

Online Training (Executive Development)
Under
Continuing Education Program of IIT Kharagpur
On
**INTELLIGENT AND PROGNOSTIC MAINTENANCE WITH SMART TECHNOLOGY FOR
MINING MACHINERY**
(Quality Improvement Programme for Excavation, E&M Engineers working in Indian Mining Industry)
(July 06-10, 2021)
Organized by Department of Mining Engineering, IIT Kharagpur

Indian Mining Industry is already adapting next generation technologies for its future mining initiatives. The heavy Earth moving machinery technologies have undergone a major shift during the recent past. Automation and remote controls were introduced few years ago. With the advent of Artificial Intelligence and Machine Learning, the manufacturers of Heavy Earth Moving Machinery and mining Machineries are adapting now the next generation of Information and Communication Technology capabilities. This has resulted in rapidly growing smart technologies in machines. Thus maintenance of the high capacity machines are based on appropriate data acquisition and data analytics leading to automated maintenance management systems. These advances have also opened the door of retrofitting of technology to the existing fleet.

This five days' online course will provide the basic foundations of advanced maintenance system to the engineers responsible for uptime of the machines. The engineers will be apprised of the present level of technology incorporated in the modern machines. Introduction to the basics of advanced Machinery Management System and Maintenance planned in this course will assist the expected transition from the present level of Condition Based Maintenance and Reliability Based Maintenance to Intelligent maintenance. This will enable the practicing engineers to plan and execute productive and perspective maintenance in mechanized mining.

The lower and middle level maintenance engineers of Excavation and E&M cadre will benefit from the course delivered by number of experienced faculty members with expertise in Mining Machinery, Mechatronics, Artificial Intelligence and Machine Learning, Industrial Engineering and Safety Engineering.

Course Content: The course will include the following broad areas:

1. Introduction to Industry 4.0 and Technology Management in Surface Mining

- Scope of Industry 4.0 in Maintenance and Machinery Management
- Assessment of Industry 4.0 and case studies of application of ICT in Technology Management in Mines
- Identification of work force skill requirements for emerging technological trends and transformational technology.

2. Modern Instrumentation in HEMM for Safety and Productivity Enhancement

- Advances in Instrumentation and monitoring of Mining Machinery
- Instrumentation for intelligent mines
- Smart actuators and Smart controllers for monitoring of large movements in underground and open pit mines
- Measuring bearing vibration and temperature, wireless machine monitoring, detecting plant maintenance requirements, condition monitoring systems beyond preventive maintenance: condition monitoring and predictive maintenance.

3. Introduction to Data Science and Data Analytics for Mine Management

- Statistical learning and Data Management for Industrial decision making.
- Maintenance Management for HEMM
- Work Order analysis, required and maintenance spanned analysis, sales and marketing analysis, supplier analysis, general cost analysis, quality and logistics analysis, store and inventory analysis.
- Visualization and alerts for mining operations
- Digital twin in mining industry

Course Outcome: Upon completion of this course participants will be able to

- Identify and assess the recent developments in intelligent and prognostic maintenance that could be useful for their work sites and how to introduce them
- Define the requirements of smart technologies for safety and productivity enhancement in mines
- Prepare a preliminary plan or pragmatic wish list for modernization of operation and maintenance of mining machinery
- Explain how to undertake technology and data driven safety and productivity audit in their mines

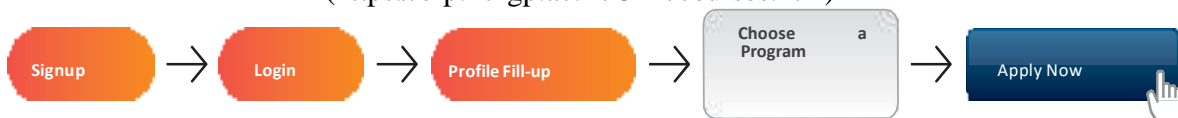
The online course will be conducted during July 06-10, 2021 from 10:00AM to 5:30PM with lunch and tea breaks. Soft copy of the **Course Materials** and **Certificate of Participation** will be available to the registered/nominated participants through a MOODLE platform accessible to the registered participants. The online lectures will be delivered by faculty members of Indian Institute of Technology Kharagpur and by experts with experience from India and abroad. Each session will be followed by interactive Q & A session. The link for participation and password will be emailed to the registered/nominated participants.

