

# NEWSLETTER

## METALLURGY DEPARTMENT

(NBA ACCREDITED 2023-25)

**January 2023 to June 2023**



# METALLURGY

# राष्ट्रीय प्रत्यायन बोर्ड

चौथा तल, ईस्ट टावर, एन. बी. सी. प्लेस, भीष्म पितामह मार्ग, प्रगति विहार, लोधी रोड, नई दिल्ली -110003  
**NATIONAL BOARD OF ACCREDITATION**  
4th Floor, East Tower, NBCC Place, Bhisham Pitamah Marg, Pragati Vihar, Lodhi Road, New Delhi 110003



F.No- 20-78-2013-NBA

Date: 27-04-2022

To  
The Principal  
Government Engineering College,  
Gandhinagar Nr. G.E.B. Cross Road,  
Sector - 28, Gandhinagar –Gujarat- 382028

**Subject: Accreditation status of program applied by Government Engineering College, Gandhinagar Nr. G.E.B. Cross Road, Sector - 28, Gandhinagar –Gujarat- 382028.**

Sir,

This has reference to your application I.D. No. 5695-15/06/2021 seeking accreditation by National Board of Accreditation to UG Engineering program offered by **Government Engineering College, Gandhinagar Nr. G.E.B. Cross Road, Sector - 28, Gandhinagar –Gujarat- 382028.**

2. An Expert Team conducted onsite evaluation of the program from **18<sup>th</sup> to 20<sup>th</sup> February, 2022**. The report submitted by the Expert Team was considered by the concerned Committees constituted for the purpose in NBA. The Competent Authority in NBA has approved the following accreditation status to the program as given in the table below:

Sl. No.	Name of the Program(s) (UG)	Basis of Evaluation	Accreditation Status	Period of validity	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
1.	Metallurgy	Tier II June 2015 Document	Accredited	Academic Years 2022-2023 to 2024-2025 i.e. up to 30-06-2025	Accreditation status granted is valid for the period indicated in Col.5 or till the program has the approval of the Competent Authority, whichever is earlier

3. It may be noted that only students who graduate during the validity period of accreditation, will be deemed to have graduated with an NBA accredited degree.

4. The program has been granted accreditation for 3 years. **Government Engineering College, Gandhinagar Nr. G.E.B. Cross Road, Sector - 28, Gandhinagar –Gujarat- 382028** should submit the Compliance Report at least six months before the expiry of validity of accreditation mentioned above so as to be eligible for consideration by the concerned Committee in NBA for further processing of the accreditation status.

5. The accreditation status awarded to the program as indicated in the above table does not imply that the accreditation has been granted to **Government Engineering College, Gandhinagar Nr. G.E.B. Cross Road, Sector - 28, Gandhinagar –Gujarat- 382028** as a whole. **As such the Institution should nowhere along with its name including on its letter head etc. write that it is accredited by NBA because it is program accreditation and not Institution accreditation. If such an instance comes to NBA's notice, this will be viewed seriously.** Complete name of the program(s) accredited, level of program(s) and the period of validity of accreditation, as well as the Academic Year from which the accreditation is effective should be mentioned unambiguously whenever and wherever it is required to indicate the status of accreditation by NBA.

6. The accreditation status of the above program is subject to change on periodic review, if needed by the NBA. It is desired that the relevant information in respect of accredited program as indicated in the table in paragraph 2, appears on the website and information bulletin of the Institute.

Tel: +91 11 2436 0620-22, 2436 0654; Telefax: +91 11 4308 4903  
Website: <http://www.nbaind.org> | Email: [membersecretary@nbaind.org](mailto:membersecretary@nbaind.org)

Contd./\_

-2-

7. The accreditation status awarded to the program as indicated in table in paragraph 2 above is subject to maintenance of the current standards during the period of accreditation. If there are any changes in the status (major changes of faculty strength, organizational structure etc.), the same are required to be communicated to the NBA, with an appropriate explanatory note.

8. A copy each of the Report of Chairman of the Visiting Team and Evaluators' Report in respect of the above program is enclosed.

9. If the Institute is not satisfied with the decision of NBA, it may appeal within thirty days of receipt of this communication giving reasons for the same and by paying the requisite fee.

Yours faithfully,

(Dr. Anil Kumar Nassa)  
Member Secretary

Encls.: 1. Copy of Report of Chairman of the Visiting Team.  
2. Copy of Expert Report of the Visiting Team.



## **ABOUT THE INSTITUTE**

Established in 2004, Government Engineering College, Gandhinagar (GEC-Gn) takes pride in its highly motivated students. Our students are life-long assets that help this institute to continuously evolve and work towards its Vision. Approved by AICTE. The College is administrated by Directorate of Technical Education, Gujarat State, Gandhinagar. GEC Gn is affiliated to Gujarat Technological University. GEC-Gn offers its students a wide range of courses like Biomedical, Computer, Electronics & Communication, Instrumentation & Control, Information Technology and Metallurgy.

## **VISION OF THE INSTITUTE**

To be a premier engineering institution, imparting quality education for innovative solutions relevant to society and environment.

## **MISSION OF THE INSTITUTE**

- To develop human potential to its fullest extent so that intellectual and innovative engineers can emerge in a wide range of professions.
- To advance knowledge and educate students in engineering and other areas of scholarship that will best serve the nation and the world in future.
- To produce quality engineers, entrepreneurs and leaders to meet the present and future needs of society as well as environment.

# **METALLURGY**

## **ABOUT THE DEPARTMENT**

The Metallurgy Department since its inception in 2008 is a backbone of GEC-Gandhinagar's events, research activities and initiatives. It is a unique initiative of Government of Gujarat in the present science and technology education and research scenario of India. At present, the department offers a four year undergraduate course in engineering. Faculty members are good blend of industrial/ academic research experienced, studied from national and state reputed institutes. Department has developed COQ (Centre for Quality) NDT which established under "Vibrant Gujarat-2019"- Financial MOU in collaboration with Gulfnde along with various well equipped metallurgical laboratories.

Currently, the focus of department activities are multi-directional with an emphasis on both research and education. Our collaborations with FCIPT, CFER, INDUS University, PDEU, IIM-Baroda Chapter, IIF- Ahmedabad Chapter, ASM International - Gujarat Chapter, IE-Gujarat Section, etc. Students are encouraged and supported to actively participate in various curricular and non-curricular activities at different level.

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## VISION OF THE DEPARTMENT

Developing excellence in Metallurgy Engineering education through research, development innovation and team work for the benefit of society and environment.

## MISSION OF THE DEPARTMENT

- To prepare competent metallurgy engineers who can apply metallurgical fundamentals to control and manage different metallurgical and materials processing operations to produce quality metals products in industries.
- To deliver information about current trends in the field of metallurgy and materials to the students.
- To encourage students to work on innovative projects related to metallurgy engineering for managing defects free, economical, energy efficient products, processes or devices to best serve the nation to fulfil the socio-economic, techno-commercial and environmental needs.

## LIST OF FACULTY MEMBERS WITH QUALIFICATION

Sr. No.	Name of Faculty	Qualification	Designation
1	Dr. I. B. Dave	Ph.D (Met. & Mat. Engg.)	Professor & Head
2	Prof. S. I. Patel	ME (Met. & Mat. Engg.)	Assistant Professor
3	Dr. D. G. Sharma	Ph.D (Metallurgy)	Assistant Professor
4	Dr. H. H. Jadav	ME (Met. & Mat. Engg.)	Assistant Professor
5	Dr. P. K. Nanavati	Ph.D (Met. & Mat. Engg.)	Assistant Professor
6	Prof. D. V. Mahant	ME (Met. & Mat. Engg.)	Assistant Professor
7	Prof. B. R. Rana	ME (Met. & Mat. Engg.)	Assistant Professor
8	Prof. H. H. Thakar	ME (Met. & Mat. Engg.)	Assistant Professor
9	Prof. R. C. Ghanghas	ME (Met. & Mat. Engg.)	Assistant Professor
10	Dr. M. S. Dani	Ph.D (Metallurgy)	Assistant Professor

## ACHIEVEMENTS OF THE FACULTIES



Dr. I B Dave completed NPTEL-AICTE approved 4 week MOOC course on “Cathodic Protection Engineering” with 62 % Elite Certification.

Delivered an expert lecture on “Effect of Alloying Elements on Aluminum Alloy - A356.2” at Steel Strips Wheels Ltd. Mehsana on 4 February 2023.

