NEW AGE MAKERS' INSTITUTE OF TECHNOLOGY

General Information /Sponsoring Body

Particulars	Requirement	Details
Name of the programmes along with the justification as to how these programmes fit into the Distinct category	Upload the name of the programmes along with the justification as to how these programmes fit into the Distinct category	List attached.

Submitted to the University Grants Commission (UGC), along with application for 'Distinct Category' under UGC Deemed to be Universities Regulations, 2023

Name the programs along with the justification for how these programs fit into the Distinct category.

Common Distinct features for all the proposed programs

The deemed-to-be-university will cater to India's Viksit Bharat ambitions.

- India has a vision of becoming a **$30 trillion economy by 2047** and for this, the manufacturing industry is poised to play a pivotal role as India will require a **16-fold growth in the manufacturing sector** over the next 23 years.
- The **Production Linked Incentive (PLI) Scheme** covers 14 key sectors aimed at fostering investment in cutting-edge technology and promoting global competitiveness. The proposed Deemed-to-be University is **aligned with 6 of those key sectors**.
- We will educate learners and provide the industry with relevant solutions, ensuring the creation of a **technological workforce** ready to lead the transformation. The skills taught will be of global standards and focused on cutting-edge fields such as **smart manufacturing, advanced robotics, and sustainability.**
- We stand aligned with strategic Indian goals related to the manufacturing sector, as laid out in **Viksit Bharat 2047, Make in India, and Atmanirbhar Bharat.**

The proposed deemed-to-be-university aims to achieve quality at scale.

- The capacity for each program will be **600 students at steady state**, a scale that has not been achieved by any other HEI (an average of not more than 20 students – refer to the Annexure for details).

Industry-aligned curriculum.

- Each program is designed with the aspects of **Technology, Design, Management and Sustainability** within them.
  - The Technology and Design aspects are as per the discipline area.
  - The **management modules** include Manufacturing Management, Project Management, Operational Excellence, Sustainability, Reliability and Quality for Engineers, and the economic aspects of manufacturing, thus preparing students for leadership roles.
  - While the **Sustainability** courses may include sustainable manufacturing practices, Decarbonization Pathways and ESG Metrics, Circularity etc. to produce graduates who can drive sustainability in industrial settings.
- In the fourth trimester students will work on **Industry Internship/ Capstone Project**, providing hands-on experience and practical application of learned concepts.

Unique Pedagogy

- Each school will have an **anchor academic and industry partner** who will be the fundamental partners, helping in setting up of the schools. In addition to these anchor partners there will be multiple other partners.
  - Anchor **Academic** partners will support in **curriculum** design, development, provide students **global** perspective, ideate and develop **cutting-edge laboratory** facilities. Further, they will jointly work on **research** projects with partner institutes.
  - Anchor **Industry** partners will play a crucial role in supporting **infrastructure** development, developing **industry-relevant curriculum**, offering **training** opportunities like internships and capstone projects, take **guest lectures** in specific industry aligned topics though a case study-based approach.
- Creating an **experiential and immersive learning** environment.

- **Flipped classroom model** will be used for effective course delivery.
- **Industry-grade labs:** digital labs, AR/ VR labs, and **mini and digital factories** for replicating the industry environment in an academic atmosphere.
- Dedicated interactive learning spaces for **activity-based discussions** and **case studies** encouraging peer-to-peer learning to inculcate the concept of "**design-and-make**" in the students.

- **Global Immersion** will be offered to students in the first year of their academic program and will be optional to opt for. (We have an existing partnership with TUM Asia for this, and students undergo global immersion at the Singapore location)

NEP Alignment

- **Modular program structure** with **multiple entry and exit points** allows students to tailor their learning according to their interests.
- **Academic Bank of Credit** (ABC) shall be established to digitally store the academic credits earned which can be utilized for pursuing various academic pathways offered.

