J.J COLLEGE OF ENGINEERING AND TECHNOLOGY

Approved by AICTE | Affiliated to Anna University | ISO 9001 : 2015 Certified
Accredited by NAAC with A Grade

SOWDAMBIKAA GROUP OF INSTITUTIONS

ESTD. 1994

DEPARTMENT OF AERONAUTICAL ENGINEERING

AE3002– AIRCRAFT GENERAL ENGINEERING AND MAINTENANCE PRACTICES

QUESTION BANK

R-2021

Prepared by
Mr. T. KUMARASAN /AP/AERO
J.J. College of Engineering and Technology, Trichy.

Prepared by
Mr. T. KUMARASAN /AP/AERO
J.J. College of Engineering and Technology, Trichy.

INSTITUTE VISION & MISSION

VISION:

To become a globally recognized "Centre of Academic Excellence" providing Quality Education to all students.

MISSION:

To provide Quality Education in the fields of Engineering, Management, Information, Technology and other Engineering areas.

DEPARTMENT VISION & MISSION

VISION:

To prepare technically skilled and competent intellectual professional graduates to meet the challenges in the Aerospace industry.

MISSION:

M1: To produce technologically competent graduates to be front-runner in their profession.

M2: To provide state-of-the-art facilities and laboratories so as to enhance excellence in teaching and learning process.

M3: To provide need-based quality training programmes in the field of the Aerospace industry.

M4: Enhance the students' sound knowledge in the latest technologies by organizing technical programs and encouraging students to make them present papers and participate in technical events.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1	To employ comprehensive knowledge in Aeronautical Engineering and analytical skills to work towards solving complex problems to excel in the professional career.
PEO2	To design, analyze and produce cutting edge engineering solutions by employing modern techniques and adhering to moral values for sustainable development.
PEO3	To assume global careers and leadership responsibilities through consistent learning with idealistic managerial practices.

PROGRAM OUTCOMES (POs)

PO1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions Using first principles of mathematics, natural sciences, and engineering sciences.
PO3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and the cultural, societal, and environmental considerations.
PO4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including the design of experiments, Analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO5	**Modern tool usage:** Create ,select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex Engineering activities with an understanding of the limitations.
PO6	**The engineer and society:** Apply to reason in formed by the contextual Knowledge to assess societal, health, safety, legal and cultural issues and the Consequent responsibilities relevant to the professional engineering practice.

PO7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO8	**Ethics:** Apply ethical principles and commit to professional ethics and Responsibilities and norms of the engineering practice.
PO9	**Individual and team work:** Function effectively as an individual, and as a Member or leader in Diverse teams, and in multidisciplinary settings.
PO10	**Communication:**Communicateeffectivelyoncomplexengineeringactivities with the engineering community and with society at large, such as, being able To comprehend And write effective reports and design documentation, make effective presentations, and give and Receive clear instructions.
PO11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply These to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning:** Recognize the need for, and have the preparation and ability to Engage in in dependent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1	To gather data using modern tools and apply design techniques to develop solutions for challenges in the domain of Aerodynamics, Propulsion, Aircraft Structures and Aircraft Maintenance with professional ethics.
PSO2	To function as engineering solution providers or entrepreneurs, who are able to manage, innovate, communicate, train and lead a team for continuous improvement.
PSO3	Graduate will be able to work as a team member which will be a main requirement in industry or research organisation or in any business enterprise. This will pave the way for successful career for the graduate and also play a role for the success of the organisation in which the graduate is employed.

AE3002 AIRCRAFT GENERAL ENGINEERING AND MAINTENANCE PRACTICES **L T P C 3 0 0 3**

OBJECTIVES

- To carryout aircraft ground handling procedure.
- To understand about the ground servicing of the various aircraft subsystem
- To understand the procedure of aircraft system maintenance and safety.
- To understand the importance of periodic inspection of aircraft.
- To understand the specification of aircraft hardware components and its materials.

UNIT I AIRCRAFT GROUND HANDLING AND SUPPORT EQUIPMENT 9

Mooring, jacking, leveling and towing operations – Preparation – Equipment – precautions – Engine starting procedures – Piston engine, turboprops and turbojets – Engine fire extinguishing – Ground power unit.

