

Course Title: Principles of satellite Quality Assurance and Reliability**Number of Credits: 3****Prerequisite: Spacecraft Systems Design****Lecturer: Dr. Farhad Fani Saberi**

Course Description:

This interdisciplinary course is designed to familiarize students with the rules governing sensitive workplaces. Observing product assurance requirements is one of the key needs of professional experts in the spacecraft systems design and implementation industry. This course is designed to provide the student with theories and principles related to teamwork, product assurance, reliability and standard. In this class students will learn about the Introduction to ECSS Space Standard, Product assurance role in space technology, fault tree analysis, Risk Management, testing, and reliability calculation. Students spend much of their class time on learning, working on projects, practicing the team-work skills and become familiar with the ECSS space standard. This course incorporates classroom instruction and practical lab work.

Course Goals and Objectives:

The Purpose of This Course is: Implementation of satellite Quality Assurance discipline according to ECSS standard

Course Topics:

1. An overview of the principles of satellite system design
2. Introduction to ECSS Space Standard
3. position of the product assurance discipline in ECSS
4. Phasing the space project based on the ECSS standard
5. Product assurance role in space technology
6. Introduction to Design assurance techniques
7. Reliability
8. FMEA / FMECA
9. FTA
10. Product Assurance Principals
11. product assurance management
12. Quality Assurance
13. Control critical items
14. control of non-compliance
15. quality assurance in Design and verification
16. Quality Assurance in Supplying and preparation
17. Quality assurance in Assembly, Integration and Manufacturing
18. Quality assurance of ground Support Equipment
19. safety
20. EEE Components
21. Software Product assurance
22. Risk Management
23. Configuration Management
24. test
25. product Assurance for space technology

The course aims to:

Students are expected to:

1. Understand the principals and importance of product assurance in space projects
2. Understand the basics of project management and risk management
3. Understand how to evaluate the mission requirements and constrains
4. Understand how to calculate the reliability
5. Be able to generate the fault tree analysis (FTA), failure mode and effect analysis (FMEA)
6. Be able to design test plan for space project based on ECSS standard
7. Be able to phasing the space project
8. Categorize the requirements of system, subsystem, component, and etc.
9. Be able to implement the Quality assurance in Assembly, Integration, Manufacturing and testing.
10. Develop teamwork and work with other groups in accordance with system engineering principles
11. Observe product assurance requirements in real industrial projects

Reading Resources:

- product assurance for space technology
- ECSS System, Description, Implementation and general Requirements

Evaluation:

Final Exam: 50%

Midterm Exam: 20%

Project & Presentation: 20%

Homework & Assignments: 10%

Participation & Class Activity: additional point