

ECE 522 – Antennas and Propagation

Term – Spring 2019 (201901)

Instructor

Dr. Jens Bornemann

Phone: 250-721-8666

E-mail: jbornema(at)ece(dot)uvic(dot)ca

Office Hours

Days: Mondays and Thursdays

Time: 15:00-16:00

Location: EOW 309

Course Objectives

- To introduce students to fundamental radiation, propagation and antenna concepts
- To familiarize students with the terminology used in antenna engineering
- To expose students to basic analysis and design aspects

Learning Outcomes

At the end of the course, students will be able to ...

- identify fundamental parameters as they apply to antennas and propagation
- evaluate the influences of reflection, diffraction, fading, scattering, absorption
- carry out link budget calculations in the presence of a variety of losses and obstacles
- design straight wire antennas, loop antennas and helical antennas
- identify the fundamental concepts and limitations of antenna arrays
- design broadside, endfire and phased-array antennas
- design sectoral, pyramidal and conical horn antennas
- design rectangular and circular patch antennas including their feeding networks
- solve the characteristic properties of reflector antennas
- design simple reflector antennas
- apply fundamental concepts to detect possible errors in calculations
- apply the limits of radiation in the microwave spectrum
- understand and explain the fundamental electromagnetic principles (and their limitations) as applied to the material presented in the course

Syllabus

Approx. No. Classes

1.	Introduction	1
2.	Fundamental Parameters of Antennas and Propagation	3
3.	Propagation	2
4.	Potential Functions	1
5.	Wire Antennas	3
6.	Antenna Arrays	2
7.	Aperture and Horn Antennas	3
8.	Microstrip Antennas	3
9.	Reflector Antennas	1
10.	Ultra-Wideband Antennas	1
11.	Corrugated Horns	1
12.	Antenna Measurements	1
	<i>Mid-term test</i>	1
	<i>Review</i>	1
	Total	24

A-Section(s): A01 / CRN 20919

A02 / CRN 24015

Days: Mondays & Thursdays

Time: 13:00-14:20

Location: CLE A202

Required Text

Title: Antenna Theory: Analysis and Design, 2nd, 3rd or 4th Ed.

Author: C.A. Balanis

Publisher: J. Wiley & Sons

Year: 1997, 2005 or 2016

Optional Text

Title: Antenna Theory and Design 2nd or 3rd Ed.

Author: W.L. Strutzman and G.A. Thiele

Publisher: J. Wiley & Sons

Year: 1998 or 2012

References: Course Website: TBA

Assessment:

Assignments: 10 %

Due Dates: TBA

Mid-term 30 %

Date: 28 Feb 2019

Project 10 %

Final Exam 50 %

Note:

1. Failure to complete all project requirements will result in a grade of N being awarded for the course.
2. The aggregate grade of the midterm and the final exam must be a passing grade ($\geq 40/80$) to pass the course.

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Graduate Calendar. <https://web.uvic.ca/calendar2019-01/grad/academic-regulations/grading.html>

Note to Students: Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair's Assistant to set up an appointment.

Accommodation of Religious Observance:

<https://web.uvic.ca/calendar2019-01/grad/registration/Registration.1.17.html#>

Policy on Inclusivity and Diversity:

<https://web.uvic.ca/calendar2019-01/general/policies.html>

Standards of Professional Behaviour: You are advised to read the Faculty of Engineering document Standards for Professional Behaviour, which contains important information regarding conduct in courses, labs, and in the general use of facilities.

<https://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf>

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult the entry in the current Graduate Calendar for the UVic policy on academic integrity.

<https://web.uvic.ca/calendar2019-01/grad/academic-regulations/academic-integrity.html>

Equality: This course aims to provide equal opportunities and access for all students to enjoy the benefits and privileges of the class and its curriculum and to meet the syllabus requirements. Reasonable and appropriate accommodation will be made available to students with documented disabilities (physical, mental, learning) in order to give them the opportunity to successfully meet the essential requirements of the course. The accommodation will not alter academic standards or learning outcomes, although the student may be allowed to demonstrate knowledge and skills in a different way. It is not necessary for you to reveal your disability and/or confidential medical information to the course instructor. If you believe that you may require accommodation, the course instructor can provide you with information about confidential resources on campus that can assist you in arranging for appropriate accommodation. Alternatively, you may want to contact the Resource Centre for Students with a Disability located in the Campus Services Building.

The University of Victoria is committed to promoting, providing, and protecting a positive, and supportive and safe learning and working environment for all its members.

Course Lecture Notes

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.

Sexualized Violence Prevention and Response at UVic

UVic takes sexualized violence seriously, and has raised the bar for what is considered acceptable behaviour. We encourage students to learn more about how the university defines sexualized violence and its overall approach by visiting www.uvic.ca/svp. If you or someone you know has been impacted by sexualized violence and needs information, advice, and/or support please contact the sexualized violence resource office in Equity and Human Rights (EQHR). Whether or not you have been directly impacted, if you want to take part in the important prevention work taking place on campus, you can also reach out:

Where: Sexualized violence resource office in EQHR; Sedgewick C119

Phone: 250.721.8021

Email: svpcoordinator@uvic.ca

Web: www.uvic.ca/svp