1. Masters in Smart Manufacturing Technology and Management

- Current projections indicate a required annual growth rate of 8.1 per cent for smart manufacturing from 2024 to 2029 for India to become a $30 trillion economy by 2047.
- The program aims to form a workforce proficient in digital transformation for the manufacturing sector, capable of leading and optimizing systems with advanced technology, and enhancing India's global manufacturing competitiveness.
- The curriculum covers technology, design, and management modules. The core modules include topics from PLC Programming to AI in Manufacturing, providing practical skills for handling complex manufacturing processes.
- Graduates will be prepared for roles such as Smart Manufacturing Engineer, contributing to the digitalization and sustainability of manufacturing.

Need Analysis of the program: The need for advanced skills in smart manufacturing is increasingly critical as the industry moves toward digitization and automation. In India, manufacturing represents approximately 17 per cent of the GDP and employs around 27 million individuals[1]. However, a significant skills gap exists in areas essential for Industry 4.0, such as robotics, AI/ML, IoT, and data analytics. Current projections indicate an annual growth rate of 8.1 per cent for smart manufacturing from 2024 to 2029[2], highlighting a strong upward trend in demand. Despite this growth, the talent pool equipped with relevant skills remains limited, with up to 60 per cent of manufacturing firms reporting a gap in these areas.[3] This mismatch between demand and supply presents a need to bridge this skills gap to support India's strategic goals in manufacturing.

Objective of the program: The primary aim of the proposed program is to develop a specialized workforce capable of driving digital transformation within the manufacturing sector. By equipping students with advanced knowledge and hands-on experience in smart manufacturing technologies, this program aims to produce leaders who can innovate, manage, and optimize manufacturing systems using cutting-edge technology. The program will cater to the industry's critical need for expertise in technology integration, data-driven decision-making, and sustainable

[1] India Skill Report 2023: Key Findings on Talent Availability
[2] India Smart Manufacturing Market Analysis | Size & Forecasts
[3] The New-age Skill Gap | Fortune India

practices, aligning with the broader goal of strengthening India's manufacturing competitiveness on a global scale.

Curriculum focus: The curriculum of the proposed program is structured to cover key modules in technology, design, and management with a strong emphasis on sustainability. The program will integrate technology modules focusing on Pneumatic and Hydraulic Technology, PLC Programming, SCADA and HMI, IIoT, Industrial and Collaborative Robots, Product Design and Rapid Prototyping for Additive Manufacturing, AI in Manufacturing, Data Analytics and Data Visualization, Digitalizing Operation with MES etc. equipping students with practical skills to handle complex manufacturing processes. Design modules introduce students to digital tools and techniques for smart product and process design.

Program outcomes: Graduates of this program will emerge with a robust set of skills in smart manufacturing technology, analytical capabilities, and leadership in operations management. They will be well-prepared for various Techno - Managerial roles including Smart Manufacturing Engineer, Automation Specialist, Operations Manager, and Data Analyst, across leading organizations such as Siemens, ABB, Fanuc, Bosch etc. in the field. With hands-on expertise and a strong theoretical foundation, they will contribute to the digital transformation of manufacturing, fostering innovation, efficiency, and sustainability within their organizations.

2. Masters in Automotive Systems Technology and Management

- Current projections indicate an annual growth rate of 8.2% for the automotive sector from 2024 to 2029, driven by technological advancements and increasing consumer demand.
- The program aims at fostering leaders skilled in automotive systems technology and management, catering to the industry's need for expertise in electric vehicles, autonomous driving, and smart mobility.
- The program's technical curriculum encompasses modules from Product Foundations to Electrification of Product.
- Prepares for roles, like Automotive Systems Engineer and Product Development Manager, driving innovation, sustainability, and smart manufacturing in the automotive sector

Need Analysis of the program: The need for advanced skills in automotive systems technology and management is increasingly critical as the industry undergoes significant transformations. In India, the automotive sector is a major contributor to the economy, accounting for approximately 7.1% of the GDP and employing over 19 million people directly and indirectly.[4] However, there is a substantial skills gap in areas essential for modern automotive engineering, such as electric vehicles (EVs), autonomous driving, and smart mobility solutions[5]. Current projections indicate an annual growth rate of 8.2% for the automotive sector from 2024 to 2029[6], driven by technological advancements and increasing consumer demand for innovative and sustainable vehicles. Despite this growth, the talent pool with relevant skills remains limited, with many automotive firms reporting a gap in expertise related to new technologies.

