CATALYSING
CORPORATE
CONSCIENCE

Indian Institute of Technology Kharagpur (IIT Kharagpur)

About IIT KGP and the CSR opportunities

The objectives of Indian Institute of Technology Kharagpur (IIT Kharagpur), located in the District of West Midnapore in the State of West Bengal, India, include:

•	To provide broad based education where students are urged to develop their professional skills.
•	To draw the best expertise in science, technology, management and law to impart overall training to students.
•	To incubate a spirit of entrepreneurship and innovation in students.
•	To undertake world class research in areas of national and global importance.
•	To provide technical services and support to industry, government and society in relevant areas.

IIT Kharagpur, the largest and oldest IIT, is a confluence of world class multidisciplinary courses, giving global exposure in academics and research, scope in entrepreneurship and best placement. The institute has 19 Departments, 12 Schools and 8 Centres of Excellence. Additionally there are more than 25 R&D units. Academic programs are offered are B.Tech.(15), B.Arch, Dual Degree(35), MBA, MHRM, LLB, MMST, M.Sc/ M.Tech/ MCP/ MS (68), PhD in 6 broad disciplines: (1) Engineering, (2) Basic Sciences, (3) Life Sciences, (4) Social Sciences & Humanities, (5) Law and (6) Entrepreneurship.

IIT Kharagpur promotes co-curricular and multidisciplinary programs through innovative research projects. This inculcates among the students research competence and industry-worthiness through sponsored research

•	Student Driven Programmes - SAE Formula Car, Boeing Aircraft Design, Robosoccer, Humanoid, Swarm Robotics, Quadrotor Aerial Vehicle, Autonomous Ground Vehicle, Autonomous Underwater Vehicle
•	Students' E-Cell: Workshops, Competitions
•	Technology Transfer Group: IndAC, Tech Transfer, TEDx

Students and faculty are actively involved in social activities through National Service Scheme (NSS)

•	More than 1000 under-graduate students and 16 faculty members and officers donate ~5 lakh man-hour every semester in developmental initiatives in 25 villages and low-income urban neighborhoods around IIT Kharagpur

Shramdaan for road building at Bolla, Mar

The broad areas in which majority of our CSR Projects aligned are:

1. Hunger, Poverty, Malnutrition and Health
2. Education
3. Rural Development Projects
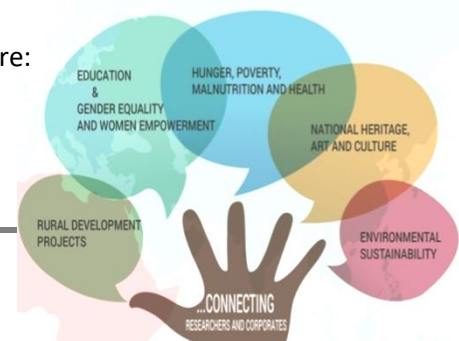
4. Gender Equality and Women Empowerment
5. Environmental Sustainability
6. National Heritage, Art and Culture

Our major activities in societal development projects are through our mega projects, centers and deployable individual projects.

Mega Projects:

- Scientific Approach to Networking and Designing of Heritage Interfaces (http://www.iitkgpsandhi.org)
- Signals and Systems for Life Science (http://signalsystemsforlifescience.in)
- Sustainable Food Security through Technological Interventions for Production, Processing and Logistics (http://sustainablefoodsecurity.in)
- Future of Cities : Enhancing Urban Life in India (http://www.facweb.iitkgp.ernet.in/~foc/)

Centers in IIT Kharagpur for Socially Relevant Initiatives:

- Rural Development Centre

(Head Prof. Virendra Kumar Tewari)

The centre has a strong foot in the rural Indian perspective covering district-based regional development schemes in many areas like Intensive Crop Farming, Forestry, Horticulture, NTFP-based crafts, Women and Child Welfare programmes etc.

- Design and Innovation Centre for Rural Technology

(Principal Investigator, Prof. P.B.S. Bhadoria)

The objective is to upgrade and transfer rural technology through NGOs. The group has 40 NGOS covering Eastern India

Sponsor: PSA, GoI

- School of Medical Science and Technology

(Head: Prof. Suman Chakraborty)

It is a platform for interdisciplinary teaching and research in the field of Medical Science & Technology, which can lead to a better integrated healthcare delivery system.

