

Al al-Bayt University
Physics Department
First Semester 2014/2015
Materials Science

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Text Book: Materials Science and Engineering, William D. Callister Jr.
Seventh Edition, Wiley (2006)

Week	Contents
1	Classification of Materials: metals, polymers, ceramics, composites, nanocrystalline, nonlinear, biomaterials, Atomic Structure and Interatomic Bonding
2+3+4	Mechanical Properties: Stress, tensile, compressive, shear, bending, strain, plastic deformation, yield, ductility, hardness, fracture, fatigue.
5+6+7	Electrical Properties: conductivity, superconductivity, semiconductors, dielectrics, piezoelectricity.
8+9+10	Magnetic Properties: diamagnetic, paramagnetic, ferromagnetic, ferromagnetic, supermagnetic, hysteresis, applications.
11+12+13	Optical Properties: electromagnetic spectrum, refraction, reflection, absorption, transmission, emission, applications.
14+15	Thermal Properties: heat capacity, specific heat, thermal expansion, thermal conductivity, thermal shock.

Other References:

- 1) Physics for Scientists and Engineers by R.A. Serway and R.J. Beichner.
Fifth Edition (2000).
- 2) Young, R. J., and P. A. Lovell. *Introduction to Polymers*. 2nd ed. Boca Raton, FL: CRC Press, 2000. ISBN: 9780748757404

First Exam: 25% 28-10-2014 (Tuesday)

Second Exam: 25% 06-12-2014 (Tuesday)

Final Exam: 50%