Dr. I B Dave published a research paper. (Details are given in research activities)



Prof. S I Patel completed NPTEL-AICTE approved 12 week MOOC course on “Welding Metallurgy” with 85 % Silver Elite Certification.

**Topper** of NPTEL-AICTE approved 4 week MOOC course on “Cathodic Protection Engineering” with 94% Gold Elite Certification.



Dr. D G Sharma was recognised for Celebrating AZADI KA AMRUT MAHOTSAV at G-20, Y-20 and coordinated Sports Fest-2023 in GEC Gandhinagar, 27 - 29 March 2023.

Reviewed 4 papers for different international peer review journals from Springer, MDPI, SAGE Journals etc in March -May 2023.

Jointly Presented a paper in International conference (Details are given in research activities)



Dr. H H Jadav reviewed 3 papers for the MDPI journals; “Material”, “Processes” in 2023.

Completed one week STTP on “Ultrasonic Testing Level II” at NITTTR EC Ahmedabad during 16-20 January 2023 .

Completed NPTEL-AICTE approved 4 week MOOC course on “Cathodic Protection Engineering” with 79 % Silver Elite Certification.



Dr. P K Nanavati Conducted two technical sessions - “Destructive Testing of the Welded Joints” & “ Welding Metallurgy & Weldability of Steels” on 23th Jan '23 in Welding Inspector Course (WIC)-2023, during 22-26 Jan '23 ,organized by Indian Institute of Welding (IIW) , Baroda branch

Delivered four technical sessions on 2-days ( 26-27 May '23) Training Program on WPS-PQR-WPQs per ASME BPVC SEC IX , Organized by Evolve, TCR Advanced Engineering Pvt. Ltd Baroda.

Successfully coordinated 40 hrs ( Life Skill & employability Skills) KCG-Finishing School Training to pre final year students of all departments (including Metallurgy Dept) during 23rd March to 6th April 2023.

## ACHIEVEMENTS OF THE FACULTIES



Prof. D V Mahant published a research paper in journal and presented a paper in international conference. (Details are given in research activities)

Completed NPTEL-AICTE approved a 4 week MOOC course on “Cathodic Protection Engineering” with 84 % Silver Elite Certification.



Prof. B. R. Rana successfully completed the NPTEL-AICTE approved a 12 week MOOC course on on Surface Engineering for Corrosion and Wear Resistance Applications with 56%.



**Topper** of NPTEL-AICTE approved a 8 week MOOC course on “Fundamental of welding science & Technology” with 79 % Silver Elite certification.

Prof. H. H. Thakar received special appreciation from advisor KCG for highly esteemed contribution in planning implementation and organizing mega placement camps in all districts of Gujarat.

Successfully coordinated One Week Webinar Series on Metallurgy and Materials Science 2023 during May 22-26, 2023



Dr. M S Dani published a research paper. (Details are given in research activities)



**Topper** of NPTEL-AICTE approved an online 8 weeks MOOC course on “Material Science and Engineering” with 77 % Silver Elite certification.

Prof. R C Ghanghas successfully completed an online 8-week NPTEL MOOC course on “Communication Skills Modes and Knowledge Dissemination” organized by NITTTR Chandigarh.

Successfully coordinated One Week Webinar Series on Metallurgy and Materials Science 2023 during May 22-26, 2023



## PEDAGOGY SESSION

Sr. No	Name of Speaker	Department	Topic Delivered	Date
1	Dr. D. G. Sharma	Metallurgy	Metals in Ancient India	07/01/2023
2	Prof. B. R. Rana	Metallurgy	Government purchase through GeM portal	21/01/2023
3	Dr. H. H. Jadav	Metallurgy	Introduction to Ultrasonic Testing	06/02/2023
4	Dr. I. B. Dave	Metallurgy	Curriculum & Credit framework NEP implementation	10/03/2023

## GLIMPSES OF EXPERT LECTURE (OFFLINE)

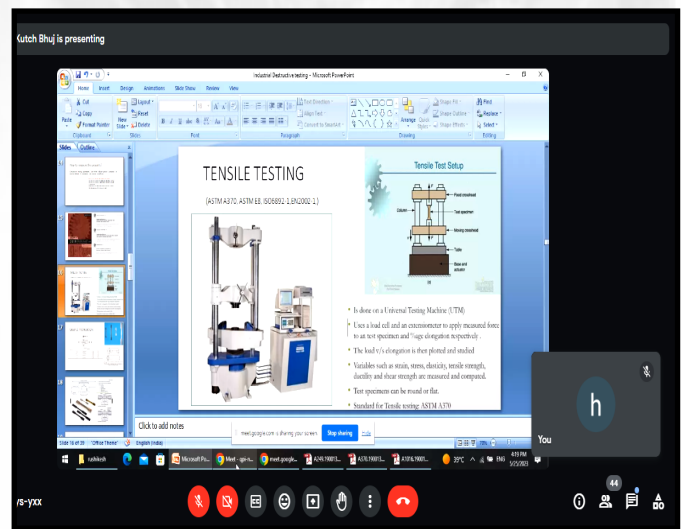
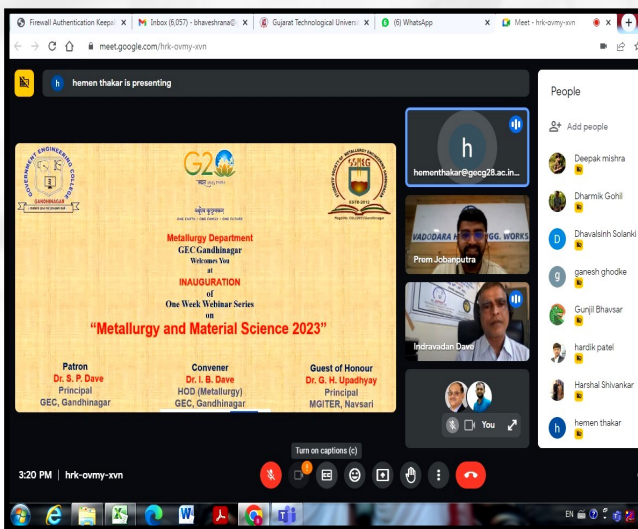
Sr. No	Date/Time	Speaker	Topic	Venue	Coordinator
1	31-1-2023 11:00 - 12:30	Prof. Pierpaolo Carlone (Italy)	Pultrusion of composites	Metallurgy Dept. GEC Gandhinagar	Dr. P K Nanavati & Prof. B. R. Rana
2	22-2-2023 11:30 - 12:30	Mr. Krishnkant B. Patel (USA)	Optimization of Processing Equipment's/ Machines in Powder Metallurgy plants by Mechanical and Metallurgy Engineer	Metallurgy Dept. GEC Gandhinagar	Prof. B R Rana, Prof S I Patel
3	19-4-2023 3:15—5:15	Prof. Harshal M. Tuvkar	Mohr's Circle Representation	Metallurgy Dept. GEC Gandhinagar	Prof. S. I. Patel & Prof. R. C. Ghanghas
4	20-4-2023	Prof. Amit Arora	Research facilities in IIT Gandhinagar and Scope for Metallurgy students	IIT Gandhinagar	Prof. D G Sharma & Prof. D V Mahant
5	20-4-2023	Ms. Prachi Sharma	Introduction to Modelling	IIT Gandhinagar	Prof. D G Sharma & Prof. D V Mahant

# GLIMPSES OF “WEBINAR SERIES”

As per the planning done in body meeting of SSMEG on 18/12/2021, under the guidance of Dr. S. P. Dave, (Principal, GEC Gandhinagar), Metallurgy department, GEC Gandhinagar has organized one week online webinar series on “**Metallurgy & Material Science 2023**” in association with alumni association Students Society of Metallurgy Engineers Gandhinagar during 22/05/2023 to 26/05/2023, 3:00 Pm onwards.

This webinar was organized by Prof. H. H. Thakar and Prof. R C Ghanghas. Motive of this event was to give exposure to students and make them familiarize with various advancement and research in metallurgy by giving online expert lectures.