For more information, visit: http://www.smstweb.iitkgp.ernet.in/

- Unnat Bharat Cell

Unnat Bharat Cell has been set up as a part of Govt. of India's Unnat Bharat Abhiyan, with a view to bring about transformational change in rural development processes by leveraging knowledge institutions to help build the architecture of an Inclusive India. The Cell is a consortium of

- National Service Scheme (NSS) unit,
- Rural Technology Action Group (RuTAG),
- Rural Development Centre (RDC),
- School of Medical Science and Technology (SMST),
- Advanced Technology Development Centre (ATDC), and
- Department of Agriculture and Food Engineering (AGFE) members.

- Ongoing activities under National Service Scheme (NSS)

(Program Coordinator: Prof. Debasis Roy)

- Income generation
- Vocational training (funded by Society for Self Employment of Unemployed Youth, Kolkata)
- Twelve 144-hour courses on tailoring, mobile phone repair, plumbing, electrical wiring, electrical appliances repair and maintenance, 2- 3- wheeler repair and maintenance
- 30-35 trainees per course
- Development work at public facilities by the trainees
- Nutritional intervention at schools
- Pilot at Malma: 95 kids, 5-12 y; eggs and fruits provided as midday meal supplement over 3 months; malnutrition reduced from ~80 % to ~50 %
- Follow-up: solya cultivation at three primary schools for sustained improvement of children's nutrition
- Infrastructure
- Road building at Balarampur (2.5 km), Malma (1 km) and Bolla (1 km)

- Agriculture and Food Engineering (AGFE)

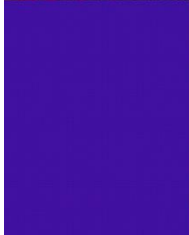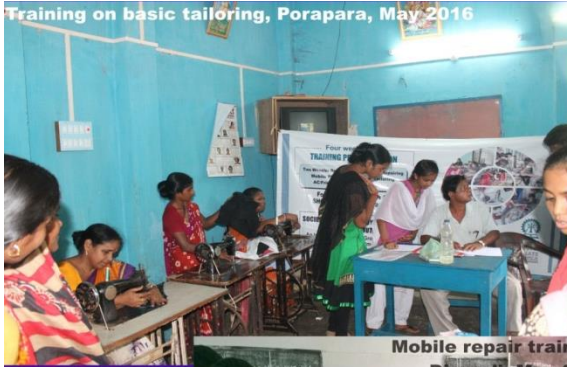(Head of the Department: Prof. Virendra Kumar Tewari)

The department is uniquie among the IITs and carries extensive research and training activities in various areas of socio-economical relevance.

One of the projects that have been widely appriciated is "Formulation and Pilot Scale Unit for Production of Therapeutic Food in Ready-to-Eat Form (TF-RTE) for Management of SAM Children" By Professor H N Mishra, Department of Biotechnology

For more information, visit : http://www.agri.iitkgp.ernet.in/

GLIMPSES OF ACTIVITIES UNDER THESE PROJECTS

Training on basic tailoring, Porapara, May 2016

Mobile repair training, Dimouli, May 2016

Training on plumbing, Upar Kenthia Primary School, Jul 2016

Various Skill Development Programmes

Puffed rice making

Puffed rice making

IIT KHARAGPUR
FISH CULTURE POND
Sponsored by : Unnat Bharat Abhiyan (MHRD, GOI)

Treatment of pond with clay

Biodiesel production from non-edible oils

Improved device for wet soil preparation

Mechanized production of Indian milk sweets

IIT Kharagpur has recently ventured into aligning with corporates for CSR funding. Some of the corporate CSR initiatives are :

• Community Participation Model for Economic Development and Nutritional Health Management Through Organic-farming And Education (Sponsored By Eastern Coalfields Limited, CIL Executed by: Prof. Khanindra Pathak, Prof.Analava Mitra et al)

• Medical Imaging Informatics for Skin Wound and Malaria Screening (Coordinating Organisation: Charities Aid Foundation, India. Donor Organisation: Microsoft India Development Center Executed by: Prof. Chandan Chakraborty)

• Tracking the antiquity and climate during Bronze age Harappan/Indus Valley Civilisation (IVC) in India using isotope and latest chronological techniques (Sponsored By: Infosys Foundation, Initiated by: Prof. Anindya Sarkar)

• Top International Conferences travel (preferably for women) under CSR Initiative of Infosys Foundation.

