Centre of Excellence for Advanced Manufacturing

About CoE for Advanced Manufacturing

CoE for Advanced Manufacturing is an esteemed center that aims to position India as a global manufacturing hub. Established in 2019, Supported by AIM, NITI Aayog, and the Government of India, the Centre offersstate-of-the-art facilities to students, faculty, entrepreneurs, researchers, and industries. With advanced equipment like FDM 3D printers, 3D scanners, industrial CNC machining centers, and licensed software tools like Solid Works and ANSYS, the COE enables the creation of diverse 3D prototypes using various materials. It also provides access to a range of workshop equipment andan industrial CNC turning center for hands-on learning and prototyping. The lab fosters interdisciplinary collaborations and industry partnerships, addressing real-world challenges and emphasizing practical applications. Through its training programs, internship courses, and supportservices, the center offers enhanced learning opportunities, practical industry experience, and networking opportunities to students and staff from host institution and nearby institutes. Additionally, the center has incubated innovative startups like Modern Manufacturers, KieKie PrivateLimited, and Scrapbuk Services Pvt Ltd, which have made significant strides in their respective domains. Collaborations with ecosystem partners such as Parametric CADTech, Medhavavi Center for Automotive Research, Cheema Boilers Limited, and ANG Industries further enrich thelab's capabilities and contribute to research, innovation, and technological advancements in the manufacturing sector.

Vision

To be a global leader in manufacturing, 3D printing, and composites, driving innovation, sustainability, and economic growth

Uniqueness (Special features)

1. COE receives significant financial support from AIM, NITI Aayog, Government of India.
2. It offers wide range of industry oriented training and internship programs to develop skilled professionals in Design, 3D printing and EV manufacturing.
3. It offers access to licensed software tools like Solid Works and ANSYS to helps students and researchers groups to enhance design analysis and optimization.
4. Equipped with Advanced FDM 3D printers, 3D scanner and vacuum/investment casting facility, the COE enables students and researchers of all disciplines to develop prototypes and innovations as per their requirements.
5. It makes sure availability of diverse materials, such as plastics, resin, silicon, ceramics, and other suitable materials to meet prototyping and Tool & Die making requirements of local industries.
6. The COE provides access to an industrial CNC turning center and necessary workshop equipment, supporting hands-on learning, performing precise machining operations and prototyping.

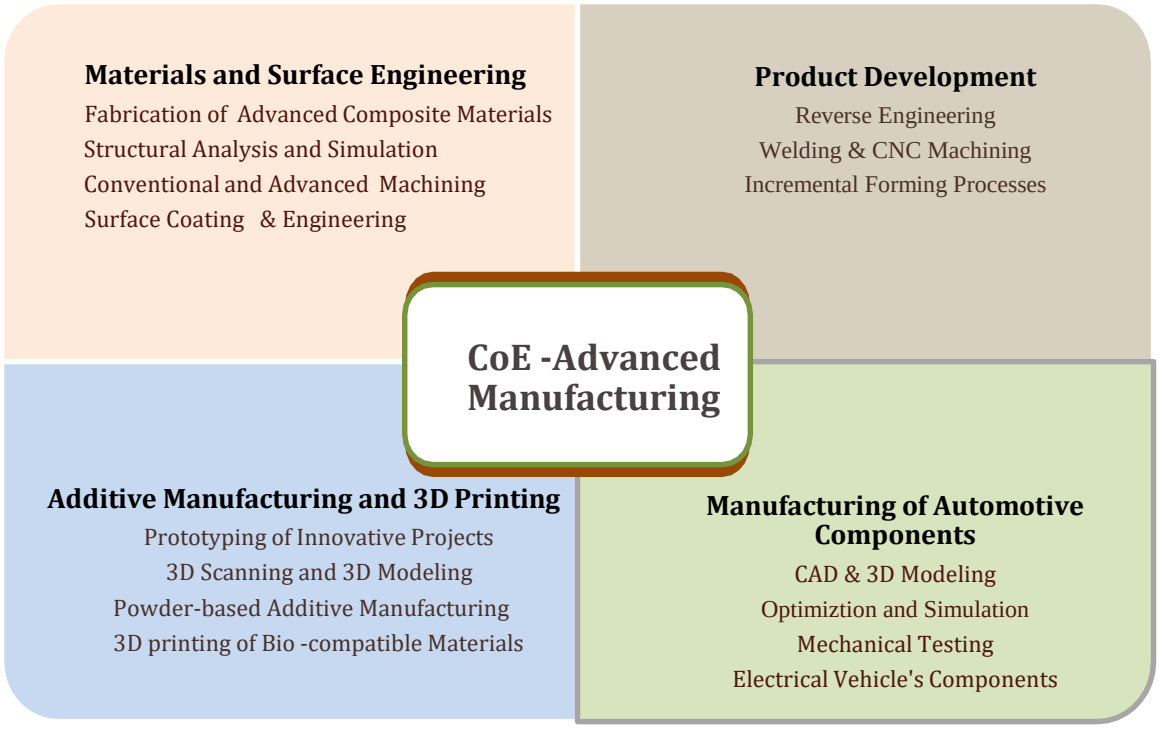
7. The COE is forum of Interdisciplinary and Industry Collaborations guiding the students, innovators, research groups, and academic institutions to addresses industry challenges and societal needs, emphasizing practical applications.

8. The lab offers addition material testing equipment's like Universal Testing Machine, computerized UTM, Brinell and Vickers hardness tester, torsion testing machine and impact testing machine and optical microscope and stroboscope for detailed material analysis.

Objectives

1. Develop and conduct advanced training and education programs to develop skilled professionals in Design, Manufacturing, and 3D printing technologies.
2. Foster strong collaboration between researchers and industry stakeholders, including manufacturers, technology providers, and policymakers, to drive knowledge transfer.
3. Promote interdisciplinary research, innovation and entrepreneurship by providing advanced design, simulation, fabrication, prototyping and 3D printing services.
4. Disseminate research findings and technological advancements through conferences, seminars, publications, patents, and tech transfer.