The webinar series was inaugurated on 22/05/2023 3:00 PM by Dr. I. B. Dave, HOD Metallurgy Dept. and Dr. G. H. Upadhyay, Principal, MGITER. Navsari. More than 60 participants like current students and alumni were remain present. Online practical session and expert lectures were given on various topics of metallurgy during this event. Uniqueness of the event was the expert speakers, being alumni of the department and currently work-



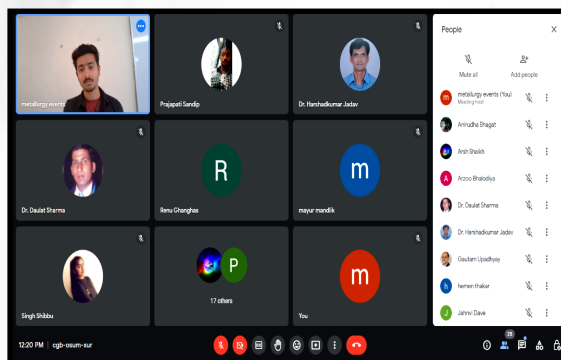
Sr. No.	Date	Expert Details	Topic
1	22/05/2023	<b>Mr. Premsharan Jobanputra</b> Executive Engineer, Larson and Toubro, Vadodara	<b>A day in the life of Welding Engineer</b>
2	23/05/2023	<b>Ms. Riddhi Shukla</b> Ph.D Scholar, Tal –Tech Tallinn University of Estonia, Europe	<b>Microstructural aspects of Manufacturing Technology</b>
3	24/05/2023	<b>Dr. Mrunalkumar Chaudhary</b> Asst.Prof. Mech. Engg.,LD College of Engineering Ahmedabad	<b>Phase Transformation in Solids</b>
4	25/05/2023	<b>Mr. Rushikesh Raval</b> Lab Incharge, Venus pipes & Tubes Ltd.	<b>Industrial Destructive Testing</b>
5	26/05/2023	<b>Mr. Mehul Hadiya</b> Lecturer, Metallurgy dept. Govt. Polytechnic	<b>Industrial Aluminum Extraction Process</b>

## GLIMPSES OF “ALUMNI MEET 2023”

The Department of Metallurgy Engineering have organized an expert talk by Alumni in this meeting for all current batches and pass out students on 18th March 2023 on the Google Meet Platform starting at 10 am as well as an offline expert talk was conducted. The meeting started with welcome introduction by Metallurgy Department alumni coordinator Prof. Renu Ghanghas followed by series of two expert sessions by Alumni of the department. The event was enjoyable and simultaneously profitable in terms of providing career as well as technical guidance to the current enrolled students.

Alumni Experts and faculty members have shared the memories, Faculty members from Metallurgy Engineering have participated in this event.

Sr. No.	Time	Expert Details	Topic
1	10:30 to 12:00 pm	Mr. Keyur Panchal (2012-Batch passout) Engineer - Product Support Metso Outotec India Pvt	“Work Methodology of Quality Department in Foundry and the importance of safety in Industry”
2	12:00 to 01:30 pm	Mr. Uddhav Bhatt (2020-Batch passout) Welding Engineer(PGET) L&T Heavy Engineering, Surat	“Welding Metallurgy of Carbon steel and Low alloy steel weld and advanced methods to control grain size”





## “STUDENT ACTIVITIES”

A three day event was organised for all the students of the college by metallurgy department students for a series of recreational activities other than studies. The event was programmed wholly and solely by the students, for the students and from the students coordinator from each department. The event started for a three day where finals were played at the end date and about 7 games at college levels were played. A total of 500+ students of college coordinated and played games in unison with smooth chances. Thanks to initiative taken by 6th semester students.



Date :- 15-03-2023

Venue :- Mahatma Mandir, Gandhinagar

Drug free India was an event where 13 students from sem 6th were sent to address the responsibilities of a good citizen by quitting drugs. It was hold under the banner of Save Soil mission of Sadhguru's art of living, GTU.



Date :- 23/03/2023

Venue :- sector 26, oppo. Kisan Nagar garden., Gandhinagar.

Tug of war represented our department and college at event organised by RSS unit of Gandhinagar. Prof. S. I. Patel was present from the faculty members at the venue location and t2 teams were from metallurgy





## “STUDENT ACTIVITIES”

Date :- 24/02/2023

Venue :- G20 Meeting, Gandhinagar

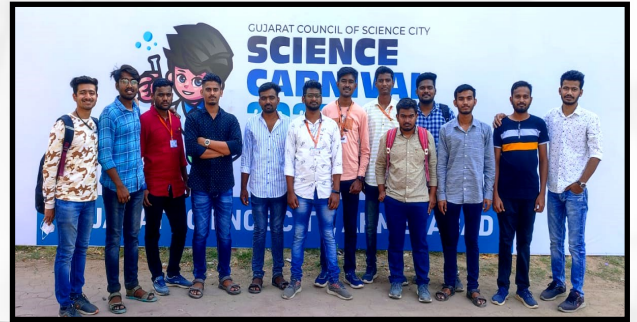
National Young Leaders program for celebrating G20 were metallurgy students went on an interactive session regarding the development of Gujarat as well as the whole and a part for the betterment of the country and which was coordinated by Prof. R. C. Ghanghas, teaching faculty at Metallurgy Department among with 15 interested students from metallurgy along with other departments of college



.Date :- 28/02/2023

Venue :- Science city, Gandhinagar

More than 3 department students participated on a two-day event at science and got opportunity to attend the last day of event based on the National Science Day celebration recognised all over India.



Date :- 28/03/2023

Venue :-LD college of Engineering, Ahmedabad

This event was organised by I hub and was based upon Students start-up innovation programme and like Shark Tank pitching was done based on the various products whilst the session ended by Q&A. It was attended by 2 students of semester 1st with Prof. H. H. Thakar.



Date :- 29/04/2023

Venue :- LD College of Engineering, Ahmedabad

This event was organised by I hub and was based upon Students start-up innovation programme and like Shark Tank pitching was done based on the various products whilst the session ended by Q&A. It was attended by 3 students of semester 3rd with Prof. H. H. Thakar.



## “STUDENT ACHIEVEMENTS”



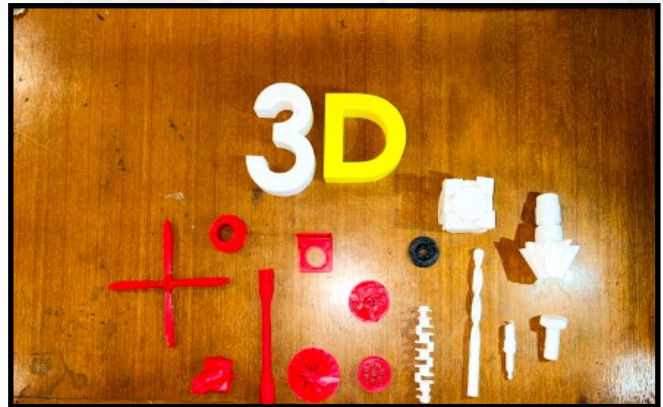
It is the proud moment for Metallurgy department that student from 8th semester; Shivam Korde (190130121010) have cleared GATE-2023 examination with AIR 594 in Metallurgy.



# TECHNICAL/ INDUSTRIAL VISIT

## Additive Manufacturing: 3D Printing of Polymer

The SSMEG along with the IIIW-PDEU organized such an informative session on the topic of Additive manufacturing:3D printing of polymer dated on 09 March 2023 - 11 March 2023 and providing the two expert professors respective to their field Dr. Vishvesh Badheka and Prof. Jaynam Patel. Also, professor Dr. P. K. Nanavati guided us in these 3-day tenure. The total number of 15 students of semester 6 were pleased to attend this 3-day workshop at PDEU. The technical session covers broadly two topics: -Additive manufacturing/3D printing of Metals/polymer resin by Jaynam Patel. Additive manufacturing with welding process by Dr. Vishvesh Bhadheka. In this 3-days students studied about how to additive manufacturing is helpful/useful, advantages and disadvantages, and how welding will help us especially Friction stir Welding. In these training students not only get technical knowledge but also, they got the hands-on training. And on final day students made their individual 3D printing models.



## 2. IFTARC Training

Students of GEC, Gandhinagar are rejoiced to have hands-on training on foundry practices which is one the most crucial subjects considered in material manufacturing processes. The 2 days training programme was contained of sand-casting process and hands-on the foundry equipment. A total number of 24 students were in this training program which is divide in groups for various activity such as sand preparation, sand testing, mould making and melting and casting. This event took place between - 12 April 2023 - 13 April 2023. At end of this 2-day training/workshop students were expected to learn more about how casting is done, what are the uses of sand casting and how we prepare sand mould and from that how casting is created and students of GEC, Gandhinagar didn't disappoint the faculties member over at Indus University.





