



DEPARTMENT OF INDUSTRIAL AND SYSTEMS ENGINEERING

INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR



MOTTO

The motto of IIT Kharagpur is “Yoga Karmashu Kaushalam”. This literally translates to “Excellence in action is Yoga”, essentially implying that doing your work well is (true) yoga. This can be traced to Sri Krishna's discourse with Arjuna in the Bhagavad Gita.

ABOUT THE INSTITUTE

Indian Institute of Technology (IIT) Kharagpur was established in 1951 at Hijli, Kharagpur. The institute is the first of the IITs. IIT Kharagpur is recognized as an Institute of Global Importance. As per the NIRF ranking system, IIT Kharagpur ranks 6th in the overall category, 5th in both engineering and research categories, in India, in 2024. IIT Kharagpur has been awarded the status of "Institute of Eminence" by the Govt. of India. There are at present 54 academic units, including departments, centers, schools and research units that caters to the specific needs and requirements of the country. Many unique centers such as Centre of Excellence in Artificial Intelligence, Advanced Manufacturing Technology, Safety Engineering and Analytics and Indian Knowledge Systems are set up to administer concentrated effort in research, outreach and consultancy in these contemporary areas. Central library of IIT Kharagpur is one of the largest Technical Library in Asia, now complemented with a full-fledged Digital Library. World class faculty members lead cutting edge research initiatives, and impart knowledge among the new generation. The institute has strong alumni base, spreading across the world contributing significantly in shaping the future. At present student capacity of IIT Kharagpur is more than 14000. Sprawling over 2100 acres, the beautiful campus of IIT Kharagpur is covered with trees and greenery, offering facilities such as hospital, gymnasium, swimming pool, eateries, banks, post office and a market.



ABOUT THE DEPARTMENT

The Department of Industrial and Systems Engineering (ISE) at IIT Kharagpur, formerly known as the Department of Industrial Engineering and Management (IEM) was established in 1973 as Industrial Management Centre and later elevated to a full-fledged department in the year 1983. Industrial and systems engineers design, optimize and improve integrated systems of people, material, information, equipment and energy by drawing upon specialized knowledge and skills in the mathematical, physical and social sciences, together with the principles and methods of engineering analysis and design. ISE brings together a perfect blend of engineering and management science in its curriculum as well as in its research. The department has earned its reputation across the world for excellent teaching and research in the fields of Operations Research, Data Analytics, Logistics and Supply Chain Management, Quality

Engineering and Process Transformations, Information Systems and E-Business, System Thinking and Policy Planning, Human Factors Engineering and Ergonomics, Safety Analytics and Virtual Reality, and Healthcare Systems. The department houses state of the art laboratory facilities to impart hands-on training to the students complementing the theoretical concepts introduced in class. The students graduated from the ISE are recruited by Analytics firms, IT/ Software Services firms, Manufacturing/ FMCG Consultancies and Financial firms. Several graduates opt for higher education in renowned universities in India and abroad every year. The PhD recipients from the department find placements in as faculty members in IITs, IIMs and other reputed institutes in India and abroad.



MESSAGE FROM HEAD OF THE DEPARTMENT

Greetings and welcome to the Department of Industrial and Systems Engineering (ISE), IIT Kharagpur. I am happy to share with you the departmental brochure. Over the period of past fifty years, our department has emerged as a knowledge hub to educate students, scholars and professionals in all the disciplines of ISE. Our faculty members bring a diverse range of academic and industry experience. Apart from teaching, they are engaged in cutting edge research and developments funded by various government bodies and private companies. We regularly publish research findings in reputed international journals and present our work in international conferences. Our outreach programs include workshops, short-term courses, industry training programs and conferences. This year we have further strengthened industry interactions with the introduction of industry connect series where industry leaders interact with our ISE community. We have also started a distinguished lecture series in which academicians in ISE and allied disciplines from across the world are invited to share their research and experience with us.

Our students do bring laurels and medals. The ISE graduates

regularly find employment in reputed large corporations. They also pursue higher education in renowned universities across the world. Our PhD program has produced many educators who are placed as faculty members in various IITs, IIMs, NITIE and other universities across India, and abroad.

In 2024, we have introduced a new 2-year M.Tech course in Operations Research and Data Analytics (ORDA). This brochure provides a brief overview of the activities at ISE. We hope this will create better awareness about our department in the larger community of prospective students, scholars, faculty and practitioners. Come, join the ISE family and let us work together in pursuit of excellence to the service of the mankind.

Professor Jitendra Kumar Jha
Head of the Department, ISE



VISION

Department of Industrial and Systems Engineering embodies to act as the hub for knowledge creation, standardization, repository and dissemination, covering the broad domain of Industrial Engineering and Management Sciences, and to nurture the students by way of teaching, research, industrial partnership and international exposure.

MISSION

- ❖ Achieve global excellence with local impact in research and teaching.
- ❖ Design and develop contemporary courses in line with the developments in international academia and industry requirements.
- ❖ Enhance analytical skill and problem-solving ability of the students through innovative design and conduct of teaching, laboratory experiments, case studies, seminars and colloquium.
- ❖ Pursue research in the emerging fields of industrial engineering and management sciences through enhancing core competence internally as well as through collaboration with internationally renowned academic institutions worldwide.
- ❖ To promote innovation of higher order that directly impacts the need of industries.

OBJECTIVES

- ❖ To promote growth in advanced Teaching, Learning, Research and Professional Practices, Graduation Outcomes, Outreach and Connectivity.
- ❖ To conduct guest lectures, short-term courses, workshops, and conferences in the contemporary areas of Industrial and Systems Engineering to enhance knowledge and skills of students and faculties.
- ❖ To design the course curriculum consistent with the latest advancements in the domain of Industrial and Systems Engineering to be at par with the international academia.
- ❖ To build excellent laboratory facilities for researchers for cutting edge research and development.
- ❖ To encourage interaction of students with industries through sponsored projects, consultancy services, industry visits, vocational training and internships to solve real-life industry problems.
- ❖ To bring coordinated efforts between academia and industries, in the area of Industrial and Systems Engineering.
- ❖ To encourage collaboration with internationally renowned academic institutions to enhance the quality of teaching and research.





