Faculty of Eng. & Natural Sci.

MATH58002-202001

Special Topics in MATH: An Introduction to Homological Algebra

Instructor(s)

Name	Email	Office	Phone	Web	Office Hours
Ayesha Asloob Qureshi	aqureshi@sabanciuniv.edu	FENS-1097	9943		By appointment

Course Content

1) Categories and functors 2) Modules 3) Tensor products of modules 4) Projective, Injective, Flat modules 5) Localization 6) Homology 7) Tor and Ext 8) Homology and rings

Recommend or Required Reading

Readings

Homological Algebra Notes, by Sean Sather-Wagstaff

Assessment Methods and Criteria

	Percentage(%)	Number of assessment methods
Midterm	40	1
Exam		0
Assignment	60	4

Course Outline

Week 1: Modules, submodules, Module homomorphism,
Week 2: Direct product and Direct sum of free modules, Free Modules
Week 3: Localization, Home Functoriality and Localization
Week 4: Tensor products
Week 5+6: Projective, Injective and Flat modules
Week 7+8: Chain complexes and homology, Ext and Tor Functors

Midterm
Week 9: Prime avoidance and Nakayama's Lemma, Regular Sequences, Depth
Week 10: Chain maps, Ext-maps, Tor-maps
Week 11+12: Long exact sequences and Koszul Complexes
Week 13+14: Homological dimensions and Regular Local rings