Objective of the program: The main goal of this program is to cultivate a highly skilled workforce capable of spearheading innovation and technological progress in the automotive sector. By providing students with in-depth knowledge and practical experience in automotive systems technology and management, the program aims to develop leaders who can design, oversee,

[4] https://static.pib.gov.in
[5] The electric cars era transforming the car repairs and services landscape - Aiman Albatayneh, 2024
[6] www.mordorintelligence.com

and enhance automotive systems using the latest technologies. This program addresses the industry's urgent need for expertise in electric vehicles, autonomous driving, and smart mobility solutions, supporting the broader objective of enhancing India's global competitiveness in the automotive industry.

Curriculum focus: The curriculum for the program is meticulously designed to provide a comprehensive education in both the technical and managerial aspects of the automotive industry. In the first trimester, students will build a solid foundation with modules on Product Foundations and Process Foundations. The second trimester focuses on advanced topics such as Accelerated Product Development, Smart Manufacturing, and Electrification of Product, equipping students with cutting-edge knowledge and skills. The third trimester allows for specialization through electives in specific fields and sustainability, ensuring students can tailor their education to their career goals.

Program outcomes: Graduates of this program will be well-equipped to take on various roles within the automotive industry, such as Automotive Systems Engineer, Product Development Manager, and Sustainability Specialist. They will possess a deep understanding of both the technical and managerial aspects of automotive systems, enabling them to drive innovation and efficiency in organizations such as Maruti Suzuki, Eicher, Mahindra, MG Motors etc. With a strong emphasis on sustainability and smart manufacturing, graduates will be prepared to lead the industry towards a more sustainable and technologically advanced future. Their hands-on experience through the capstone project will ensure they are ready to tackle real-world challenges and contribute significantly to their field.

3. Masters in Semiconductor Manufacturing Technology and Management

- The semiconductor market in India is expected to reach $13.31 billion by 2029 with an annual growth rate (CAGR) of 11.60%.
- Curriculum includes semiconductor devices, fabrication processes, and supply chain management, with focus on thin-film deposition, MEMS, and understanding international economics.
- Prepares for careers in the semiconductor industry for roles like Process Engineers and Production Managers in semiconductor companies, overseeing manufacturing processes, ensuring quality, and managing operations, advancing semiconductor production technology and efficiency.

Need Analysis of the program: The semiconductor industry in India is experiencing significant growth, driven by **increasing demand for electronic devices, IoT, and AI integration**. In 2024, the semiconductor market in India is projected to reach **$7.69 billion**, with an annual growth rate **(CAGR) of 11.60%**, expected to reach **$13.31 billion** by 2029. The Indian government has set ambitious goals to establish the country as a global leader in semiconductor manufacturing, aiming to **achieve a domestic chip-making industry** valuation of $110 billion by 2030. This growth is supported by initiatives to reduce dependency on imports, which currently account for around **85% of India's semiconductor needs**. With a focus on building a **robust semiconductor ecosystem**, India is poised to significantly increase its share in the global semiconductor market.

Objective of the program: The objective of the program is to prepare students for successful careers in the semiconductor industry by providing a comprehensive understanding of **semiconductor devices, fabrication processes, and industry standards**. This program equips students with the technical knowledge, practical skills and managerial skills needed to

design, manufacture, and manage supply chain & operations of semiconductor products. Key areas of focus include **thin-film deposition, microelectromechanical systems (MEMS), quality control**, moreover the course has been designed to understand **international economics and supply chain** of the semiconductor & its related products.