ACADEMIC PROGRAMS >>

- ❖ B.Tech in Industrial Engineering (IE) (Duration: 4 years)
- ❖ M.Tech in Industrial Engineering and Management
(Duration: 2 years)
- ❖ M.Tech in Operations Research and Data Analytics
(Duration: 2 years)
- ❖ Master of Science (MS) (By Research)
- ❖ Doctor of Philosophy (PhD)
- ❖ Post-doctoral Fellowship (PDF)

ADMISSION TO ISE DEPARTMENT IIT KHARAGPUR

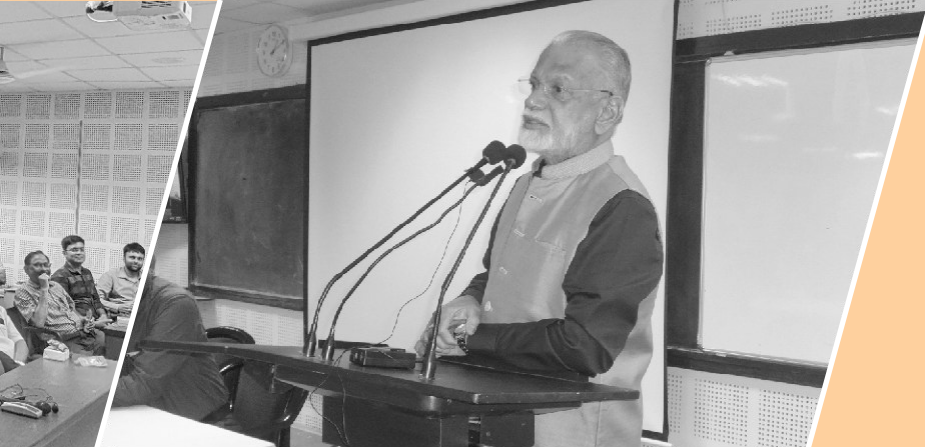
Listed below are the various academic programs offered by the Department of Industrial and Systems Engineering. For more information visit

<http://www.iitkgp.ac.in/academics-programs>

B. Tech (4years)

Admission to undergraduate and postgraduate courses in IIT Kharagpur is conducted through written entrance examinations.

Admission to undergraduate programs in all IITs is tied to the Indian Institute of Technology Joint Entrance Examination (IIT-JEE). Candidates who qualify for admission through IIT-JEE can apply for admission in a four-year B.Tech (Bachelor of Technology) degree, a five-year B.Arch. degree, a five-year Dual Degree (Integrated Bachelor & Master of Technology) or a



five-year integrated M.Sc (Master of Sciences) at IIT Kharagpur.

MTech in Industrial Engineering and Management

The Institute offers 2-year M. Tech program in Industrial Engineering and Management for candidates qualifying Graduate Aptitude Test in Engineering (GATE) in a number of relevant disciplines.

Latest information will be available in GATE prospectus of the current year.

MTech in Operations Research and Data Analytics

The Institute offers 2-year M. Tech program in Operations Research and Data Analytics (ORDA) for candidates qualifying Graduate Aptitude Test in Engineering (GATE) in a number of relevant disciplines.

Latest information will be available in GATE prospectus of the current year.

MS by Research

Research fellows are hired from time to time as per the requirements of research projects. The job listings are posted on <http://www.iitkgp.ac.in/temporary-jobs>. The fellows have the option to pursue MS in the department. The application for MS is invited twice annually during March-April and October-November.

Ph.D.

The Institute provides facilities for research leading to the Degree of Doctor of Philosophy (Ph.D.). There are several categories within the Ph.D. Program in the Institute, viz.

- ❖ Regular with Institute Assistantship
- ❖ Ph.D. with Individual Fellowship (INSPIRE, UGC NET etc.)
- ❖ Ph.D. for working professionals
- ❖ Ph.D. through sponsored research projects
- ❖ PMRF

Joint doctoral programs in collaboration with reputed universities.

FACULTY MEMBERS



Mahanty B
Professor

- ❖ Operations Research
- ❖ Operations Management
- ❖ Project Management
- ❖ System Dynamics
- ❖ Information Systems



Maiti J
Professor

- ❖ Data Science
- ❖ Safety Analytics
- ❖ Quality Analytics
- ❖ Occupational Health and Ergonomics
- ❖ Virtual Reality
- ❖ Risk and Uncertainty Analysis



Sarmah S P
Professor

- ❖ Logistics and Supply Chain Management
- ❖ Inventory Management
- ❖ Risk Management
- ❖ Waste Management





Tiwari M K
Professor (on lien)

- ❖ Modeling and Analysis of Manufacturing Systems
- ❖ Supply Chain Network
- ❖ Operations Management
- ❖ Optimization and Heuristics

(Currently appointed as the Director of IIM, Mumbai)



Jenamani M
Professor

- ❖ E-business
- ❖ Web data analytics
- ❖ Supply chain optimization
- ❖ ICT applications
- ❖ Recommender systems



Naikan V N A
Professor

- ❖ Condition Monitoring
- ❖ Product Design and Development
- ❖ Quality and Reliability
- ❖ Maintenance Engineering & Management
- ❖ System Simulation
- ❖ Operations Research





Jha J K
Associate Professor
Head, ISE

- ❖ Supply Chain Management and Logistics
- ❖ Operations Research
- ❖ Inventory Control
- ❖ Facility Location



Kumar A
Associate Professor

- ❖ Business Analytics
- ❖ Closed-loop Supply Chains
- ❖ Product Returns and Remanufacturing
- ❖ Pricing and Revenue Management
- ❖ Autonomous Diagnostics & Prognostics
- ❖ Condition-Based Maintenance



Kumar S K
Associate Professor

- ❖ Supply Chain Management
- ❖ Port Logistics
- ❖ Knowledge Management
- ❖ Game Theory and Optimization
- ❖ Operations Research

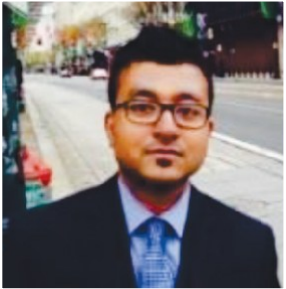


Sen G
Assistant Professor

- ❖ Integer Programming
- ❖ Large Scale Optimization Techniques
- ❖ Facility Location
- ❖ Transportation and Network Design
- ❖ Nature Inspired Algorithms (Metaheuristics)
- ❖ Hybrid Solution Approaches

FACULTY ACHIEVEMENTS

1. Fellows of Indian National Academy of Engineering (INAE), Institute of Engineers (IE(I)) and other Academy of Engineering and Sciences
2. Institute Chair Professor
3. Alumni Chair Professor



Roychowdhury S
Assistant Professor

- ❖ Operations Research
- ❖ Cyber security
- ❖ Reinforcement learning
- ❖ Simulation
- ❖ Statistical Learning



Menon B G
Assistant Professor

- ❖ Energy systems modelling and management,
- ❖ System dynamics and policy planning
- ❖ Operations management
- ❖ Applied econometrics
- ❖ Forecasting



Abraham A J
Assistant Professor

- ❖ Resource Economics
- ❖ Game Theory
- ❖ Price and revenue management



Sharma A
Assistant Professor

- ❖ Behavioral Operations
- ❖ Industry 4.0 Enabled Supply Chain
- ❖ Social Preferences in Supply Chain
- ❖ Supply Chain Coordination



Sidhanta S
Assistant Professor

- ❖ Artificial Intelligence
- ❖ Big Data Analytics
- ❖ Machine Learning
- ❖ Computer Vision
- ❖ Systems and Networking

4. Institute Faculty Excellence Award
5. Associate Editors of world leading international journals
6. Editorial Board Members of world international journals
7. Listed among top productive authors and researchers in the area of Production and Operations Management, and

8. Safety Science
8. Listed in the top 2% researchers in the world by Stanford University and Clarivate Analytics

STAFF MEMBERS



Dey J K
Jr Superintendent



Haque F
Jr Executive



Das A
Sr Technician



Goswami S
Sr Technical Superintendent



Santra I
Jr Technical Superintendent



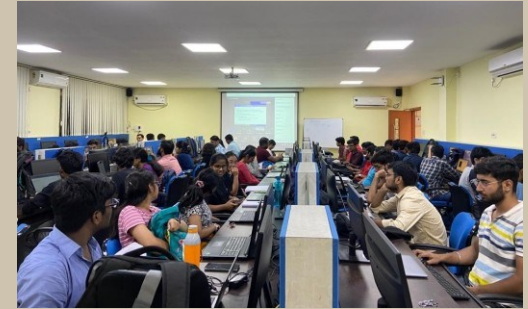
Ranjan A (on lien)
Jr Technician



Pradhan S
Jr Technician

LABORATORY FACILITY

ISE houses state of the art laboratory facilities, to impart hands on training to the students and to conduct cutting edge research in the diverse domains of ISE.



