



भारतीय प्रौद्योगिकी संस्थान हैदराबाद  
Indian Institute of Technology Hyderabad



Centre for Materials  
for Electronics  
Technology (CMET)

**M.Tech.,  
E-Waste Resources Engineering & Management (EREM)**

# About the Program

With rapid change in technology and more digitalization in the world, there is an explosive growth in electronics industry and subsequently that has led to enormous growth in electronic waste (e- waste). E-waste contains many hazardous and toxic substances which have serious health and environmental effects, if not managed properly. Therefore, it becomes essential to learn about various technological interventions to manage, reduce and recycle e-waste for its safe disposal.

M.Tech., in E-waste Resource Engineering & Management (EREM) is being offered, from academic year 2020, jointly by IIT Hyderabad and C-MET. This M.Tech. program will catalyze the efforts towards E- waste management in the country and worldwide and will provide a necessary support for several of Government initiatives in this direction such as Skill India, Swachh Bharat, Waste-to-Wealth initiatives.

# Chairman's Message

*"As you are well aware, the Greenko School of Sustainability was established in 2022 as a pioneering institution dedicated to fostering excellence in Sustainable Science and Technology education. The school is the first in India to offer specific master's level programs on sustainability. The school offers master's programs in E-waste Resource Engineering and Management, Sustainable Engineering and Energy Science and Technology.*

*It is with great pleasure that I introduce our distinguished graduates, who embody the fusion of theoretical knowledge and practical skills essential for success in today's rapidly evolving professional landscape. At the Greenko School of Sustainability, we are committed to cultivating individuals who demonstrate academic prowess and showcase creativity, innovation, and a steadfast dedication to excellence.*

*Our graduates are uniquely equipped with the adaptability and resilience required to thrive across diverse professional domains. Our meticulously crafted curriculum not only meets rigorous industry standards but also emphasizes holistic development, ensuring our graduates are poised to make meaningful contributions from their first day onward.*

*I encourage you to explore the exceptional capabilities of our graduates and consider them for opportunities within your esteemed organizations. Together, let us forge a future where talent meets opportunity, driving sustainable progress and innovation."*



Dr. Sireesh Saride  
Chairperson GSS  
Department of Civil Engineering  
IIT Hyderabad  
Email: [chair@gss.iith.ac.in](mailto:chair@gss.iith.ac.in)

# Faculty Coordinator's Message



**Dr. Ashok Kamaraj**

Faculty Coordinator

E-Waste Resource Engineering & Management

**Greenko School of Sustainability**

**IIT Hyderabad**

Email: [fic.mtech.arem@iith.ac.in](mailto:fic.mtech.arem@iith.ac.in)

*Recent technological advancements globally have generated enormous amounts of electronic waste. This mandates the development of efficient, economic, social and environmentally sound technologies to meet the sustainable development goals. The Ministry of Environment, Forest and Climate Change of India has introduced E-waste Management Rules in 2011 to regulate the e-waste generation. To meet the human resource demand pertaining to E-waste engineering and management, IIT Hyderabad and CMET Hyderabad have jointly started the M. Tech program “E-Waste Resources Engineering and Management (EWRM)” in 2020, first of its kind in the world. The program is interdisciplinary in nature and major goal of the program is to inculcate students with fundamental to advanced concepts on recycling and recovering values from E-Waste and management through joint teaching from IITH and CMET. The curriculum encapsulates subjects ranging from basics of e-waste management rules, metallurgical principles for metal recycling, life cycle and SWOT analysis, application of machine learning in e-waste management, supply chain optimizations, etc. Students also gain practical experience through visits and project training at CMET. As the program coordinator, I extend my warm welcome to all the recruiters to register for campus placement and consider our students for any potential future positions and also wish the students good luck for all your future endeavors.*

# Message from Director General of CMET

*To empower prospective students to stay abreast of the latest innovations and practices in E-waste Management, IITH, and C-MET, Hyderabad jointly started two years MTech program on E-waste Resource Engineering and Management, the first of its kind in the country. Our creative education strategies and innovative research approaches have spawned a conducive ecosystem for nurturing intellectual alertness among students and forging constructive collaborations with prospective E-waste recycling.*



**Dr. Ratheesh Ravendran**  
Director General, CMET  
Email: [ratheesh@cmet.gov.in](mailto:ratheesh@cmet.gov.in)

# Eligibility Criteria

- **B.Tech. in Metallurgical Engg./Materials Sci & Engg./Chemical Engg./Civil Engg./ Environmental Engg./Electrical Engg./ Mechanical Engg./Engg. Sciences/Engg. Physics/Minerals Engg. and affiliated areas with GATE qualification OR M.Sc. in Physics/Chemistry with NET/GATE qualified**
- **GATE Subjects: CE/CH/CY/EC/EE/IN/ME/ MN/MT/PH/PI/XE-C/XE-F/XE-H/XL-P/ES**
- **NET/GATE qualification is exempted for i) industry-sponsored candidates with a minimum of two years' experience, ii) IITs/IISc Undergraduates with a minimum CGPA of 8.0. and iii) self-sponsored candidates.**

## How to apply and selection criteria?

- **Eligible candidates may register and apply through the COAP portal. Reservations will be made as per the GoI norms.**
- **MHRD scholarship will be available for GATE-qualified selected candidates. MHRD candidates will be selected based on GATE scores.**
- **Sponsored candidates will be selected based on written exams and/or interviews.**