UNIT II GROUND SERVICING OF VARIOUS SUB SYSTEMS 9

Air conditioning and pressurization – Oxygen and oil systems – Ground units and their maintenance

UNIT III MAINTENANCE OF SAFETY AND AIRCRAFT SYSTEM PROCESSES 9

Shop safety – Environmental cleanliness – Precautions- Hand tools – Precision instruments – Special tools and equipments in an airplane maintenance shop – Identification terminology

UNIT IV INSPECTION 9

Process – Purpose – Types – Inspection intervals – Techniques – Checklist – Special inspection – Publications, bulletins, various manuals – FAR Air worthiness directives – Type certificate Data sheets – ATA Specifications

UNIT V AIRCRAFT HARDWARE, MATERIALS, SYSTEM PROCESSES 9

Specification and correct use of various aircraft hardware (i.e. nuts, bolts, rivets, screws) – American and British systems of specifications – Threads, gears, bearings, – Drills, tapes and reamers – Identification of all types of fluid line fittings. Materials, metallic and non-metallic Plumbing connectors – Cables – Swaging procedures, tests, Advantages of swaging over splicing.

TOTAL :45 PERIODS

COURSE OUTCOMES (COs)

On completion of the course, the student is expected :	
CO1	Explain the various ground support system for aircraft operations.
CO2	Illustrate the ground servicing of critical aircraft systems.
CO3	Inspect the aircraft by considering the FAA airworthiness regulations and the check list.
CO4	Apply the maintenance procedures to the aircraft subsystem and equipment's
CO5	Explain the specifications standards of aircraft hardware systems and materials.

CO's – PO's & PSO's MAPPING

Correlation of COs with POs / PSOs															
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	2	-	-	-	-	-	-	-	-	-	-	-	2	-	-
CO2	2	-	1	-	-	-	1	-	1	-	-	-	2	-	-
CO3	3	1	-	-	-	-	1	-	1	1	2	1	3	2	1
CO4	3	1	-	-	-	-	-	-	1	-	-	-	2	1	1
CO5	2	-	1	-	-	-	-	-		-	-	-	2	2	1
AVG	**2.4**	**1**	**1**	**-**	**-**	**-**	**1**	**-**	**1.5**	**1**	**1.5**	**1**	**2.2**	**1.66**	**1**
3 – High; 2 – Medium; 1 - Low; - No correlation															

Prepared by
Mr. T. KUMARASAN /AP/AERO
J.J. College of Engineering and Technology, Trichy.

TEXT BOOK

1. Kroes Watkins Delp, "Aircraft Maintenance and Repair", McGraw Hill, New York, 1993.

REFERENCE BOOKS

1. A&P Mechanics, "Aircraft Hand Book", F A A Himalayan Book House, New Delhi, 1996.
2. A&P Mechanics," General Hand Book", F A A Himalayan Bok House, New Delhi, 1996.

UNIT– I

AIRCRAFT GROUND HANDLING AND SUPPORT EQUIPMENT

PART–A				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1	What is meant by mooring and Leveling?	CO1	Understand	Low
2	Why jacking is required?	CO1	Understand	Low
3	Define leveling and its types.	CO1	Remember	Low
4	Mention the various ground power units used un aircraft maintenance.	CO1	Understand	Low
5	What are the fire extinguishing agent.	CO1	Understand	Low
6	What are the equipment used in aircraft ground handling?	CO1	Understand	Low
7	Define towing.	CO1	Remember	Low
8	What is mean by fire and classify it?	CO1	Understand	Low

PART–B				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1	Sketch and explain in detail about jacking of an aircraft.	CO1	Understand	Medium
2	Explain in detail about the engine starting procedures.	CO1	Understand	Medium
3	Describe in details the starting procedure of piston engine.	CO1	Understand	Medium
4	Sketch and explain in detail about levelling of an aircraft.	CO1	Understand	Medium
5	Sketch and explain in detail about mooring of an aircraft.	CO1	Understand	Medium
6	Sketch and explain in detail about towing of an aircraft.	CO1	Understand	Medium
7	Explain in details about fire extinguishing system and its types and also explain maintenance and inspection.	CO1	Understand	Medium
8	Explain with neat sketch Ground power unit and its types.	CO1	Understand	Medium

UNIT – II

GROUND SERVICING OF VARIOUS SUB SYSTEMS

PART–A				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1	What are the advantages of oxygen and oil system?	CO2	Understand	Low
2	What is the need of pressurization in an aircraft?	CO2	Understand	Low
3	Define purging.	CO2	Remember	Low
4	Define oxygen hazards.	CO2	Remember	Low
5	What is mean by pressurization system?	CO2	Understand	Low
6	Define air conditioning system and its types.	CO2	Remember	Low
7	Differentiate between VCM and ACM.	CO2	Understand	Medium