Thrust areas

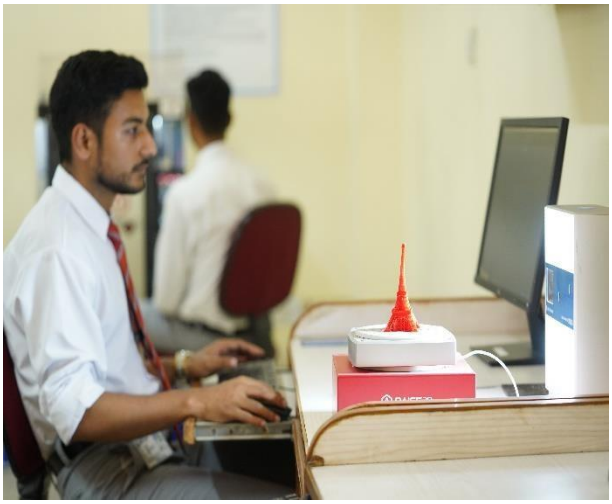


Focus Area of research and innovation

Benefits to students and Faculty

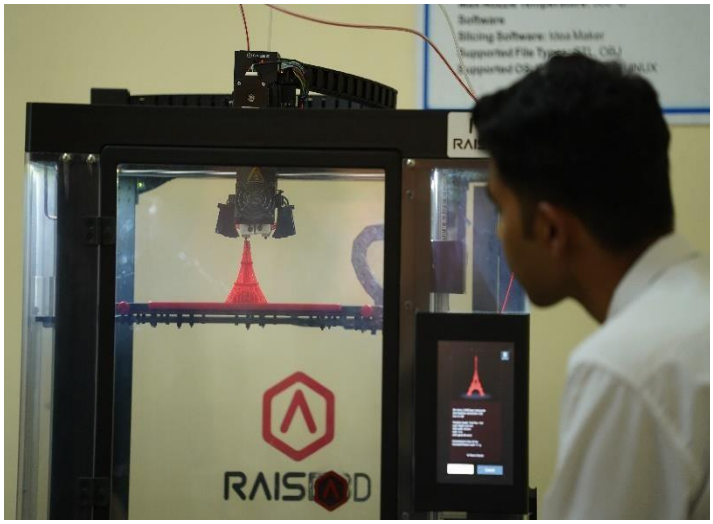
1. Enhanced learning opportunities in advanced manufacturing for students and staff from hos institution and other nearby institutes.
2. Practical industry experience through real-world projects and hands-on training with state-of-the-art equipment.
3. Availability of advanced design, simulation, fabrication, prototyping and 3D printing, CNC turning center and necessary workshop equipment services at ease.
4. Networking and collaboration opportunities with industry professionals, researchers and manufacturing companies.

Major Equipment: Centre of Excellence in Advanced Manufacturing



3 D Scanner

CNC Machine



3D Printer

Certificate Courses

- Certificate Course on 3D printing and 3D scanning
- Certificate course on Design, Manufacturing, and assembly of E- Vehicles
- CNC Programming & Machining

Internship course

Design, Manufacturing, and assembly of Multipurpose –Electric Cart, Solid Works & ANSYS Simulation

Support Services

3D Modeling & Simulation, Fabrication, Prototyping, Material Testing, and 3D Printing & Scanning

Advisory Board

External Experts

- Prof. (Dr.) Harry Garg, Head Mechanical Design & Fabrication Facility (MDF) CSIR-CSIO, Chandigarh.
- Prof. (Dr.) Inderdeep Singh, Professor and Head, Department of Design, IIT Roorkee
- Prof. (Dr.) Alakesh Manna, Professor, ME Department, PEC, Chandigarh
- Prof. (Dr.) Rupinder Singh, Professor, ME Department, NITTTR, Chandigarh
- Dr. (Lt.) Charanjit Singh, Founder & Director, M/s Modern Manufacturers
- Mr. Jaskaran Singh Sahni, Director, Windsor Industries Private Limited
- Mr. Satnam Singh Hansra, Senior Manager, Godrej & Boyce Manufacturing Co.Ltd. (Appliance Division), Mohali, Punjab

Internal Experts

- Prof. (Dr.) Rajdeep Singh, Director Principal, CEC-CGC, Landran, Mohali
- Prof. (Dr.) Ruchi Singla, Dean, R & D, CEC-CGC, Landran, Mohali
- Prof. (Dr.) Rachin Goyal, Head, Department of Mechanical Engineering, CEC-CGC, Landran, Mohali
- Prof. (Dr.) Sanjeev Sharma, Faculty, Department of Mechanical Engineering, CEC-CGC, Landran, Mohali

Startups Incubated

1) Startup Name: Modern Manufacturers

Founder: Ms. Saravjeet and Mr. Charanjit Singh

Year of Initiation: 2020

About the startup: Modern Manufacturers is a startup founded by Mr. Charanjit Singh in 2020. The company specializes in 3D modeling, printing, and personal protection products. They offer a range of services including Cad-Cam 3D modeling work, 3D scanning work, 3D printing work, and design and development services. They also serve as a third-party exporter.Modern Manufacturers provides solutions for various industries, including safety face shields, metallic parts, medical instruments, and automobile plastic parts. They assist clients in selecting appropriate materials, sketching design ideas, using computer software for design specifications, and researching market trends. Additionally, they support customers in material selection and design testing to ensure product feasibility.

Modern Manufactures (founders) participating in a workshop at CSIO, CHD

Some notable innovations by Modern Manufacturers include:

- Low-Cost Tea Vending Machine: They have utilized 3D printing technology to design and manufacture a low-cost Tea Vending Machine. This approach allows for efficient prototyping and optimization of the machine's design and functionality.
- Medico Purpose Trolley for PGI Hospital, Chandigarh: Modern Manufacturers has employed 3D printing to create Medico Purpose Trolleys specifically tailored for PGI Hospital in Chandigarh. By using 3D printing, they can customize the trolleys to meet the

- hospital's unique requirements, incorporating features and functionalities that enhance patient care and streamline hospital operations.
- Travel Cap for Razor: Modern Manufacturers has utilized 3D printing to develop a Travel Cap for the Razor.These travel caps serve as protective covers during transportation, ensuring the blades are safeguarded from damage.
- Scissor Trolley (for Nestle India Pvt. Ltd.): Furthermore, Modern Manufacturers has used 3D printing innovations to manufacture Scissor Trolleys for Nestle India Pvt. Ltd. 3D printing enables the production of precise and intricate designs, ensuring the trolleys meet Nestle's specific requirements. This technology facilitates efficient prototyping and customization, optimizing the trolleys for Nestle's operational needs.