Operations Research & Data Science Laboratory



E-Business Laboratory



Safety Analytics & Virtual Reality Laboratory

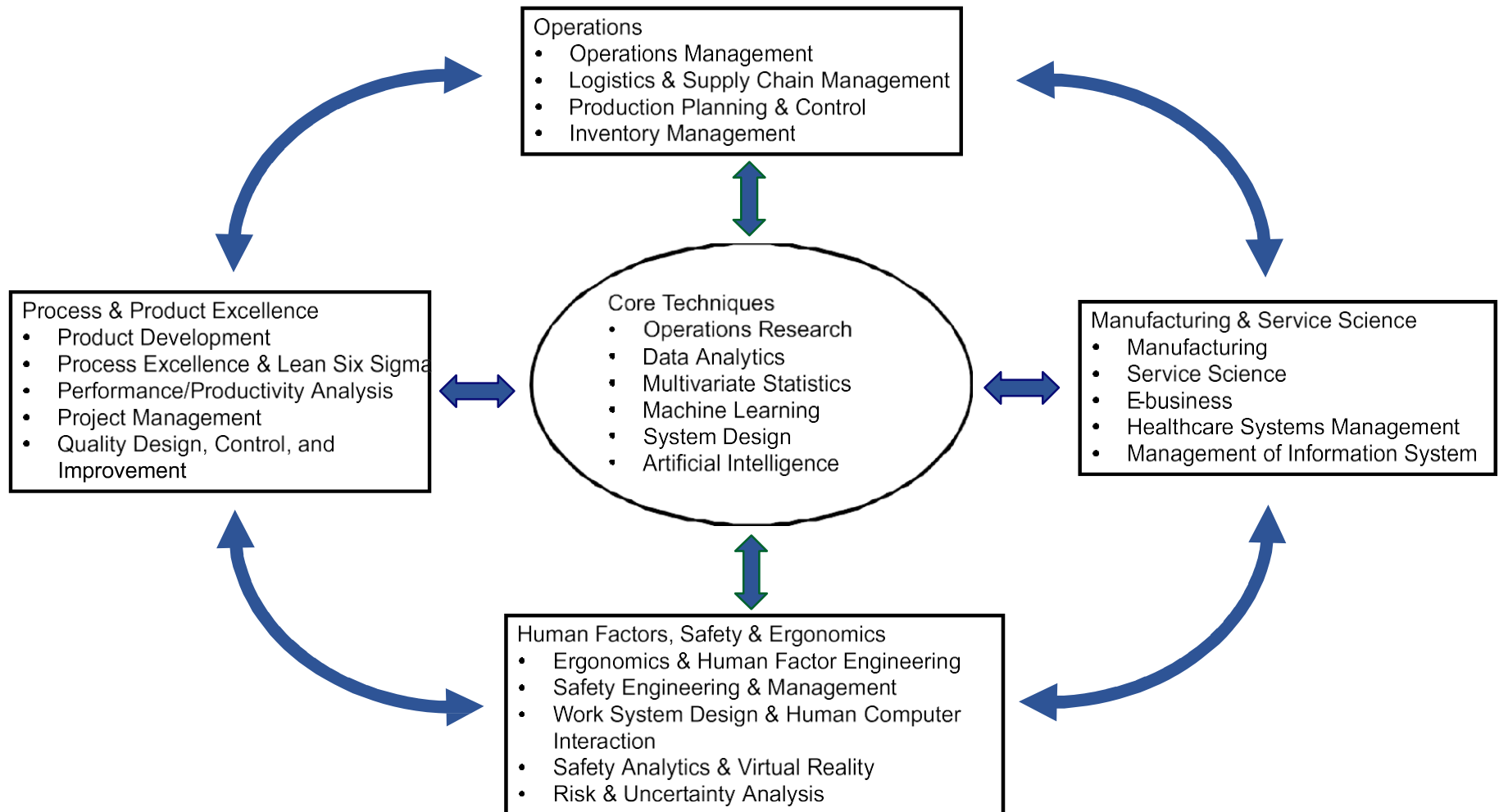


Quality Design & Control Laboratory



Work System Design & Ergonomics Laboratory

RESEARCH AREAS



PUBLICATIONS

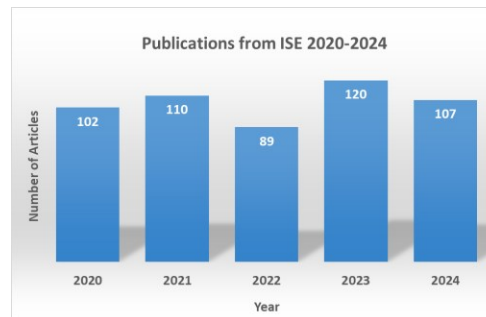
The faculty members and scholars of ISE maintain stellar publication record, which include articles in reputed international journals (SCI-indexed), book chapters, and articles international conference proceedings. Some of the journals where ISE articles are featured regularly are listed below:

- ❖ Accident Analysis & Prevention
- ❖ Annals of Operations Research
- ❖ Applied Intelligence
- ❖ Applied Mathematical Modelling
- ❖ Applied Soft Computing
- ❖ Computers & Operations Research
- ❖ Computers and Industrial Engineering
- ❖ Engineering Application of Artificial Intelligence
- ❖ European Journal of Operational Research
- ❖ Expert Systems with Applications
- ❖ IEEE Transactions on Engineering Management
- ❖ IEEE Transactions on Evolutionary Computation
- ❖ IEEE Transactions on Fuzzy Systems
- ❖ Information Sciences
- ❖ International Journal of Production Economics
- ❖ International Journal of Production Research
- ❖ Journal of Cleaner Production

- ❖ Journal of Operational Research Society
- ❖ Neural Computing and Applications
- ❖ Neurocomputing
- ❖ Operations Research Perspectives
- ❖ Production Planning and Control
- ❖ Reliability Engineering and System Safety
- ❖ Safety Science



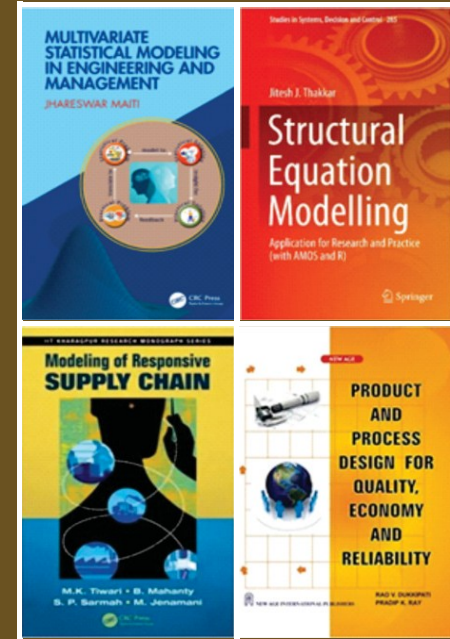
The chart shows the number of publications (including journal articles, conference proceedings, book chapters and book) in the last five years from ISE, as per SCOPUS.



