



Full Syllabus



Course Title

High-Temperature Materials

Lecturer

Brian Rosen

Semester

B

Course requirements

Recommended knowledge: mechanical properties of materials, introduction to materials science, chemistry

Final grade components

Final project presentation (in groups), 30%

Final project written report (individual), 70%

Course schedule

Class no. / Date	Subject and Requirements (assignments, reading materials, tasks, etc.)
1	The thermodynamic heat engine, process efficiency at high temperature
2	Partial molar quantities, derivation of phase diagrams
3	Ellingham diagrams, vapor species diagrams, Wagner theory of oxidation
4	Multi-layer oxidation, high temperature oxidation of alloys
5	Mechanical stability at high temperature, creep resistance in materials
6	Deformation and fracture at high temperature
7	Ultra-high temperature materials and their properties, processing and sintering
8	Case Studies: MAX phases and internal reduction (exsolution)
9	Techniques programmed techniques for materials analysis
10	Techniques compatible with in-situ high temperature techniques and their limitations
11	Presentations
12	Presentations
13	Presentations

Required course reading

Optional course reading

Comments