

OUTLINE

ELECTROMAGNETIC PROPERTIES OF DIELECTRICS

- Complex permittivity/complex permeability
- Measurement of dielectric constant, loss tangent, and dielectric conductivity

ALTERNATING-CURRENT SPECTROSCOPY

- Dielectric relaxation
- Equivalent circuit models
- Assessment of cell membrane integrity
- Assessment of transport functions and drug actions
- Automatic network models with lumped-element models

ACTIVE MICROWAVE IMAGERY

- Comparison to x-ray and ultrasound
- Methods of image formation by scattering parameter and differential propagation delay techniques
- Methods of image processing
- Anatomical and physiological correlates

PASSIVE MICROWAVE IMAGERY

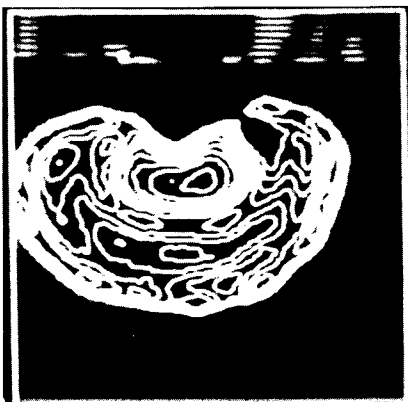
- Radiometry/thermography
- Pathophysiological correlation

MICROWAVE INACTIVATION OF THERMOLABILE ENZYMES

- The problem of enzyme kinetics
- The microwave approach

MICROWAVE THAWING OF FROZEN BLOOD AND ORGANS

- Methods of erythrocyte and leukocyte preservation and thawing
- Organ preservation and thawing



Time delay spectroscopic image of isolated canine kidney.

MICROWAVE THERAPEUTICS

- Adjunctive use with chemotherapeutic agents in the treatment of cancer
- Wound healing acceleration
- Promotion of repair in pathologic fractures
- Diathermy
- Microwave compatible temperature electrodes

INSTRUCTORS

Lawrence E. Larsen, M.D., is Chief of the Department of Microwave Research at The Walter Reed Army Institute of Research. He has performed research in the field of microwave interactions with biological systems since 1970. During that time his research activities have included studies of biological hazards, technology and instrument development, and biomedical applications. Dr. Larsen is the author of more than 30 papers and two book chapters on biomedical research topics; he holds several patents on methods for biosystem interrogation by RF and microwave techniques.

John H. Jacobi is Associate Chief for Engineering of the Department of Microwave Research at The Walter Reed Army Institute of Research. He has worked in the fields of microwave and radio-frequency techniques for over 20 years and has applied these methods to biomedical problems since 1974. Mr. Jacobi has written numerous papers on the subject of microwave interactions with biological systems and holds several patents in the area.

TEXT

Class notes consisting of a collection of reprints and other original material will be provided. Text material will also include the proceedings of the Symposium on Electromagnetic Dosimetric Imagery.

HOUSING AND MEALS

Housing and meals are not provided. However, there is a wide variety of hotels, motels, and restaurants nearby. Since hotel accommodations may be difficult to obtain on short notice, reservations should be made as early as possible. If you have difficulty obtaining reservations, we will be happy to assist you.

FEE

The fee for the courses is \$555. This includes lecture notes and supplies. Make checks and purchase orders payable to GWU, Continuing Engineering Education. Participants may delay payment until arrival. Parking is provided.

TIME AND PLACE

Check-in will be at 8:15 a.m. on the first day in the 6th floor lobby of the University Library, 2130 H St., N.W. (corner of 22nd and H), Washington, D.C. Classes will meet from 8:30 a.m. to 4:15 p.m.

CONTINUING EDUCATION UNITS (CEU)

Course participants will receive a Certificate of Completion indicating the number of Continuing Education Units (CEUs) awarded for the course. The CEU is a standard measurement for noncredit continuing education programs. One CEU is given for each 10 contact hours in the classroom.

REGISTRATION

Tentative or final registration should be made as soon as practicable. Fill out and mail the attached registration form, or apply by letter, telephone, TELEX or purchase order to Continuing Engineering Education Program, George Washington University, Washington, D.C. 20052, (202) 676-6106, the toll free number (800) 424-9773, or TELEX 64374 (International).

SPECIAL COURSES

Most of our courses can be presented on an inhouse contract basis, or new courses can be developed based on the specific training needs of your organization. In either case, the cost per capita is substantially lower than advertised fees. We will be happy to provide you with additional information.

UNIVERSITY POLICY ON EQUAL OPPORTUNITY

George Washington University does not discriminate against any person on the basis of sex, race, color, religion, national origin, or handicap in any of its education or employment programs or activities. Federal regulations implementing Title IX of the Education Amendments of 1972 and Section 504 of the Rehabilitation Act of 1973 call for an explicit statement that the requirement not to discriminate on the basis of sex or handicap extends to employment in and admission to such programs and activities. The University is also subject to the District of Columbia Human Rights Law. Inquiries concerning the application of this policy and federal laws and regulations concerning discrimination in education or employment programs and activities may be addressed to Marianne Phelps, Assistant Provost for Affirmative Action, Rice Hall, Washington, D.C. 20052, or to the Director of the Office for Civil Rights of the Department of Health, Education, and Welfare.

**BIOMEDICAL APPLICATIONS OF
MICROWAVE RADIATION**
October 6-8, 1980

COURSE OBJECTIVE

The objective is to increase awareness of the biomedical relevance of microwave and radio-frequency (RF) radiation as a sensor and effector among biological scientists and to assimilate microwave/RF system designers into this new area of application.

WHO SHOULD ATTEND

Engineers, scientists, and physicians who are interested in the application of microwave/radio-frequency technology to biomedical science and the diagnosis and treatment of disease.

DESCRIPTION

The course will pursue a multi-disciplinary approach to the subject of biomedical applications of microwave/RF radiation. The subject will be developed in a tutorial manner from the aspects of both biomedical applications and principles of microwave/RF instrumentation.

The course will begin with a bio-physical introduction to the properties of biosystems as media for the propagation of microwave/RF energy and a contrast of those properties with the more familiar forms of radiant energy such as x-rays, optics, and sound. Topics pertinent to biomedical applications will constitute most of the course. The topics include methods for physiological assessment of the functional status of the cell membrane, microwave thermography, active microwave scattering parameter imagery, time-delay spectroscopic imagery methods for amelioration of multipath propagation, therapeutics, and diagnostic applications.

PREREQUISITE

There is no prerequisite for this course. However, some knowledge of microwave and/or radio-frequency engineering, as well as mammalian physiology, would be helpful.

**SCHOOL OF ENGINEERING
AND APPLIED SCIENCE**

**CONTINUING ENGINEERING
EDUCATION PROGRAM**

**BIOMEDICAL
APPLICATIONS
OF
MICROWAVE
RADIATION**

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**THE
GEORGE WASHINGTON
UNIVERSITY**

WASHINGTON, D.C. 20052
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No. 691
BIOMEDICAL APPLICATIONS
OF MICROWAVE RADIATIONS
October 6-8, 1980

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Please Note: We occasionally mail to selected lists which cannot be cross-checked against our files. Therefore, you may receive a duplicate of this announcement. If so, we hope you will pass it along to an interested associate.