PART–B				
Q.No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1	Explain with neat sketch in details about aircraft oxygen and oil systems.	CO2	Understand	Medium
2	Explain in details about aircraft air conditioning system with neat sketch.	CO2	Understand	Medium
3	Explain in details about aircraft pressurization system with neat sketch.	CO2	Understand	Medium
4	Explain maintenance procedure of ACM and VCM with neat sketch for any one passenger aircraft.	CO2	Understand	Medium

UNIT – III

MAINTENANCE OF SAFETY AND AIRCRAFT SYSTEM PROCESSES

PART–A				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1	Write any four precautions to avoid hazards in aircrafts.	CO3	Understand	Low
2	List out various precautions during maintenance of an aircraft.	CO3	Remember	Low
3	Define shop safety.	CO3	Remember	Low
4	What is mean by Environmental cleanliness?	CO3	Understand	Low
5	Define precision instrument and types.	CO3	Remember	Low
6	Define fire safety and electrical safety.	CO3	Remember	Low

Prepared by
Mr. T. KUMARASAN /AP/AERO
J.J. College of Engineering and Technology, Trichy.

PART–B				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1	Explain the various factors involved in environmental cleanliness. And also explain in details about various precautions in shop safety.	CO3	Understand	Medium
2	Explain with neat sketch and types of Hand tool used in aircraft maintenance shop.	CO3	Understand	Medium
3	Explain in detail about shop safety and also write inspection and maintenance.	CO3	Understand	Medium
4	Explain with neat sketch and types of Precision instruments used in aircraft maintenance shop.	CO3	Understand	Medium
5	Explain with neat sketch and types of special tool used in aircraft maintenance shop.	CO3	Understand	Medium

UNIT – IV

INSPECTION

PART–A				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1	Explain service bulletin and FAR.	CO4	Understand	Medium
2	Define maintenance manual and overhaul manual.	CO4	Remember	Low
3	Define inspection and its types.	CO4	Remember	Low
4	Define inspection techniques.	CO4	Remember	Low
5	Define inspection intervals.	CO4	Remember	Low
6	Define TCDS.	CO4	Remember	Low
7	Define ATA Specification.	CO4	Remember	Low
8	What is purpose of inspection?	CO4	Understand	Low
9	What is the process of inspection?	CO4	Understand	Low
10	List out various types of manual.	CO4	Remember	Low
11	Define bullitiens.	CO4	Remember	Low

Prepared by
Mr. T. KUMARASAN /AP/AERO
J.J. College of Engineering and Technology, Trichy.

PART–B				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1	Explain in detail about FAR airworthiness directives and ATA Specifications.	CO4	Understand	Medium
2	Explain in detail about TCDS and Special inspection procedures.	CO4	Understand	Medium
3	Explain: 1. Inspection 2. Inspection process 3. Purpose of inspection 4. Inspection Techniques	CO4	Understand	Medium
4	Explain about Checklist.	CO4	Understand	Medium
5	Explain in detail about Special inspection procedures and its types.	CO4	Understand	Medium
6	Explain about Publication and its types.	CO4	Understand	Medium
7	Explain: 1. Bulletins 2. CFR 3. FAR	CO4	Understand	Medium

UNIT – V

AIRCRAFT HARDWARE, MATERIALS, SYSTEM PROCESSES

PART–A				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1	What are the advantages of swaging over splicing?	CO5	Understand	Low
2	State the types of batteries used in aircraft.	CO5	Remember	Low
3	Differentiate between tapes and reamers.	CO5	Understand	Low
4	Differentiate between American and British systems of specifications.	CO5	Understand	Low
5	Differentiate between metallic and non-metallic.	CO5	Understand	Low
6	List out various types of aircraft hardware.	CO5	Remember	Low
7	Define Threads and its types.	CO5	Remember	Low
8	Define gears and its types.	CO5	Remember	Low
9	Define bearing and its types.	CO5	Remember	Low
10	Define Swaging procedures.	CO5	Remember	Low

PART–B				
Q. No	**Questions**	**CO Mapping**	**BT Level**	**Complexity**
1	Explain and discuss in details about specification and correct use of various aircraft hardware with neat sketches.	CO5	Understand	Medium
2	Explain in detail about various threads, gears and bearing used in engines with neat sketches.	CO5	Understand	Medium
3	Explain in details about (i) Various pipe fitting in aircraft. (ii) Swaging procedures.	CO5	Understand	Medium
4	Explain in detail about various types drills, used in aircraft neat sketches.	CO5	Understand	Medium

THANK YOU

ALL THE BEST

Prepared by
Mr. T. KUMARASAN /AP/AERO
J.J. College of Engineering and Technology, Trichy.