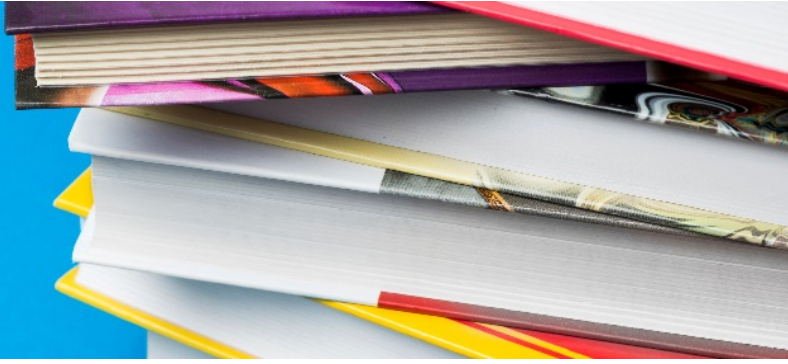
TEL AVIV UNIVERSITY אוניברסיטת תל אביב

Full Syllabus



Course Title

Advanced Ceramics

Lecturer

Dr. Maxim Sokol

Semester

1

Course requirements

Mandatory homework.
Topic of the summary project is chosen with the lecturer.

Final grade components

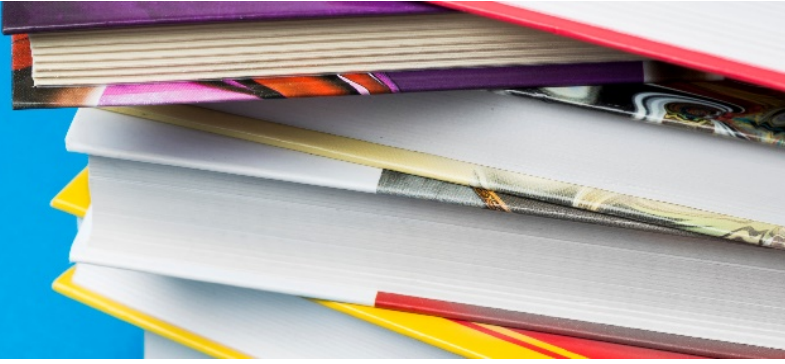
30% Homework and 70% summary project.

Course schedule

Class no. / Date	Subject and Requirements (assignments, reading materials, tasks, etc.)
1	• Introduction and motivation • Sintering of Ceramics: The sintering process, mechanisms of sintering, effect of grain boundaries, theoretical analysis of sintering (thermodynamics and kinetics), alternative derivation of the sintering equations.
2	-"-
3	• Fabrication principles for ceramics with controlled microstructure: Grain growth and coarsening, driving force for grain growth, normal and abnormal grain growth, effect of grain size on properties, Ostwald ripening and Lifshitz-Slyozov-Wagner (LSW) theory, mechanisms controlling the boundary mobility, pore evolution during sintering
4	-"-
5	• Liquid phase, reactive and activated sintering
6	• Sintering process variables: Sintering measurement techniques, conventional sintering, anisotropic shrinkage, heating schedule, sintering atmospheres
7	• Pressure assisted sintering: Hot pressing, reactive hot pressing, hot isostatic pressing (HIP)
8	• Novel sintering techniques: Microwave sintering, spark-plasma sintering (SPS), effect of external electric field, flash sintering, sinter forging and texturing, cold sintering, additive manufacturing of ceramics
9	-"-
10	• Transparent ceramic materials
11	• High and ultra-high temperature ceramics
12	• MAX, MXene and MAB phases
13	-"-

TEL AVIV UNIVERSITY אוניברסיטת תל אביב

Full Syllabus



Required course reading

- Mohamed N. Rahaman, 'Sintering of Ceramics', Taylor & Francis
- Adrian Goldstein, Andreas Krell, Zeev Burshtein, 'Transparent Ceramics' ,Wiley
- Reading materials, uploaded to Moodle

Optional course reading

Comments

3 hours of class per week