

**Course: Fundamentals of Semiconductors - . 3 credits  
1-2-4052**

**Course Staff:**

Name	Role	address	Tel	Email
Dr. Bashouti Muhammad	Responsible lecturer	Building 26, Room 105	08 / 6596738	<a href="mailto:Bashouti@bgu.ac.il">Bashouti@bgu.ac.il</a>

**Components of the course grade:**

**Exercises:** Submission of 10 home exercises is mandatory (out of 14). The score will be determined by the average of the 10 best exercises. (20 pts)

**Bonus:** In the course you will be given preparatory exercises, for each preparation exercise there will be an addition of 1 point to the final score.

**Exams:** Mid exam (20 points) and final exam (60 points).

Reference material for the final exam - Formulas pages of the course. (Without personal extensions).

**Syllabus**

Week	Syllabus per week
1	Introduction and basic concepts
2,3	IV, III-V and II-VI semiconductors Crystallinity of semiconductors & characterizations
4-5	Wet chemistry Vs solid growth of semiconductors Isotropic and anisotropic shapes
6	Carriers, generation and recombination Electrical conductivity, mobility, diffusion and transport equations
7	Diffusion and transport equations
8	Excess carriers Continuity equations
9-10	Applied continuity equations Diffusion and internal field
11	Energy band and occupation Fermi level in equilibrium
12	Real diode Diffusion capacitance
13	MOS capacitor MOS transistor
14	Bipolar transistor Ebers–Moll model

**Bibliography in English:**

- Physics of semiconductor devices, S.M. Sze, Wiley-Interscience, 2<sup>nd</sup> edition, 1981.
- Introduction to Solid State Physics, Ch. Kittel, John Wiley&Sons, 1972.
- Solid State Physics, N. W. Ashcroft, N. D. Mermin, Brooks Cole, 1<sup>st</sup> edition, 1976.
- Semiconductor Device Fundamentals, Robert F. Pierret, Addison Wesley, 2<sup>nd</sup> edition, 1996.

**בביבליוגרפיה בעברית:**

- זאב בורשטין, "מוליכים למחצה ושימושיהם", דיונון (2002).
- התקני מוליכים למחצה ומיקרואלקטרוניקה מאת אדיר בר-לב וגדי גולן (האוניברסיטה הפתוחה, 2000).