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**Department of *Aviation***

**College of Engineering**

**University of Salahaddin**

**Subject: Fundamentals of Airport Radar system**

**Course Book – *(Year 1)***

**Lecturer's name *Msc.* *Mustafa Mohammed Mohammed***

**Academic Year: *2022/2023***

**Course Book**

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| **1. Course name** | **Fundamentals of Airport Radar system** |
| **2. Lecturer in charge** | **Lecturer MSc. Mustafa Mohammed Mohammed** |
| **3. Department/ College** | **Aviation Dept. / College of Engineering** |
| **4. Contact** | **e-mail: mustafa.mohammed@su.edu.krd****Tel:**  |
| **5. Time (in hours) per week**  | **Theory: 4****Practical: 0**  |
| **6. Office hours** | **4 hours** |
| **7. Course code** | **9004** |
| **8. Teacher's academic profile**  | **-BSc. Electrical engineering /Rafidain University 2007.****-MSc. Communications eng. And networks/ Birmingham university 2014.****Assistant lecturer / Erbil international university/2017-2019****Assistant lecturer / Nobel institute/2020-2021.****Assistant lecturer / salahddin university/2022.****-20 participation in workshops for higher education.****International trainer in e-government 2016-2022** |
| **9. Keywords** | **History to radar system, introduction of radar, radar frequencies, radar equation receivers, transmitters.**  |
| **10. Course overview:** Aviation engineering is consisted of many aspects from airplane body, airplane electrical and electronics system, and Airport as a ground station for controlling Aircrafts in a space. One of the most important tool that used in airport is radar system. The radar system has a significant role in the field of Aviation in which has an ability to control the airspace movement and helps to avoid crashes.Moreover, Weather also plays an important role in the movement of airspace, as known radar systems helps to predict of meteorology and decide for the movement of airspace. Radar receiver and transmitter studies in addition to the radar equation will be shown to that how this technology provide controlling the air.  |
| **11. Course objective:**The aviation engineers during the application may need to study the scientific conception of such a sophisticated system, they may need to evaluate and calculate its equation to get knowledge on how this system is working. So the course provides students with the fundamentals for solution and analysis of such complex technology. * History of radar
* Radar frequencies
* Radar transmitters
* Radar receivers.
* Radar signal processing.
* Synthetic aperture radar .
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| **12. Student's obligation**The students are asked to attend al the lectures and they should arrive on time to the class and that is their responsibility to find out what assignment to be made when they are absent. They should active participation in the class for their successes. The student must participate in all quizzes and exams. He has to present all the home work at the required time.  |
| **13. Forms of teaching**Using a whiteboard tool to cover in details all the required explanation. |
| **14. Assessment scheme**- Midterm Exam : 20 %-Home works And Quizzes : 20 %-Final Exam: 60 %‌ |
| **15. Student learning outcome:**- They are expecting how to deal with radar components.- Students will use new technology to check radar performance.- The students will able to identify radar application in many aspects.- the student will be able to calculate radar maximum range through its equation   |
| **16. Course Reading List and References‌:**▪ Key references:* Moreira, P. Prats-Iraola, M. Younis, G. Krieger, I. Hajnsek, and K. P. Papathanassiou, “A tutorial on synthetic aperture radar,” IEEE Geosci. Remote Sens. Mag., 2013, doi: 10.1109/ MGRS. 2013.2248301.
* S. Thorndahl et al., “Weather radar rainfall data in urban hydrology,” Hydrol. Earth Syst. Sci., 2017, doi: 10.5194/hess-21-1359-2017.
* E. Yavari, O. Boric-Lubecke, and S. Yamada, “Radar Principles,” in Doppler Radar Physiological Sensing, 2016.
* M. Heistermann, S. Jacobi, and T. Pfaff, “Technical Note: An open source library for processing weather radar data (wradlib),” Hydrol. Earth Syst. Sci., 2013, doi: 10.5194/hess-17-863-2013.
* W. Wiesbeck, L. Sit, M. Younis, T. Rommel, G. Krieger, and A. Moreira, “Radar 2020: The future of radar systems,” in International Geoscience and Remote Sensing Symposium (IGARSS), 2015, doi: 10.1109/IGARSS.2015.7325731.
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| **17. The Topics:** | **Lecturer's name** |
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| Week 1: History of radar systemWeek 2: Introduction of radar Week 3: Principals of radar system Week 4: Radar frequencies Bands Week 5: Radar equationWeek 6: Radar remote sensing Week 7: radar components  Week 8: Radar transmitters Week 9 : Radar receivers Week 10: Radar scopes Week 11: Radar signal processing Week 12 : synthetic aperture RadarWeek 13 : MIMO radarWeek 14: tutorial . |

 | **Mustafa mohammed mohammed**  |
| **18. Practical Topics (If there is any)** |  |
| There are no practical topics.  |  |
| **19. Examinations:*****1. Compositional:*** All questions and problems based on analysis and the student has to finish all the calculations and explanation needed with final result to be about their solution. |
| **20. Extra notes:**The students should support themselves be able to solve and design project daily by them and not neglect the subject. |
| **21. Peer review :** |