Source: SCOPUS

BOOKS AUTHORED BY ISE FACULTY

Books authored by the ISE faculty members in the recent past are shown below:



EDITED BOOKS



RESEARCH AND CONSULTANCY PROJECTS

Funding Agencies

Government Agencies/PSU

- ❖ Coal India Limited
- ❖ Defence Research and Development Organisation (DRDO)
- ❖ Department of Science and Technology (DST)
- ❖ Ministry of Skill Development and Entrepreneurship
- ❖ Science and Engineering Research Board (SERB)
- ❖ Ministry of Education, GoI (formerly MHRD)
- ❖ Ministry of Steel, GoI
- ❖ Ministry of Heavy Industries, GoI
- ❖ Directorate of Ordnance (formerly Ordnance Factory Board)

Private

- ❖ Aarti Steel Limited
- ❖ CISCO
- ❖ Somnio Research Private Limited
- ❖ Tata Sons Private Limited
- ❖ Tata Steel Limited
- ❖ Tata Hitachi
- ❖ Tata Metaliks Ltd.
- ❖ Haldia Petrochemicals Ltd.

SPONSORED RESEARCH PROJECTS

A few ongoing projects are highlighted below to showcase the diversity and impact of the sponsored research projects.

Safety Analytics: Save people at work from accidents and injuries

(PI: Prof J. Maiti)

Objectives

- ❖ Creation of safety database.
- ❖ Modeling and analysis of data.
- ❖ Development of prevention and mitigation programs.



Deliverables

- ❖ Data, methods/algorithms and prototypes: Under the project, different safety datasets, methodologies/ algorithms /frameworks, and prototypes for software and virtual reality (VR) simulator were developed.
- ❖ Publications: 24 articles were published in various international journals of repute from 2017 to 2022. 15 papers were published at various conferences from 2017 to 2022 and 27 book chapters were published from 2017 to 2022.
- ❖ Student projects: 6 PhD scholars and 1 MS student were directly involved in the project. 40 M.Tech dissertations and 56 B.Tech dissertations were completed by researching on the data provided by the project.
- ❖ NPTEL/MOOC Course: A 60-lecture series on "Safety and Risk Analytics" was developed and offered in NPTEL/MOOC/SWAYAM.

Real-time monitoring and embedded analytics for quality and traceability in cold chains for sea export of agricultural produce (PI: Prof. M. Jenamani)

Objectives

- ❖ Infrastructure design for cold chain traceability during long distance sea transport using IoT based sensors networks.
- ❖ Quality monitoring predictive analytics using the data generated from traceability system.
- ❖ Quality assurance during sea transport of vegetables to long distance countries and protocol design for increasing shelf life.



Deliverables

- ❖ Designing and validation of sensors, communication interfaces, and information architecture for streaming the traceability data to the cloud.
- ❖ Creating laboratory setups for emulating sea conditions, conducting experiments to find the optimal parameters for minimizing quality deterioration and design of sea protocol for export of vegetables to long distance countries.
- ❖ Decision support model to suggest optimal conditions to be maintained during sea transport for increasing the shelf life of vegetables exported through sea route.
- ❖ Design and implementation of algorithms for visualization and quick assessment of quality on local servers using handheld devices such as smartphones.

- ❖ Design and implementation of cloud based detailed analytics for assessment of remaining shelf life using past sensor data

SPARC Project on Design and Development of Automated Systems for Ergonomic Evaluation of Human-Product Interface in Healthcare Systems

(PI: Prof. P. K. Ray and
Co-PI Prof V.K. Tewari, former Director, IIT Kharagpur)

Objectives

Design and development of an automated interface design between the humans and the product considering a number of design aspects such as postural analysis, anthropometric match, physical and mental work capacity and impact of environmental factors on the performance of the person including risk factors.

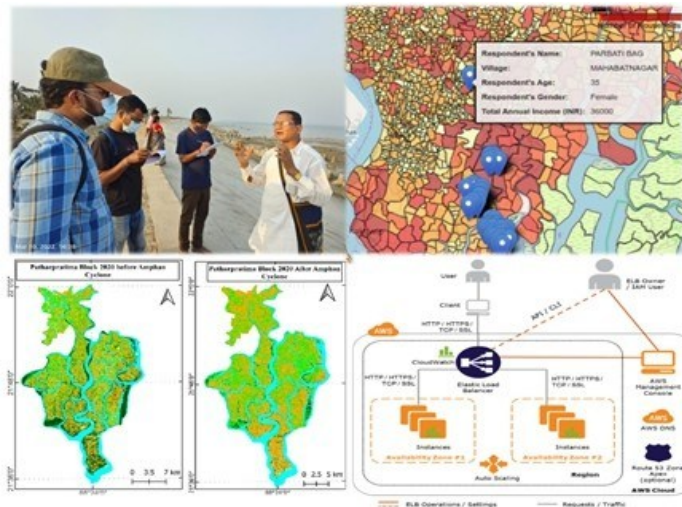
Outcomes

- ❖ Prof. P K Ray and Prof. V K Tewari (former Director, IIT Kharagpur) along with Prof. Denny Yu and Prof. Vaneet Aggarwal from Purdue University conducted two workshops on 'Healthcare Systems and Automation' and

'Human-Product Interfaces and Their Performance in Healthcare Environment'.

- ❖ A 5-day duration training course on 'Human Factors Engineering in Healthcare Systems' was organized during the visit of Prof. Denny Yu to IIT Kharagpur.
- ❖ A number of eminent healthcare professionals, Dr. S Halder from Dr. Grey's Hospital, Elgin, Dr. Kaushik Ray, Consultant General Surgeon, Belford Hospital, UK, Dr. S Bhattacharya from Tata Medical Centre, Mr. Amalendu Pal and Dr. Asok Sarkar from Indian Association of Blood Cancer and Allied Diseases have joined the workshops and the training course.

