

BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
FIRST SEMESTER 2021-22
COURSE HANDOUT (PART-II)

20.08.2021

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 : ME F313
Name of the Course : Production Techniques-II
Instructor-In-Charge : N. SURESH KUMAR REDDY
Instructors (Prac & Tut) : N. Suresh Kumar Reddy

1. Course Description:

Unconventional manufacturing processes and analysis, Micro-manufacturing technologies, Introduction to computer-aided manufacturing, CNC machines, CNC part programming, Additive manufacturing, Modelling & simulation of manufacturing processes, Surface technologies, Related laboratory exercises and fabrication project.

2. Scope and Objective of the Course

This course is designed to enrich theoretical, analytical as well as practical knowledge about advanced production techniques used in manufacturing. Methods of selection of proper production techniques, CAM and micro manufacturing technologies are also included.

3. Textbook

1. Serope Kalpakjian and Steven R. Schmid, "Manufacturing Engineering and Technology," Pearson Education (Low Cost Indian Edition), 4/e, 2001, New Delhi
2. Amitabha Ghosh and Asok Kumar Mallik, "Manufacturing Science", Affiliated East-West Press, New Delhi, 1985.

4. Reference Books

1. Roy A. Lindberg, "Processes and Materials of Manufacture," PHI, New Delhi, 2004.
2. P. N. Rao, "Manufacturing Technology: Foundry, Forming & Welding," TMH, New Delhi, 2000.
3. P. N. Rao, "Manufacturing Technology: Metal Cutting & Machine Tools," TMH, New Delhi, 2000.

5. Course Contents

Topics to be covered	Learning objectives	Number of Lectures	Chapter in the Text Book
Metal cutting theory	A brief overview of different metal cutting processes	4	T1
Non-traditional machining processes	Introduction, Ultrasonic Machining, Abrasive Jet Machining, EDM, ECM, LBM, EBM, ECG and Chemical Machining	6	T1
Micro-manufacturing	Introduction, Chemistry-based, Electron-beam lithography	2	T1

Topics to be covered	Learning objectives	Number of Lectures	Chapter in the Text Book
technologies			
Introduction to computer aided manufacturing (CAM)	Introduction, developments in conventional machine tools, CIM, FMS, Modern developments in machine tools	3	T1
CNC machines	NC and CNC Machines, Operation of NC/CNC, Definition of terms often used in numerical control, Positional control	3	T1
CNC part programming	Introduction, Programming for NC/CNC Machining, Some commonly used G codes	6	T1
Surface Technologies	Meaning of tribology, Lubrication, Wear, Cost of friction and wear	2	T1
Additive manufacturing	Introduction to Additive manufacturing processes	1	T1
Modelling & simulation of manufacturing processes	Introduction and purpose of Modelling & simulation of manufacturing processes	1	T1
Fabrication project	Design and material selection	3	Class notes
Analysis	Analysis of mechanics of metal cutting in turning, milling and drilling, cutting force calculation, power estimation, cutting temperature calculation, Lee-Shafer theory, Ernest-Merchant theory, chip separation, tool life, Machining with controlled contact tools	6	T1 & T2
Economics	Costs of single pass turning operation, optimum cutting speed for maximum profit rate in turning, restrictions on optimum cutting speed	3	T1 & T2
Quality control of metal cutting	Introduction, aims of inspection, scope, essentials and principles	2	T1 & T2
Total		42	

6. Evaluation Scheme and Schedule

EC No.	Component	Duration	Weightage (%)	Date & time	Nature of Component
1	Mid Sem Test	90 min	25	21/10/2021 11.00 -12.30PM	OB
2	Tutorial		10	To be announced later	OB
3	Class Room Assignments		10	To be announced later	OB
4	Practical		15		OB
5	Comprehensive exam	120 min	40	18/12 FN	OB

7. Chamber Consultation Hour: To be announced in the class.

8. Notice: Notices, if any, concerning this course shall be displayed on CMS only.

9. Make-up Policy: Make-up will be granted ONLY in genuine cases with prior permission. The request application for make-up test must be reached to the Instructor-in-charge before commencement of the scheduled test.

10. 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.

NOTE: The border cases in final grading will be decided based on mainly classroom attendance and attentiveness in the classroom.

**Instructor-In-Charge
ME F313**