Fees and How to Apply:

Fees of the online training is Rs. 15,000.00 (Rupees Fifteen Thousand only) per participant. GST @ 18% is to be paid extra as per GoI rules.

[The fees should be paid by electronic money transfer to “CEP STC IIT Kharagpur” to the account number 95562200002955 of Canara Bank at Branch SRIC IIT Kharagpur (IFSC Code CNRB0019556)].

- ✓ **Please email the Name(s) of the participants, their designation, valid email address and mobile numbers as early as possible.**
- ✓ **Alternatively, application may be made online using the following link**
(<https://erp.iitkgp.ac.in/CEP/courses.htm>)



Payment is to be done **ONLINE** after getting short listed for the program.

(The detailed procedure for applying through IIT Kharagpur online course registration portal is enclosed along with this brochure)

For any other information, or sending nomination please contact:

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Developer and Principal Instructor

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Course Manager

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IIT Kharagpur-721302

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Department of Mining Engineering, IIT Kharagpur

Set up in the year of 1956, this Department has steadily grown as one of the best mining education centre in the country. Besides offering undergraduate, postgraduate, and doctoral courses in Mining Engineering, it is actively involved in short term courses and research activities in the areas of Mining Machinery, Mine Safety and Reliability, Mine Fire and Explosions, Model Studies in Ventilation, Rock Mechanics and Ground Controls, Numerical Analysis of Mine Structures, Underground and Surface Environment, Geometrics and Remote Sensing, Mine Closure Planning and relevant computer applications. Short-term courses, consultancy, sponsored research programmes and postgraduate project works are part of the department's regular activities.

ACCOUNT DETAILS

- Name of the Account: CEP-STC
- Account No.: 95562200002955
- Bank Name: Canara Bank
- Branch: SRIC, IIT Kharagpur branch
- IFSC: CNRB0019556
- Account Type: Savings

Continuing Education Programme (CEP)

Indian Institute of Technology Kharagpur

Procedure for applying through IIT Kharagpur online course registration portal

Use the link: <https://erp.iitkgp.ac.in/CEP/courses.htm>

Steps to be followed:

1. Sign-Up
2. Verify your email-id (link will be sent to your e-mail)
3. Login
4. Edit Profile(Fill up all the mandatory fields, upload photo and signature)
5. Click on 'APPLY NOW' button.
6. Upload your **.pdf** format id-card (if necessary).
7. Payment Gateway activated

*** An e-mail will be communicated from Principal Coordinator/Convenor/Organiser, IIT Kharagpur to the shortlisted applicants stating the payment procedure.

*** This is a one time sign up process for applying through IIT Kharagpur online course registration portal. You can apply for any other programme using the same Login-id and Password.