Program outcomes: Graduates of program will be equipped with the technical expertise and management skills necessary to excel in the **semiconductor industry**. They will be prepared for roles such as **Process Engineers, Quality Assurance Specialists, Production Managers, and Semiconductor Fabrication Technicians**. Leading companies in the semiconductor sector, including **Intel, TSMC, and Applied Materials**, frequently offer such positions. These roles involve overseeing semiconductor **manufacturing processes**, ensuring **product quality**, and **managing production operations**, all critical to advancing the technology and efficiency of semiconductor production.

4. Masters in Sustainable Engineering and Management

- About 86% of Indian companies now recognize sustainability as a core part of their strategy, but only 16% have actively integrated sustainability goals into their business models
- The program readies students with interdisciplinary skills to tackle environmental challenges, merging engineering, economics, promote sustainable practices and sustainability principles for viable, eco-friendly solutions.
- Equipped for roles such as Sustainability Consultants and Energy Managers in leadership profiles across sectors like environmental technology and public policy.

Need Analysis of the program: There is a pressing need for sustainability studies as India continues to face environmental challenges, need for climate-resilient infrastructure, and a shift towards sustainable business practices. About **86%** of Indian companies now **recognize sustainability** as a core part of their strategy, but **only 16% have actively integrated sustainability goals** into their business models.[7] The demand for '**green skills'** in India, including those needed for **renewable energy, electric vehicle technology and environmental governance** has surged. LinkedIn's 2024 Global Climate Talent Stocktake report highlights that while the **demand** for green skills has been **growing** at an average **rate of 5.9% per year** globally, the increase in skilled professionals has **lagged at 3.2%.**[8] By 2047, India is projected to **create 35 million green jobs**, yet existing educational and training programs are struggling to keep pace with the demand.[9]

Objective of the program: The objective of the program is to equip students with the interdisciplinary knowledge and skills necessary to address complex **environmental challenges**. This program integrates principles of **engineering, economics, and sustainability** to develop solutions that are technically sound, economically viable, and environmentally responsible. Students learn to **analyze and manage the impacts** of engineering projects on the environment, ensuring **sustainable development and resource management**. The curriculum often includes **hands-on projects, case studies, and collaboration with industry** experts to prepare graduates for leadership roles in various sectors, including **environmental technology, sustainable production, and public policy**.

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[7] 16% of Indian organisations have prioritized sustainability goals: Study - BusinessToday

[8] economicgraph.linkedin.com/content/dam/me/economicgraph/en-us/PDF/linkedIn-global-climate-talent-stocktake-sept-2024.pdf

[9] Green pastures: Green jobs market awaits skilled talent amid ripe opportunities | YourStory

Program outcomes: Graduates of the Sustainable Engineering and Management Program will be well-equipped to tackle **environmental challenges and drive sustainable practices** across various industries. They will possess a strong foundation in sustainability principles, engineering, and management, enabling them to **design and implement** effective solutions for sustainable development. Upon completion, students can pursue roles such as **Sustainability Consultants, Environmental Engineers, Energy Managers, and Sustainable Project Managers**. Companies like **Siemens, Schneider Electric, NTPC** etc. are known to offer job opportunities in this domain, reflecting the growing demand for professionals skilled in sustainability and environmental management**.**

5. Masters in Robotics Engineering and Management

- The India's Graduate Skill Index: 2023 report reveals only 48% employability rate among Indian graduates in AI and ML roles
- Prepare students for robotics industry by providing comprehensive knowledge in designing, developing and managing robotic systems for manufacturing and hands-on training with robotic equipment.
- Take on roles like Robotics Engineer and Design Engineer, support industries in adopting robotics to improve efficiency and reduce costs, advancing automation initiatives for national economic growth.

