

Graphic Era (Deemed to be University) Dehradun
Department of Management Studies
Executive Development Program
(Post Graduate Diploma in Sustainable Manufacturing)



COURSE OVERVIEW

- Duration: 9 Months
- Category: Operations Management.
- Course Fee: INR 50,000/-

PROGRAM DETAILS

The emphasis on sustainable manufacturing (SM) is gaining increasing attention with environment-friendly companies discovering higher potential to not only lower costs but also to boost overall performance through improved products (Nidumolu, Prahalad, & Rangaswami, 2009). A relatively recent study with 30,000 participants in 60 economies suggests that millennials are willing to spend extra for the products and services offered by firms committed to sustainability issues (the Nielsen Company, 2015). SM refers to the process of developing products and services by incorporating sustainable economic and environmental practices (Akbar & Irohara, 2018).

SM deals with the conservation of energy and natural resources (Akbar & Irohara, 2018) and ensures the safety and well-being of all stakeholders while producing products and services of desired quality (Jawahir, Badurdeen, & Rouch, 2015). SM is different from traditional manufacturing in that it is considered more holistic and comprehensive in its approach, while the latter is primarily concerned with either the economic or value-creation perspective (Stark, Seliger, & Bonvoisin, 2017).

Hence to imbibe the best practices and the know-how of sustainable manufacturing among industry professions department of management studies, Graphic Era Deemed to be university, Dehradun presents a comprehensive 9 monthly program. This program recapitulates participants' knowledge of the SM at an operational level and seeks to build on it to develop a strategic perspective. The program aims to equip middle and top-level managers, with knowledge and skills to build capabilities for sustainable manufacturing.

The program does so by integrating the concepts and practices of industrial energy excellence, Lean six sigma (LSS), and sustainable business strategies. It is important to incorporate the conceptual and practical aspects of industrial energy excellence while developing capabilities for sustainable manufacturing because industrial energy efficiency is considered one of the most feasible, cost-competitive, and safe environmental strategies for mitigating the distinct challenges associated with climate change (Tanaka, 2011). Energy cost contributes to about 5% to 35% of the manufacturing cost in an organization across the industry. Besides contributing to energy cost optimization, organizations enable resource conservation, thus contributing to reduced greenhouse gas emissions and sustainable development. Industrial energy efficiency also makes excellent business sense as it is one of the most attractive and cost-effective tools which reduces the cost of production and could contribute to increased profitability.

The program further strengthens the capabilities for sustainable manufacturing by integrating the aspects of LSS. Implementing lean practices enables firms in eliminating non-value-added activity (waste) in a process or service. Hence, resulting in reduced service cycle

times, improved on-time delivery performance, and reduced costs. On the other hand, the concept of six-sigma helps firms to measure and understand both individual data points, averages, and variation in a process or service, hence resulting in achieving improvements in service quality and cost.

Finally, the module on sustainable business strategies will focus on the fundamental strategies, tools, and techniques required to analyze and design sustainable businesses.

Program Content

The program is designed to be executed in three parts. The first part will help participants to develop capabilities in the domain of energy excellence, while the second part will develop capabilities in the domain of manufacturing excellence. And finally, part three will train participants in developing sustainable business strategies.

Part A Energy Excellence

Module 1: General Aspects of Energy Management

- Energy Scenario and Laws
- Basics of Energy & its various forms
- Energy Management & Audit
- Renewable Sources
- Material & Energy Balance
- Energy Action Planning
- Financial Management
- Project Management
- Energy Monitoring & Targeting

Module 2: Energy Efficiency in Thermal Utilities

- Fuels & Combustion
- Boilers, Steam System
- Furnaces
- Insulation & Refractory
- FBC Boilers
- Cogeneration
- Waste Heat Recovery

Module 3: Efficiency in Electrical Utilities

- Electrical Distribution System
- Electric Motors
- Compressed Air System
- HVAC & Refrigeration System
- Fan & Blowers
- Pumps & Pumping Systems
- Cooling Tower

Module 4: Project Financing for Energy Efficiency projects

- Understanding the following financial parameters for evaluating the new investment decision (NPV IRR XIRR)
Payback period etc.
- Developing, analyzing, and appraising the economics of the new investment decision with a specific focus on energy efficiency.
- Financial Modeling on MS Excel
- Understanding and evaluating the Time value of money and Cash flow analysis for the new project.
- Project appraisal
- Financial options available in the market.
- Upcoming trends in project financing, national and international perspective.
- Discussion on Successful project financing case study.
- Developing bankable Detailed project report

Part B Manufacturing Excellence

Module 5: Understanding manufacturing excellence.