Tea Vending Machine

Med Trolley for PGI

Travel Cap for Razor

Scissor Trolley (Nestle)

2) Startup Name: KieKie Private Limited

Founders/Directors: Ravinder Bishnoi and Shubh Sarpal

Corporate Identification Number (CIN): U29200RJ2022PTC080094

Year of Incorporation: 2022

About the Startup: KieKie Private Limited is a startup operating in the automotive industry. The company was established with the aim of revolutionizing the industry by introducing state-of-the-art solutions that were previously unheard of. They have developed innovative and patented products that prioritize both safety and convenience, providing a unique combination of features.Trust and reliability are core values for KieKie, and the company emphasizes sustainable practices in its operations. Despite being a relatively new entrant, KieKie has already gained recognition and success. Within just seven months of operation, the company has received more than 10 awards, showcasing its rapid growth and achievements. This notable progress positions KieKie as one of the fastest-growing startups of 2022.

Innovations:

- Vehicle Horn Control Assembly: A patented device used to curb noise pollution from unnecessary honking, promoting a quieter and more environmentally friendly driving experience.
- Automatic Side Stand: A patented technology that automatically releases and retracts the side stand of two-wheelers, reducing accidents caused by human negligence.

Achievements:

- Atal New India Challenge Winner 2.0: KieKie Private Limited was selected as a winner of the Atal New India Challenge 2.0, receiving a prize of 1 Crore/122k USD.
- Valuation: KieKie Private Limited has achieved a valuation of 10 Crore/1.2 Million USD within its first year of operation.
- International and All India Ranks: The founders have achieved high rankings, including International Rank 13 and All India Rank 1 NCO, showcasing their expertise and dedication.
- Sustainable Development Goals Ideathon: KieKie Private Limited secured the All India Rank 1 in the "In Quest of Sustainable Development Goals Ideathon 2021" organized by Atal Innovation Mission & NITI Aayog, Government of India.
- Representation at G20: The startup has represented India and Indian startup culture at the G20, showcasing their influence and presence on a global scale.
- Innovation Challenge: KieKie Private Limited achieved All India Rank 2 in the JK Lakshmipath University Innovation Challenge.
- Prolific Inventor Award: The founders received the Prolific Inventor Award by the World Intellectual Property Forum (WIPF) in recognition of their innovative contributions.

- Atal Tinkering Marathon: KieKie Private Limited secured a position in the All India Top 6 at the Atal Tinkering Marathon organized by Atal Innovation Mission & NITI Aayog.
- UNLEASH Global Talent: The founders participated in the UNLEASH Global Talent program, further highlighting their commitment to innovation and global impact.

Glimpses of the startup journey of KieKie Private Limited (Founder: Ravinder Bishnoi)

3) **Name of Startup –** Scrapbuk Services Pvt. Ltd.

Founder's Name- Sukant Gupta

Year of Incorporation: 2021

Briefly about the Scrapbuk - Scrapbuk is a technology based startup for the sale and purchase of Scrap material with the help of mobile application. We educate people about the benefits and impacts of recycling on environment. We promote sustainability by selling products like-

- Plan table Paper Seed Pencil
- Eco Friendly Sustainable Pens
- Plan table Ecofriendly calendar
- Wood free Eco-Friendly rim

We have been collecting waste from various households and recycling them in the best possible way. It's our motto that we make India a country known for "best waste management". We have been operating to do this since 2020. We initially started our services in Tricity, but now we are expanding to Delhi also.

Employment generated- Till date we have generated employment for more than 100people.

Award received by the startup- Till date we have received several awards:

- Appreciation award by Municipal Corporation Mohali.
- Appreciation from PMIDC
- Won Best technology startup on IPR day 2023.
- Got featured in Hindustan times and many other news channel.
- Biography and Scrapbuk journey created by Suraya Samachar.
- Best D2C and Man or honor award by DLF.
- Awarded by the Economic times.
- We have received the startup award from ACIC rise Associate.
- Received an Appreciation Award from the Excise department or Haryana Police for recycling 40,000 liquor bottles.
- 1st price at CEC-CGC Landran for business idea presentation.
- Received grant from Invest Punjab of INR 3,00,000.

CERTIFICATE NO:
DIPP96684

#startupindia

Government of India
Ministry of Commerce & Industry
Department for Promotion of Industry and Internal Trade

CERTIFICATE OF RECOGNITION

This is to certify that ***SCRAPBUK SERVICES PRIVATE LIMITED*** *incorporated as a* ***Private Limited Company*** *on 15-10-2020, is recognized as a startup by the Department for Promotion of Industry and Internal Trade. The startup is working in 'Waste Management' Industry and 'Others' sector as self-certified by them.*

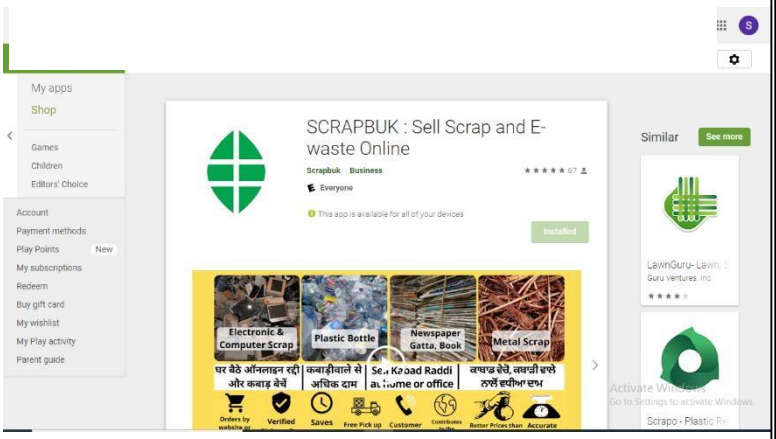
This certificate shall only be valid for the Entity up to Ten years from the date of its incorporation only if its turnover for any of the financial years has not extended ₹ 100 Cr.

12-03-2022	14-10-2030
DATE OF ISSUE	VALID UPTO


CHANDIGARH PLUS

These tricity start-ups want to transform lives

World now aware of India's strength, says Defence Minister



India EducationDiary.com

CGC Landran's Student Team MEC Innovators Files 20 Patents In One Year

Bhubaneswar: As an interdisciplinary approach in research and problem-solving is the need-of-the-hour in fostering the progress of the nation, this 4-student team from Chandigarh Group of Colleges, Landran from branches of Mechanical Engineering (ME) and Electronics and Communication Engineering (ECE) has successfully utilized this aspect in coming up with astounding discoveries and patent filings.

The team encompasses Sukant Gupta, the Team Leader, who is pursuing Mechanical Engineering along with Sangram Singh Thakur and Arihit Sehgal from the same branch and Neeraj Kumar from ECE and is known by the name of MEC INNOVATORS. With their collective efforts and creative instincts, they have filed 19 patents in just one year and 20th is in the pipeline.