• Balmer Lawrie Scholarship under CSR Initiative of Balmer Lawrie & Co. Ltd. Kolkata for SC/ST /PC students.

CCC Project Proposal -3

1. **Area**: Education

2. **Name of the Project**: EGT-based Assessment Tools for Program Comprehension

3. **Project Brief**:
   Over 70% of software development effort is spent in software maintenance comprising bug fixes and version updates. These activities involve fast comprehension of large codebases authored by other developers. Unfortunately, developers are mostly trained to *write code* while in practice they often need to *read code*. Hence effective and efficient systems are needed to assess the code reading ability of developers.

   In this project, we propose to build an assessment system for a program comprehension using Tobii's X2-30 eye-gaze tracker. The system comprises a flat screen monitor fitted with X2-30 and the developer-under-test (DUT) seated within a specific distance from it. As the developer reads the program, her eye movements are captured by X2-30 at 30 samples / sec. Once the reading is over, the X2-30 data stream is analyzed off-line along with the program text to generate the reading sequence of the tokens as read by the developer. A language translator also builds a hierarchical model of the program. Next the EGT stream is abstracted and mapped on this hierarchy to create a 3D navigational view of program reading. Finally, machine learning techniques are used to identify cognitive patterns relating to the program comprehension skill of the DUT in 5 categories – novice, beginner, intermediate, expert, guru.

   The assessment systems can be used for several purposes including:
   a. Testing programming skills in recruitment / self-assessment
   b. Gauging quality of codebases (tested against certified programmers)

   While experimental systems built so far use proprietary IDE, the proposed system would be IDE agnostic and work for Eclipse, CodeBlock, Netbeans, DDK, and Visual Studio. The front end of the system has been developed in prototype and reported to a conference already.

4. **Total Fund Requirement**: **INR 60 lakh**. INR 40 lakh will be used for a high resolution Tobii EGT, other gaze tracker sensors, high-end computing system. INR 20 lakh will be used for human resources (research staffs, code experts), travel etc.

5. **Time for Completion**: 3 Years

6. **Professor(s) In-Charge**: Dr. P P Das, Rajendra Mishra School of Engineering Entrepreneurship (RMSoEE) & Department of Computer Science and Engineering

CCC Project Proposal -10

1. **Area**: Education

2. **Name of the Project**: *EGT-based Assessment Tools for Program Comprehension*

3. **Project Brief**:
   Over 70% of software development effort is spent in software maintenance comprising bug fixes and version updates. These activities involve fast comprehension of large codebases authored by other developers. Unfortunately, developers are mostly trained to *write code* while in practice they often need to *read code*. Hence effective and efficient systems are needed to assess the code reading ability of developers.

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   The assessment systems can be used for several purposes including:
   c. Testing programming skills in recruitment / self-assessment
   d. Gauging quality of codebases (tested against certified programmers)

   While experimental systems built so far use proprietary IDE, the proposed system would be IDE agnostic and work for Eclipse, CodeBlock, Netbeans, DDK, and Visual Studio. The front end of the system has been developed in prototype and reported to a conference already.

4. **Total Fund Requirement**: **INR 60 lakh**. INR 40 lakh will be used for a high resolution Tobii EGT, other gaze tracker sensors, high-end computing system. INR 20 lakh will be used for human resources (research staffs, code experts), travel etc.

5. **Time for Completion**: 3 Years

6. **Professor(s) In-Charge**: Dr. P P Das, Department of Computer Science and Engineering

CCC Project Proposal 24

1. **Area**: *Education*

2. **Name of the Project**: *Outreaching NMST to Schools*

3. **Project Brief**:

   The Nehru Museum of Science and Technology (NMST) is a unique setup of its kind among all the IIT-s. Set up in 1990, the museum caters to the preservation of the history of the IIT system, the building in which it is housed (which has a rich legacy in the national freedom struggle), and the exposition of the nuances of science and technology to the public, especially the schools of the neighbourhood. The museum has recently expanded its galleries on interactive science models, thanks to a grant from the Ministry of Culture.