# TECHNICAL/ INDUSTRIAL VISIT

## Academic Visit to IIT Gandhinagar.

Students of GEC, Gandhinagar were obliged to have a one-day visit/tour on 20-04-2023 of the most well-known institute of India {IIT, Gandhinagar}. IIT Gandhinagar, located in Gandhinagar, Gujarat, is one of India's premier technical institutes. Known for its academic excellence, cutting-edge research, and state-of-the-art infrastructure, IIT Gandhinagar attracts students from across the country. Here the students of semester 4 & semester 6 took the privileged of visiting this institute. Approx 50 student attended this visit. This visit was carried out under the mentorship of Mr. Vivek Kumar Singh (one of the PHD student and PMRF). Students went on for the tour of the labs. After that we had a very interactive session with one of the Associate Professor Dr. Amit Arora. We talked about the new venture coming into the research and also talked about the different policies for the students who want to do their Masters and Pre-PhD in the field of Material Science. After that we have our Hi-Tea break and to close off the tour we had a very skilled session on the topic of “Modeling automation” given by one of the other PhD students namely Ms Prachi Sharma. This topic consists of how you can make a prototype of your work before actually making it and not just that it also shows how you can identify the errors in it. And as we were leaving the premise, we get a tour of the sports facilities which were there in the IIT Gandhinagar. So, to sum it up we the students of GEC Gandhinagar enjoyed our one-day tour at IIT Gandhinagar. This industrial visit was coordinated by Dr. D G Sharma an Prof. D V Mahant.



# TECHNICAL/ INDUSTRIAL VISIT

## Keepsake COE Welding Training.

Students of GEC, Gandhinagar are rejoiced to have hands-on training on welding which is one the most crucial subjects considered in material joining processes. The whole 10 days training programme starting from 02-05-2023 to 11-05-2023 was engulfed around workshop and classroom sessions where daily 1-2 hrs of classroom session of experts in that fields whilst rest of the remaining hrs for project work and hands-on the welding machines. The activities were planned on the basis of equal hours of theory and practical knowledge that's where the perfect coalescence meets as of welding definition. A total of 19 students were in this training program. Inauguration by Dignitaries Introduction- Keepsake and Safety protocols of Center. Setting the context Think like an Engineer & Study of Corrosion with breakfast was one the aim as to kick start the first day. Pre-training assessment in the training hall and from 11:30 to 12 pm was the time where we were taught methods of measurement. Pre-training assessment Measurement Practical (Plate). Theory on spark test as well as hands-on it was demonstrated and applied into practice. Introduction to gas cutting & grinding and especially safety and hands on that equipment using was main aim of the people who were present over there. Types of Welding - SMAW, MIG & TIG process, power source & equipment and one of the major attraction at keepsake is the stimulation software practice on Welding Simulator. Types of Welding Position & Joints. Electrode & filler material and Welding Practice on Actual Power Source as well we were given the opportunity to interact with many industrial traits at the same time. Welding metallurgy. Pre-heating & Post heating during welding and Welding Practice on Actual Power Source and was given lecture on awareness in welding areas. Types of Welding Defects, Causes & Remedy and Welding Practice on Actual Power Source and also that was the day where we started doing project to make fabricated tables and chairs. EHS (Environment, Health and safety) at industry level as of our project. DT, NDT & X-ray film review and the hands-on practice of those tests and one of the major advantages for Metallurgy students. Automation in Welding and also principles of how welding can be done by automated welding robots. Presentation tropics based on what we have learnt from welding including soft skills and we were made to present that on stage. Post-training assessment & Review in the training hall Feedback on training and the prize distribution ceremony was conducted under the hands of GEC, Gandhinagar Principal, Dr. Sweta Dave and gave an important lifelong and learning lesson whilst handing over training certificate.





# TECHNICAL/ INDUSTRIAL VISIT

## Industrial Visit to (MTC Business, Laxcon Steels, Electrotherm (India))

Department of Metallurgy Engineering, Government Engineering College Gandhinagar arranged a one-day industrial visit for the 6th semester degree. students to "MTC Business Pvt. Ltd., Sanand, Gujarat, dated May 16th, 2023, in order to improve technical knowledge enhancement of students. A visit is important, especially for those in the field of engineering because engineering practice inevitably and irrevocably affects society. These activities, which can range from a basic manufacturing system curriculum for students to more advanced ones, can be effective tools for fostering a healthy industrial climate. The overall goal of all these visits is to force the pupils to change with the pace of technological advancement. After the visit, students can evaluate their own performance and efficiency, which is crucial for their profession, increasing their productivity and self-assurance. From this visit, we got the information and practical knowledge about Recycling and manufacturing. Students got the knowledge about testing of different samples used in production of billets. They got the idea how electric transformers are made and it's Working. About 15 students of 6th Semester Metallurgy Engineering of government Engineering College, sector 28, Gandhinagar, Gujarat benefited from this visit as they got chance to discussion with In-charge officer and other engineers working at industry. Students were eagerly to say organizing this type of industrial visit for practical exposure which is shows the success of this visit. The industrial visit provided us with an invaluable opportunity to learn about the latest technology and production processes used in the industry. It helped us to understand the various challenges faced by the industry and the solutions they have adopted to overcome them. We also got the chance to observe the production line and its various components in action. This experience will surely help us to make better decisions in our future career. The industrial visit was a great experience for the engineering college students. It gave them a chance to explore the industrial world and to gain first-hand knowledge about the different processes and technologies used in industry. This industrial visit was coordinated by Dr. D G Sharma.





## RESEARCH ACTIVITIES

Research Paper counter (Jan 2019 onwards)	Previously published	Addition	Total
	45	4	49

Sr. No.	Title of the Paper	Authors	Conference/ Journal
1	<b>Investigation of microstructure and Mechanical properties of ZrO<sub>2</sub>, TiO<sub>2</sub> and ZrTiO<sub>4</sub> Added Cast Al7075 Alloy</b>	<b>Devang V Mahant Vandana J Rao</b>	<b>Indian Foundry Journal : Volume 69:issue 2 :FEB 2023</b>
2	<b>Development of Al-Mg Alloy for the protection of Steel Structure in 3.5% NaCl</b>	<b>Vidhi A Mistry* Dr. Minal S Dani Dr. Indravadan B Dave Vandana J Rao</b>	<b>Jurnal Kejuruteraan: Vol. 35(5): September : 2023</b>
3	<b>Novel Blending Methodology To Produce Nano-Reinforced Feedstock Powders For Thermal Spraying</b>	<b>Ajaykumar Solanki, Hetal R. Chauhan, Sahil Variya, Daulatkumar G. Sharma Sekar Saladi</b>	<b>International Conference on Powder Metallurgy and Particulate Materials + Exhibition 2023 (PM-23)</b>
4	<b>Intermediate Phase Analysis of Cast Al7075 after the Addition of High-Temperature Oxides</b>	<b>Devang V Mahant Vandana J Rao</b>	<b>International conference (ICATCHCOME 2023) at KPR institute Coimbatore</b>

## PLACEMENTS

Sr. No.	En. No.	Name of Student	Name of Industry/ Institute	Annual Package
1	190130121012	MADHU KUMARI	JSW STEEL LTD.	650000
2	200130121508	NIRAJ ITANKAR	SARLOHA ADVANCE PVT. LTD.	400000
3	200130121516	RAHATE VAIBHAV CHANDRASHEKHAR	SARLOHA ADVANCE PVT. LTD.	400000
4	200130121522	ANTURKAR SANDEEP SHANKAR	SARLOHA ADVANCE PVT. LTD.	400000
5	190130121001	DIYA CHURAKKATE	WELSPUN DAHEJ	300000
6	190130121007	PRIYANKA JANI	WELSPUN DAHEJ	300000
7	190130121021	PATEL NIDHI KAMLESHBHA	WELSPUN DAHEJ	300000
8	190130121032	KUSHAGRA SINGH	WELSPUN CORP LTD.	300000
9	190130121033	SHRUTI SRIVASTAVA	WELSPUN CORP LTD.	300000
10	200130121506	KOTHIWALA TRUSHAR R	WELSPUN CORP LTD.	300000
11	200130121511	GOND ABHISHEK DHARMENDRA	WELSPUN CORP LTD.	300000
12	200130121514	PAWAR VEDANT MANISHKUMAR	GODREJ BOYCE	300000
13	200130121518	PRATIK NAMDEORAO THAWARE	WELSPUN CORP LTD.	300000
14	200130121523	KORADIYA RUCHITKUMAR GOPALBHA	WELSPUN CORP LTD.	300000
15	200130121515	JAIMIN ATULKUMAR RAJYAGURU	SHREE KRISHNA ENGINEERS	287832
16	200130121520	MRUNAL BHUPENDRA BRAHMANE	ALLIEMA	210000
17	190130121023	PATHAN ALTAMAS	STEEL STRIP WHEELS LTD.	200000
18	190130121036	TRAPASIYA KEVALKUMAR BHARATBHA	STEEL STRIP WHEELS LTD.	200000
19	200130121513	NEWRA SAURABH RAJKUMAR	STEEL STRIP WHEELS LTD.	200000
20	190130121031	SIDDHARTH SANJAY SHAH	THE M S UNIVERSITY OF BARODA	ME WELDING TECHNOLOGY
21	200130121509	BARAD NISARGSINH NARENDRASINH	THE M S UNIVERSITY OF BARODA	ME WELDING TECHNOLOGY
22	200130121512	PARMAR PARTH PRAMODBHA	THE M S UNIVERSITY OF BARODA	ME WELDING TECHNOLOGY
23	190130121002	ANIKET NIKUNJ DAVE	MET-HEAT ENGINEERS PVT LTD	ENTREPRENEUR
24	190130121015	MUNSHI MOHAMMED AASIM	FIXOCHEM INDUSTRIES	ENTREPRENEUR