Socio-economic Impact of Migration during COVID-19 Crisis in the Sundarbans Region: A Study of Sustainable Solutions using Geo-spatial Analytics (PI: Dr. S. Roychowdhury (ISE), Co-PI: Prof. P. Mishra (HSS))



Objectives

- ❖ Creation of a knowledge base on the socio-economic status of the local population and impact of migration due to COVID 19 crisis in 10 key villages in the 3 target blocks, Mathurapur II, Patharpratima and Sagar in the Sundarban region by means of a detailed survey.
- ❖ Identify the dynamics and underlying factors of regular migration, seasonal migration and reverse migration due to COVID 19, impact on socio economic status.
- ❖ Creation of an interactive resource map from the survey data, satellite images and interviews, and secondary data sources.
- ❖ Hotspot analysis and development of multi-hazard cascade model for the areas affected by the combined effect of the pandemic and natural disasters.
- ❖ Design of intervention strategies to create sustainable opportunities locally.

Deliverables

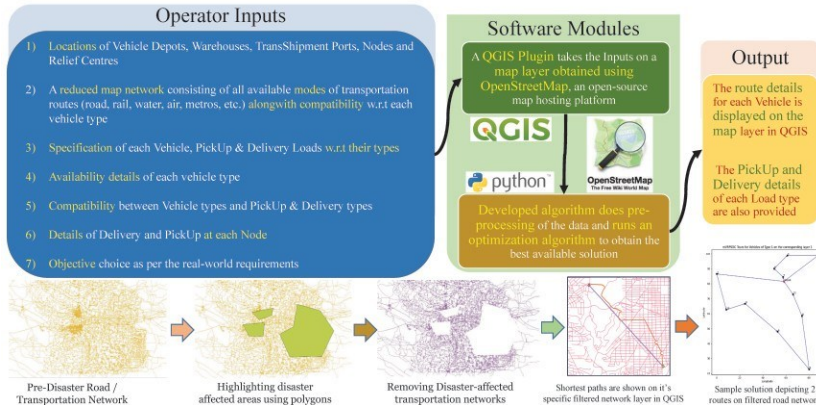
- ❖ A web based interactive resource map, highlighting available agricultural land, skillsets of local workforce, existing training centres and educational institutions, healthcare.
- ❖ Analysis of factors affecting migration and impact of migration on local population.
- ❖ Intervention mechanisms for generating sustainable livelihoods for the local population.

Spatial Decision Support Systems for Vehicle routing during emergency/ Disaster Management

(PI: Prof. G. Sen)

Spatial Decision Support System for Vehicle routing for Emergency/Disaster Management

A GIS based DSS is being developed for vehicle routing decisions during Emergency Operations. This tool will provide near-optimal solutions for large scale operations involving goods transfer from warehouses to relief centres using heterogeneous vehicles from multiple vehicle depots and for evacuating humans. (Funded by NRSC, ISRO)



Objectives

- ❖ To reduce overall route cost (sum of distance dependent Variable Costs and vehicle type dependent Fixed Costs of all vehicle routes).
- ❖ In the upcoming versions the user would be able to select objectives based on the usage of the algorithm depending on the requirement in real applications (e.g.: Time/Distance/Cost minimizations).

Deliverables

- ❖ Development of a Decision Support System (DSS) for multimodal heterogeneous Vehicle allocation from their respective Depots, to multiple Evacuation Nodes for delivering supplies and picking up human evacuees/livestock.

- ❖ The DSS would suggest the best possible (optimal in case of small problems; and good solution obtained from a Heuristic in case of large operations) route allocations along with the cargo/supply assignments to each vehicle at the start of its journey with details of pickups and drops.
- ❖ An interactive GIS dashboard (with provisions of feeding traffic data for better route optimization) within the DSS allowing the user to input data and view the solutions, enabling better and faster decision making during disasters and emergencies.

In addition to the projects mentioned above, some of the other sponsored research projects which are currently being undertaken at ISE are:

1. E Business Center of Excellence, sponsored by Ministry of Human Resource Development (MHRD), Government of India.
2. A Decision Support Tool for Covid-19 Outbreak Control on Suburban Train Services Network, sponsored by CISCO University Research Program.
3. AI and Virtual Reality Modelling and Collaborative Learning of Risk and Situational Awareness in the Socio-Technical System Under Disruptions, sponsored by Science and Engineering Research Board (SERB), Government of India.
4. A Network Optimization based Prediction Model for Covid 19 Outbreak Tree, sponsored SERB, Government of India.
5. Development of Approaches for Air Transport Loading and Scheduling, sponsored by Centre for AI and Robotics, DRDO.

6. Digital Manufacturing and Industrial Internet of Things for Enhanced Supply Chain Co-ordination, Quality and Maintenance, sponsored by TATA SONS PRIVATE LIMITED, Department of Heavy Industries (DHI).
7. Dynamic Distribution Planning under Risk During Epidemic Outbreak in Humanitarian Supply Chain, sponsored by Coordination Committee of RAKSHAK.
8. Evaluation of Human Factors and Safety in Submersible Platform for Acoustic Characterisation and Evaluation, sponsored by Naval Physical and Oceanographic Laboratory.
9. Management of Inland Waterways Logistics Systems, sponsored by Ministry of Shipping, Government of India.
10. Manufacturing of Shells for Field Guns with Improved Design and Performance, sponsored by Ordnance Factory Board and MHRD, Government of India.
11. Vehicle Interdiction Strategy in Complex Road Networks, sponsored by SERB, Government of India.

CONSULTANCY PROJECTS

A few consultancy projects involving ISE faculty members are listed below:

- ❖ Consultancy Advisory on Data-Driven Solutions for Cybersecurity for Turtleneck Systems and Solutions Private Limited (April 2025 – March 2026).
- ❖ Development of Prediction Based Occupational Safety Management Systems (OSMS) & Virtual Accident Models for Haldia Petrochemicals Limited (May 2025 – May 2026).
- ❖ Evaluation of District Skill Development Planning (DSDP) Awards under SANKALP Programme of MSDE, sponsored by Ministry of Skill Development and Entrepreneurship, Government of India.
- ❖ Hazard Identification and Risk Assessment (HIRA), Emergency Plan and Disaster Management Plan for Dhenkanal Steel Plant, sponsored by Rungta Mines Limited.
- ❖ Implementation of Integrated Safety Management System at Aarti Steels Ltd., Cuttack, (Odisha), sponsored by Aarti Steels Limited.
- ❖ Predictive Analytics for Special Freight Train Operator, sponsored by TM International Logistics Ltd.
- ❖ Preparation of Human Resources (HR) Plan of SECL, sponsored by South Eastern Coalfields Limited.
- ❖ Revisit of Normative Rates Derived by IIT Kharagpur in Respect of Loading and Transportation of Coal by Ex-Serviceman Transport Companies for CIL, sponsored by Coal India Limited.
- ❖ Yield Improvement of Ball Powder Manufacturing Process Sponsor – Ordnance Factory Itarsi.

