

AYAS

NEWSLETTER 2023

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Department of Metallurgical Engineering Centre of Excellence in Steel Technology





Message by the VICE CHANCELLOR

"Department of Metallurgical Engineering" is a fast-growing department under the School of Engineering of OP Jindal University Raigarh. The department provides excellent teaching and research services to the students to mould them into valuable Metallurgist as well as efficient industry professionals. The department is equipped with the most advanced instrumentation facilities and well qualified faculty members catering to the students need to attain the highest standards in academics, research and professional skills. This year the university has secured a position in the Rank/Band of 151-300 in Innovation Achievements (ARIIA) renamed as "NIRF Innovation" and also won the prestigious award as "The Most Promising Corporate-Governed University" at the New Normal Education Summit held in New Delhi. In this session university has introduced new department of Mining Engineering starting with a diploma course. The university is modifing the curriculum in line with the New Education Policy (NEP) and firmly committed to apply for Assessment and Accreditation by NAAC. I believe that the constant efforts of the department will surely create an ambience for nurturing innovation, creativity, and excellence within the students for their successful and rewarding careers.



Dr. R. D. Patidar *Vice-Chancellor*

Message by the HEAD OF THE DEPARTMENT

It gives me immense pleasure to share my views on release of the departmental newsletter AYAS-2023. This newsletter carries the contributions reflecting achievements and aspirations of the students and faculty members of the department. The department offers Diploma, B.Tech, M.Tech and Ph.D programme equipped with highly sophisticated instrumental facilities for teaching and research. The curriculum covers in-depth knowledge of various advanced metallurgical fields with industry links which helps the students to enhance their theoretical concepts to industrial applications. The students of the department are the shining stars to the various Metallurgy based Iron and Steel Industries such as Jindal Steel & Power, JSW Steel Limited, MSP Steel & Power Limited, Sunflag Iron & Steel Limited, EWAC Alloys Limited and many more. The department is continuously focusing in empowering the students with sound knowledge, experience, and training to compete globally in iron & steel industrial market.



Dr. S. DasProfessor and Head

Courses Offered Diploma Metallurgical Engineering

B.Tech Metallurgical and Materials Engineering M.Tech Material Science and Technology Ph.D Metallurgical and Materials Engineering

Major Equipment	
Muffle Furnace 1800°C	Micum Drum
Electronic Tensometer	Vibratory Cup Mill
Induction Melting Machine	Tubular Furnace 1400°C
Hydraulic Mounting Machine	Pin on Disk Wear Tester
Double Disc Polishing Machine	Jominey Hardenability Tester
X-Ray Diffractometer-SmartLab	Pellet Mill Unit (450 mm Dia)
Brinell Hardness Testing Machine	Industrial Furnace (Grooved Type)
Scanning Electron Microscope-EVO18	Mega 3D Printer (500 X 500 X 500 mm)
Digital Rockwell Hardness Testing Machine	Potentiostat & Galvanostat (Model 302 N series)
Portable Electrolytic Polishing and Etching unit	High Precision Cutting Machine-Isomet 1000
Digital Vickers Micro Hardness Testing Machine	Tumbler Drum Test Apparatus (500 X 1000 mm)
High Resolution Upright Metallurgical Microscope with Image Analyser	Single Drum Magnetic Separator (500 X 500 mm)

Publications

- Nandalal Acharjee, Subhas Kumar Ganguly, Bidyapati Sarangi & Ashok K. Srivastava, A review of various ceramic pigment preparation and characterization methodologies for applications, Journal of Australian Ceramic Society, 59 (2023) 303-323.
- **Deepak Patel, Prasenjit Biswas,** Archana Mallik, Sanjeev Das, *Synthesis of Al-Sn Alloys by Direct Chill Casting under the effect of Mechanical stirring: An Experimental and Simulation Optimization Study,* International Journal of Materials Research (2023) https://doi.org/10.1515/ijmr-2022-0049.
- Prasenjit Biswas, Deepak Patel, Amrik Kundu, Shashank Poddar, Arjun Kundu, Archana Mallik, Sanjeev Das, *Production and characterization of Al-Cu Binary Alloy produced by using Novel Continuous Casting Process*, International Journal of Material Research' (2023) https://doi.org/10.1515/ijmr-2022-0029.



