FIRST SEMESTER 2015-2016
Course Handout (Part II)

Date: 03/08/2015

In addition to part I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No. : **MF F312**

Course Title : **Tool and Fixture Design**

Instructor-in-charge : **RAJESH P MISHRA**

Instructor (Practical) : **Rajesh P Mishra**

1. **Scope and objective of the Course:**

Rapid growth in manufacturing industries and modernization in machine tools in all over the world have created an opportunity in design of new tool and fixture. To achieve high productivity and quality part at lower cost is common goal for every industry. Therefore, theoretical and practical knowledge of tool and fixture design helps to meet such requirements. To fulfill the industry's requirement for trained and highly skilled engineers, a specialized course like tool and fixture design is mandatory in manufacturing engineering. This course aims to provide a comprehensive knowledge about tool design like design of cutting tools, die and mold, jigs and fixture which are common practice in any industry. It also gives a thorough knowledge in job holding devices and locating principles of them. Apart from this, the present course gives a direction in brief introduction of rapid tooling using rapid prototype method.

Projects using CAD/CAM software (CATIA, PRO-E), Conventional and CNC machine tools are highlighted in the course.

2. **Text Book:**

T1. Cyril Donaldson, George H LeCain, V C Goold, Tool Design, Tata McGraw-Hill Edition, 1976.

Reference Books:

R1. Edward.G Hoffman, Jig and Fixture Design, Delmar Cengage Learnining, New Delhi, Fifth Edition
R2. P H. Joshi, Jigs and Fixture Design, Tata McGraw-Hill publication, Second Edition

3. **Course Plan:**

Lect. No.	Objective	Topics	T/R-Chapter
1-3	Introduction	Objectives, Tool Design, Need in manufacturing, Requirements to Tool designer	T1-1, R1-1
4-7	To introduce tool making practice	Tools for Toolmaker, Die and mold manufacturing process (Conventional and Non Conventional)	T1-2, R1-8
8-12	To study tool materials and heat treatment	Properties of materials, Heat treatment for Ferrous and Non Ferrous materials	T1-3, R1-21

13-18	To design of cutting tools	Brief in metal cutting, Basic requirements of cutting tool, mechanics and geometry of chip formation, Various metal cutting tools	T1-4,
20-22	Gages and Gage Design	Fixed gage, Gage tolerance, Selection of material for various gages and uses	T1-5
23-25	To be familiar with locating and clamping methods	Basic principles of location, locating methods and devices, Clamping principles	T1-6, R2-(3-5)
26-28	To design of drill jigs	Drill jig, chip formation in drilling, general consideration in design of drill jig, drill bushings	T1-7, R2-2
29-31	To design of fixtures and modular fixturing	Fixtures and economy, lathe, milling, boring broaching .grinding fixtures	T1-8, R2-16
32-35	To design of sheet metal blanking and piercing dies	Die-cutting operations, cutting actions in punch and die operations, die design	T1-9
33-35	To design of sheet metal bending forming and drawing dies	Bending, Forming, Drawing die, parameter study in these operations	T1-10
35-37	To study plastics as tooling materials and rapid tooling	Construction methods for plastic tooling, Applications of Epoxy plastic, Process and Application of rapid tooling	T1-11, and class notes
38-41	To study tool design for CNC machine tools	Need for CNC machines, fixture design for CNC machine tools, cutting tool; tool holding device	T1-12,R1-19

4. Evaluation Scheme:

Component	Duration	Weightage	Date & Time	Remarks
Mid Semester Test	90 min	25%	5/10 8:00 - 9:30 AM	Closed book
Class assignments/Surprise Quizzes	10 min	15%	TBA	Closed book
Lab experiments / Project		25%	Before comprehensive Examination	Viva Voce
Comprehensive	3 hours	35%	1/12 FN	Partial Closed book

5. **Chamber Consultation Hours:** To be announced in the class.

6. **Notices:** Notices, if any, concerning the course will be displayed on the Mechanical Engineering notice board only.

7. **Make-up Policy:** Make-up will be given only for genuine reasons with prior permission. However no makeup will be given for surprise quiz and Lab experiments.

Instructor-in-charge

MF F312