Department of Aviation

College of Engineering

University of Salahaddin

Subject: Aviation Fuel and Lubricants & Environmental aspects of their use.

Course Book – *First Stage*

Lecturer name:

Dr. Ali Issa Sulaiman

Academic Year: 2023/2024

Course Book

1. Course name	**Aviation Fuel and Lubricants & Environmental aspects of their use.**
2. Lecturer in charge	**Dr. Ali Issa Sulaiman**
3. Department/ College	**Engineering /Aviation Department**
4. Contact	**e-mail: Ali.sulaiman.su.edu.krd**
5. Time (in hours) per week	**6 hours in a Week**
6. Office hours	**Two days at the week**
7. Course code	
8. Teacher's academic profile	**Ali Issa Sulaiman: PhD of Aircraft Engines, Kazan National Research Technical University named after A. N. Tupolev – KAI, Kazan-Russia, 2020** **From 2021 to present working as one of the faculty members in our college, He have been taught for the First and Second stage from that date till now.**
9. Keywords	**Fuel, Lubricants, Aircraft, engine, fuel and lubricant systems**

10. Course overview:

This course provides for the study of the composition, physicochemical and operational properties of aviation fuels, lubricants and special liquids, which are collectively called the common term “fuels and lubricants”.

The reliability and efficiency of operation of aircraft engines and systems depends on the quality of fuels and lubricants.

Employees of the aviation engineering service (EAS) are directly responsible for checking the compliance of the quality of fuels and lubricants with the requirements of regulatory documentation, preparing aircraft tanks for receiving aviation fuels and lubricants (draining and sludge control).

To work successfully, an aviation mechanical engineer must have a clear understanding of the processes occurring in fuels, oils, lubricants, special fluids during their storage, transportation, refueling of the corresponding aircraft systems, as well as during the operation of their components and assemblies.

It must be clearly remembered that the quality of fuels and lubricants and their competent operation are one of the main components of ensuring flight safety.

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11. Course objective:

During this course we will cover the following main topics:

1- What is crude oil, method of extraction and purification

2- Aviation fuel, how it is obtained, the main tasks of aviation fuel, its composition and its characteristics

3- Fuels and lubricants such as oil and grease, how they are obtained, their tasks, composition and types

4- Fuel system and lubricant system, components of their tasks and how they are located

12. Student's obligation

Here the students should;
They have to attend the lectures.
Listen to the Teacher and participation.
They have to submit the Reports or present their presentations.

13. Forms of teaching

The staff will use;
Data show to explain the lectures and different seminars.
Draw on the whiteboard.
Giving a hard soft copy for the lectures in order to be easy for them to read and study.

14. Assessment scheme

20% activity
10% practical
20% mid-term exam
15% final practical exam
35% final theoretical Exam

15. Student learning outcome:

At the end of the semester, students would be able to understand the study of the composition, physico-chemical and operational properties of aviation fuels, lubricants and special fluids, which in the aggregate are usually called the single term “fuels and lubricants” (F&L). The student will get familiar to Fuel and hydraulic system and operating principle. They will get to know How much fuel will the plane need from one point to another. How to store fuel, what checks the fuel undergoes before refueling the aircraft. And many other useful information.

16. Course Reading List and References:

1- Aviation Fuels And Lubricants. Department of Aviation Fuel Supply and Aircraft Repair/ E.A. Konyaev, M.L. Nemchikov. 81 p.

2- Modification of jet fuels composition with renewable bio-additives. Anna v. Yakovlieva, sergii v. Boichenko, Kazimierz lejda, Oksana o. Vovk/ national aviation university. Kyiv –2019. 208 p.

3- Aviation fuels, lubricants and special fluids. Aksenov A. F. Moscow 1975/ 85 p.

4- Calculation of Fuel-Optimal Aircraft Flight Profile. Tong Wang/ Stockholm, Sweden 2019. 53 p.

5- Weight estimation of parametrically design of fuel and hydraulic systems of a commercial airplane. Francesc Olives/ Imperial College of Science, Technology and Medicine Department of Aeronautics/ 2019. 87 p.

6- Monitoring of the lubrication system of an aircraft engine through a

Prognostic and Health Monitoring approach. Pierre Grassart. KTH School of Industrial Engineering and Management. 2015. 87 p.

7- Aviation maintenance Technical Handbook- Power plant Volume 2 U.S. Department of transportation, Federal Aviation Administration.

8- Aircraft De/Anti-icing manual- Incheon international airport

9- ASTM D86-15. Test Method for Distillation of Petroleum Products at Atmospheric Pressure.

10- ASTM D130 Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test.

11- MIL-DTL-5624V. Turbine Fuel, Aviation, Grades JP-4 and JP-5. Detail specification.

12- MIL-DTL-83133J. Turbine Fuel, Aviation, Kerosene Type, JP-8 (NATO F-34), NATO F-35, and JP-8+100 (NATO F-37). Detail Specification.

13- Defence Standard 91-91. Turbine Fuel, Kerosine Type, Jet A-1. NATO Code: F-35 Joint Service Designation: AVTUR: Issue 7.

17. The Topics: Theoretical Subjects	**Lecturer's name**
Week 1. Introduction and course book Week 2. Crude oil Week 3. Crude Oil Composition Week 4. Physic-chemical Properties of Crude Oil Week 5. Aviation fuels (introduction, types and purpose) Week 6. Aviation Fuels Composition Week 7. Performance properties of aviation fuels Week 8. Aviation oils. Lubricants Week 9. Performance properties of lubricants Week 10. Midterm Exam Week 11. Fuel System and Fuel Calculation Week 12. Lubricant System Week 13. Greases Week 14. Hydraulic fluids Week 15. De-icing fluids	**Dr. Ali Issa Sulaiman**

بەشداریکردن لە تۆمارکردنی وانەکان لەسیستمی Moodle بۆ کۆلێژی زانست/ ئەندازیاری بۆهەرسمستەرێك