- Neeraj Kumar Verma, Mukesh Kumar, Vinay Kumar, Ashutosh Sharma *Microstructural heterogeneity and anisotropy control of additive manufactured Ti-6Al-4V alloy for aircraft components* 'JOM 75 (2023) 1695 1709.
- Prasenjit Biswas, Deepak Patel, Archana Mallik, Sanjeev Das, Concept development, design, and validation of a novel continuous casting equipment" 'World Journal of Engineering' (2023).
- Rupesh Kumar Verma, **Prasenjit Biswas**, Manoj Chopkar, Simulation and Experimental Investigation of Centrifugal-Cast Functionally Graded Aluminum-B4C composite, Materials and Manufacturing Processes (2023) https://doi.org/10.1080/10426914.2023.2176879.
- Anand Kumbhare, **Prasenjit Biswas**, Anil Bisen, Chandan Chaudhary *Investigation of Effect of the Rheological Parameters on the Flow Behavior of ADC12 Al Alloy in Rheo-Pressure Die-casting*, International Journal of Metal casting (2023).
- M. K Phani, *Additive manufacturing: Environmental impact, and future perspective,* Book Title: Practical Implementations of Additive Manufacturing Technologies, Springer Nature 2023.
- Rupesh Kumar Verma, **Deepak Patel**, Manoj Kumar Chopkar, *Wear behavior investigation of Al-B4C functionally graded composite through Taguchi's design of experiment*, Journal of Engineering Research (2023) 100095.
- Arjun Kundu, **Prasenjit Biswas, Deepak Patel,** Archana Mallik, Sanjeev Das, *Effect of Electromagnetic Flow Direction on Grain Refinement of Al 2024 Alloy,* JOM 75, 2799-2817 (2023)
- Prabhat Gautam, Anurag Gautam, Neeraj Kumar, Impact of cyano and fluorine group functionalization on the optoelectronic and photovoltaic properties of donor-acceptor-π-acceptor benzothiadiazole derived small molecules: A DFT and TD-DFT study, Korean Journal of Materials Research 33 (6) (2023).
- Akeshwar Singh Yadav, Nitin Kumar, Gaurav Mahendru, **Guru Prakash**, S. K Nath, *Erosive Wear of Low Temperature Nitrided 13/4 MSS for Hydro-turbine Application*, Conference Proceeding: Springer nature Singapore.
- Neeraj Kumar, Ashutosh Sharma, M. K. Manoj, Byungmin Ahn, *Taguchi optimization of tribological properties and corrosion behavior of self-lubricating Al-Mg-Si/MoS2 composite processed by powder metallurgy*, Journal of Materials Research and Technology, 26 (2023) 1118-1197.

Research Projects

- Dr. S. Das (HOD) Development of hot rolled high strength steel sheet for load body and chassis applications (Ongoing).
- **Dr. M. K. Phani** (Associate Professor) & **Dr. S. Das** (HOD) Controlled In Line heat treatment of rail steels Rail Research Centre, Delhi & RUBM, JSP, Raigarh (Ongoing).

- **Dr. Sibnath Kayal** (Associate Professor) Development of a prototype device for oxygen separation from air, a strategic technological solution to control the food spoilage- International Cooperation Bilateral scheme (DST- India and MSTR Sri Lanka) (Ongoing).
- **Dr. S. Das** (HOD) & **Dr. T. Talapaneni** (Sr. Assistant Professor) Preparation of a high temperature non-sticky refractory-based coating material with a low wear rate for use in a rotary kiln to avoid accretion formation and to improve its refractory lining life- DRI, JSP, Raigarh (Ongoing).
- Dr. Sibnath Kayal (Associate Professor) Cancer Therapy by Stimuli-Responsive Metal-Organic Framework (MOF) Based Drug Delivery Systems to Africa India Mobility Fund - DBT/Wellcome Trust India Alliance - (Ongoing).
- **Dr. Nidhi Khobragade** (Assistant Professor) & **Dr. Vatsala Chaturvedi** (Sr. Assistant Professor) Development of niobium carbide reinforced copper composites through powder metallurgy route (Seed Money Project- OPJU Ongoing).