These patents relate to distinct ideas that address numerous concerns that society experiences in day-to-day living. Few of these are Advanced Integrated Bathing Chair for handicaps and old people, Helmet with Integrated Mask for Prevention from COVID- 19, Autonomous Keypad Disinfectant Systems for cash dispensing machine, Autonomous AI Pumps for irrigation in fields by recycling of AC drained water, and Firefighting Spider Robot.

Glimpses of the startup journey of Scrapbuk Services Pvt. Ltd. (Founder: Sukant Gupta)

Ecosystem Partners

1. Parametric CADTech, Sector 8CChandigarh:

PARAMETRIC CADTECH is the leading company providing engineering solutions & services, founded in year 1999. It has completed various projects in the field of solid modeling, surface modeling, drafting, tool path generation, finite element analysis and optimization with the help of high end software. Few of its prestigious clients are Ashok Leyland, Swaraj Mazda, JCBL, Federal Mogul, Agroking, HMT machines Tools, HMT Tractors, Swaraj Mazda, Preet Tractors, Contour Automotive, Federal Mogul, GatesIndia, Tata Motors, Force motors, HMM Coaches, ISGEC, INDO Farm, ABB etc.

Parametric CADTech is a highly skilled and experienced ecosystem partner of the COE in Advanced Manufacturing at Chandigarh Engineering College. With expertise in computer-aided design (CAD) technologies, 3D modeling, and product development, Parametric CADTech plays a crucial role in strengthening the design capabilities of the COE. Their collaboration with the COE supports the development of innovative solutions in the manufacturing sector. By leveraging their knowledge and skills in CAD technologies, Parametric CADTech contributes to the advancement of product design and optimization within the COE.

2. Medhavavi Center for Automotive Research

MCAR, based in Hoshiarpur, Punjab, specializes in electronics and automobile applications. They understand the increasing role of electronics in the automotive industry, offering enhanced safety, comfort, and sustainability. With a focus on research and innovation, MCAR provides valuable knowledge and support to clients for the seamless execution of projects. They also aim to create a pool of skilled automotive engineers by organizing workshops and training programs, ensuring a knowledgeable workforce equipped with the latest automotive technologies. MCAR's mission is to deliver high-quality services to automotive companies at competitive prices, catering to the industry's demands and staying at the forefront of advancements in automotive electronics. They stay updated with the latest technologies and are well-versed in fields like CRDi, MPFi, ABS, TPMS, Start-Stop, Automatic Climate Control, VVT, VCR, DPF, SCR, and Predictive Emergency Braking.

The Medhavavi Center for Automotive Research is a specialized ecosystem partnerfocused on automotive research and development. Through their collaboration with the COE, they enhance the knowledge base and research capabilities in the automotive sector. The partnership supports the COE's efforts in developing advanced automotive technologies and solutions. By leveraging the expertise of the Medhavavi Center for

Automotive Research, the COE contributes to advancements in automotive manufacturing, sustainability, and efficiency

3. Cheema Boilers Limited, Mohali:

Established in the year 1999, Cheema Boilers Limited is an ISO 9001: 2000 firm engaged in manufacturing and exporting of process steam and power generation equipment for various industrial applications. We abide by guidelines laid by Indian Boilers Regulation (IBR) and American Society of Mechanical Engineers (ASME) code to ensure that our products meet and even surpass international quality parameters.Our range includes oil boilers, AFBC boilers, energypac boilers, slop fired boiler, electrostatic precipitator, industrial electrostatic precipitator, traveling grate, dumping grate, waste heat recovery boilers, oil pack, centrifugal fans, hot air generator and compact lift conveyors,

Cheema Boilers Limited is a prominent manufacturer and supplier of industrial boilers. Their collaboration with the COE brings valuable expertise in the manufacturing of boilers and related components. As an ecosystem partner, Cheema Boilers Limited contributes to knowledge sharing, innovation, and technological advancements in the boiler manufacturing sector. Their experience and insights enable the COE to explore new possibilities in boiler design, efficiency, and sustainability, driving advancements in the industry.

4. Windsor Industries Pvt. Ltd.

Windsor Industries Pvt. Ltd. is a pioneering company in Northern India known for its expertise in EPS (thermocol) processing. With a focus on manufacturing high-quality packaging, components, and disposable products, Windsor aims to meet customer expectations in a cost-effective manner. The company boasts a versatile portfolio, including thermocol industrial packaging, insulation sheets, crockery made from thermocol and biodegradable cornstarch, and BOPP self-adhesive tape. With state-of-the-art facilities and in-house tool rooms, Windsor ensures precision, volume production, and timely delivery. The company's commitment to quality is reinforced by independent laboratories that ensure consistent product quality. Additionally, Windsor has established a large unit for manufacturing EPS disposable glasses, plates, bowls, and lunch boxes, equipped with imported machinery and automated technology. Recently, the company has introduced biodegradable cornstarch-based disposable crockery, offering an eco-friendly alternative for food consumption.

4. ANG Industries, JLPL Industrial Area SAS Nagar, Mohali:

Established in the year "2017" in Mohali, Punjab, ANG Industries" engaged as the foremost Manufacturer and Wholesaler of Rebar Coupler. The collaboration facilitates joint research, development, and innovation projects in the automotive sector. By leveraging ANG Industries' experience and knowledge, the COE explores new advancements in automotive manufacturing processes, components, and technologies.

Publications (SCI & Scopus indexed):

S. No.	Title of paper	Name of the author/s	Name of journal	Year of publication	ISSN number
1	Corrosion performance of hydroxyapaite and hydroxyapaite/titania bondcoating for biomedical applications	Santosh Kumar	Material Research Express	2019-2020	2053-1591
2	Optimization and Effect of Reinforcements on the Sliding Wear Behavior of Self-Lubricating AZ91D-SiC-Gr Hybrid Composites	Sandeep Kumar Khatkar	Silicon	2019-2020	1876-9918
3	Parametric Optimization of Submerged Arc Welding Process Parameters by Response Surface Methodology	Sachin Mohal	Materials Today: Proceedings (Elsevier)	2019-2020	2214-7853
4	Tribological Investigation of AZ91/SiC Magnesium Hybrid Composite under Dry, Oil and Nanofluids Lubricating Conditions.	Archana Thakur	Silicon	2019-2020	1876-9918
5	Parametric optimization of EDD using RSM-Grey-TLBO-based MCDM approach for commercially pure titanium	Rachin Goyal	Grey Systems: Theory and Application	2019-2020	2043-9377
6	To Study the Mechanical Properties of AISI H11 Tool Steel after Heat Treatment	Mr. Aneesh Goyal	International Journal of Scientific Research in Multidisciplinary Studies	2019-2020	2454-6143
7	Synthesis of biomedical Ti-25Ni-15Si-10HA alloy by mechanical alloying and spark plasma sintering.	Sachin Mohal	Journal of Physics: Conference Series	2019-2020	1742-6588
8	Experimental investigation of surface crack density and recast layer thickness of WEDMed Inconel 825	Pawan Kumar Nain	Journal of Computational and Applied Research in Mechanical Engineering	2019-2020	2251-6549