   It is now proposed to expand the activities of the museum further by incorporating the following tasks:
   1. Making the models interactively operable from a remote location, like a village school, and
   2. Designing educational models for easy understanding of scientific concepts by school children

   Since the basic setup of the museum is ready, it is now required to engage one designer and two technicians (mechanical and electrical/electronic) to carry out the activities planned. It is presumed that the project would last for three years. Some expenses may also have to be borne for procuring the basic raw materials for making the models.

4. **Total Fund Requirement**: INR 38,40,000
   Breakup:
   Designer (Rs. 40,000 per month): Rs. 4,80,000 per year, that is, Rs. 14,40,000 in 3 years
   Technicians (Rs. 25,000 per month per person): Rs. 6,00,000 per year, that is, Rs. 18,00,000 in 3 years
   Consumables and raw materials: Rs. 2,00,000 per year, that is, Rs. 6,00,000 in 3 years

5. **Time for Completion**: 3 years

6. **Professor(s) In-Charge**:
   Dr. Dhrubajyoti Sen
   Professor, Department of Civil Engineering
   Chairman, Nehru Museum of Science and Technology
   IIT Kharagpur

CCC Project Proposal 28

1. **Area**: Education

2. **Name of the Project**: Legal education as Business Enabler: a proposal for reform

3. **Project Brief**: In 2016, India has ranked 150 out of 189 countries in ease of doing business. Ease of doing business is important from the perspective of employment generation, social innovations, market liquidity and economic development. Soto promote the environment of ease of doing business, India needs to undergo several reforms ranging from practice to legal compliance framework.

   There are several issues which are responsible for ease of doing business; one of them is a legal compliance. The business sector in India has always faced problems regarding the complex legal & regulatory compliance requirements at multiple levels in government. In India, it is hard to incorporate the business and harder to exit from the business. For ease of doing business, the previous government appointed a commission to suggest regulatory changes. The present government also appointed a committee torecommend amendment & repeals the redundant laws.

   There are several regulations and legislations of colonial and post –colonial origin, developed and enacted with particular socio-economic objectives of that time, that have become redundant with change in economic objectives and acts as impediment to business. The continuing existence of these laws has a strong connection with the existing legal educational framework of the country.

   Those who are in regulatory bodies, governments and also in compliance, often perceive business as a necessary social evil. These beliefs pervade during the years of training in the administrative& professional institutes, universities, and law schools. These beliefs over the years become deep rooted within the people and affect their interactionwith people in business and industry.This has an impact on the entire eco-system of framing, structuring and implementation of regulations and laws. So, the legal education framework needs to realign with the current development agenda of the country. Core legal education philosophy should shift from business stumble to a business enabler.

   Approaches for Execution
   - A.   Assess the broader objectivesof inclusion pattern of business law subjects in different management, professional (CA/CS etc.) and law educational program;
   - B.   Analyze the perspectives followed and pedagogies use for delivering the courses in the program.
   - C.   Suggest the structure of business law subjects and re-modeling the pedagogies for make the program to produce the manpower who are oriented towards business enablement.

4. **Total Fund Requirement**: INR Rs.20,00,000.00

5. **Time for Completion**: 3 years

6. **Professor(s) In-Charge**: Prof. Indrajit Dube, Rajiv Gandhi School of Intellectual Property Law Indian Institute of Technology, Kharagpur.

CCC Project Proposal 29

1. **Area**: Education

2. **Name of the Project**: *E-waste Management Framework*

3. **Project Brief**: E-Waste for short - or Waste Electrical and Electronic Equipment (WEEE) - is the term used to describe old, end-of-life or discarded appliances using electricity. According to EU WEEE directive, E-waste means Electrical or electronic equipment which is waste including all components, sub-assemblies and consumables, which are part of the product at the time of discarding." Directive 75/442/EEC, Article 1(a) defines "waste" as "any substance or object which the holder disposes of or is required to dispose of pursuant to the provisions of national law in force."   It includes computers, consumer electronics, fridges etc. which have been disposed of by their original users. There is no uniform definition of E-waste. The definitions of E-waste differ from USA to EU. It is reported that average person in USA use 24 electronic products. Further the rapid space of innovation in electronic and communication technology leads to reduce the life of consumer electronic product.   This leads to generation of end of life electronic product. Literature suggests that Europeans produce approximately 20 kilograms of e-waste/person/year while U.S. residents produce about 7 kilograms of e-waste/person/year. The total e-waste generated in India amounts to 1, 46,180 tons per year. In developing countries and countries with economies in transition the sales of electrical and electronic equipment has been increasing rapidly. Therefore the domestic arising of e-waste will likely to increase significantly in those countries. Moreover, e-waste is exported from developed countries to developing countries, typically for re-use, repair or recovery of materials. E-waste is also imported in India for recycling. Basel Convention has provided the guidelines for trans-boundary movement of E-waste.

