

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY
SAULT STE MARIE, ONTARIO

COURSE OUTLINE

Course Title: MICROWAVE AND SATELLITE COMMUNICATIONS
Code No. ELN 316-5
Program: ELECTRONIC ENGINEERING TECHNOLOGY
Semester: SIX
Date: JANUARY, 1991
Author: Doug Faggetter

*W.F.
Jan 10/91*

New: _____ Revision:

APPROVED: *D. Faggetter*

DATE: 91/01/22

Course name

Course number

PHILOSOPHY/GOALS

In this course the student will gain a thorough knowledge of the theory and operation of passive and active components employed in microwave equipment. Laboratory work includes the experimental generation of microwave signals and their testing with waveguide hardware. Also included are microwave circuit construction projects.

METHOD OF ASSESSMENT:

Mark breakdown:

Labs: 30%

Tests and quizzes: 70%

Grades will be assigned as follows:

A+	90-100%
A	80-89%
B	65-79%
C	55-64%
R	REPEAT

TEXTBOOK

Microwave Theory, Components and Devices - John A. Seeger

<u>TOPIC NO.</u>	<u>PERIODS</u>	<u>TOPIC DESCRIPTION</u>
1	1	<u>Introduction</u> Microwave frequencies History Application of Microwaves Units Co-ordinate Systems
2	8	<u>Circuits and Fields</u> Circuit Theory Electromagnetic Fields High Frequency Effects
3	6	<u>Transmission Lines</u> Step Input to a Transmission Line AC Solution for Transmission Line
4	8	<u>Waveguides and Resonators</u> Transverse Electric Modes in a Rectangular Waveguide Power in a Rectangular Waveguide Transverse Magnetic Modes in a Rectangular Waveguide Circular Waveguides Waveguide Cavities
5	10	<u>Smith Chart</u> Determination of Input Impedance Use of the Smith Chart with Admittance Reflection Coefficient and VSWR Single Stub Matching Using the Smith Chart Double Stub matching Determining Impedance Using the Smith Chart and the Slotted Line Smith Chart and Power Lossy Lines Frequency and the Smith Chart
6	5	<u>Microwave Network Parameters</u> Two Port Parameters The ABCD- Parameters Scattering Parameters Properties of S-Parameters Change of Port Position Scattering Transfer Parameters Signal Flow Graphs

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Solid-State Microwave Devices
Semiconductor Concepts
~~Microwave Applications of~~
Microwave Transistors

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Microwave Components
Coaxial Cables
Waveguide Sections
Waveguide Reactive elements
Terminations
Attenuators
Phase Shifter
Waveguide Tees
Magic Tee
Directional Coupler
Isolator
Circulator

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Microwave Tubes
Linear-Beam Microwave Tubes
Crossed-Field Tubes
Millimeter-Wave Tubes

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Antennas
Properties of Antennas
Dipole Antenna
Small Loop Antenna
Horn Antenna
Parabolic Reflector Antennas
Lens Antenna
Slot Antenna
Polyrod Antenna
Helical Antenna
Frequency-Independent Antenna
Antenna Arrays

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Satellite Communications