**Global Learning Initiatives Program Course Syllabus**

Please complete the following form in English. The information will be updated to the Global Learning Initiatives Program website for students’ reference. If you will be offering more than one course, please fill out one form per course offered. Examples in grey.

**Course Information**

|  |  |
| --- | --- |
| Course Name  \*provide the **English** course name of the course. | Radiation Effects in Electronics |
| Lecturer(s)  \*provide the lecturers’ **English** name. If there are more than one lecturer, please indicate all lecturers in the column. | Chin-Han Chung |
| Course Description  \*briefly describe the contents covered in the courses. | Radiation causes reliability issues in electronic devices not only in space applications but also during commercial usages. These issues can differ from one device to another based on the material, the device structure, and the application. In addition, as we enter the era of 5G, the communication system is expanding to the earth’s orbit, which makes radiation-induced reliability issues more critical.  In this course, basic mechanisms of radiation-induced effects in electronics devices will be introduced. Simulation tools will also be used to help understood and predict these effects. |
| Course Objectives  \*list out knowledge or skills students should acquire upon completion of course. | To understand the hazardous effects and reliability issues caused by radiation in electronic devices and how to mitigate them. |
| Suggested Proficiencies  (if any)  \*list preferred knowledge or skills students should have before taking the course. | Fundamental knowledge on physics and electronic devices |
| Reading List  (if any)  \*list out the textbooks, references, or other reading materials. | Terrestrial Radiation Effects in ULSI Devices and Electronic Systems, Eishi H. Ibe, Published by Wiley in 2015 |
| Grading Criteria  \*how would the students be assessed during the course. | Midterm exam (open book): 30% Final exam (open book): 40% Final report: 30% |

**Course Schedule**

Please complete the following table with the dates and expected course topics. If there are more than one lecturers instructing the course, please also indicate the lecturer for each class.

|  |  |  |  |
| --- | --- | --- | --- |
| Class | Date (YYYY/MM/DD) | Course Topic | Lecturer |
| 1 |  | Introduction | Chin-Han Chung |
| 2 |  | Topic 1: Basic Knowledge on Radiation Effects and Soft Error | Chin-Han Chung |
| 3 |  | Topic 2: Terrestrial Radiation | Chin-Han Chung |
| 4 |  | Topic 3: Fundamentals of Radiation Effects | Chin-Han Chung |
| 5 |  | Topic 3: Fundamentals of Radiation Effects | Chin-Han Chung |
| 6 |  | Topic 4: Fundamentals of Electronic Devices and Systems | Chin-Han Chung |
| 7 |  | Topic 4: Fundamentals of Electronic Devices and Systems | Chin-Han Chung |
| 8 |  | Midterm exam | Chin-Han Chung |
| 9 |  | Topic 5: Irradiation Test Methods | Chin-Han Chung |
| 10 |  | Topic 6: Simulation Tool: PHITS | Chin-Han Chung |
| 11 |  | Topic 6: Simulation Tool: PHITS | Chin-Han Chung |
| 12 |  | Topic 6: Simulation Tool: PHITS | Chin-Han Chung |
| 13 |  | Student Presentation | Chin-Han Chung |
| 14 |  | Student Presentation | Chin-Han Chung |
| 15 |  | Final exam | Chin-Han Chung |