Mat 423 / 523 Cement Chemistry and Technology

FALL 2021

Topics and lectures

* Week #1 Introduction: Mali 27 09
	+ Organization
	+ History of cements
* Week #2 Types of Cements and Hydration of OPC Mali 04 10
	+ Types of cements (hydraulic)
	+ Phases of OPC and their functions
* Week #3 Hydration of OPC: Zeynep11 10
	+ Hydration of phases of OPC
	+ Properties of C-S-H
	+ Hydrated Microstructure
* Week #4 Other types of Cements Mali or Zeynep? 18 10
	+ White Portland Cement
	+ Calcium aluminate cements
	+ Phosphate cements
	+ Calcium Sulfoaluminate Cements
	+ Carboaluminate cements
* Week #5 Cement Manufacture Caglar? 25 10
	+ Raw Materials and Mining, extraction,
	+ Raw mix
	+ Comminution Raw Meal, Homogenization
	+ Cement Grinding Plants – Ball Mills – Classifiers
* Week #6 Cement Manufacture clinker production: Irfan 01 11
	+ Clinker Reactions and high temperature Chemistry
	+ Firing Systems - Fuels Preheaters, Calciner & Bypass Systems, Clinker Coolers
	+ Kiln Heat and Mass Balance
	+ Clinker Microstructure :Mali
* Week #7 Midterm I
* Week #8 Production of Concrete: Ismail 08 11
	+ Cement to concrete
	+ Concrete Design
	+ Transport and Placement Concrete
* Week #9 Cement Additives and Admixtures Mali Zeynep and Ozge 15 11
	+ Alternative raw materials
	+ Composite cements
	+ Supplementary cementitious materials
	+ Admixtures
		- Retarders
		- Accelarators
		- Air entraining agents etc
* Week #10 Properties of fresh concrete Zeynep 22 11
	+ Concrete Rheology and pumping
	+ Strength
	+ SCC, HPC UHPC, DUCTAL,ECC,
* Week #11 Midterm II 29 11
* Week #12 Fresh and Hardened Performance of concrete Zeynep 06 12
	+ Durability of Cementitious Materials & Environment
		- Main Cement Problems Related to Durability(Sulfata Attack, Efflorescence, ASR, Freeze-Thaw.. Etc.)
* Week #13 Fiber Reinforced cement-based composites Zeynep 13 12
	+ High Strength precast
	+ RMC Precast Applicaitons
	+ Dry-Mix Applications (Mortars, Renders&Plasters, Tile Adhesives, Floor Screed)
	+ Dry-Mix Applications (Grout, Self Levelling Underlayments, External Insulation & Repair Systems)
* Week #14 New topics in concrete Zeynep 20 12
	+ New alternative for Construction
	+ Magnetorheology
	+ 3-D manufacturing
	+ Self Healing Concrete
* Week #15 Factory Visit AkcanSA B Cekmece