- Philosophy of operational/manufacturing excellence
- Dimensions of operations management
- Challenges of operations management

Module 6: Understanding Lean Six Sigma

- Lean Six Sigma (LSS): An Introduction
- Introduction to DMAIC methodology
- Introduction to key activities and tools used in the defined phase.
- Voice of the Customer-Business-Employee
- Developing project charter

Module 7: Capacity Enhancement

- Introduction to capacity enhancement
- Capacity enhancement approach
- Basic lean concepts for Matrices of time efficiency
- Time trap Vs Capacity Constraints: Identifying Time trap and Capacity Constraints
- A systematic approach for Realizing the capacity enhancement objective.

Module 8: Implementing LSS Tools

- Journey of the DMAIC cycle
- Waste classification
- LSS tools
 - RACI matrix
 - Pareto Analysis

- Value stream mapping
- Why-why analysis
- FMEA
- Other tools as per the requirement of participants

Module 9: Quality Excellence

- Quality excellence
- Quality function deployment
- Measurement system analysis
- Control charts
- Understanding six sigma
- Process capability
- Hypothesis Testing
- ANOVA

Part C Sustainable business strategiesModule 10: Sustainable Business Strategies

The module on sustainable business strategies will focus on the fundamental strategies, tools, and techniques required to analyze and design sustainable businesses. In this module, we will refer to case studies on sustainability practices at the firm level, research papers on sustainability, and expert talks to develop our understanding of sustainable business strategies. To learn practical insights on sustainable business strategies we will (a) identify a sustainability issue faced by a particular industry (b) collect data on the issue (c) analyze the issue, and (d) provide a solution to the problem. Class sessions will combine presentations, research paper discussions, case study discussions, and guest speakers. All participants will work on a course-long team project that critically evaluates the sustainable business strategies of an industry or a publicly traded company. Grades will be based on class participation, case study assignments, and the team project.

Program Highlights

- Designed to equip managers with global best practices in sustainable manufacturing.
- Content delivery through workshop mode
- The course is spread over 9 months period, considering the time constraints of working professionals.
- A unique blend of multidisciplinary subjects
- Lectures delivered by industry professionals.

Program Details

PEDAGOGY

The teaching approach will be highly interactive and deploy diverse pedagogical tools and techniques including lectures, case studies, live corporate examples, and general discussions. To provide greater industry insights, practitioners would also be invited to share their experiences.

KEY LEARNING OUTCOMES

After completing this program, the participants should be able to:

- Develop capabilities in the domain of Energy Excellence
- Develop capabilities in the domain of Manufacturing Excellence
- Develop capabilities in the domain of sustainable business strategies.

PROGRAMME DELIVERY/COURSE PEDAGOGY

Sessions will be conducted via offline classroom sessions and a state-of-the-art Interactive Learning (IL) platform that can be accessed by learners on their Desktop, Laptop, Tablet, or Smartphone. Participants will be provided with reading materials, etc., for each course. A basic outline of course delivery methodology is illustrated below.

Type of learning	Teaching Methodology
Basic concept building	<ul style="list-style-type: none">• Lectures/Talks• Books
Learning from active research in the domain	<ul style="list-style-type: none">• Discussion on research papers
Learning from case studies in the domain	<ul style="list-style-type: none">• Discussion on case studies
Practical learning	<ul style="list-style-type: none">• Identify a sustainability issue faced by firms.• Data collection on the issue• Analyzing the issue• Providing a solution to the problem

WHO SHOULD ATTEND?

- Experienced managers, engineers, and other energy practitioners who plan to enhance their skills in energy excellence, manufacturing excellence, and sustainable business strategies.
- Professionals who wish to appear for the BEE Energy Auditor examination
- Energy managers/Auditors/Quality improvement managers/Operational excellence managers within the organization.
- Consultants, vendors, and Project teams who need to evaluate the techno-commercial feasibility of the project they are working on.
- Managers in financial institutions who are into project financing of continuous improvement projects in firms
- Faculty and Students who want to make careers in the domain of sustainable manufacturing

ELIGIBILITY CRITERIA

- Diploma engineers/ Engineering graduates and post-graduates working in manufacturing industries.
- Candidates should have a minimum of two (2) years of full-time paid experience at the time of application. This should be after the graduation degree/qualifying degrees complete
- Participants will be selected based on their overall profile.
- Select applicants may be interviewed by Program Directors if required.

ASSESSMENT

S.No	Evaluation criteria	MM
1	Class participation	10
2	Class presentation one	10
3	Class presentation two	10
4	Project (Assessment of group activities)	10
5	Project (Assessment of individual activities)	30
6	Final project presentation	30