## TRAINING/INTERNSHIP (12 WEEKS)

During January–May 2023, all the students of 8th semester Metallurgy, have undergone 12 weeks internship program in reputed industries as listed below as a part of GTU curriculum.

Sr. No.	En. No.	Name of Student	Name of Industry/Institute
1	170130121017	KANJARIYA KEYUR	ASTRON CAST INDUSTRIES
2	180130121007	MEET CHAUHAN	ASTRON CAST IND.
3	180130121014	KATHIRIYA DHRUVAL DINESHBHAI	ASTRON CAST IRON PVT LTD
4	190130121001	CHURAKKATE DIYA	WELSPUN CORP, ANJAR
5	190130121002	DAVE ANIKET	MET-HEAT ENGINEERS PVT LTD.
6	190130121003	DESAI SHIVANSHI	L&T SPECIAL STEELS AND HEAVY FORGINGS
7	190130121007	JANI PRIYANKA	RAMDOOT TECHNOCAST PVT. LTD.
8	190130121008	KHETANI PRAMAY	ASTRON CAST IRON PVT LTD
9	190130121009	KHUNT JAYMIL	INVESTMENT CASTING
10	190130121010	KORDE SHIVAM	RAMA CYLINDERS PVT LTD
11	190130121011	KUMAR RAJ	ONGC PETRO ADDITION (OPAL)
12	190130121012	MADHU KUMARI	WELSPUN CORP LTD
13	190130121014	MEGHANI ANKUSH	GUJARAT FOUNDRY P. V. T.
14	190130121015	MUNSHI MOHAMMEDAASIM	S S METAL Ltd.
15	190130121017	PANDEY ANURAG SHIVAKANT	GUJARAT FOUNDRIES
16	190130121018	PATANI JAIMIN	JAYHIND FOUNDRY
17	190130121019	PATEL KEVIN	AMIDEEP ALLOYS INDIA
18	190130121020	PATEL LOVE	MET-HEAT ENGINEERS PVT LTD, VADODARA, GUJARAT
19	190130121021	PATEL NIDHI	L & T HAZIRA SURAT
20	190130121022	PATEL NISARG	ECHJAY INDUSTRIES PRIVATE LIMITED, RAJKOT
21	190130121023	PATHAN ALTAMAS	L&T ENERGY HYDROCARBON
22	190130121024	PATHAN MOHAMMAD IRFAN	S S METAL Ltd.
23	190130121025	PITHWA VIRAJ	RAMDOOT TECHNOCAST PVT LTD
24	190130121027	RITUL SHARMA	BARC MUMBAI
25	190130121031	SIDDHARTH SANJAY SHAH	HARSHA ENGINEERS INTERNATIONAL LIMITED, CHANGODAR
26	190130121032	SINGH KUSHAGRA	WELSPUN METALLICS



## TRAINING/INTERNSHIP (12 WEEKS)

Sr. No.	En. No.	Name of Student	Name of Industry/Institute
27	190130121033	SRIVASTAVA SHRUTI	WELSPUN CORP.
28	190130121036	KEVAL TRAPASIYA	STEEL STRIPS WHEEL LIMITED
29	190133121004	DAVE KEVAL	METRO METALIKS LTD.
30	200130121501	THAKER BHARGAV	JAY JALARAM EXTRUSIONS
31	200130121503	PATEL BHAVYANSHUKUMAR	INOXCAV INDIA LTD.
32	200130121504	PATEL ABHISHEK JASHUBHAI	MET-HEAT ENGINEERS PVT.LTD
33	200130121505	SALI SHUCHIVRAT MILIND	UNNATI STEEL FABRICATION
34	200130121506	KOTHIWALA TRUSHAR RAJESHBHAI	WELSPUN CORP LTD.
35	200130121507	WARULKAR SAURABH	JSW STEEL COATED PRODUCT LTD KALMESHWAR
36	200130121508	NIRAJ ITANKAR	SAARLOHA ADVANCED MATERIALS PVT LTD
37	200130121509	BARAD NISARGSINH	AMCON CASTINGS PVT. LTD
38	200130121511	GOND ABHISHEK	WELSPUN DUCTILE IRON PIPES LIMITED
39	200130121512	PARMAR PARTH	L&T HEAVY ENGINEERING
40	200130121513	NEWRA SAURABH	STEEL STRIPS WHEEL LTD
41	200130121514	PAWAR VEDANT	Q-TECH TESTING SERVICES
42	200130121515	RAJYAGURU JAIMIN	L&T HAZIRA, SURAT
43	200130121516	VAIBHAV RAHATE	SAARLOHA ADVANCE MATERIAL PVT.LTD. PUNE MAHARASHTRA
44	200130121517	KALE TANMAY	JSW STEEL COATED PRODUCTS LTD KALMESHWAR
45	200130121518	PRATIK NAMDEORAO THAWARE	WELSPUN CORP LTD
46	200130121520	BRAHMANE MRUNAL	ALLEIMA INDIA PVT LTD
47	200130121521	JAY BHANDERI	PLUMBTECH INDIA PVT. LTD
48	200130121522	SANDEEP SHANKAR ANTURKAR	SAARLOHA ADVANCED MATERIALS PVT. LTD. (ERSTWHILE KALYANI CARPENTER SPECIAL STEELS PVT. LTD.)
49	200130121523	KORADIYA RUCHITKUMAR	WELSPUN CORP LIMITED

## TRAINING/ACTIVITY ATTENDED BY FACULTY

Sr. No.	Name of the Faculty	Title of Training/Activity	Duration	Organizer
1	Dr. I B Dave	Successfully completing the course Catholic Protection Engineering with a consolidated score of 62%	Feb – Mar 2023 (4 Week course)	NPTEL
		A one-day National Seminar on “Shiksha, A Chatam Avam Shiksha-A Chatam” organized by the Gujarati Rajya Mahavidyalaya Education Authority, an ideological framework linking “Education and A Chatam”. We are delighted to award this certificate for making our program a success.	2 Jan 2023	Gujarat Rajya Mahavidyalaya Shaikshik Sangh National Symposium
		For devoting precious time to organize and conduct Grand Finale of Azadi ka Amrit Mahotsav Hackathon-2022.	10 and 11 February, 2023	L. D. College of Engineering, Ahmedabad
		Appreciation letter for expert talk on “Effect of Alloying Elements on Aluminum Alloy – A356.2” for Dr. I B Dave.	4 Feb 2023	SSWL
2	Prof. S I Patel	Successfully completing the course Welding Metallurgy with a consolidated score of 85%	Jan – Apr 2023 (12 Week course)	NPTEL
3	Dr. D G Sharma	Successfully completing the course Catholic Protection Engineering with a consolidated score of 94%	Feb – Mar 2023 (4 Week course)	NPTEL
		Reviewed 4 papers for the following MDPI journals in 2023: Materials, Processes	Mar-May 2023	MDPI
4	Dr. H H Jadav	Successfully completing the course Catholic Protection Engineering with a consolidated score of 79%	Feb – Mar 2023 (4 Week course)	NPTEL
		Reviewed 3 papers for the following MDPI journals in 2023: Materials, Processes	Mar-May 2023	MDPI
		Completed one week STTP on Ultrasonic Testing Level II at NITTTR EC	16-20 January 2023	NITTTR