9	Parametric optimization of EDD using RSM-Grey-TLBO-based MCDM approach for commercially pure titanium	Vinod Kumar Rohilla	Grey Systems: Theory and Application	2019-2020	2043-9377
10	Selection of range of pulse duration during cryogenically assisted electric discharge machining	Rachin Goyal	Materials Today: Proceedings	2020-2021	2214-7853
11	Selection of range of pulse duration during cryogenically assisted electric discharge machining	Aneesh Goyal	Materials Today: Proceedings	2020-2021	2214-7853
12	WEDM process parameter optimization for newly developed hybrid Al/(SiC + Gr + Fe2O3) –MMC	Amresh Kumar	Journal of the Indian Chemical Society	2020-2021	0019-4522
13	Optimization of Laser Engraving Process Parameters for the Engraving of Hybrid Glass Fiber Reinforced Plastic (GFRP) Combinations	Dr. Rahul Mehra	Laser in Engineering	2020-2021	0898-1507
14	Microwave-synthesized Mg+ 2 doped jute fibers and their application as a reinforcement in biocomposites	Dr. Saurabh Chaitanya	Composites Part B: Engineering	2020-2021	1879-1069
15	A Comparative Study on Fracture Parameters of Friction Stir Welded AA5083 using NCORR	Pardeep Bishnoi	AIP Proceedings	2020-2021	1551-7616
16	The role of additive manufacturing for medical applications: A critical review	Rakesh Kumar	Journal of Manufacturing Process	2020-2021	1526-6125
17	Investigating the influence of WEDM process parameters in machining of hybrid aluminum composites	Amresh Kumar	Advanced Composite Letters	2020-2021	2634-9833
18	Advancements in multi-scale filler reinforced epoxy nanocomposites for improved impact strength: A review	Karanbir Singh	Critical Reviews in Solid State and Materials Sciences	2020-2021	1040-8436
19	Optimization of Laser Engraving Process Parameters for the Engraving of Hybrid Glass Fiber Reinforced Plastic (GFRP) Combinations.	Mukesh Kumar	Laser in Engineering	2020-2021	0898-1507
20	To evaluate the effect of boron carbide (B4C) powder mixed EDM on the machining characteristics of INCONEL-600	Dr. Satish Kumar	Materials Today: Proceedings	2021-2022	2214-7853
21	To evaluate the effect of boron carbide (B4C) powder mixed EDM on the machining characteristics of INCONEL-600	Dr. Sanjeev Sharma	Materials Today: Proceedings	2021-2022	2214-7853
22	An overview of various applications of cold spray coating process	Dr. Rajdeep Singh	Materials Today: Proceedings	2021-2022	2214-7853

23	Recent advancements in abrasive flow machining and abrasive materials: A review	Dr. Rajdeep Singh	Materials Today: Proceedings	2021-2022	2214-7853
24	Recent advancements in abrasive flow machining and abrasive materials: A review	Mr. Swarn Singh	Materials Today: Proceedings	2021-2022	2214-7853
25	Analyzing the response of submerged arc welding process parameters on Form factor and dilution	Dr. Saurabh Chaitanya	Materials Today: Proceedings	2021-2022	2214-7853
26	Mechanical properties assessment of TIG welded SS 304 joints	Ms. Aishna Mahajan	Materials Today: Proceedings	2021-2022	2214-7853
27	Decision on the range of peak current during cryogenically assisted electric discharge machining process	Mr. Aneesh Goyal	Materials Today: Proceedings	2021-2022	2214-7853
28	Effect of different types of reinforcement on tribological properties of aluminium metal matrix composites (MMCs) – A review of recent studies	Mr. Rajwinder Singh Gill	Materials Today: Proceedings	2021-2022	2214-7853
29	A systematic review on recent advancements in Abrasive Flow Machining (AFM)	Dr. Santosh Kumar	Materials Today: Proceedings	2021-2022	2214-7853
30	A review on machining performance of AISI 304 steel	Dr. Amresh Kumar	Materials Today: Proceedings	2021-2022	2214-7853
31	Analyzing the response of submerged arc welding process parameters on Form factor and dilution	Dr. Sachin Mohal	Materials Today: Proceedings	2021-2022	2214-7853
32	Mechanical properties assessment of TIG welded SS 304 joints	Mr. Satish Kumar	Materials Today: Proceedings	2021-2022	2214-7853
33	Friction stir welding: Types, merits & demerits, applications, process variables & effect of tool pin profile	Dr. Santosh Kumar	Materials Today: Proceedings	2021-2022	2214-7853
34	Fabrication of hybrid metal matrix composites (HMMCs) – A review of comprehensive research studies	Dr. Amresh Kumar	Materials Today: Proceedings	2021-2022	2214-7853
35	To evaluate the effect of boron carbide (B4C) powder mixed EDM on the machining characteristics of INCONEL-600	Dr. Rajesh Sharma	Materials Today: Proceedings	2021-2022	2214-7853
36	Artificial neural network based modeling to predict micro-hardness during EDM of cryo-treated titanium alloys	Dr. Rajdeep Singh	Materials Today: Proceedings	2021-2022	2214-7853
37	To evaluate the effect of boron carbide (B4C) powder mixed EDM on the machining characteristics of INCONEL-600	Dr. Pradeep Bishnoi	Materials Today: Proceedings	2021-2022	2214-7853