Visitors in the Department

■ Mr. Sabyasachi Bandopadhya, ED JSP Raigarh visited department of Metallurgical Engineering on February 6, 2023. Mr. Bandopadhya visited Centre of Excellence in Steel Technology (Scanning Electron Microscope and X-Ray Diffractometer) and prototype of head hardened rail and interacted with HOD of the department and other faculty members.



- Shri Taran Prakash Sinha, IAS Collector Raigarh visited department of Metallurgical Engineering on March 15, 2023.
- **Dr. Sanjeev Das,** Associate Professor in the department of Metallurgical and Materials Engineering, National Institute of Technology Raipur visited department of Metallurgical Engineering on April 2, 2023.
- Dr. Sanjeev Rana, Nalwa Steel Limited, Raigarh visited department of Metallurgical Engineering on April 2, 2023.
- Hon'ble **Shri Naveen Jindal**, the Chairman of Jindal Steel and Power Group of Companies, visited OPJU campus and inaugurated the Scanning Electron Microscope and X-Ray Diffractometer under the Centre of Excellence in Steel Technology (COEST) on April 25, 2023.







Mr. A. K Jha, the Former Chairman of Coal India Ltd. and Advisor, JPL visited the Centre of Excellence in Steel Technology (Scanning Electron Microscope and X-Ray Diffractometer) and prototype of head hardened rail and other departmental laboratories on May 8, 2023.



Events: Technical Talks

The Technical Talks were organised by Department of Metallurgical Engineering in association with ASM International Eastern India Raigarh Chapter and Society of Metallurgical Engineering.

Dr. Arghya Majumder delivered a talk on "Green Steel Making: Possible Solution to Pollution". He is working as Director, School of Mines & Metallurgy, Kazi Nazrul University, Asansol. Dr. Majumder has given insights on green steel production and the challenges encountered by the steel industries.



Professor in the Department of Applied Mechanics, MNNIT Allahabad, delivered a talk on "Influence of Water Parameters On Corrosion Behaviour of High-Carbon Pearlitic Rail Steel". He discussed the corrosion behaviour of rail steel in wet environment and compared it with behaviour of rail steels already in commercial application.



Events: Webinar

One-day webinar on *Recent Advances in Iron and Steel* was organized by the department in association with *ASM International, Eastern India Raigarh Chapter & Society of Metallurgical Engineers* on May 12, 2023. Dr. R. D. Patidar, Vice Chancellor, OPJU was the Chief Patron; Dr. S. Das, Steel Chair Professor & HOD was the Chairman-cum-Convener (Metallurgical Engg. Dept.) and Dr. Guru Prakash (Associate Professor) was the co-convener. The eminent speakers were experts in their fields from IIT Kanpur, R & D TATA Steel limited, Jamshedpur, Coal & Coke Chemical Department, Visakhapatnam Steel Plant and DMRL Hyderabad.



Events: Parents Summit

The *Parents Summit 2023* was organised in the Department of Metallurgical Engineering at OPJU Campus. The head of the department and other faculty members interacted with the parents. The core objective of the meeting was to evaluate the academic and non-academic performances of the students.



Events: Society of Metallurgical Engineering (SME) Meeting

The department has organized a general body meeting of *Society of Metallurgical Engineering* (*SME*). The meeting was attended by the faculties and the students of Metallurgical Engineering. The General Body appointed the following as the office bearer of the society: (i) Chairman: Dr. S. Das (ii) Secretary: Prof. Nandlal Acharjee (iii) Jt. Secretary: Dr. Nidhi Khobragade, (iv)Treasurer: Dr. Deepak Patel and Mr. Vedaj Patel (6th sem) (v) Executive Members: Faculties: Prof. Neeraj Verma, Dr. Vatsala Chaturvedi Students: Mr. Sachin Sharma (6th Sem), Mr. Ujjawal Kesharwani (6th Sem) and Mr. Abhishek Yadav (4th Sem) and Mr. Vishal Singh (4th Sem).







Events: Visit to Sohar University, Sultanate of Oman

OP Jindal University, India and Sohar University, Oman signed a MoU for academic and research & development activities, student and faculty exchange programme, establishment of centre of excellence in steel technology and other educational collaborations. Dr. R. D. Patidar (Vice Chancellor) and Dr. Satyabrata Das (HOD, Metallurgy) visited Sohar University and interacted with the faculties and discussed on the possible areas of interaction.