OUTREACH

As part of outreach initiatives, ISE conducts training programs, workshops, short-term courses and conferences involving students, professionals and scholars. Some of the programs undertaken in last few years are given below:

International Conferences

- ❖ International Conference on Industrial Engineering & Analytics (ICONIEA 2024)
- ❖ E-Business and Supply Chain Competitiveness (2016)
- ❖ Management of Ergonomic Design, Industrial Safety and Healthcare Systems (MESH 2016)

ISWT/GIAN Programmes

- ❖ Ergonomics and Human Factors Engineering, December 7-18, 2015
- ❖ Production and Operations Management, IIT Kharagpur, India during May 23 - June 3, 2016
- ❖ New Product Development Using Systems Engineering Principles October 21-22, 2016
- ❖ Quality Engineering in Products and Processes, December 19-30, 2016
- ❖ Environmental Performance of Manufacturing Systems: Modelling and Application, March 25-29, 2019
- ❖ Sustainable Production Management: Concepts and Practices, May 13-24, 2019

SPARC Programme

- ❖ Design and Development of Automated Systems for Ergonomic Evaluation of Human-Product Interface in Healthcare Systems

Workshops/Short-term Courses

- ❖ Exploratory Data Analysis (EDA), March 14, 2015.
- ❖ Decision Support Models in E-business and Supply Chain Management, February 11-12, 2017
- ❖ New Product Development Using Systems Engineering Principles, March 16-18, 2017
- ❖ Productivity Management in Manufacturing and Service Organizations, August 18-19, 2017
- ❖ Workshop on Project-Based Training Programme on Inventory Management (Aarti Steel Limited), April 14-23, 2022
- ❖ Short-term courses under QIP-TEQIP (17)
- ❖ Short-term courses for industry (11)

SWAYAM/NPTEL Courses

- ❖ Applied Multivariate Statistical Modeling by Prof. J. Maiti
- ❖ Design and Analysis of Experiments by Prof. J. Maiti
- ❖ Safety and Risk Analytics by Prof. J. Maiti
- ❖ Industrial Safety Engineering by Prof. J. Maiti
- ❖ Decision Modeling by Prof. B. Mahanty
- ❖ Management Information Systems by Prof. B. Mahanty
- ❖ Automation in Production Systems and Management by Prof. P.K. Ray
- ❖ Quality Design & Control by Prof. P.K. Ray
- ❖ Human Factors Engineering by Prof. P.K. Ray
- ❖ Management of Inventory Systems by Prof. P.K. Ray
- ❖ E-business by Prof. M. Jenamani

ALUMNI CONNECT

ISE has a strong alumni community that can bring incredible value to the students and scholars. Their diverse experience helps the department in shaping the future course of actions, as well as support the students into making more informed career decisions. To keep the ISE community growing, the alumni may visit the ISE social media pages in Facebook, LinkedIn and Twitter to stay connected. Every year, ISE hosts the eminent alumni of the department during Annual Alumni Meet of IIT Kharagpur.

On January 20, 2023 Padma Bhushan Dr. K. Radhakrishnan, visited ISE and engaged in an insightful interactive session with scholars and faculty members. Dr. Radhakrishnan, a distinguished alumnus of ISE, IIT Kharagpur (PhD, IEM 2000) served as the Chairman of ISRO from 2009 to 2014. Currently he is serving as the Chairperson of the Board of Governors of IIT Kanpur and IIT Ropar, and Chairman of the Standing Committee of the IIT Council.



Padma Bhushan Dr. K Radhakrishnan
(former chairman ISRO) interacting
with ISE faculty and scholars

IEM 1998 Batch department visit

DEPARTMENT / FACULTY LEVEL COLLABORATION WITH FOREIGN UNIVERSITIES

- ❖ Virginia Tech, USA
- ❖ Northeastern University, USA
- ❖ Purdue University, USA
- ❖ The Ohio State University, USA
- ❖ University of Ottawa, Canada
- ❖ University of Saskatchewan, Canada
- ❖ Warwick Manufacturing Group, UK
- ❖ University of Warwick, UK
- ❖ Loughborough University, UK
- ❖ Management School University of York
- ❖ TU Delft, Netherlands
- ❖ EPFL Swiderland
- ❖ Aix-Marseille University, France
- ❖ Polytechnic University of Milan, Italy
- ❖ The Hong Kong Polytechnic University, Hong Kong
- ❖ University of Cyprus, Cyprus
- ❖ Yuan Ze University, Taiwan
- ❖ Seoul National University, South Korea
- ❖ Texas A&M University, USA
- ❖ Luleå University of Technology, Sweden

INDUSTRY CONNECT

In recent times, the following industry connect activities have been undertaken at ISE.

PRE-TRAINING WORKSHOP

The Department of Industrial and Systems Engineering (ISE), IIT Kharagpur, has successfully organized a Pre-Training workshop on "Project-based Training on Inventory Management for the Officials of Aarti Steels Limited" on 5th of March 2022. This was done in order to capture the experience of the plant and the company personnel working at different control points of the inventory and materials management systems.



WORKSHOP ON PROJECT-BASED TRAINING PROGRAMME ON INVENTORY MANAGEMENT

A workshop on "Project-based Training on Inventory Management for the Officials of Aarti Steels Limited" was successfully conducted during April 14th - 23rd 2022, at Aarti Steels Limited, Cuttack.



Professor P. K. Ray, Professor B. Mahanty, and Professor J. Maiti delivered lectures on inventory management system. A number of interactive sessions were held during the workshop where the inventory management related problems of the company were discussed. The officials of Aarti Steels Limited were also given different projects to work on their current issues.

ACADEMIC EXPERT TALK

On July 31st, 2023, a workshop on "Management of Municipal Solid Waste" was organized jointly by IIT Kharagpur and the Fulbright-Nehru Specialist Program. The workshop was delivered by Prof. Subhas C Sarin, Paul T. Norton Endowed Professor, Industrial and Systems Engineering, Virginia Tech University, USA, and Prof. Brajesh Kumar Dubey, Professor, Civil Engineering, IIT Kharagpur. The session covers the

<p align="center">WORKSHOP ON MANAGEMENT OF MUNICIPAL SOLID WASTE Under Fulbright-Nehru Specialist Program (HYBRID MODE)</p>		
<p align="center">Online link: https://meet.google.com/bpt-kxsf-kyw</p>		
<p>Date: July 31, 2023</p>	<p>Time: 10.00 A.M. – 01.00 P.M</p>	<p>Venue: Department of ISE, IIT Kharagpur</p>
 Prof. Brajesh Kumar Dubey Professor, Civil Engineering Indian Institute of Technology Kharagpur, INDIA SESSION 1: Overview of Present Waste Management Practices in India - with few case studies	 Prof. Subhash C. Sarin Paul T. Norton Endowed Professor Industrial and Systems Engineering Virginia Tech University, USA SESSION 2: SWEEP: Solid Waste Echelon-Embedded Planning with Web-based tool	 Organized by Department of Industrial & Systems Engineering (ISE) Indian Institute of Technology Kharagpur
<p align="center">Session 3: Panel Discussion with panel members and participants</p>		

Overview of present waste management practices in India-with few case studies and solid waste echelon-embedded planning with web-based tool. A team of IITKGP professors including Prof. J. Maiti, (HoD, ISE), Prof. B. Mahanty, Prof. P.K. Ray, Dr. B. G. Menon, Dr. S. Roychowdhury, Dr. A. J. Abraham, Dr. A. Sharma, Dr. C. R. Borra and Dr. A.K. Deb were also present.