38	Mechanical properties assessment of TIG welded SS 304 joints	Mr. Harvinder Singh	Materials Today: Proceedings	2021-2022	2214-7853
39	Tool electrode considerations in EDM of titanium alloys – A review	Dr. Amresh Kumar	Materials Today: Proceedings	2021-2022	2214-7853
40	Analyzing the response of submerged arc welding process parameters on Form factor and dilution	Dr. Rachin Goyal	Materials Today: Proceedings	2021-2022	2214-7853
41	Effect of different types of reinforcement on tribological properties of aluminium metal matrix composites (MMCs) – A review of recent studies	Dr. Amresh Kumar	Materials Today: Proceedings	2021-2022	2214-7853
42	Mechanical properties assessment of TIG welded SS 304 joints	Dr. Santosh Kumar	Materials Today: Proceedings	2021-2022	2214-7853
43	Numerical approach for solution of fluid and heat transfer coupled problem through porous media	Dr. Sanjeev Sharma	Materials Today: Proceedings	2021-2022	2214-7853
44	A review on machining performance of AISI 304 steel	Dr. Santosh Kumar	Materials Today: Proceedings	2021-2022	2214-7853
45	Microstructural and Mechanical Characterization of a Cold-Sprayed WC-12Co Composite Coating on	Harvinder Singh	Journal of thermal spray technology	2022	1059-9630
46	Development of high pressure cold spray coatings of tungsten carbide composites	Harvinder Singh	Materials Today: Proceedings	2023	2214-7853
47	Experimental investigation of WC-12Co cold sprayed: Substrate	Harvinder Singh	Materials Today: Proceedings	2023	2214-7853
48	Impact of operating parameters on electric discharge machining of cobalt-based alloys	Harvinder Singh and Santosh Kumar	Materials Today: Proceedings	2023	2214-7853
49	Parametric optimization and wear analysis of AISI D2 steel components	Santosh Kumar & Harvinder Singh	Materials Today: Proceedings	2023	2214-7853
50	Parametric evaluation of PMEDM for the machining of inconel-800 using response surface methodology	Dr. Satish Kumar, Dr. Sanjeev Kumar, Dr. Rahul Mehra	Materials Today: Proceedings	2023	In Press
51	A Review on Lasers Assisted Machining Methods – Types, Mode of Operations, Comparison and Applications	Dr. Rahul Mehra & Dr. Santosh Kumar	CGC International Journal of Contemporary Technology and Research	2022	ISSN: 2582-0486
52	A review on surface modification techniques	Swarn Singh, Santosh Kumar, Virat Khanna	Materials Today: Proceedings	2023	2214-7853

Patents Filed/Published/Granted:

Sr. No.	Title of Patent	Name of Faculty Inventor	CBR No./Patent No.	Status (Filed / Published / Granted)	Date of Publication
1.	Sanitizable Seat Partition Device	Dr. Amresh Kumar	202111010176	Published	16/12/2022
2.	Automated Soldering/De-Soldering Device	Dr. Sanjeev Kumar	202111013802	Published	16/12/2022
3.	Smart Soldering Gun	Dr. Satish Kumar	202111013823	Published	16/12/2022
4.	Automated Fixture Device For Mechanical Elements	Dr. Mukesh Kumar,Dr. Pawan Nain	202111013829	Published	16/12/2022
5.	Intelligent Sun Catcher Manufacturing Device	Dr. Saurabh Chaitanya	202111013853	Published	16/12/2022
6.	Rider Restraint Saddle	Dr. Manjit Singh	202111013866	Published	16/12/2022
7.	Assistive Device For Ice Maintenance In Winter Games	Dr. Rajdeep Singh,	202111013858	Published	16/12/2022
8.	Blade Sharpening Device	Dr. Pawan Nain	202111013861	Published	16/12/2022
9.	Automated Nut-Bolt Wrenching Device	Dr. Manjit Singh	202111014130	Published	16/12/2022
10.	Automated Fastener Fixation Device	Dr. Rajdeep Singh	202111014135	Published	16/12/2022
11.	Tile Cutting Device	Dr. Sanjeev Kumar	202111014134	Published	16/12/2022

Sponsored Research Activities:

The facilities available under COE –Advance Manufacturing are extended to complete the innovations under the sponsored project from DST, Govt. of India

Project 1:

TITLE OF THE PROJECT: To promote and disseminate environment-friendly technologies to generate sustainable employment opportunities for rural communities.

TECHNOLOGY DEVELOPMENT/DEPLOYMENT

Design & Development of multipurpose E-cart with possibility of retrofitting of body for specific street vending purpose (garbage/other goods) & electrical/solar module.

Design and Development Low cost smart garbage picker attachment to reduce contaminationand drudgery

Multipurpose Electrical Cart (DST/SCSP/408)

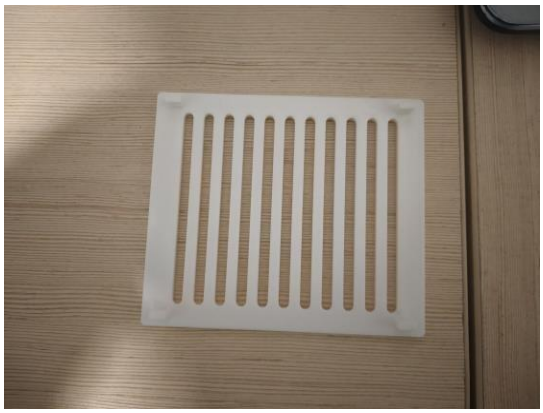
Low Cost Garbage Can Picker ((DST/SCSP/408))

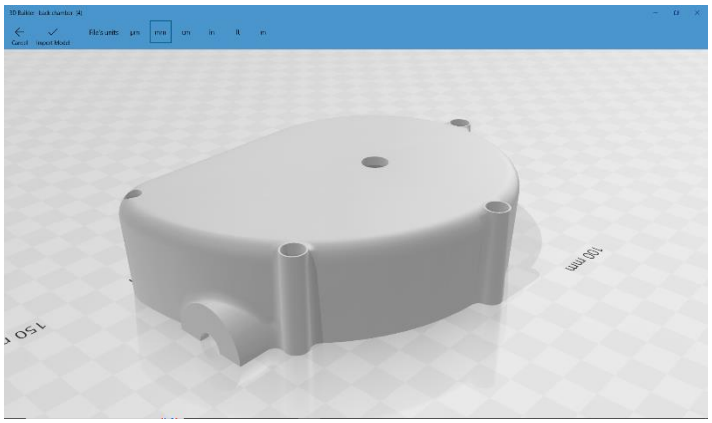
Consultancy Work

Consultancy work with Bt Energyplus Pvt. Ltd.