Visit to Sohar University









Events: Pre-placement Training

Dr. Satyabrata Das (HOD), **Dr. M. Kalyan Phani** (Associate Professor), **Dr. Guru Prakash** (Associate Professor) and **Dr. Trinath Talapaneni** (Sr. Assistant Professor) conducted pre-placement training to the B.Tech 8th sem students. The pre-placement training helped the students to enhance their domain concepts and to excel in their placement drive.







Events: Value Added Course

■ The Department conducted Value Added Course on *Design Thinking* in the field of Metallurgy and Material Science from April 17 – 21, 2023 for B.Tech IV semester students. In this course, in this course Dr. B.P. Panda, Professor in School of Management discussed about importance of Design Thinking for Metallurgy and Material Science. He emphasised on the empathy, its need, ideation through brainstorming and prototype an object or concept as a sample solution.



Events: Social Activities

The students of the department conducted social outreach activities under *National Service Scheme*, OPJU Raigrah at Tumidih, Samaruma and Amlidih villages. The students took part in various activities such as My Village, Clean Village under Swachha Bharat campaign; Awareness session at Primary School and at Blind School (Netraheen Bal Vidya Mandir) on importance of education and current awareness; Women's health and hygiene; Door to Door Voter Awareness sessions and Energy Conservation.





Placements

- We glad to announce that our B.Tech (2019-2023) students got placed in *JSP*, *Raigarh* the leading steel manufacturer in India. Its product includes hot-rolled coils, sheets and plates. The company operates plants in various parts in India and also in abroad.
- We delighted to announce that our B.Tech (2019-2023) students got placed in *JSW STEEL LIMITED*. JSW Steel is one of the leading steel manufacturers in India. Its product includes hot-rolled coils, sheets and plates, cold-rolled coils and sheets. The company operates manufacturing plants in Karnataka, Tamilnadu and Maharashtra, in India and its subsidiaries operates in the US, Mauritius, Panama, the Netherlands, the UK and Italy.









We glad to announce that our B.Tech (2019-2023) students got placed in *Jindal Saw Gulf, Abu Dhabi* leading integrated plant in Middle-East parts. The company produces welded and seamless ductile iron and stainless steel pipes and tubes, pipe coatings, bends and connector castings.

■ We delighted to announce that our B.Tech students (2019-2023) got placed in *SUNFLAG IRON & STEEL LIMITED*. The plant is located in the central part of India, Maharashtra. It has a capacity to produce 500,000 tonnes per annum of high-quality special steel using liquid pig iron and sponge iron as basic inputs. The company produces a variety of steel grades such as Carbon Steels, Alloy Steels and Bearing Steels.





We glad to announce that our B.Tech (2019-2023) students got placed in *EWAC ALLOYS LIMITED*. EWAC Alloys Limited, started as a joint venture of Larsen & Toubro Limited, India & Eutectic Castolin Group, Switzerland. The company manufactures and sells cutting-edge welding products, kits, and accessories. The company offers gas consumables and welding electrodes.

We gald to announce that our B.Tech (2019-2023) student got placed in APTAGRIM. Aptagrim is a data science company which specializes in blend of machine learning, statistical analysis, data visualization optimization and data engineering techniques.





We pleased to announce that our B.Tech (2019-2023) students got placed in *FLIPKART*. Flipkart Private Limited is an Indian e-commerce company. The company offers more than 80 million products spread across more than 80 categories.

We glad to announce that our B.Tech (2019-2023) students got placed in *Inmovidu Technologies Private Limited*. Inmovidu is involved in computer related activities such as maintenance of websites of other firms or creation of multimedia presentations for other firms etc.





We glad to announce that our B.Tech (2019-2023) student got placed in *KSB Limited*. KSB is one of the leading pumps and valves manufacturer in India. KSB specializes in Centrifugal End Suction Pumps, High Pressure Multistage Pumps, Industrial Gate, Globe, Check Valves, Submersible Motor Pumps, Monobloc & Mini Monobloc Pumps.

