	
SI 412	Material Innovation	2	2	0	
CI 413	Research Project	2	0	6	8
		Total credits			24

3

Third Year (Specialization through Electives)

Semester 5

Code	Course	Course Structure			Credits
		L	T	P	
SI 501	Presentation Techniques	0	3	0	3
SI 502	Experience Design	2	0	0	3
SI 503	Planning & Conducting Pilots	2	0	0	3
SI 504	Documentation & Analysis	2	1	0	3
	Electives (one to be chosen)				
SI 505	Urban Environments	2	2	0	4
SI 506	Safety & Security	2	2	0	
SI 507	Smart Healthcare Systems	2	2	0	
SI 508	Planning Healthcare Sytems	2	2	0	
SI 509	Education Technologies	2	2	0	
SI 510	Teaching/Learning Experiences	2	2	0	
SI 511	Energy Needs Optimization	2	2	0	
SI 512	Sustainable Consumption	2	2	0	
SI 513	Field Project	1	0	6	8
			Total credits		**24**

Semester 6

SI 601	Communities & Culture	2	2	0	3
SI 602	Financial Planning & Budget	2	2	0	3
SI 603	Project Monitoring Techniques	2	2	0	3
SI 604	IPR & Technology Transfer	2	2	0	3
	Electives (one to be chosen)				
SI 605	Urban Ssytems Management	2	2	0	4
SI 606	Green Cities	2	2	0	
SI 607	Healthcare Equipment Design	2	2	0	
SI 608	Healthcare Education Systems	2	2	0	
SI 609	Ed-tech: Hardware & Software	2	2	0	
SI 610	Ed-tech Program Implementation	2	2	0	
SI 611	Sustainable Energy Systems	2	2	0	
SI 612	Energy Management	2	2	0	
SI 613	Field Project	2	0	6	8
			Total Credits		**24**

4

Fourth Year (All projects in area of specialization)

Semester 7

Code	Course	Course Structure L	T	P	Credits
SI 701	Systems Design (Individual)	0	2	2	6
SI 702	Systems Design (Collaborative)	0	3	3	8
SI 703	Research Project	3	0	4	10
		Total Credits			24

Semester 8

SI 801	Project Management & Professional Practice	2	0	0	4
SI 802	Final B.Des. Project	0	10	0	20
		Total Credits			24

The detailed course contents of all courses have been worked out in a meeting of invited subject experts and IITI faculty. Further specializations would be added as new areas of major national needs are identified and expertise developed in the Institute.

M.Des. & Ph.D. Programs

A two-year M.Des. progam, and a Ph.D. program is proposed to be started from 2027 academic session, as it is expected that the School of Innovation building will be ready then.

Admissions

Entry Qualification

12th from CBCE, ICSE, and State Boards with Science & Maths.

Entrance Test & Interview

Admission to the program will be through UCEED (Undergraduate Common Entrance Exam for Design) conducted by IIT Bombay.

Student intake

Total number of students to be admitted to the first batch will be 16. The following reservations will apply:

Open	6 seats
EWS GEN	2 seats
OBC NCL	4 seats
SC	2 seats
ST	1 seat
PwD	1 seat
Total	**16 seats**

UCEED Undergraduate Common Entrance Exam for Design 2025

www.uceed.iitb.ac.in

Placement Support

Internship and Placement

Being a new program, a promotion program will be created for placing the graduating students in industry. Awareness building will be done for potential employers which are seen as Consulting Organizations, Planning Bodies, and various Ministries at National and State levels. Efforts will be made to find sponsors for all selected candidates to who will employ them on completion of the course.

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Urban Systems Management
Educational Infrastructure, Mumbai

Prof Venkatesh Rajamanickam
IDC School of Design, IIT Bombay.

Prof Kannan Moudgalya
E&M Mehta Advanced Education Technology Chair Professor,
IIT Bombay

Mr Unmesh Kulkarni
Helathcare Systems expert.
Oceanic Circles, Pune

Advisor

Prof Kirti Trivedi
Visiting Distinguished Professor
IIT Indore

Faculty

Head

Prof Avinash Sonawane
Department of Biosciences and Biomedical Engineering
IIT Indore

Core Faculty

Four Full-time Faculty members with specialization in Design & Planning, Innovation Management, and Systems-thinking.

Visiting Faculty

Visiting faculty members consisting of eminent professionals from the field will be conducting specialized courses.

Interdepartmental Faculty

Identified faculty members with interest in the areas of specializations offered from IIT Indore will be part of the faculty team.

Co-ordinators for Specializations

One each from each area of specialization:

- Urban Systems
- Educational Technologies
- Healthcare Sytems
- Sustainable Energy

Research & Teaching Associates

Senior Technical Assistants and Research Associates to take care of various studios and facilities; and to work on Sponsored Research Prjoects.

Urban Systems

Education Technologies

Healthcare Systems

Sustainable Energy