CERTIFICATE COURSE ON “SUPPLY CHAIN MANAGEMENT AND LOGISTICS & INVENTORY MANAGEMENT”

In view of the needs of emerging opportunities in the field of Supply Chain Management and Logistics, two Three-day short-term courses on: (i) “Supply Chain Management and Logistics” from March 29th to 31st, 2024, (ii) “Inventory Management” from June 19th to June 21st, 2024 were conducted by the Department of Industrial and Systems Engineering (ISE), IIT Kharagpur at Agartala, Tripura through Continuing Education Programme (CEP), IIT Kharagpur. The course was sponsored by the School of Logistics, Communication and Waterways, SIPARD, AD Nagar, Agartala.



INTERNATIONAL FACULTY VISIT



Prof. Denny Yu (Purdue University, USA)

In connection with the project titled 'Design and Development of Automated Systems for Ergonomic Evaluation of Human-Product Interface in Healthcare Systems' under SPARC (Scheme for Promotion of Academic and Research Collaboration), Ministry of Education, Government of India in collaboration with Purdue University, USA, a training course on 'Human Factors Engineering in Healthcare Systems' was organized during May 16 - 20, 2022 at the Department of ISE. Dr. Denny Yu, (PhD, CPE) Associate Professor of Industrial Engineering, Purdue University USA visited ISE, to deliver lectures on the contemporary practices and research problems relevant to the topic. The lecture sessions centered around topics such as Information-centred Human Factors, Human Body-centred Ergonomics, Organisation-centred Human Factors, and Applications in Healthcare Systems.

**Prof. Christoph Glock
(TU Darmstadt, Germany)**

The Department of ISE invited Prof. Christoph Glock to share his insights on advanced research topics in Industrial Engineering. He delivered an insightful and informative lecture on “future prospects and research opportunities in areas like energy management, human factors and supply chain management” on 11th October 2022 at the I S E department. Prof. Glock is currently a professor at the Institute of Production and Supply Chain Management and Dean of the Department of Law and Economics at TU Darmstadt, Germany. In addition, he is handling editorship roles in top-rated journals like Applied Mathematical Modelling, Computers & Industrial Engineering and the International Journal of Integrated Supply Management. The department of ISE looks forward to collaborate with Prof. Glock and the Technical University of Darmstadt, Germany.



Dr. Ryichi Shibasaki, (The University of Tokyo)

Dr. Ryichi Shibasaki, Associate Professor, Resilience Engineering Research Center, Department of Technology Management for Innovation (TMI), The University of Tokyo, visited the department of ISE with his student Mr. Koki Kawachi on 24th November 2022. They delivered an insightful lecture on “Global Logistics Intermodal Network Simulation modelling and its application to South Asia”. Dr. Shibasaki was the Head of International Coordination Division, NILIM, MLIT, Japan. He is also an associate editor of Asian Transport Studies and Maritime Policy & Management. His research areas include maritime economics, logistics, and transportation engineering. He was accompanied by Mr. Hitoshi Onodera, chief project manager, Pacific consultants co. ltd.

SPARC-UKIERI WORKSHOP ON SEMICONDUCTOR SUPPLY CHAIN RESILIENCE

As a part of the SPARC-UKIERI project **AI-Driven Resilient Semiconductor Supply Chain**, the Department of **Industrial and Systems Engineering (ISE)** at **IIT Kharagpur** successfully organized the workshop on Semiconductor Supply Chain Resilience from **November 11-12, 2024**. The event was inaugurated by **Prof. Karabi Das (Dean Outreach)**, **Dr. Alok Choudhary (WMG, University of Warwick)**, **Prof. J Maiti (former HoD, ISE)**, **Prof B Mahanty (ISE)** and **Dr. Akhilesh Kumar (PI)**. The workshop covered current trends, key challenges, and opportunities in resilient semiconductor supply chains in India and the UK. Industry participants **Dr. Arnab Banerjee (Director, Supply Chain Analytics and AI, Micron Technology)**, **Mr. Rajat Khanna**

(**Director, Global Foundries Engineering Ltd.**), **Dr. Sanjeev Kumar (Head of Business Development, Renishaw Metrology Systems Ltd., Pune, India)** provided the industry perspective for achieving Semiconductor Supply Chain Resilience. **Prof. B Mahanty** and **Dr. A Kumar** discussed the role of academia in the same. This workshop also had a panel discussion session themed **India's Role in the Global Semiconductor Supply Chain: Challenges and Opportunities**. In this workshop, **54 participants** benefited from insightful discussions and knowledge sharing.

CULTURAL EVENTS

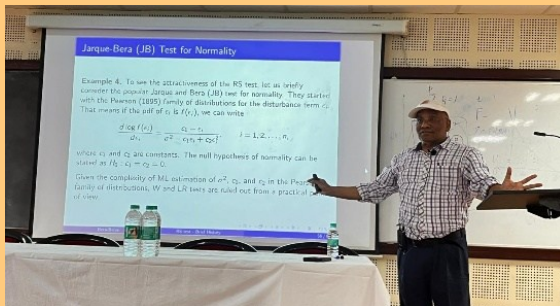
Teacher's Day 2024

ISE students and research scholars, celebrated Teacher's Day by hosting a cultural program on the 5th of September, 2024. Among the program events, the main attractions were a duo song performance by research scholars and the solo performances by professors.



WORKSHOP ON ADVANCED RESEARCH TOPICS IN INDUSTRIAL ENGINEERING AND ECONOMICS

The Department of ISE invited *Prof. Anil Bera* to share his insights on advanced research topics in *Industrial Engineering and Economics*. He delivered an insightful and informative lecture on *“Three Score and 15 Years (1948-2023) of Rao’s Score Test: A Brief History”* on 4th December 2024 at the ISE department. He is currently working as Professor of Economics in the *University of Illinois at Urbana-Champaign (UIUC)*, Illinois, United States. He received a B.Sc. from *Calcutta University* in 1975 in Statistics (*First Class*), a master's degree from *Indian Statistical Institute* in 1977 in Econometrics and Planning (*First Class*), and a Ph.D. in 1983 from *Australian National University*. He has contributed to the development of a number of test statistics, such as *Jarque-Bera test* for normality and *Bera-McAleer’ test* for linear and *log-linear models*.



His book *“Financial Econometrics and Empirical Market Microstructure”* introduces novel approaches for stress-testing and reviews methodology for mortgage econometrics. His current research includes *Spatial Statistics, Econometrics, Testing Under Misspecified Models, History of Statistics & Econometrics*. Dr. Bera established a Free School for the needy children in his village under *A. Bera Center for Development and Education (ABCDE)* in January 2020. ABCDE now, as of November 2024, has **~80 students** and **10 teachers**.