■ We delighted to announce that our B.Tech student (2019-2023) got placed in *BEKAERT*. It is a global company with headquarters in Belgium. Its primary business is steel wire transformation and coatings. Bekaert applies its expertise beyond steel to create new solutions with innovative materials.





We glad to announce that our B.Tech (2019-2023) student got placed in *BMM ISPAT LIMITED*. BMM Ispat is a steel plant with capacity of 2200 thousand tonnes per annum (TTPA) basic oxygen furnace (BOF), direct reduced iron (DRI) and electric arc furnace (EAF) steel plant operating in Danapura, Karnataka, India. The company offers pellets, sponge iron, TMT, round bars, billets, blooms, and alloy steel products.

We delighted to announce that our B.Tech (2019-2023) students got placed in *COLLEGETOUR*. Collegetour is an online forum which provides education industry related data centres to the students and information and updates pertaining to the educational institutions across India and globe. It also delivers the latest updates and current events of the education industry.











We pleased to announce that our B.Tech (2019-2023) students got placed in *AMALGAM STEEL & POWER LIMITED*. It is an integrated steel plant based on Sponge Iron Technology. Amalgam Steel is a leading steel manufacturer of Iron Ore Pellet, Billet, Sponge Iron, and Structural Rolled Products.

We glad to announce that our B.Tech (2019-2023) students got placed in *METALMAN AUTO PRIVATE LIMITED*. It is an integrated steel plant based on Sponge Iron Technology. It is a leading steel manufacturer of Iron Ore Pellet, Billet, Sponge Iron, and Structural Rolled Products.







We glad to announce that our B.Tech (2019-2023) students got placed in *MSP STEEL*. MSP Steel is one of the integrated steel company with a capacity of 352 thousand tonnes per annum (TTPA) direct reduced iron (DRI) and electric arc furnace (EAF) units. The company produces sponge irons, mild steel billets, construction bars, industrial oxygen, and ferro alloy.

We glad to announce that our Diploma (2023) students got placed in *JSW MONNET*. Monnet is a primary steel producer with a world class integrated steel plant at Raigarh that has a production capacity of 1.5 MTPA. It produces HR plates, steel ingots and billets, ferro alloys, rebars and structure profiles to cater to the rapidly growing infrastructure & construction industry.











We glad to announce that our Diploma (2023) student got placed in *STAR WIRE LIMITED*. Star Wire (India) Limited is one of the leading Mini Steel Plant engaged in the manufacturing of Alloy Steels, Stainless Steel and Special Steels for diversified engineering application in shape of castings, forging and rolled products.



■ We glad to announce that our Diploma (2023) student got placed in *SCHENCK PROCESS*. Schenck Process is the global technology and market which provides sustainable products, integrated solutions and services in applied measuring and process technology.





We glad to announce that our Diploma (2023) student got placed in *TPI COMPOSITES*. It is US-based manufacturer of wind turbine blades and other large-scale composite structures for the transportation and military vehicle markets. TPI operates composite products manufacturing facilities in North America, Europe and Asia.

Knowledge Imparted

Dr. M. Kalyan Phani, Associate Professor in the department of Metallurgical Engineering delivered a lecture as a resource person in the Value-Added Course on *Innovation and Entrepreneurship Management* organized by the School of Science in association with Institution's Innovation Council during April 12 to 26, 2023. He also delivered a guest lecture on the topic "Innovations and Intellectual Property Rights" on 21 April, 2023, at GH Raisoni University, Saikheda (MP).





Dr. Prasenjit Biswas (Assistant Professor), **Dr. Deepakar Panda** (Assistant Professor), **Dr. Deepak Patel** (Assistant Professor) and **Mr. Vikas Mahato** (Scientific Officer) imparted knowledge on X-Ray Diffractometer (XRD) and Scanning Electron Microscope (SEM) to the B.Tech students of Metallurgical Engineering department from NIT Raipur.

■ Dr. Satyabrata Das (HOD), Dr. M. Kalyan Phani (Associate Professor), Dr. Guru Prakash (Associate Professor), Prof. Neeraj Verma (Sr. Assistant Professor), Dr. Nidhi Khobragade (Assistant Professor), Dr. Deepankar Panda (Assistant Professor) and Dr. Prasenjit Biswas (Assistant Professor) delivered lectures to PGDC Students-Graduate Engineers at Jindal Power Limited Tamnar, CG.