# COURSE CURRICULUM

## SOFT SKILLS



# COURSE BASKET

Introduction to E-Waste Management	Advanced Numerical Methods
Sustainable Chemical Metallurgy	Life Cycle Assessment & Sustainability
Machine Learning for Process Systems Engineering	Molecular Thermodynamics
Instrumentation & Characterization	Design Concepts of Project Capacity to a Viable Scale
E-Waste Recycling Methods	SWOT Analysis & Risk Management
Supply Chain Management & Circular Economy	Global Government Policies on E-waste Mgmt
Trace Metal Analysis	Instrumentation for Efficient Recycling & Automation
E-Waste Laboratory	Electrochemistry
Communication Skills: Advanced	Industry Lecture Series

# Faculty - IITH



**Dr. Ashok Kamaraj**  
Assistant Professor  
MSME



**Prof. Kishalay Mitra**  
Professor  
AI, CE & CC



**Dr. Ambika S**  
Assistant Professor  
Civil Engineering



**Prof. Subrahmanyam Ch**  
Professor  
Chemical Engineering



**Dr. Koyal Baneerjee Ghosh**  
Assistant Professor  
Chemistry



**Dr. Lohithaksha Maniraj Maiyar**  
Assistant Professor  
E&M



**Dr. Ramkaran Patne**  
Assistant Professor  
Chemical Engineering



**Prof. Suhash R Dey**  
Professor  
MSME

# Faculty - CMET



**Dr. Rajesh Kumar**  
CMET  
Scientist

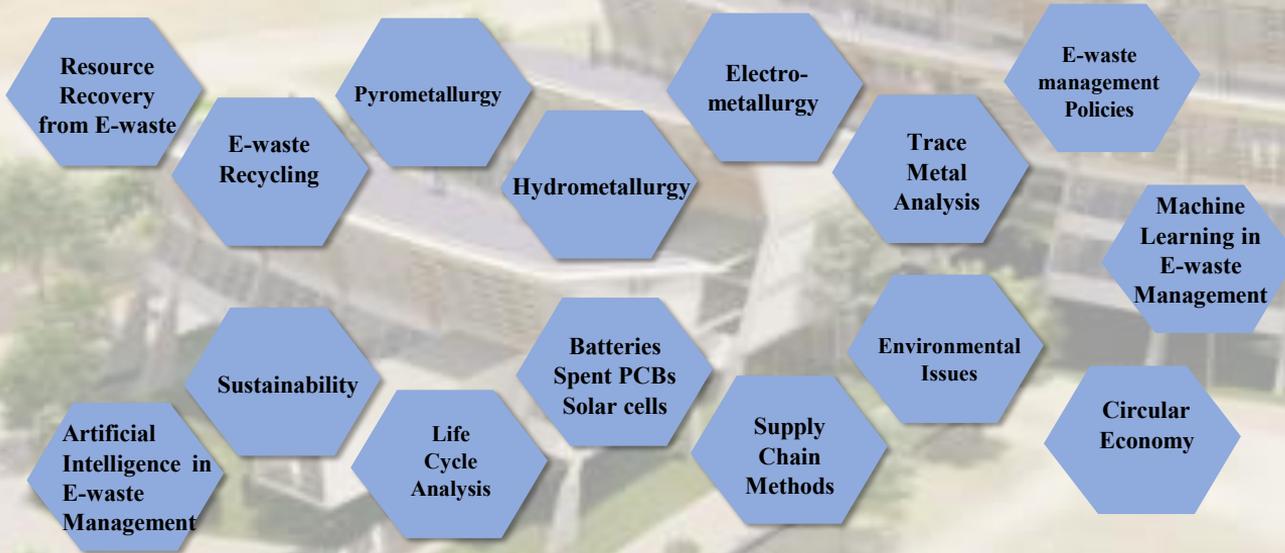


**Dr. U. Rambabu**  
CMET  
Scientist



**Dr. Ajay Kaushal**  
CMET  
Scientist

# Research Areas



**E-Waste Management**

**Resource Recovery**

**LCA, Sustainability,  
Circular economy**

**Supply Chain**

**AI & ML**

**Policies**

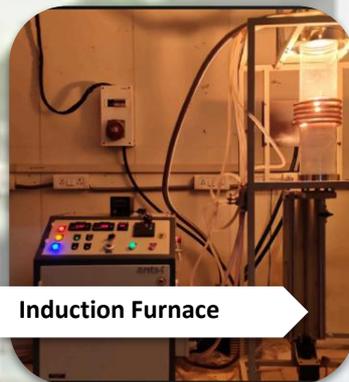
# Laboratories and Research



Energy Dispersive X-Ray Fluorescence



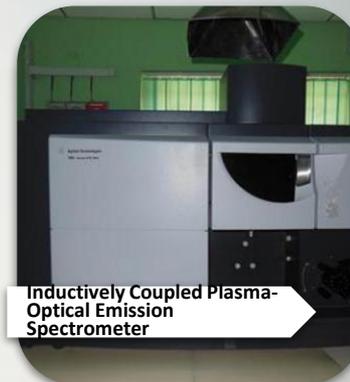
Environmental Lab



Induction Furnace



Gas Chromatography Mass Spectrometer



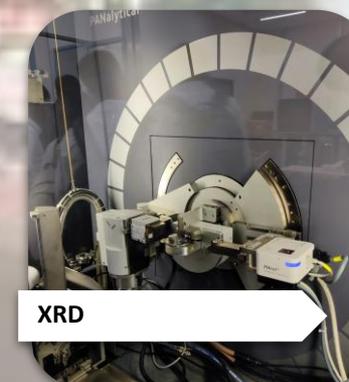
Inductively Coupled Plasma-Optical Emission Spectrometer



Ion-Chromatography



Atomic Absorption Spectrometer



XRD



Ball Mill Machine



UV-Visible Spectrophotometer

# Internships and Project Collaborations

*Students are undertaking their Thesis projects in collaborations with C-MET and undertaking Internship opportunities with Industries in order to keep up with cutting edge research and industry standards*



# Past Recruiters