INTERNATIONAL CONFERENCE ON INDUSTRIAL ENGINEERING & ANALYTICS (ICONIEA 2024)

In celebration of **Golden Jubilee**, the **Department of Industrial and Systems Engineering (ISE)**, IIT Kharagpur, successfully organized an **International Conference on Industrial Engineering & Analytics (ICONIEA, 2024)** during **February 16-18, 2024** in a hybrid format.



This prestigious event was designed to dialogue, collaboration, and knowledge under the theme, '**Data to Decisions**'. **ICONIEA 2024** aimed to bring together experts in **Industrial & Systems Engineering** from academia and industry to share the critical challenges, opportunities and latest advancements in areas such as artificial intelligence, machine learning, optimization techniques, safety analytics, supply chain analytics, game theory, sustainable development, emerging technologies, E-business, system dynamics, and human factors engineering, etc. The above theme aimed to address the rapid advancements and the need for research driven solutions to global issues.

The conference provided an excellent interactive platform for showcasing cutting-edge research innovation and directions. All the accepted articles are going to be published in **Springer-edited books**. We received sponsorship from the various industry partners like **GAIL, SK Traders, and WCL, India**.

Prof. Amit Patra, the former Deputy Director of IIT Kharagpur, addressed and welcomed the **Padma Shri Prof. Sankar K. Pal**, **Prof. Manoj Kumar Tiwari**, (Director, Indian Institute of Management, Mumbai and Vice-Chancellor Tata Institute of Social Sciences), and all distinguished speakers and the numerous participants. He expressed his gratitude to the host, Department of **Industrial and Systems Engineering** at **IIT Kharagpur**, for their professionalism and dynamism and for creating a true family spirit for the organisation of the conference. **Prof. J. Maiti**, former Head of department also emphasised his thanks to the IIT Kharagpur and all professor from ISE department for providing the opportunity to organise the **ICONIEA 2024** on the occasion of **golden jubilee** of the Department of Industrial and Systems Engineering at **IIT Kharagpur**.



OPTIMA 2025: A CELEBRATION OF TECHNO-OPTIMIZATION (STUDENT TECH FEST)

Optima 2025, the annual techfest of the Department of Industrial and Systems Engineering was held from **7th - 9th March 2025**, offering a rich mix of competitions, workshops, seminars, and interactive sessions. There were **23 events** organized – including 8 competitions, 12 guest lectures, and 3 workshops. The event saw **4,000+ registrations** and **250+ offline** attendees from across the country.

Shri S K Nayak, Director PXE Lab, DRDO presided as our Chief Guest and **Shri Sanjoy Chatterjee**, Eastern Region Chair of NASSCOM as our Guest of Honour.



Dr. Tanushyam Chattopadhyay from Adani AI shared compelling real-world applications of computer vision at Adani Enterprises Limited, while **Nitish Kumar** presented fascinating use cases on **AI-OR** driven advancements in Tata steel. Additionally, the Innovate-X event conducted by senior officials of IBM gave students the opportunity to showcase their ground-breaking innovations, reinforcing the importance of academia-industry collaboration in driving technological advancements.





TRAINING AND PLACEMENT

A broad range of companies employ ISE graduates in a variety of sectors, including core manufacturing, financial services and insurance, consulting services, software services, e-commerce, supply chain management and logistics.



Training and Placement



PH.D. PLACEMENT



INDUSTRIES



BOSCH



BARCLAYS



TATA MOTORS



ACADEMLA



IIT JAMMU



NITIE

National Institute of
Industrial Engineering



॥ त्वं ज्ञानमयो विद्वानमयोऽसि ॥



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OPPORTUNITIES AT ISE

FACULTY OPENINGS

ISE welcomes applications for the following positions:

1. Professor
2. Associate Professor
3. Assistant Professor
4. Professor of Practice

For details about qualifications and application process, visit
<https://erp.iitkgp.ernet.in/FacultyCareer/homeFacultyCareer.jsp>

TEMPORARY PROJECT POSITIONS

The Department offers several temporary positions such as:

1. Post-doctoral Fellow
2. Research Associate
3. Senior Research Fellow
4. Junior Research Fellow
5. Project Assistant

To view the job listings, please visit

<https://www.iitkgp.ac.in/temporary-jobs>

WALKING DOWN THE MEMORY LANE

CONNECT TO HERITAGE

The Founder of the Department

Professor Kailas Chandra Sahu, b.1934, a Distinguished Alumnus and one of the stalwarts of IIT Kharagpur, has left for his heavenly abode on **14th of April, 2023**, leaving behind a treasure of great values and inspirations for both the teaching and student communities, and will remain a role model for all the teachers of future generations of our country.

Professor K C Sahu, the founder head of the Industrial Management Centre, played a pivotal role in the creation of the centre which was first of its kind in the IIT system in 1973. He made significant impact in making the Industrial Management Centre as the most preferred educational destination in the Subcontinent. Under his able leadership, the research activities spurred up and many of his scholars have occupied prominent positions in industry and academia. The publications made by the Industrial Management Centre under the guidance of Professor K C Sahu in reputed scholarly peer-reviewed journals are worth mentioning. Professor K C Sahu transformed the activities of the Industrial Management Centre and brought excellence in all facets of learning, education, training, research, consulting, and institute-industry collaboration.



A BRIEF HISTORICAL SKETCH OF THE DEPARTMENT

The Industrial Management Centre was established in 1973 under the leadership of Prof. K.C. Sahu. Before the centre came into existence, a number of Industrial Management courses were run for training students and industry executives in IIT Kharagpur. Among other eminent faculty members, Prof. Rajendra Mishra initiated the education of Industrial Engineering in India in the mid-50s. Several executive development programs were also conducted, involving hundreds of participants.

Since its inception, the Centre offered the M.Tech. course in Industrial Engineering and Operations Research, and introduced a new M. Tech. course in Industrial Management. Subsequently, the Centre introduced two more M.Tech. programmes, one in Maintenance Engineering and Management, and the other in Systems Engineering and Management. It also offers several compulsory and elective subjects in these areas to the final year students of



almost all the undergraduate engineering courses of the Institute. Alongside teaching, the research activities also flourished at the centre in different disciplines of Industrial Engineering and Management.

In appreciation of the excellent academic progress and achievements of the Centre, the Senate, the Board of Governors, and The IIT Council recommended the upgradation of the Centre to the status of a Department. On this recommendation, the Centre was renamed as the Department of Industrial Engineering and Management (IEM) on 10.11.1983 after necessary amendments in the Statutes of the Institute. The department was renamed as the Department of Industrial and Systems Engineering (ISE), in 2012-13. At present IIT, Kharagpur, is among a few institutes in the country, with a full-fledged Department of Industrial and Systems Engineering. Since its inception in 1973, the Industrial Management Centre and later IEM and ISE has produced more than 170 Ph.Ds till date. The department continues to uphold academic excellence, through teaching, research and industry connections.



Sitting from the left: Prof P K J Mohapatra; Prof N P Rao; Prof K C Sahu; Prof P S Das.

Standing from the left: Prof S S Sahay; Prof R N Banerjee; Prof S Sahu; Prof A Saha; Prof D Acharya



IEM Family: Year 1976





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