

**Tishk International University
Engineering Faculty
Mechatronics Department**

AVIONICS

TOPIC: Introduction to avionics

Week1_Lecture1

3rd Grade- Fall Semester 2020-2021

Instructor: N. S. Sivakumar



Course Information

Course Code and Name:

ME 352 AVIONICS

Weekly Hours:

Theoretical:2 Hrs (Online/ Campus)

Lecturer Name And Department

Sivakumar N S

Assistant Professor

Mechatronics Department

Office: #6, Research Centre, TIU.



- **Course Description:**

- The objective of this course is to develop student's skills and understanding on the principle of auto-flight, radio communication and navigation systems. The course includes the principles of auto-flight and its applications in modern aircrafts and also covers the principles of radio communications and its application to navigation systems. Various kinds of aircraft instruments are explained, and Communication and navigation systems such as VHF, VOR, DME, MLS, GPS, Inertial navigation systems are covered.

- **Prerequisites:**

Electronics engineering
Instrumentation
control systems



Text and Reference Books

- **Course Text Book:**
- Albert Helfrick.D., “Principles of Avionics”, Avionics Communications Inc., 2004
- Collinson.R.P.G. “Introduction to Avionics”, Chapman and Hall, 1996.



Assignment Information

- **Homework assignments:** Homework problems will be assigned on a regular basis. Problems will be solved using the Problem-Solving Technique on any white paper with no more than one problem written on one sheet of paper. Homework will be collected when due, with your name written legibly on the front of the title page. It is graded on a 0 to 100 points scale. Late homework (any reason) **will not be accepted.**
 - **Problem-Solving Technique:**
 - A. Known
 - B. Find
 - C. Assumptions
 - D. Schematic
 - E. Analysis, and
 - F. Results



Examination Information

- **Quiz:** There are two or more partial quizzes during the semester.
- **Mid Term:** There will be a Mid semester exam during the mid of semester.
- **Project work:**
 - There will a project regarding application of electronics and mechanical subjects for control of aircrafts.
- **Final Exam:** The whole content of the subject will be included for final exams question patten and mark distributions will be discuss while final review session , and a final exam at the end of the semester.



Course Grading

- The total course grade is comprised of homework assignments, quizzes, Mid term, Practical Report& exams, and final exam as follows:

– Homework (Minimum 2)	10%
– Quiz (Minimum 2)	10%
– Mid Term Exam	25%
– Project	10%
– Presentation	5%
– Final Exam	40%
TOTAL MARKS	100%
- **Cheating:** You are allowed to cooperate on homework by sharing ideas and methods. Copying will not be tolerated. Submitted work copied from others will be considered academic misconduct and **will get no points**.



Course Materials

- Most Course Material (Course Notes, Handouts, Homework, Final Project, and Communications) on **Web Page/PIS SYSTEM**.
- Power Point Lectures will posted every week or two
- Office Hours: Sunday to Thursday @ 9:00 to 17:00 Hrs
- Email: sivakumar.ns@tiu.edu.iq



Course Outline

- Introduction to avionics
- Basics of Aircraft
- Flight control System
- Auto pilot
- Air traffic control
- Fly by wire flight control
- Flight Management System
- Aircraft Instruments
- Gyroscopic Instruments
- Communication Systems
- UAV
- Cockpit display technology



INTRODUCTION

- **Avionics are the electronic systems** used on aircraft, artificial satellites, and spacecraft.
- Avionic systems include communications, navigation, the display and management of multiple systems, and the hundreds of systems that are fitted to aircraft to perform individual functions. These can be as simple as a searchlight for a police helicopter or as Complicated as the tactical system for an airborne early warning platform.

INTRODUCTION cont.....

- Many modern avionics have their origins in world war II wartime developments.
- For example, autopilot systems that are prolific today were started to help bomber planes fly steadily enough to hit precision targets from high altitudes.
- Famously, radar was developed in the UK, Germany, and the United States during the same period. Modern avionics is a substantial portion of military aircraft spending. Aircraft like the F-15E and the now retired F-14 have roughly 20 percent of their budget spent on avionics.
- Most modern helicopters now have budget splits of 60/40 in favor of avionics.

ASSIGNMENT/ PROJECT

TOPICS

- Aircraft control using RF Controller
- Arduino based motor control for drone applications
- Rudder control using servo motor
- Modelling of drone using 3D printer
- Design of Aircraft instruments

THANK YOU