Achievements

Dr. M. Kalyan Phani (Associate Professor) and **Mr. Sidharth Kumar Mishra** (M.Tech student) received Best Paper Presentation Award on the topic *An overview of rail defects: causes and remedies* Conference Proceedings. Dr. Phani also received Best Innovation Award for the research work on *Microstructural and Mechanical Characterization of Brass and Bronze Alloys* in the Stream of Mechanical Engg. in the International Conference on Emerging Research in Science, Engineering and Management, held during 19 & 20 May, 2023, at SRIT, Proddatur, Andhra Pradesh.

- Dr. Satyabrata Das (HOD), Dr. M. Kalyan Phani (Associate Professor) invited as Jury members in the Innovation week with theme Energy Efficiency held during August 1-5, 2023 by JSP Raigarh. we jury members have evaluated 128 innovation ideas presented by various departments of the JSP, Raigarh during the Innovation week.
- Dr. M. Kalyan Phani, Associate Professor presented an Invited talk on *Green steel:* Race towards achieving net Zero in the award function of the Innovation Week at JSP, Raigarh held on August 07, 2023.
- **Dr. M. Kalyan Phani** (Associate Professor) and **Mr. Sidharth Kumar Mishra** (M.Tech student) received Best Paper Presentation Award on the topic *An overview of in-service defects in rail: causes and remedies* Conference Proceedings in International Conference on Sustainable Innovation in Technology, Science, Commerce & Samp; Management 2023 held during February 16-17, 2023, at G H Raisoni University, Saikheda, M.P.
- **Prof. Nandalal Acharjee**, Sr. Assistant Professor, invited for two half day sessions Guest lectures for the students of M.Des (Lifestyle Accessory Design) of National Institute of Design, Gandhinagar on the Technical Topic: *Materials Methods Techniques*.
- M.Tech student Mr. Sambit Tripathy selected for Ph.D Program in Indian Institute of Technology (IIT) Ropar in the Department of Metallurgical and Materials Engineering.
- Dr. M. Kalyan Phani (Associate Professor) invited and appointed as Editorial Board member of American Journal of Mechanical and Materials Engineering.
- M.Tech 4th sem student **Mr. Siddarth Mishra** won First Prize in E-Poster presentation in Recent Advances in Material Science and Technology in BTT 2023 organized by IIM Jamshedpur Chapter in association with AcSIR, TATA Steel and NML Jamshedpur.











B.Tech 8th sem student Mr. Rishav Mahato achieve position in top 100 achievers of UNO MINDS 3.0 Virtual Competition organized by *UNO MINDA GROUP*.





- M.Tech student **Mr. Subrat Kumar Bindhani** successfully qualified the Graduate Aptitude Test in Engineering (GATE 2023) in Metallurgical Engineering. He scored all india rank of 387.
- B.Tech 8th sem student **Mr. Saharsh Pandey** selected for M.Tech Program in *Indian Institute of Technology* (IIT) Jodhpur.



 B.Tech 7th sem student Ms. Shraddha K selected for Paid Long Term Internship of Rs. 22,500/per month in TEKOR MINERALS PRIVATE LIMITED.

New Joining in the Department

■ Dr. Guru Prakash (Associate Professor)

Dr. Guru Prakash earned his M.Tech and Ph.D degree in Metallurgical and Materials Engineering from Indian Institute of Technology, Roorkee. He did his B.E in Metallurgical and Materials Engineering from National Institute of Technology Jamshedpur. He did his Post Graduate Diploma in Steel Technology (PGDST) in Metallurgical and Materials Engineering from IIT, Kharagpur. He worked as a Assistant Professor in Punjab Engineering College Chandigarh, MANIT Bhopal and Maharishi Markandeshwar University Ambala. He also has a 10 years of industrial experience at TATA Steel, Jamshedpur.



Department Glimpse







Coordinator: Dr. Nidhi Khobragade (Assistant Professor)

Department of Metallurgical Engineering

Design: Mr. Arjun Gupta (Graphic Designer)

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Marketing and Outreach Department