

KAIST
NQE489: Nuclear Fuel Cycle
Fall 2017
Prof. Sungyeol Choi

Time: Monday and Wednesday 10:30-11:45.

Location: Room 2425 (Red), Bldg. N7-1.

Office Hours: Students can directly reach Prof. Sungyeol Choi by e-mail. Please give Prof. Choi a short note specifying the issues you would like to discuss.

Objectives: This course introduces the key technologies and materials of nuclear fuel cycle ranging mining & milling, conversion & enrichment, fuel design & fabrication, storage, and reprocessing, and disposal. This course also covers the policy analysis of nuclear fuel cycle including safety, security, nonproliferation, economics, and environmental impact.

Textbook: Reading materials will be distributed.

Reference: Nick Tsoulfanidis, *The Nuclear Fuel Cycle*, American Nuclear Society, 2013.

P. D. Wilson, *The Nuclear Fuel Cycle: From Ore to Waste*, Oxford, 1996.

Grading: Attendance 10%, homework 20%, mid-term exam 30%, and final exam 40%.

Homework: A set of 6 homework assignments will be distributed. Homework turned in late will be worth of 50% of the graded score. Homework will not be accepted over a week late.

Schedule

Weeks	Topics	Weeks	Topics
1	Course overview Evolution of nuclear fuel cycle	9	Aqueous reprocessing Aqueous reprocessing
2	Basics of fuel cycle chemistry Basics of fuel cycle chemistry	10	Non-aqueous reprocessing Non-aqueous reprocessing
3	Fuel resources, mining & milling Conversion and enrichment	11	Non-aqueous reprocessing Transmutation
4	Conversion and enrichment Conversion and enrichment	12	Waste classification and disposal Waste classification and disposal
5	Fuel design and fabrication Fuel design and fabrication	13	Decommissioning Environmental impact
6	Properties of spent nuclear fuel Properties of spent nuclear fuel	14	Nonproliferation Nonproliferation
7	Storage of spent nuclear fuel Storage of spent nuclear fuel	15	Economics of nuclear power Economics of nuclear power
8	Mid-term exam	16	Final exam