Birla Institute of Technology & Science, Pilani
Hyderabad Campus

SECOND SEMESTER 2018-2019
COURSE HANDOUT (PART-II)

Date: 07/01/2019

In addition to Part-I (General Handout for all courses appended to the timetable), this portion gives further specific details regarding the course.

Course Code : **MF F485**
Name of the Course : **Sustainable Manufacturing**
Instructor-In-Charge : **PHANEENDRA KIRAN CHAGANTI**

I. **Scope and Objective of the Course**

Growing awareness and concerns about climate change, energy security and natural resource scarcity led by the rapid expansion of economic activity in the last two decades have put government and business under immense pressure to optimize the natural resources, to increase use of renewable energy and recycled material and to reduce the environmental effects involved in the production and consumption of goods and services. The primary objective of this course is to provide environmental, economical and social perspective of manufacturing processes, systems and tooling including material, energy and toxicity analysis during the various phases of product life cycle. A multidisciplinary approach will be undertaken. Collection and analysis of real world data from industry will be encouraged.

II. Textbook

Required material will be supplied during lecture hours.

III. Reference books

1. D. Dornfeld (ed.), *Green Manufacturing: Fundamentals and Applications*, Springer, New York, 2013.
2. Wen LI(ed), Efficiency of manufacturing process: Energy and Ecological perspective, Springer, Australia, 2015.
3. David T Allen & David R Shonnard, Sustainable engineering, Pearson, India, 2015.
4. J Paulo Davim, Sustainable Manufacturing, Wiley, UK, 2010
5. Rob Thompson, Sustainable Materials, process and production, Thames & Hudson, 2013.

IV. Contents

Topic	**Learning Objective**	**Number of Lectures**
1. Introduction	Overview, WEEE, triple bottom concept of environment, economy and society	**2**

2. Sustainable manufacturing implementation factors	Driver and barriers to sustainable manufacturing, SM stakeholders	**5**
3. Sustainable manufacturing design	Eco-innovation, design for environment, design for disposal, design for energy efficiency, design for material efficiency, sustainable materials, sustainable energy	**5**
4. Sustainable practices and matrices	Recycling, remanufacturing, reuse, resource efficiency, energy efficiency in machine tools and process chains	**5**
5. Life cycle management and assessment	Strategic and operational evaluation of technologies using life cycle concept, MET analysis, environmental impact assessment, various impact assessment models, life cycle costing	**5**
6. End of life (EOL) strategies	End-of-life strategies and product definition, reverse logistics, recycle, reuse and remanufacture	**5**
7. Sustainability framework	Elements and relationship	**3**
8. Sustainable business models	Integrated product policy, sustainable product service systems, green factories	**4**
9 Waste minimizations	Lean and green, waste categorization, waste reduction	**5**
Case studies and practice on Umberto		**3**
	Total	**42**

V. Evaluation scheme and schedule

EC NO	Component	Duration	Weightage (%)	Date, time	Nature
1	**Mid Exam**	90min	30	15/3 3.30 - 5.00 PM	CB
2	**Seminar//Case study (Each chapter-1component during class hour)**		20		OB
3	**Project**		10		OB
4	**Comprehensive Exam**	3hr	40	11/05 AN	CB

V. Chamber consultation hour: To be announced in the class
VI. Notices concerning the course: All notices concerning the course will be displayed on CMS notice board only
VII. Makeup Policy: Makeup will be permitted only in genuine medical cases with prior permission.

Academic Honesty and Integrity Policy*: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.*

Instructor-In Charge
MF F485