The C3D printing facility available at CoE for Advance Manufacturing was used to develop cover of the battery model for BT ENERGYPLUS PRIVATE LIMITED in Mohali. This brief assignment was completed in coordination with Mr. Ankit Saranagal, lead member of Battery manufacturing unit of Bt Energyplus Pvt. Ltd. The following tasks were executed from Dr. Amresh Kumar & Mr. SonuKadam.

i. Understand the Requirements: Begin by meeting with representatives from BT ENERGYPLUSto discuss their specific requirements for the battery model cover. Understand their expectations and any prototyping preferences they had.
ii. CAD modeling and Analysis: The solid works software was utilized to Analyze the existing battery model cover, identifying its strengths and weaknesses.
iii. Material Selection and Prototyping: Once the design concept was approved, proper filamentmaterial for 3D printing was used to 3D print the prototype of the cover of the battery.
iv. Design Refinement: Based on the prototype testing and feedback, refined the design further.
v. Finalization and Production: Once the final design was approved by the concerned industry,the final product was produced.





Consultancy work with Bt Energyplus

Prototyping services (3D Printing):

S. No.	Name	Startup/Innovator Name	Name of part/project	No. of parts
1	Harman Dhiman	Reseta research LLP	Blegel Packaging Bottle Prototype	2
2	Harman Dhiman	Reseta research LLP	Bottles	4
3	Ravinder Bishnoi	Kiekie Pvt Ltd	VHCA	2
4	BT energy plus Pvt. Ltd.	Winch	cover case	2
5	Manish Pandit	Chandigarh Institute of Drones	cap,lock,bottom,top for rover	3
6	R.P. Jenish Raj	Gyrodrone(CU)	Gyro drone	9
7	Ankit Sarangal	BT Energy Plus Pvt Ltd	cover case	2
8	Shreyansh Srivastava	Spider Bot	line inspection rover	16
9	Vishal Kharte	Lizard Bot	Lizard Bot	16
10	R.P. Jenish Raj	Gyro drone	frame for drone	6
11	Devan Miglani,Chit Prakash,Ayush Gupta	Drone design	Drone Frame	1
12	Shreyansh Srivastava,Sundar Newar,Vishal Kharte	Structure of the project	Structure of the project	1
13	Akshay Verma	Chasis of dog robot	Chasis of dog robot	1
14	R.P. Jenish Raj	Drone part	Drone part	1
15	Gavakshit Verma	Drone ducts	Drone ducts	8

Innovative Projects by Students:

S. No.	Project	Mentor	Batch	Student names	Status
1	ALL- TERRAIN VEHICLE	Er. BeantSingh	2018-2019	Dron Mahna, Sahil Datta, Radraush,Pratik KR Khemka	Completed
2	SAE SUPRA CAR	Er. Amandeep Singh	2019-2020	Himanshu, Sanyam Bajaj, Himanshu Lawania	Completed
4	Fuel Adulteration Detection System	Dr. Sanjeev Sharma	2018-2019	Naman Goyal Mohd. Jafar	Completed
6	Hydraulic Road Speed Breaker Power Generation	Dr. Amresh Kumar	2019	Ankit Bansal	Completed
7	Epoxy Based GFRPs Reinforced With Pet Fabric	Dr.Sachin Mohal/Dr. Karanbir Singh	2020	Diyvanoor Singh	Completed
15	Mechbollinger	Mr. Ravinder Singh	2021-2022	Ritik Jain Sahil Verma Shubham Singh	Completed
16	Automatic Solar Powered Grass Cutter	Dr. Manjit Singh	2021-2022	Rahul Kumar Robin Saini Rajdeep Singh Shriyansh	Completed
17	FPV Racing Drone	Mr. Ravinder Singh	2021-2022	Aman Thappa Balram Tiwari Brajaditya Singh	Completed
18	Design And Development of Go- Kart	Dr. Rajneesh Kumar	2021-2022	Anirban Gupta Kashish Bajaj Manik Himanshu Agrawal	Completed
19	Fire Fighting Spider	Dr. Amresh Panjila	2021-2022	Kul Kumar Mudit Wadhwa Paras Dangey	Completed
20	Automatic Pesticides Spraying Machine	Mr. Ravinder Singh	2021-2022	Akashdeep Singh,Amandeep Singh Amritpal Singh,Bharav Bansal	Completed
21	Power Generation Device	Santosh Kumar, Rakesh Kumar	2021-2022	Meghul Kumar Kushawaha,	Completed

22	Multi Purpose Electric Vehicle Cart	Dr. Saurabh Chaitanya	2022-2023	Mohit Kaundal ,Vishal ,Rajeev Harshit	Completed
23	Pick and Place Robotic Arm using Hand Gestures	Dr. Rachin Goyal	2022-2023	Satyam Paliwal, Vishal kumar Yadav Sundram Kapil, Rahul kumar Jha	Completed
24	Rainwater Sensing Automatic Shed System	Dr. Rajneesh	2022-2023	Faiz Abbas , Anshul Diwakar	Completed
25	Cinewhoop Drone	Dr. Sachin Mohal	2022-2023	Nishant Thakur, Aditya Yadav Kaustubha Srivastava	Completed
26	Automatic Side stand	Dr. Manjit Singh	2022-2023	Abhishek,Akshat Kirola	Completed
27	Design and analysis of wheel rim	Dr. Sachin Mohal	2022-2023	Chandan Choudhary, Sambhav Bedi	Completed

Innovative Projects –Achievements

HYBRID TADPOLE TRIKE

- 1st Prize at Pushpa Gujral Science City in Innotech 2019.

BATTERENT

- 1st Prize at Pushpa Gujral Science City in Innotech-2019
- 1st runner in Smart India Hackathon 2019 (SoftwareEdition)

Ambulance Drone (Rapid action Drone RAD) / FPV Racing Miniquad

- Rs. 11,000 at Pushpa Gujral Science City inInnotech 2019
- 1st Prize at BML Munjal University
- 3rd Prize at IIT Roorkee

