

EC825 RF/ Microwave Interaction with Biological Tissues

llabus

Chapter 1- Fundamentals of Electromagnetics

RF and Microwave Frequency Ranges, Fields, Electromagnetics, RF and Microwave Energy, Penetration in Biological Tissues and Skin Effect, Relaxation, Resonance and display, Dielectric Measurements, Exposures

Chapter 2- RF/ Microwave Interaction Mechanisms in Biological Materials

Piezoelectricity, Tissue Characterization, Dielectric Dispersion in Tissues, Measurements, Thermodynamics, Energy

Chapter 3- Biological Effects

Absorption, Nervous system, cells and Membranes, Molecular level, Low-level Exposures and ELF Components, Ear, Eye and Heart, Influence of Drugs, Nonthermal, Microthermal and Isothermal effects, Epidemiology Studies, Interferences, Radiation Hazards and Exposure Standards

Chapter 4- Thermal Therapy

Introduction to Thermal therapy, Heating Principle, Hyperthermia, Method of Thermometry

Chapter 5- EM Wave Absorbers Protecting Biological and Medical Environment

Fundamentals of EM Wave Absorbers, Classifications of Wave Absorbers, Fundamental Principle, Fundamental Theory of EM Wave Absorbers, Application of EM Absorber, EM Wave Absorber Based on Equivalent, Methods of Improving RF Field Distribution in Small Room

Chapter 6- RF/ Microwave Delivery Systems for Therapeutic Applications

Introduction, Transmission lines and Waveguides for Medical Applications, Antennas RF and Microwave Ablation, Perfusion Chamber, RF Gastroesophageal Reflux disease, Endometrial Ablation, Microwave Measurement Techniques: Examples, Future Research, Microwave Tissue welding, Endoscopic Light source and Microwaves for Photodynamic Therapy, Microwave Balloon Catheter, Thermally Molded Stent for Cardiology, Urology and other Medical and Veterinary applications