

Sabanci University
Faculty of Engineering and Natural Sciences

ME 402 / ME 502: Plasmonics

Instructor: Kürşat Şendur **Office:** 1065 **Tel:** 9527

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Class Hours: Tuesday 12:40-14:30 (Synchronous)
Wednesday 08:40-09:30 (Synchronous)

Zoom Link and ID:

<https://sabanciuniv.zoom.us/j/9873876593?pwd=OUF3eW1ueHZ6bnd2UkRDSDBxdHNpQT09>

Meeting ID: 987 387 6593

Passcode: 402502

Teaching Assistant: Niloufar Pirouzfam: npirouzfam@sabanciuniv.edu
Amin Balazadeh Koucheh: aminb@sabanciuniv.edu

Text Book:

Plasmonics: Fundamentals and Applications, Stefan Maier, Springer

Surface Plasmons on Smooth and Rough Surfaces and on Gratings, Heinz Raether, Springer-Verlag.

Course Overview:

In recent years, there is a growing interest for plasmonics due to potential nanoscience and nanotechnology applications. These applications include near-field imaging, solar cells, nanolithography, optical data storage, heat assisted magnetic recording, light emitting devices, spectroscopy, medical applications, bio-chemical sensors, femtosecond pulse shaping, single molecule spectroscopy, single molecule fluorescence enhancement, and plasmonic waveguides. This course will cover the fundamentals of plasmonics and surface plasmons. This class will provide the basic knowledge for understanding and manipulating surface plasmons and localized plasmons. In addition, emerging applications involving various plasmonics systems will be discussed. Surface plasmons on a single interface, thin film plasmons, localized plasmons on nanoparticles, and plasmonic nano-antennas will be discussed. This course is intended to teach students the principals of plasmonics encountered in different applications. Therefore, this course can be of interest for students in many departments.

Grading (Tentative):

Homeworks: 40%

Project 1: 30%

Project 2: 30%

Tentative Syllabus:

05.10-09.10	Week 01	Introduction and examples of plasmonic systems
12.10-16.10	Week 02	Electrodynamics for plasmonics review / Applications of plasmonic systems
19.10-23.10	Week 03	Electrodynamics for plasmonics review / Applications of plasmonic systems
26.10-30.10	Week 04	Electrodynamics for plasmonics review / Applications of plasmonic systems (NOTE : October 27th class will be asynchronous. Recording will be shared before the class date.)
02.11-06.11	Week 05	Electrodynamics for plasmonics review / Applications of plasmonic systems
09.11-13.11	Week 06	Electrodynamics for plasmonics review / Applications of plasmonic systems
16.11-20.11	Week 07	Tutorial for Project #1 (Lumerical**)
23.11-27.11	Week 08	Optical properties of noble metals
30.11-04.12	Week 09	Optical properties of noble metals/ Tutorial (MATLAB)
07.12-11.12	Week 10	Surface plasmon polaritons at planar interfaces
14.12-18.12	Week 11	Surface plasmon polaritons at planar interfaces
21.12-25.12	Week 12	Excitation of surface plasmons / Thin-film plasmons
28.12-01.01	Week 13	Localized plasmons / Tutorial for Project #2 (HFSS)
04.01-08.01	Week 14	Tutorial for Project #2 (HFSS)

****:** Important note: If there is a problem with the Lumerical licenses, another computer program will be used.