M. Tech. Thesis

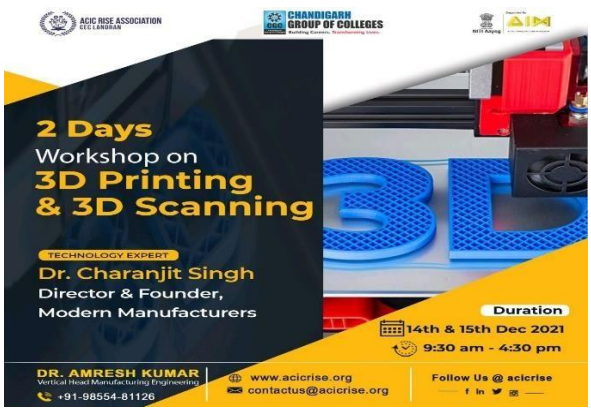
Thesis Title	Supervisors	Year	Roll no.	Candidate
Investigating the machining characeristics of Die Steel Using vegetable Oil In EDM	Dr. Sanjeev Sharma/ Dr. Saurabh Chaitanya	2020	1803054	Ajay Sharma
Parametric study on electric discharge drilling of Nickel Based alloy	Dr. Rachin Goyal/ Dr. Vinod Kumar Rohila	2020	1803058	Jaswinder Singh
Development of frame work for kaizen implementation in manufacturing firm: an ISM approach	Dr. Manjeet Singh/ Dr. Sachin Mohal	2020	1803057	Harmandeep Singh
Investigation of mechanical characteristics of superalloy (INCONEL 600) using powder mixed electric discharge machining	Dr. Rajesh Sharma/ Dr. Satish Kumar	2020	1834409	Randeep Singh
Experimental investigations on electric discharge drilling of Nickel based alloy	Dr. Rachin Goyal	2021	1903032	Nakul Sharma
An experimental investigation on wired EDM of Beryllium Copper C17200	Dr. Rachin Goyal/ Dr. Amresh Kumar	2021	1918552	Gourav Katwal
An experimental investigation on wired EDM of Titanium Ti-6Al-4V	Dr. Amresh Kumar/ Dr. Rajesh Sharma	2022	1903031	Gurpreet Singh
Parametric study on electric discharge drilling of Nickel Based alloy	Dr. Rachin Goyal/ Dr. Vinod Kumar Rohila	2020	1803058	Jaswinder Singh
Investigation of mechanical characteristics of superalloy (INCONEL 600) using powder mixed electric discharge machining	Dr. Rajesh Sharma/ Dr. Satish Kumar	2020	1834409	Randeep Singh
An experimental investigation on wired EDM of Beryllium Copper C17200	Dr. Rachin Goyal/ Dr. Amresh Kumar	2021	1918552	Gourav Katwal
An experimental investigation on wired EDM of TITANIUM Ti-6Al-4V	Dr. Amresh Kumar/ Dr. Rajesh Sharma	2022	1903031	Gurpreet Singh

Awareness/Outreach Events Organized (If Any)

S. No.	Start Date	End Date	Event Name	Event Type
1	23rd Sept 2021	23rd Sept 2021	RISE Inno Tech talks on opportunities in 3D printing for innovators and Entrepreneurs	Outreach
2	12th Oct 2021	12th Oct 2021	RISE Inno Tech Talks on Role of 3D Printing in spurring innovation and Entrepreneurship	Outreach
3	25th Oct 2021	25th Oct 2021	Design Thinking	Capacity Building
4	26th Oct 2021	26th Oct 2021	Business Model Canvas	Capacity Building
5	10th Nov 2021	10th Nov 2021	RISE Inno Tech Talks on Entrepreneurship Opportunities in Rural Areas	Outreach
6	30th Nov 2021	1st Dec 2021	To create and nurture women led micro food processing enterprises focusing Desi Indian food products	Outreach
7	1st Dec 2021	1st Dec 2021	Importance of the Founding Team	Capacity Building
8	17th Jan 2022	17th Jan 2022	Be a Change Maker, Become an Entrepreneur	Outreach
9	24th Jan 2022	24th Jan 2022	RISE InnoTech talks “3D printing technology”	Outreach
10	28th Jan 2022	28th Jan 2022	Investor Demo Day	Fund raising event
11	27th Jan 2022	27th Jan 2022	Product Market Fit	Capacity Building
12	31st Jan 2022	31st Jan 2022	Expert Session on "My story"	Outreach
13	31st Jan 2022	6th Feb 2022	Basics of Entrepreneurship	Capacity Building-Workshop
14	2nd Feb 2022	2nd Feb 2022	Physics of Drone Technology'	Outreach
15	4th Feb 2022	4th Feb 2022	Unit Economics	Capacity Building
16	11th Feb 2022	11th Feb 2022	Financial model	Capacity Building
17	11th Feb 2022	11th Feb 2022	Entrepreneurship Skill	Outreach

18	19th Feb 2022	19th Feb 2022	Story Telling	Capacity Building
19	15th Feb 2022	15th Feb 2022	Session on Design Thinking, Critical thinking and Innovation Design	Outreach
20	24th March 2022	24th March 2022	Awareness camp for farmers for Cropping Patterns and Organic Farming	Outreach
21	8th March 2022	8th March 2022	workshop for Exploring Women entrepreneurial potential.	Outreach
22	5th May 2022	6th May 2022	Capacity building workshop	Capacity Builing
23	26th May 2022	26th May 2022	RISE InnoTech talks role of 3D printing in spurring innovation and entrepreneurship	outreach
24	26th May 2022	26th May 2022	Awareness session on 3D printing for young students and innovators	Outreach
26	30th May 2022	30th May 2022	Awareness workshop on interventions for sustainable agribusiness	Outreach
27	28th May 2022	28th May 2022	E-commerce based interventions for sustainable agribusiness	Outreach

Events at a Glance:



Glimpses of the Events

Faculty Associated (Advanced Manufacturing Lab)

- Dr. Rachin Goyal, HoD, Department of Mechanical Engineering (Ph.D. – IKG PTU, Jalandhar)
- Dr. Sanjeev Sharma, Professor, ME Department (Ph. D. – Thapar University Patiala)
- Dr. Narinder Kumar, Associate Professor, ME Department (Ph.D. - PEC, University of Technology)
- Dr. Sachin Mohal, Associate Professor, ME Department, (Ph. D. - Punjab University Chandigarh)
- Dr. Saurabh Chaitanya, Associate Professor, ME Department, (M. Tech. and Ph.D. - IIT Roorkee)
- Dr. Santosh Kumar, Associate Professor , ME Department (Ph.D. –IKG PTU, Jalandhar)

Contact Person – CoE for Advanced Manufacturing

Dr. Rachin Goyal,
Professor & Head,
Department of Mechanical Engineering
Chandigarh Engineering College- CGC Landran, Mohali
Contact hod.cecme@cgc.edu.in ; 9781925249

Dr. Amresh Kumar Panjla
Professor & Coordinator,
CoE for Advanced Manufacturing
Supported by: Atal Community Innovation Centre (ACIC-RISE)
Chandigarh Engineering College-CGC Landran, Mohali
Contact 9855481126; amresh.coeme@cgc.edu.in