Need Analysis of the program: According to India STEM Foundation, **robotics education** in India is growing but remains **fragmented**, especially in terms of available resources, trained teachers, and infrastructure. Globally, women's participation in STEM fields lie at 28%. The India's Graduate Skill Index: 2023 report reveals only **48% employability rate** among Indian graduates in AI and ML roles.[10] Revenue is expected to show an annual growth rate **(CAGR 2024-2029) of 8.26%,** resulting in a market volume of **US $664.4 million by 2029**.[11] This poses a massive demand in skills pertaining to robotics discipline.

Objective of the program: The objective of the program is to prepare students for successful careers in the **robotics industry** by providing a comprehensive understanding of **designing, developing, and managing robotic systems** tailored for **manufacturing, logistics**, and other sectors. The courses will give students a robust foundation in both **theory and application**. **Hands-on training** with robotic equipment will allow students to understand the intricacies of robotic **integration, troubleshooting, and maintenance**.

Program outcomes: Graduates of program will be equipped with the technical expertise and management skills necessary to excel in the **robotics industry**. They will be prepared for roles such as **Product Engineer, Robotics Engineer, Machine Learning Specialist, Robotics Machine Operator, Design Engineer** etc. Leading companies in the sector, including **Micron, ABB, Siemens** etc. frequently offer such positions. The expertise gained will position graduates as leaders in the **automation revolution**. They will be qualified to support industries in adopting **robotic systems** that improve **efficiency, reduce labor costs, and minimize human error**. These graduates will be instrumental in managing and advancing automation initiatives that align with the nation's economic and technological growth aspirations.

[10] Mercer_Mettl_Indias_Graduate_Skill_Index_2023.pdf

[11] Robotics - India | Statista Market Forecast

Annexure: Illustrative list of institutes providing a residential post graduate program in similar disciplines

Discipline	Institute Name	Program Name	Duration	Student Intake
Smart Manufacturing	IISc Bangalore	M. Tech in Smart Manufacturing	Two-year	10
	IIITDM Jabalpur	M. Tech in Smart Manufacturing	Two-year	10
	IIT Jodhpur	M. Tech in Advanced Manufacturing and Design	Two-year	12
	NIT Jamshedpur	M. Tech in Smart Manufacturing	Two-year	15
	IIIT DM Kurnool	M. Tech in Smart Manufacturing	Two-year	15
	NIT Bhopal	M. Tech in Smart Manufacturing	Two-year	20
Semiconductor	IISc Bangalore along with 4 Taiwan Universities	Joint M. Tech in Semiconductor Technology	Two-year	8
	IISc Bangalore	M.E. in Semiconductor Technology	One-year	20
Sustainability	NIT Tiruchirappalli	M. Tech Energy Efficient & Sustainable Architecture	Two-year	25
	NIT Warangal	M. Tech in Sustainable Energy Generation and Storage Technologies	Two-year	20
	NIT Puducherry	M. Tech Structural Engineering - Resilience and Sustainability	Two-year	10
	NIT Hamirpur	Sustainable Architecture	Two-year	19
	Central University of Rajasthan	Sustainable Architecture	Two-year	12
	TERI School of Advanced Studies	M.Sc. in Environmental Studies and Resource Management	Two-year	50
	IIT Madras	M. Tech Environmental Science & Engineering	Two-year	10
	IIT Hyderabad	M. Tech Energy Science and Technology	Two-year	15
Robotics	NIT Bhopal	M. Tech Automation and Robotics	Two-year	5
	IIIT DM Kurnool	M. Tech Robotics and Automation	Two-year	20
	IIIT Allahabad	M. Tech IT with specialization in Machine Learning, Robotics and Human Computer Interaction Group	Two-year	48
	Guru Ghasidas Vishwavidyalaya	M. Tech in CAD/CAM-ROBOTICS	Two-year	18
	IIT Madras	Interdisciplinary Dual Degree program in Robotics	Five-year	25