

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: Monday 10:40-13:30

In-Person Class Location: FENS G029

Zoom Link and ID for Online Attendance:

<https://sabanciuniv.zoom.us/j/94881672952?pwd=QXI0blg5MTREQSs0TDBqcTlKZlpCZz09>

Meeting ID: 948 8167 2952

Passcode: 402502

Teaching Assistant: Niloufar Pirouzfam: npirouzfam@sabanciuniv.edu

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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: 30%

Exam: 40%

Project: 30%

Tentative Syllabus:

27.09-01.10	Week 01	Introduction and examples of plasmonic systems
04.10-08.10	Week 02	Electrodynamics for plasmonics review / Applications of plasmonic systems: Medical Applications, Microscopy, Sensors
11.10-15.10	Week 03	Electrodynamics for plasmonics review / Applications of plasmonic systems: Data Storage
18.10-22.10	Week 04	Electrodynamics for plasmonics review / Applications of plasmonic systems: Radiative Heat Transfer, Smart Materials
25.10-29.10	Week 05	Electrodynamics for plasmonics review
01.11-05.11	Week 06	Optical properties of noble metals
08.11-12.11	Week 07	Optical properties of noble metals
15.11-19.11	Week 08	Optical properties of noble metals/ Tutorial (MATLAB)
22.11-26.11	Week 09	Surface plasmon polaritons at planar interfaces
29.11-03.12	Week 10	Surface plasmon polaritons at planar interfaces
06.12-10.12	Week 11	Excitation of surface plasmons
13.12-17.12	Week 12	Exam
20.12-24.01	Week 13	Thin-film plasmons Exam / Localized plasmons / Tutorial for Project
27.12-31.12	Week 14	Tutorial for Project