# NATIONAL TAIWAN UNIVERSITY OF SCIENCE AND TECHNOLOGY

**Department of Electronic and Computer Engineering**

## ET5923701 Special Topics on Electronic Engineering (III)

**Class room: IB-610**

**Instructor: Saravanan (AK)** **Hours: R6, R7 and R8**

| No. | Date | Topics | Contents (tentative) |
|---|---|---|---|
| **1** | 02/22 | Course introduction | Brief introduction about Course and syllabus<br>Begin with basics. |
| **2** | 02/29 | Introduction of Electronic components | Lecture on most common and useful electronic devices/semiconductor components |
| **3** | 03/07 | Transistor components and high frequency integrated circuits. | Lecture on Transistor components and integrated circuits technology trends, modern design and applications |
| **4** | 03/14 | Transistor components and high frequency integrated circuits. | Power MOSFET and MOSFET scaling and challenges, SOI, FinFET transistors and transistors to 5-1 nm gate lengths |
| **5** | 03/21 | Advanced Optical fiber technology | Fiber-Optic Communication Network, Optical Fiber Fabrication Methods and Overview of optical fibers and their applications |
| **6** | 03/28 | Industrial control electronic components | Discussion and lecture on Industrial control electronic components (IoT devices) and their applications<br>Digital System Design and embedded system |
| **7** | **04/04** | **Tomb-Sweeping Day (no class)** | |
| **8** | 04/11 | **Mid-term exam** | |
| **9** | 04/18 | Optoelectronic engineering | Discussion and lecture on Optoelectronic semiconductor physics, devices, and applications |

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| **10** | 04/25 | Semiconductor engineering | Discussion and lecture on modern Semiconductor devices and applications |
| **11** | 05/02 | VLSI design and advanced IC fabrication | Discussion and lecture on modern VLSI, 3D, chiplet design and fabrications. |
| **12** | 05/09 | **Invited talk from SIEMENS Industry-Chairman, or TSMC-Taiwan** | |
| **13** | 05/16 | Laser, LED-OLED-microLED displays | Discussion and lecture on laser, LED-O-Q-LED-microLED displays future technology in real time applications. |
| **14** | 05/23 | Photovoltaic device and Photodetector technology | Discussion and lecture on Photovoltaic (Solar-cell) and Photodetector CMOS technology in real time applications. |
| **15** | 05/30 | Next generation electronic devices | Discussion and lecture on Advanced quantum, WBG, AI-IoT, Si hybrid electronic devices |
| **16** | 06/06 | **Final exam/report (tentative)** | |

**Textbook:**

- *Allan R. Hambley, "Electrical Engineering: Principles and Applications," 7th ed. 2018.*
- Semiconductor Pyhsics-Donald A.Neimen. Third edition.
- Nanotechnology and Nano Electronics –measurement Techniques– Springer.
- Class handouts
- Invited talk from Top industry (SIEMENS Industry-Chairman, Taiwan)

- **Grading and evaluation:**
  - **Attendance and participation: 10%.**
  - **Homework: 10%**
  - **Mid-term: 40%.**
  - **Final Exam/report: 40%.**

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