Sr. No.	Name of the Faculty	Title of Training/Activity	Duration	Organizer
5	Prof. D V Mahant	Successfully completing the course Cathodic Protection Engineering with a consolidated score of 84%	Feb – Mar 2023 (4 Week course)	NPTEL
		Appreciation letter for expert talk on “Aluminum Alloy – A356.2 Micro-structure” for Prof. D V Mahant.	4 Feb 2023	SSWL
6	Prof. B R Rana	Successfully completing the course Surface Engineering for Corrosion and Wear Resistance Application with a consolidated score of 56%	Jan – Apr 2023 (12 Week course)	NPTEL
7	Prof. H H Thakar	Successfully completing the course Fundamentals of Welding Science and Technology with a consolidated score of 79%	Jan – Mar 2023 (8 Week course)	NPTEL
		Appreciation certificate for his highly esteemed contribution in planning, implementation and organizing Mega Placement Camps in all Districts of Gujarat organized by Placement Cell.	Jan—March. 2023	Placement Cell, Department of Education, Government of Gujarat
8	Prof. R C GHANGHAS	Successfully completing the course Materials Science and Engineering with a consolidated score of 77%	Jan-Mar 2023 (8 week course)	NPTEL
		STTP on Study Webs of Active-Learning for Young Aspiring Minds “Communication Skills Modes & Knowledge Dissemination”	Mar 2023	(SWAYAM) July2022



# METALLURGY AWARENESS

Date: 09/06/2022

Venue :- Surat

A healthy discussion was carried out for improving the scenario of admissions in diploma and degree Metallurgy engineering with alumni of metallurgy department GEC Gandhinagar residing at surat by Dr. I B Dave. (Picture on left) and on the same day evening, interacted with few more diploma students currently working at AM/NS hazira at dinner along with their families (Picture on right).



Date :- 08/12/2022

Venue :- Bright School, Vadodara

Chirayu Pande of semester 6th gave an presentation last year based on the awareness of Metallurgy Dept; He gave presentation to the 12 standard students from his alumnus school in Vadodara. More than 60+ were present at the moment at Shri J. R. Shah Auditorium.



Date:02/02/2023

Venue :- Tip Top convent school Nagpur

As of the recent activities done to create awareness among students regarding metallurgy of 10th class a presentation was given by Nihar Huprikar in his hometown whilst sharing his journey from diploma to degree job opportunities in the world as of engineers and how one can pursue post graduation in Metallurgy and Materials department. He was felicitated by school's principal Dr. Ketki Siras.





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## SSIP SELECTED PROJECTS

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A total of 3 teams were selected for SSIP from department to give presentation on their topics to be selected. Total 2 teams were selected from department by Principal of Navsari Government Engineering college-Dr. G. H. Upadhaya and the Event Incharge was Dr. P K Nanavati, of Metallurgy Department.

Selected SSIP projects are :-

- 1) Development of Cu-Zn-Al shape memory alloy
- 2) Light Transmitting Concrete



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## INTERNATIONAL YOGA DAY

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International Yoga Day which is celebrated all over the world on 21<sup>st</sup> of June as the Summer solstice event was celebrated by the faculty members from department with semester 4<sup>th</sup> in morning at 8 am in college premises to mark that event. Since the last few years it's been a legacy of our department.





## MEDIA COVERAGE

### સેક્ટરની-28ની સરકારી ઇજનેરી કોલેજમાં એલ્યુમનીઝ મીટનો કાર્યક્રમ યોજાયો



ગાંધીનગર । નગરના સેક્ટર-28ની સરકારી ઇજનેરી કોલેજ ખાતે તાજેતરમાં એલ્યુમનીઝ મીટનો કાર્યક્રમ યોજવામાં આવ્યો હતો. તેમાં અલગ અલગ વિભાગમાં ભૂતપૂર્વ વિદ્યાર્થીઓ દ્વારા હાલમાં અભ્યાસ કરતા વિદ્યાર્થીઓને જરૂરી માર્ગદર્શન આપ્યું હતું. જેનો કોલેજના 450 જેટલા વિદ્યાર્થીઓએ લાભ લીધો હતો. આ પ્રસંગે કોલેજના આચાર્ય ડો.એસ.પી.દવે તેમજ દરેક વિભાગના વડાઓનો સહયોગ મળ્યો હતો.

### સરકારી ઇજનેરી કોલેજમાં વિદ્યાર્થી સંમેલન યોજાયું



સેક્ટર- ૨૮ ખાતે આવેલી સરકારી ઇજનેરી કોલેજમાં અલગ અલગ વિભાગમાં વિદ્યાર્થી સંમેલનનું તાજેતરમાં આયોજન કરવામાં આવ્યું હતું. જે અંતર્ગત દરેક વિભાગના ભૂતપૂર્વ વિદ્યાર્થીઓ ધ્વારા હાલ અભ્યાસ કરતા વિદ્યાર્થીઓને માર્ગદર્શન આપવામાં આવ્યું હતું. જેનો લગભગ ૪૫૦ જેટલાં વિદ્યાર્થીઓએ લાભ લીધો હતો.

### ગાંધીનગર કોલેજમાં બ્લડ ડોનેશન કેમ્પ યોજાયો



યુનિટ ક્લબ અમદાવાદ હોસ્ટ દ્વારા ગાંધીનગર એન્જિનિયર કોલેજમાં બ્લડ ડોનેશન કેમ્પ યોજાયો. ૨૩ કોસ સોસાયટી અમદાવાદ સાથે મળીને કેમ્પનું આયોજન કરાયું હતું. જેમાં 67 બ્લડ યુનિટ કલેક્ટ કરાયા હતાં.

### સરકારી ઇજનેરી કોલેજ ગાંધીનગર દ્વારા સાપ્તાહિક ઓનલાઈન વેબીનારનું આયોજન



ગાંધીનગર, તા. ૨૨ ઉચ્ચ શિક્ષણના તાબા હેઠળના મેટલર્જી વિભાગ (NBA Accredited), સરકારી ઇજનેરી કોલેજ, સેક્ટર-૨૮, ગાંધીનગર ખાતે સંસ્થાના આચાર્ય ડો. એસ. પી. દવે ના માર્ગદર્શન હેઠળ સાપ્તાહિક ઓનલાઈન વેબીનાર "મેટલર્જી એન્ડ મટિરિયલ સાયન્સ ૨૦૨૩" નું મેટલર્જી વિભાગના ભૂતપૂર્વ વિદ્યાર્થીઓ ના સંયોજન (સ્ટુડન્ટ સોસાયટી ઓફ મેટલર્જી એન્જિનિયરીંગ ગાંધીનગર) દ્વારા તારીખ ૨૨ થી ૨૬ મે, ૨૦૨૩ દરમિયાન કરવામાં આવ્યું. આ તારીખના સંયોજક મેટલર્જી વિભાગના પ્રાધ્યાપકો પ્રા. એચ. એચ. ઠાકર તથા પ્રા. આર. સી. ઘંઘાસ હતા. ઉપરોક્ત સાપ્તાહિક

ઓનલાઈન વેબીનારનું ઉદ્દઘાટન મેટલર્જી વિભાગના વડા ડો. આઈ. બી. દવે તથા MGTTER, નવસારી ના આચાર્ય ડો. જી. એચ. ઉપાધ્યાય ની ઉપસ્થિતિ માં થયું. આ વેબીનાર નો મુખ્ય હેતુ વર્તમાન પરિસ્થિતિમાં વિદ્યાર્થીઓ ને મેટલર્જી વિષય માં ઔદ્યોગિક તથા રીસર્ચ ક્ષેત્રે થયેલ એડવાન્સમેન્ટથી માહિતગાર કરવાનો હતો. આ વેબીનાર ની ખાસિયત એ હતી કે તજજ્ઞો મેટલર્જી વિભાગ, સરકારી ઇજનેરી કોલેજ, સેક્ટર-૨૮, ગાંધીનગર ના જ ભૂતપૂર્વ વિદ્યાર્થીઓ હતાં કે જેઓ હાલમાં રાષ્ટ્રીય તેમજ આંતરરાષ્ટ્રીય કક્ષાએ વિવિધ ઔદ્યોગિક એકમો/વિદ્યાશાળા માં સારા હોદ્દા પર કાર્યરત છે.

