AIRCRAFT MATERIALS AND PRODUCTION LABORATORY

IV Semester: AE

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIA	SEE	Total
AAE105	Core	-	-	3	2	30	70	100
Contact Classes: Nil	Tutorial Classes: Nil	Practical Classes: 36				Total Classes: 36		

I. COURSE OVERVIEW:

The Aircraft Production Technology lab encompasses on providing sound practical knowledge on testing of engineering material and conventional machining process which plays a vital role in designing the components with minimum cost and with longer service.

II. OBJECTIVES:

The course should enable the students to:

I	Understand the basic material properties to identify the suitable applications in aerospace industries.
II	Illustrate other conventional machining techniques required for aircraft production.
III	Learn the tooling and material joining technique used in aircraft assembly.

III. COURSE OUTCOMES:

After successful completion of the course, students should be able to:

CO 1	**Identify** the microstructures of the materials for selecting the suitability in industrial applications. .	Apply
CO 2	**Illustrate** various jobs for joining the materials using welding operation in real time applications.	Understand
CO 3	**Identify** the types of machining process required for producing desired shape of components used in Aerospace and allied industries.	Apply
CO 4	**Demonstrate** molding processes and their application for producing machine components used in industries.	Apply
CO 5	**Select** the suitable tools and process parameters required in machining, drilling and slotting operations for producing components with minimum cost.	Understand
CO 6	**Illustrate** various jobs for joining the materials using Riveting operation in industries.	Apply

IV. SYLLABUS:

LIST OF EXPERIMENTS

Week-1	**BASIC METALLURGY -I**
Preparation and study of microstructure of pure materials like Cu and Al. Hardenability of steels by Jominy End Quench test	
Week-2	**BASIC METALLURGY -II**
Study of microstructures of non-ferrous alloys. Study of microstructure of heat treated steel.	
Week-3	**LATHE OPERATIONS**
Introduction- lathe machine, plain turning, Step turning & grooving, Taper turning-compound rest/offset method & Drilling using lathe, External threading-Single start	
Week-4	**SHAPING & SLOTTING**
Shaping-V-Block & Slotting-Keyways.	

Week-5	**GRINDING & MILLING**
Grinding-Cylindrical /Surface/Tool & cutter. Milling-Polygon /Spur gear, Gear hobbing-Helical gear.	
Week-6	**DRILLING**
Drilling, reaming, counter boring, Counter sinking Taping.	
Week-7	**CNC MACHINING**
Basic operations, Introduction to CNC programming.	
Week-8	**WELDING PROCESSES I**
Gas Welding, Brazing, Electric and Black smithy, Soldering.	
Week-9	**WELDING PROCESS II**
Arc welding. Spot welding, Seam welding, TIG welding and MIG Welding.	
Week-10	**BASIC CASTING**
Casting of plaster of Paris using different dies.	
Week-11	**RIVETING ALUMINUM SHEETS**
Spot and Blind Rivets on aluminum sheets.	
Week-12	**EXAMINATIONS**
Internal and external examinations.	
Reference Books:	
1. Keshu S. C, Ganapathy K. K, "Air Craft Production Techniques", Interline Publishing House, Bangalore, 3rd Edition, 1993. 2. R. K Jain-Khanna, "Production technology", Mc Graw Hill, 1st Edition, 2002. 3. O. P Khanna, Lal. M. Dhanpat Rai, "Production technology, 5th Edition, 1997.	
Web References:	
1. https://nptel.ac.in/courses/112107145/ 2. https://nptel.ac.in/courses/112105126/	
Course Home Page:	

LIST OF EQUIPMENTS REQUIRED FOR A BATCH OF 36 STUDENTS:

S. No	Details of Equipment	Quantity Required
1	Metallurgic Micro Scope	1
2	Image Analyzer With Hcl P4 System	1
3	Disc Polisher	1
4	ASME Grain Size Measurement 10x Eye Piece	1
5	Trinocular with Video Camera	1
6	Mounting Press	1
7	Belt Polisher	1
8	Muffle Furnace	1
9	Rockwell Hardness Test	1
10	Milling machine	1
11	CNC Turning centre	1
12	Gas welding and Brazing equipment	1
13	Arc welding equipment	1
14	Soldering machine	1
15	TIG welding machine	1
16	MIG welding machine	1
17	Lathe Machine	1
18	Sloting Machine	1
19	Riveting tools	5 sets
20	Drilling machine	1
21	Shaping Machine	1