



MACHINERY FAULT DIAGNOSIS AND SIGNAL PROCESSING

PROF. AMIYA RANJAN MOHANTY

Department of Mechanical Engineering
IIT Kharagpur

PRE-REQUISITES : BE/B. Tech in Mechanical Engineering

INTENDED AUDIENCE : Students, Faculty Members, Industry Professionals

INDUSTRIES APPLICABLE TO : PSUs like SAIL, ONGC, BHEL, NALCO, EIL, RINL, BARC, Indian Railways, HAL, DRDO Organizations Private Industries like TATA Group, Jindals, Reliance, Birla Group

COURSE OUTLINE :

The subject of machinery condition monitoring has been recently receiving considerable attention in India owing to concerns related to equipment reliability and safety. This increasing interest is primarily due to the significant impact of economic changes and strong competition in the global market. This course will provide students/engineers/managers with the state of the art techniques in machinery condition monitoring along with the recent developments in the field of signal processing, thermography, ultrasonics apart from the traditional noise and vibration monitoring. There will be demonstration of realtime machinery health monitoring by various condition monitoring aspects.

ABOUT INSTRUCTOR :

Prof. A. R. Mohanty is a Professor and the Shyamal Ghosh and Sunanda Ghosh Chair Professor at the Mechanical Engineering Department of the Indian Institute of Technology Kharagpur with 30 years of experience in areas of noise control and machinery condition monitoring. He holds a PhD degree from the University of Kentucky, USA. He is a recipient of several awards, Fellow of the Indian National Academy of Engineering, Fellow of the Acoustical Society of India, Fellow of the Condition Monitoring Society of India and the International Society of Engineering Asset Management. He has conducted around 100 sponsored research and industrial consultancy projects.

COURSE PLAN :

- Week 1:** Maintenance Principles, FMECA, Fault Prognosis
- Week 2:** Vibration Analysis, Experimental Modal Analysis, Rotor Dynamics
- Week 3:** Time domain Signal analysis, Data Acquisition, Filtering
- Week 4:** Fourier Series, FFT, Modulation and Sidebands
- Week 5:** Order Analysis, Orbits
- Week 6:** Instrumentation, Data Recording
- Week 7:** Vibration and Noise Monitoring
- Week 8:** Rotating Machines, Bearings and Gears
- Week 9:** Fans, Blowers, Pumps, IC Engines
- Week 10:** Motor Current Signature Analysis, Wear Debris and Oil Analysis
- Week 11:** NDT, Ultrasonics, EddyCurrent
- Week 12:** Case Studies, Failure Analysis