### સરકારી એન્જિનિયરિંગ કોલેજ ખાતે સ્પોર્ટ્સ વીક યોજાયું



સે-૨૮ ખાતેની સરકારી એન્જિનિયરિંગ કોલેજ દ્વારા જુન-૨૦ના ભાગરૂપે વિદ્યાર્થીઓ માટે સ્પોર્ટ્સ વીકનું આયોજન કરવામાં આવ્યું હતું. જેમાં વિદ્યાર્થીઓ માટે ક્રિકેટ, વોલીબોલ, ફુટબોલ, બેડમિન્ટન, કબડ્ડી, ચેસ જેવી વિવિધ ઇનડોર અને આઉટડોર રમતોનું આયોજન કરવામાં આવ્યું હતું.



## A summary of recent developments in indium metallurgy-A review

### Introduction:-

Ferdinand Reich and Hieronymous Richter helped discover indium in 1863 at the Freiberg School of Mines in Germany, however Richter initially claimed the discovery. Which caused a disagreement between the two scientists. While examining a piece of sphalerite in pursuit of thallium, Reich unintentionally discovered indium. The least common essential metal, indium is unrestricted in various zinc, iron, lead, and copper minerals. The principal mineral sources for its industrial manufacture have been by-products from zinc refineries. When making diverse technologies like LCDs, solar cells, energy-efficient windows, Spectro electrochemistry, and organic light-emitting diodes, various indium alloys are used.

Its use has increased by 2000% since 1985. Indium industries have increased both their production units and outputs to keep up with demand. As a result, the principal indium mineral sources are unable to keep up with the enormous demand. Recycling indium from used LCDs is currently being done in anticipation of the anticipated shortage of primary resources. For the manufacturing of indium using a low-cost, environmentally friendly approach, many metallurgical features of pyrometallurgical or hydrometallurgical processes have been experimented with.

This review article discusses various facets of current, advanced indium extractive metallurgy. Even though there aren't many review articles on the subject, the ones that are available aren't sufficient to draw any conclusions about indium met-

allurgy. Numerous research publications testing various novel methods of indium recovery are released every year. Since pyrometallurgy is only occasionally used to recover the least abundant indium at a cheap cost, the review paper places special emphasis on various hydrometallurgical processes.

### Usage of indium

If more than a few milligrams of indium are consumed, it is poisonous; the precise nature of the toxicity has not been established. Numerous applications call for various indium alloys. According to the distribution of applications, the United States uses indium in coatings to the tune of 49%, low melting-point lead-free solders and alloys to the tune of 33%, electrical components and semiconductors to the tune of 14%, and re-

search and other uses to the tune of 4%. The majority of indium is consumed in Japan for the production of various industrial goods. Over the past ten years, Japan has used indium at a rate of 1000%.

Production of ITO uses about 45% of all indium. ITO is appropriate for semiconductor devices due to its large bandgap ( $E > 3.5$  eV). In the visible range, the ITO is an optically transparent electrode. It has a strong affinity for glass and conducts electricity. In switchable mirror-sand smart windows, a thin film of ITO deposited over a glass substrate serves as an auxiliary anode. It can be used in a wide range of products, including solar panels, touch screens, flat displays, organic light-emitting diodes, energy-efficient windows, Spectro electrochemistry, and LCDs.

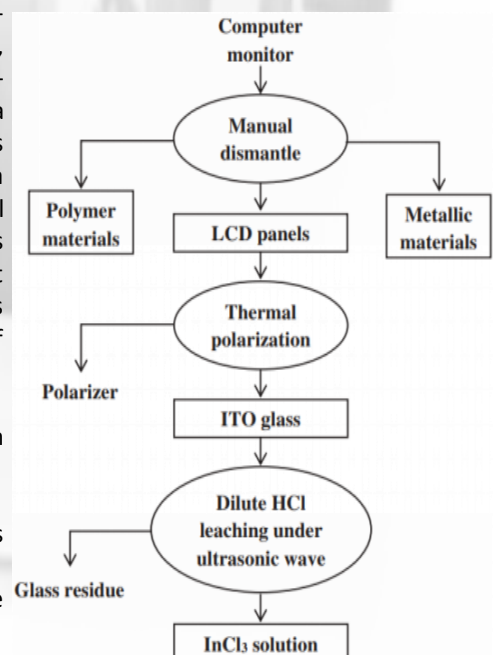
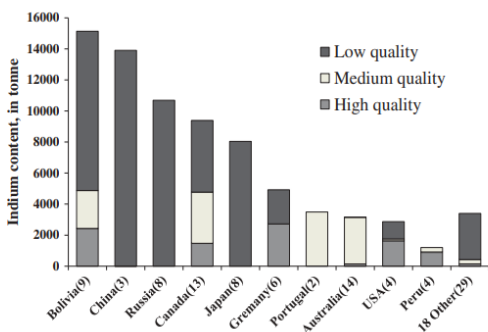
### Pyrometallurgical approach-

The recycling of industrial wastes is being greatly improved through pyrometallurgical technology. In industrial processes like dismantling, smelting, drossing, sintering, melting, and gas-phase reactions, it has been successfully implemented. In the process of recycling metals, the metal-containing trash is burned at a high temperature in a furnace, and then the valuable metals and contaminants as slag are separated. However, the pyrometallurgical process goes through a number of steps, beginning with pre-treatment and continuing through final extraction. The reaction environment is extremely specialised, and all processes are carried out at high temperatures. The entire process becomes more difficult to maintain. Together, they result in a more expensive procedure, which raises the price of the finished goods. The procedure also results in the generation of hazardous gases, not with standing.

### Conclusion-

The following are some of the key conclusions of the recent advances in indium metallurgy:

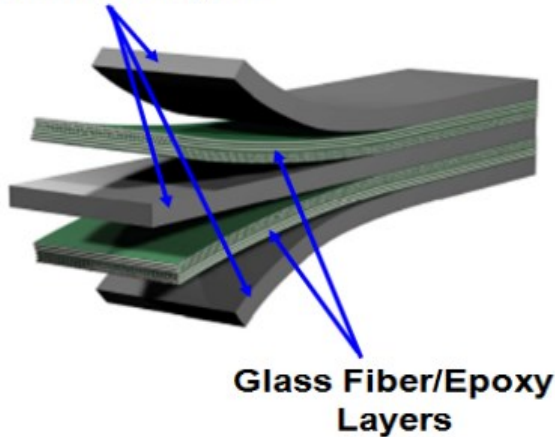
- Pyrometallurgical techniques have been improved to reduce emissions and improve recovery rates.
- Hydrometallurgical techniques have been developed to improve the efficiency of indium extraction and recycling.



## GLARE (AN ADVANCED AIRCRAFT MATERIAL)

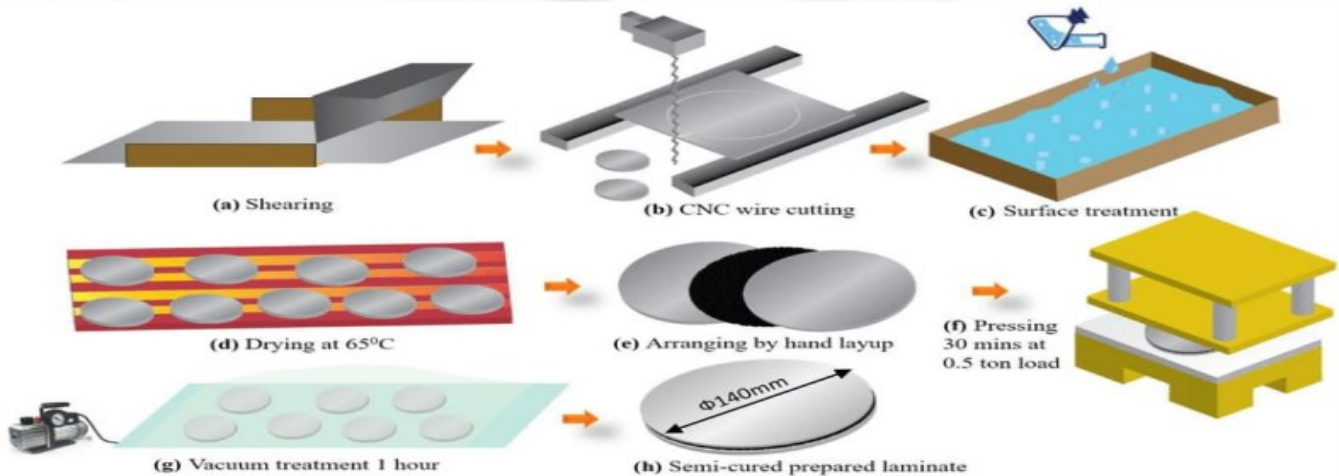
### INTRODUCTION

#### Aluminum Layers



GLARE (glass-reinforced aluminium laminate) is a new class of fibre metal laminates for advanced aerospace structural applications. It consists of thin aluminium sheets bonded together with unidirectional or biaxially reinforced adhesive prepreg of high-strength glass fibres. GLARE laminates offer a unique combination of properties such as outstanding fatigue resistance, high specific static properties, excellent impact resistance, good residual and blunt notch strength, flame resistance and corrosion properties, and ease of manufacture and repair. GLARE laminates can be tailored to suit a wide variety of applications by varying the fibre/resin system, the alloy type and thickness, stacking sequence, fibre orientation, surface pre-treatment technique, etc. This article present comprehensive overview of the mechanical properties of various GLARE laminates under different loading conditions. GLARE is a "Glass reinforced" Fibre Metal Laminate (FML), composed of several very thin T layers of metal (usually aluminium) interspersed with layers of glass-fibre "pre-preg", bonded together with a matrix such as epoxy. The uni-directional pre-preg layers may be aligned in different directions to suit the predicted stress conditions.