For any help please call @ the following help-line numbers:(0)-3222-269626

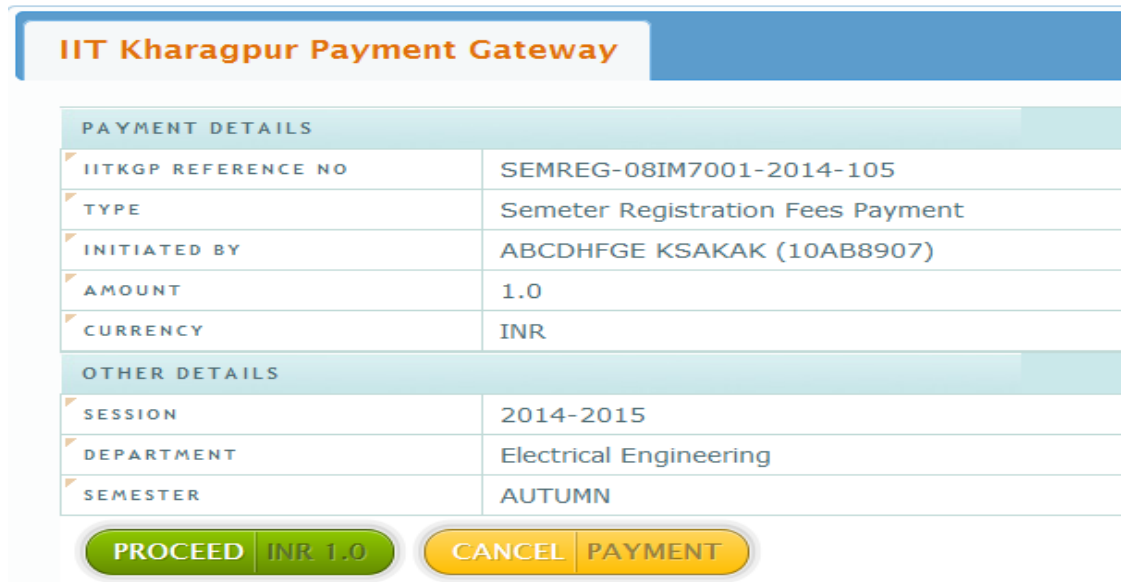
or Email us: cep_erp@iitkgp.ac.in

Payment procedure for CEP Programs (if applicable)

Once short listed for the program the candidate receives an email for making fee payment (if applicable) from ERP System, IIT Kharagpur. He/She is redirected to IIT Kharagpur Payment Gateway page by clicking on the Fee Payment option of the program chosen after login at <https://erp.iitkgp.ac.in/CEP/secure/courses.htm>.

A. Fee Payment

1) Click on the button “**Pay Fees**”. You will be redirected to IIT Kharagpur Payment Gateway page.



The screenshot displays the IIT Kharagpur Payment Gateway interface. At the top, there is a header bar with the text "IIT Kharagpur Payment Gateway". Below this, the page is divided into two main sections: "PAYMENT DETAILS" and "OTHER DETAILS".

PAYMENT DETAILS	
IITKGP REFERENCE NO	SEMREG-08IM7001-2014-105
TYPE	Semeter Registration Fees Payment
INITIATED BY	ABCDHFGE KSAKAK (10AB8907)
AMOUNT	1.0
CURRENCY	INR

OTHER DETAILS	
SESSION	2014-2015
DEPARTMENT	Electrical Engineering
SEMESTER	AUTUMN























At the bottom of the form, there are two buttons: a green "PROCEED" button and a yellow "CANCEL PAYMENT" button. The "PROCEED" button also displays "INR 1.0" next to it.

2) Check the details shown and click on **Proceed**. You will be redirected to State Bank of India MOPS facility (SBIMOPS).

Continuing Education Programme (CEP)
Indian Institute of Technology Kharagpur

State Bank MOPS
Multi Option Payment System

State Bank Collect

NET BANKING	CARD PAYMENTS
 State Bank of India <i>With you - all the way</i> Bank Charges: Nil 	 State Bank ATM-cum-Debit Card Bank Charges: 11.0 
 State Bank of Bikaner and Jaipur <i>The Best with a vision</i> Bank Charges: Nil 	 Other Banks Debit Cards Bank Charges: 11.0 
 State Bank of Hyderabad <i>You Can Always Bank on Us</i> Bank Charges: Nil 	 Credit Cards Bank Charges: 0.02 
 State Bank of Mysore <i>Working for a Better tomorrow</i> Bank Charges: Nil 	OTHER PAYMENT MODES
 State Bank of Patiala <i>With You Everyday Every Day of the Year</i> Bank Charges: Nil 	 SBI BRANCH Bank Charges: 50.0 
 State Bank of Travancore <i>A Long Tradition of Trust</i> Bank Charges: Nil 	 Other Banks Internet Banking Bank Charges: 15.0 

[Click here to abort this transaction and return to the IIT Kharagpur semester fee site.](#)

3) Choose the mode of payment and proceed as per instructions.

4) After successful payment through SBI MOPS click on “**Click here to return to IIT Kharagpur e-Transaction**”. This ensures redirection to the page from where payment has been initiated, and subsequently updating payment status. In some cases successful payment status may not be updated immediately due to some technical reasons. The status would be updated within two hours (from the time of realization of payment in IITKGP account) in such cases. The status of branch payment will be updated within two hours of payment.

If transaction fails due to some technical reason and amount is debited from your account, please do not pay again. Kindly wait for the last transaction to be settled. It can be refunded to you or credited to IITKGP account.