 E-waste contains different substances, some of which are toxic, and can pose serious risks and create severe pollution upon wrong handling and disposal. Basel convention leads to formation of MPPI and PACE who has issued guidelines for handling, use, and storage of E-waste. E-waste is also partly valuable. End of life motherboards for instance may well sell for more than 1000US$ per ton to recyclers for recovery of metals. Academic institute also use lot of electronic devices like computer, electronic equipment etc that reach the end of life due to advancement in technology. The consumption of computer and electronic components has been increasing over the year. It is really challenging for the institute/organization to manage the end of life electronic products. The product can be re-used or re-cycled or land-filled. In order to efficiently manage the e-waste generated in academic institute/organization, it is required to properly classify the E-waste as per component or sub-component.   There is no effective E-waste management framework for academic institute is available. Hence, the objective of the present proposal is creation of efficient management framework e-waste.

 Objective:
 • Identification for various sources of e-waste
 • Analysis of various means/tools for generation of e-waste
 • Analysis of legislative provision in light of EPR (Extended Producer Responsibility)
 • Classification of various e-wastes
 • Formulating procedure for re-use of e-waste

- Formulating process step to recycle end of use e-waste

The industry-population collaborative approach under CSR umbrella will establish well-formulated approach. For the study, the electronic equipment manufacturer and end users industries should be considered. This will help them to formulate policy for Extended Producer Responsibility.

4. **Total Fund Requirement**: INR 20 Lacs (Manpower: 12 Lacs; Awareness Workshop: 3 Lacs; Registration: 3 Lacs; Contingency: 2 Lacs

5. **Time for Completion**: 3 years

6. **Professor(s) In-Charge**: Prof. T K Bandyopadhyay,

CCC Project Proposal 43

1. **Area**: Education

2. *Name of the Project*: *:* Outreaching benefits of the Nehru Museum of Science and Technology (NMST) of IIT Kharagpur to schools

3. **Project Brief**: The Nehru Museum of Science and Technology (NMST) is a unique setup of its kind among all the IIT-s. Set up in 1990, the museum caters to the preservation of the history of the IIT system, the building in which it is housed (which has a rich legacy in the national freedom struggle), and the exposition of the nuances of science and technology in public, especially to the school children of the neighbourhood. the museum has recently expanded its galleries on interactive science models, thanks to a grant from the Ministry of Culture, Government of India. It is now proposed to expand the activities of the museum further by incorporating the following tasks:

   1. Making the models interacxtively operable from a remote location, like a village school and
   2. Designing educational models for easy understanding of scientific concepts by school children

   Since the basic museum setup is ready, it is now required to engage one designer, two technicians (mechanical/electrical or electronic) and two demonstrators to carry out the activites as planned. It is presumed that the project would last for one and half years initially. Some expenses may also have to be borne for procuring the basic raw materials for making the models.

4. **Total Fund Requirement**: INR 41.50 lacs

5. **Time for Completion**: 3 years

6. **Professor(s) In-Charge:**   **PI** Chairman, Nehru Museum of Science & Technology
                                   Co PI   Secretary, Nehru Museum of Science & Technology

CCC Project Proposal 54

1. **Area**: Education

2. **Name of the Project**: *:* Increasing education performance in school students- an evidence based approach

3. **Project Brief**: Introduction
Researchers had already published that the GDP of a country is proportional to IQ and that majority of brain development occurs within first 6 years of life. Intelligence of a child depends on nature and nurture. Obviously apart from genetics, environmental factors particularly rearing, diet and familial, school and local conditions have a role. The present researchers are already in operation at ECL to abate the nutritional problems in community and positive societal growth through indigenous avenues of crop planning, management, agrarian practices etc.

