ELEC 454 — Microwave Engineering
Spring 2006
Professor: Dr. Wolfgang J.R. Hoefer

Introduction to operating principles, analysis and design of microwave passive and active components

1. Objectives

1.1 Analyze microwave components and circuits in terms of scattering parameters.

1.2 Determine the electrical characteristics of waveguides and transmission lines through electromagnetic field analysis.

1.3 Design microwave amplifiers and oscillators based on stability, bandwidth, power gain and noise figure criteria.

1.4 Generate layouts and measure the performance of such components.

2. Syllabus

		Lectures
2.1	**Circuit Theory for Wave Guiding Systems**	**5**
	N-ports, transmission matrix representation, scattering matrix, non-reciprocal devices, waveguide junctions, lumped element representation.	
2.2	**Planar Circuits**	**3**
	Effective dielectric constant, characteristic impedance, losses, microstrip, coplanar and slotline, coupled lines.	
2.3	**Passive Circuits**	**4**
	Resonators, filters, power dividers, couplers, matching networks, circulators, isolators	
2.4	**Nonlinear Components**	**12**
	Design of amplifiers and oscillators	
	Total	**24**

3. Laboratory Experiment (Each lab session is of 3 hours duration.)

Project: Design and Realization of a Two-Stage, Low-Noise Microstrip Transistor Amplifier.
For details, see the lab manual (item 4.2 below)

4. Texts

Required

(1) D. Pozar, *Microwave Engineering, 2nd edition*, John Wiley & Sons, 1998.

(2) W.J.R. Hoefer and S. Willke, *Laboratory Manual for ELEC 454 — Microwave Engineering Design and Realization of a Two-Stage, Low-Noise Microstrip Transistor Amplifier*.

Optional References

(3) G. Gonzales, *Microwave Transistor Amplifiers – Analysis and Design*, Prentice-Hall, Inc., 2nd Edition, 1997.

(4) G.D. Vendelin, A.M. Pavio, U.L. Rohde, *Microwave Circuit Design Using Linear and Nonlinear Techniques*, John Wiley & Sons, 1990.

(5) S.Y. Liao, *Microwave Circuit Analysis and Amplifier Design*, Prentice-Hall, Inc., 1987.

5. Evaluation Method

Assignments	—	*Problems will be recommended, solutions will be posted.*
Lab Project	40%	
Midterm	15%	*March 2, 2006, 11:30 to 12:50,* ***ELL 161****.*
Final Exam	45%	*April 2006*

Note: Failure to complete all laboratory requirements will result in a grade of N being awarded for the course. Laboratory reports must be satisfactory, and you must attend all four laboratory sessions. You must be prepared before you start a lab session. The laboratory instructors are authorized to conduct a short quiz at the beginning of each lab. Failure to complete the laboratory requirements will result in an incomplete grade for the course. One report per group is due two weeks after the last session.

The final grade obtained from the above marking scheme will be based on the following percentage-to-grade point conversion. (This marking scheme is identical with the official UVic scheme)

90	≤	A+	≤	100	
85	≤	A	<	90	
80	≤	A–	<	85	
75	≤	B+	<	80	
70	≤	B	<	75	
65	≤	B–	<	70	
60	≤	C+	<	65	
55	≤	C	<	60	
50	≤	D	<	55	
35	≤	E	<	50	Fail, conditional supplemental exam.
0	≤	F	<	35	Fail, no supplemental exam
		N			Fail, did not write final examination or otherwise complete course requirements by the end of the term or session; no supplemental exam.

Note: Failure to complete the laboratory requirements will result in a grade of N being awarded for the course.

Supplemental Exam(s) will be granted to a qualified student (see calendar) who has received a grade of E and has applied for the exam.

6. Contact Information and Important Dates

Professor: Dr. Wolfgang J.R. Hoefer
Telephone: 721-6030
E-Mail: **whoefer@ECE.UVic.CA**
Office: EOW 419
It is recommended that you call Donna (721-8821) for an appointment

Online Info: ELEC 454 Homepage

Lecture Hours: Mondays and Thursdays, 11:30 — 13:00h, **ELL 161**
Office Hours: Mondays 14:00 — 16:00 h **EOW 419**

Midterm Exam Date: Thursday, March 2, 2006

7. Guidelines on Religious Observances

7.1 Where classes or examinations are scheduled on the holy days of a religion, students may notify their instructors, at least two weeks in advance, of their intention to observe the holy day(s) by absenting themselves from classes or examinations.

7.2 Instructors will provide reasonable opportunities for such students to make up work or missed examinations.

7.3 Students will cooperate by accepting the provision of reasonable opportunities for making up work or missed examinations.

7.4 The University Secretary's Office will distribute a multi-faith calendar to each academic unit annually.

8. Commitment to Inclusivity and Diversity

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.

9. Faculty of Engineering Standards for Professional Behaviour

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour (http://www.engr.uvic.ca/policy/professional-behaviour.html) which contains important information regarding conduct in courses, in labs and in the general use of facilities.
Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult http://web.uvic.ca/calendar2005/FACS/UnIn/UARe/PoAcI.html for the UVic policy on academic integrity.

10. Posting of Grades

The Department of Electrical and Computer Engineering will no longer post grades. Students may access their grades via the Internet at http://www.uvic.ca/reco/ and selecting WebView (Student Records On-Line).