### Preparation



### Application

Glare has been most often applied in the aviation field. It forms part of the Airbus A380 fuselage and the leading edge of the tail surfaces. In 1995, an aircraft freight container made out of Glare became the first container certified by the Federal Aviation Administration (FAA) for blast resistance; the container can absorb and neutralize the explosion and fire from a bomb such as the one used in the Pan Am Flight 103 disaster over Lockerbie, Scotland in 1988. Glare has also been used in the front radome bulkhead of the Bombardier Learjet 45 business jet, which was first delivered in 1998. The material was used as a cargo liner solution for regional jets, in the lower skins of the flaps in the Lockheed Martin C-130J Super Hercules military transport aircraft, and in straps for the highest loaded frames in the Airbus A400M military transporter.

### References:-

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2. Vlot 2001, pp. 101–102 McMullin, David (January 2002). "Lockerbie insurance: Hardened luggage containers can neutralize explosives"



# TECHNO RIDE

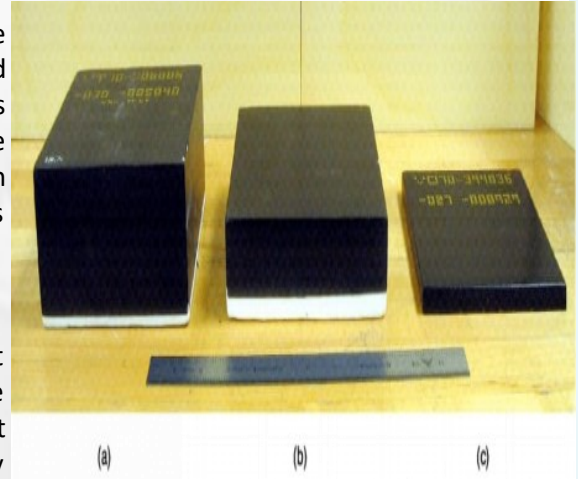
- By, Mr. Shaikh Mohammad Arsh Mohammad Arif(210130121003)

## Space Shuttle Thermal Tiles

### **Introduction: -**

Approximately 24,300 tiles were installed on each space shuttle and each tile was designed to survive 100 trips to space and back. Varying in thickness from one inch (2.54 cm) to five inches (12.7 cm) depending on the heating they will be subjected to, the tiles collectively protected the orbiter from temperatures as high as 2,300 degrees Fahrenheit during its re-entry into the Earth's atmosphere.

The silica tile material is referred to as LI-900. They insulate heat so well that tiles can be held bare-handed on one side even while the opposite side is still red hot. Educators can demonstrate that ability in the classroom, substituting a blow torch for the re-entry-generated heating.



### **Manufacturing process:**

LI-900 has a density of 9 pounds per cubic foot. It is made from pure silica glass fibres, but 94% of the volume of each tile is pure air, making each tile incredibly light and strong!



Fibrous Refractory Composite Insulation tiles helped reduce the overall weight and later replaced the LI-2200 tiles used around door penetrations. Alumina Enhanced Thermal Barrier was used in areas in which small particles would damage fragile tiles. As part of the post-Columbia Return to Flight effort, engineers developed Boeing Rigidized Insulation. Overall, the major improvements included reduced weight, decreased vulnerability to orbital debris, and minimal thermal conductivity. Orbiter tiles were bonded using strain isolation pads and room-temperature vulcanizing silicone adhesives. The inner mold line of the tile was densified prior to the strain isolation pad bond, which aided in the uniform distribution of the stress concentration loads at the tile-to-strain isolation pad interface. The structure beneath the tile-to-tile gaps

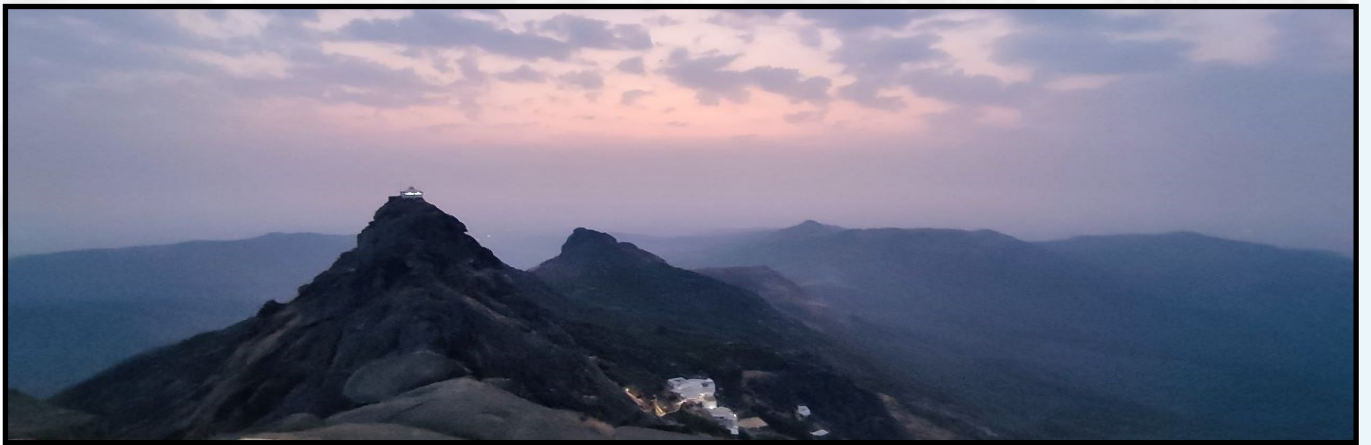
was protected by filler bar that prevented gas flow from penetrating into the tile bond line. NASA used gap fillers (prevented hot air intrusion and tile-to-tile contact) in areas of high differential pressures, extreme aero-acoustic excitations and to passivate over-tolerance step and gap conditions. The structure used for the bonding surface was, for the most part, aluminium; however, several other substrates used included graphite epoxy, beryllium, and titanium.

### **Reference:-**

1. [www.nasa.gov.com](http://www.nasa.gov.com)
2. [https://imagws.app.goo.gl/uh8jfxfyetivmsw9584728main\\_Wings-ch4b-pgs182-199](https://imagws.app.goo.gl/uh8jfxfyetivmsw9584728main_Wings-ch4b-pgs182-199).
3. <https://youtu.be/Pp9Yax8UNoM>

# ART GALLERY

- Photography by, Mr. Nihar Huprikar. 210130121504



- Sketch by:- Mr. Kelvin Vikani (200130121001)



## ART GALLERY

पतझड़ तो एक दिन होनी ही है  
आभा तो एक दिन खोनी ही है  
बरकरार रहे मासूमियत दिलकी  
ढलती उमर तो बस अपनी है ।

ये चमक ये दिखावा तुम छुपालो  
तस्वीर से चाहे सारे रंग चुरा लो  
बचेंगी जो भी रेखाएं कागज पर  
वो तस्वीर तो बस अपनी है ।

हो ऊंचा बरगद या पेड़ बबूल का  
हो रेगिस्तान या चमन फूलों का  
सुर्ख सुबह के गालों को छूकर  
आये जो धानी खुशबू बस अपनी है।

सोंधे सोंधे कुछ सपने ओढ़े  
रात उमड़ उमड़ बदली को छेड़े  
गम या खुशी में अशको की बारिश  
आसर्मा की हर बून्द बस अपनी है।

पतझड़ तो एक दिन होनी ही है  
आभा तो एक दिन खोनी ही है  
तिजारत से भरी इस दुनिया में  
वफ़ा की जलती लौ बस अपनी है

Written by:- Shreyas Jamale(220133121008)

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