Principles of Bioelectronics Design – 334011

Faculty of Biomedical Engineering

Technion – IIT

Academic Term: Winter 2019-2020

Credit: 4 points

Pre-requisites: תורת המעגלים החשמליים - 044105
( zaman ) אוטות ומפעלות - 044130/044131

Instructor: Prof. Daniel Ramez
Office Hours: By appointment via email
e-mail: ramizda@bm.technion.ac.il
Office: Emerson building, 7th floor

Tutor: Alon Saguy
Office Hours: TBD
e-mail: alonsaguy@campus.technion.ac.il
Office: Emerson building, 8th floor

Tutor: Evgeny Reznik
Office Hours: TBD
e-mail: evgeniy.rez@campus.technion.ac.il
Office: Emerson building, 7th floor

Textbooks

- Foundations of Analog and Digital Electronic Circuits, 1st Edition, Agarwal & Lang
- Physics of Semiconductor Devices by S.M. Sze
- Design of Analog CMOS Integrated Circuits, Behzad Razav
Homework

Theory assignments ("dry"): 6 sets of practice questions to be solved individually and submitted using moodle system. The answers will be graded automatically by the system for immediate feedback. Four attempts will be given for each set.

Computer simulation assignments ("wet"): Two hands-on basic system analysis and design assignments using industry leading analog design software. Submission using the moodle in pairs. Individual work and submission allowed. Groups of 3 should have special permission.

Grading Policy

Homework: 30% divided to:

- 15% “dry” homework: mean of the best 5 grades out of 6
- 7.5% “wet” – 1
- 7.5% “wet” – 2

Final examination: 70%

Exam day:

- Term-A: 03.02.2021 (Wednesday)
- Term-B: 17.03.2021 (Wednesday)

Syllabus

Devices:

1. Introduction to semiconductors
2. PN junction
3. MOS capacitor
4. MOS transistor

Analog Design:

1. Circuits – small signal analysis
2. Circuits – MOSFET amplifier
3. Differential amplifier
4. Frequency response of amplifiers
5. Negative feedback (optional)