School education in India started by colonial rule and hence designed to serve the purpose. With independence through a large number of referendums and committee proceedings the style of education has started to serve the need of the nation, though it still needs major changes to produce the desired impact, accountability and acceptability. Obviously, in rural based children the impact of school curriculum should be assessed, improved and should have a flavor of ingenuity and improved acceptance.

Until now, the school education has two basic streams—science oriented in which mathematical ability matters and humanities oriented which deals with finer aesthetics and language skills.The other branch commerce or trade is a mixture of two. The basic problems in academic curriculum of rural school children in India is language grasping and fluency particularly English and mathematical ability. Yet also there are children who love sports/ adventures/arts and basic engineering without any curricular knowledge.

In this proposed project, the impact of motivational training the basics of school education will be assessed; improved and directional approaches will be given through scientific experimental documentation and analysis using brain mapping techniques as of present day improved imaging and image analysis, signal processing and analysis and psychological modeling based on data interpretation.The approach is selective or non-selective with a selective core. The recommendations will definitely help in skill development / academic performance improvement and thus futuristic growth of the nation.

Objectives
1. Early identification of numerical abilities and language skills of a particular child and their furtherance

2. Courses & curricula evaluation and refinement for better development of his/her inherent ability

3.   Providing work and aptitude based professional development for school students using mapping based neurological profiling

4.   Extension of the accessibility of the updated techniques for the betterment of under privileged   sector   and   futuristic   growth   using   the   data   with interpretation/validation/correlation

Methodology

• 3 schools in rural India will be identified.
• A model will be set in the area provided by Coal India to demonstrate the different activities of the project to the participants and their guardian, leaders of the locality/selected persons from community/stakeholders.
• Teachers of the school will be trained and will actively participate in the process.
• All school children enrolled in the schools thus selected will initially be screened for psychological and mental, social and physical health parameters.
• An initial survey will be done to see the pedigree chart of the child and effects of nurture, i.e., family. Survey/ conditions of rearing, familial dietary habits, life style pattern, socio-culturo-economic conditions of family/locality etc. will be obtained(task A).
•   About 40 students in the school will be selected at random (lottery) and assessed for academic performance starting from the zero level and that will be recorded; along with the evaluation of the student by the teachers. An academic panel will be constituted and they will make a grading system of the school student in each year, the data will be statistically evaluated(task B).
• An academic panel will be consulted for setting 3 different sets of questions with increasing difficultiesin these two subjects –mathematical ability and language skill in everyclass. The question pattern will be dependent on school (task C).
•   Motivational factors will be assessed as par psychometric quantification techniques and efforts will be set to increase the motivational drive through active and passive persuasive techniques.
• The student will be motivated with positive inputs as per initial result and emphasis will be put on further coaching/training by teacher and solving more difficult questionnaire. Obviously school education pattern will change depending on the student and should be specific instead of non-specific. Brain indicator response nullifies the effect of training and will hit the hidden capacity of the student in the subject. This will be channelized and affected in a concrete pattern to avail the excellence in the liking area of the student and also selective training will help the student to pass through the non-liking area with least difficulty with training. The student inclined to sports or other activities can also be effectively mapped through this technique.
• Signals from fMRI and use of image processing techniques.fMRI results will precisely localize the neuronal activation on skill assessment and help to validate the data obtained.

• A co-relation may likely to be developed. fMRI definitely puts more emphasis as it directly shows the area of involvement in the brain along with associated areas based on activity and the

area differs in different student and also in the same student in different aptitudes depending on his/her likings.

• A student may not be aware of his/her in build capacity and may be misdirected by motivational/other thrusts from nurture; but accurate brain mapping can give perfection to his ability and increase the likeliness of his/her success and in nation building.

• The increase effects in training will be made evidence based through analysis of fMRI and image processing techniques.

4. **Total Fund Requirement**: INR 1,57,65,600(breakup will be provided if requested)

5. **Time for Completion**: 3 years

6. **Professor(s) In-Charge name(s) and affiliation(s)** PI: Dr. Dr. A. Mitra, SMST
   Prof. P. K. Biswas, ECE, IIT KGP   INVESTIGATORS (IIT Kharagpur) Prof. R.Pradhan, HSS
   Other Investigators Prof. A. Mitra, VITAM, CE   Prof A. Basu, CU

IIT KGP- Trendsetters in CSR