

ENPH 360 Microwave Theory

Department: Engineering and Physics

Credit Hours: 3

Required or Elective (circle one)

Current Catalog Description:

Review of electromagnetic theory and transmission lines, analysis of transmission lines and waveguides, microwave network analysis, impedance matching, power dividers, couplers, and hybrids, Prerequisites: ENPH 332 or concurrent enrollment, and ENPH 225. Course fee \$ 15.

Course Schedule:

3 lecture hr/wk, 0 lab hr/wk

Coordinator:

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Prerequisites by Topic:

ENPH 332 or concurrent enrollment
ENPH 225

Course Learning Goals and Program Outcomes Map:

The Program Outcomes for Engineering Physics are:

- A. an ability to apply knowledge of math, engineering & science
- B. an ability to design and conduct experiments, as well as to analyze and interpret data
- C. an ability to design system, component or process to meet needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- D. an ability to function on multi-disciplinary teams
- E. an ability to identify, formulate, and solve engineering problems
- F. an understanding of professional and ethical responsibility
- G. an ability to communicate effectively
- H. the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- I. a recognition of need for, and ability to engage in life-long learning
- J. a knowledge of contemporary issues
- K. an ability to use techniques, skills, and modern engineering tools necessary for engineering practice.
- L. a depth and breadth of knowledge in engineering and physics necessary to work in a multidisciplinary environment

| Course Goals Upon completion of this course with a C or better, students will | Program Outcome(s): |
|--|----------------------------|
| 1. Understand the role of microwave theory in engineering and science as well as its application. | F,H,I,J,L |
| 2. Understand and be able to obtain the solution of Maxwell equations and related wave equation, propagation of electromagnetic energy in media | A,E,K |
| 3. Explain and determine the following microwave theory terminology: power absorption, wave reflection, dielectric interface, transmission line, smith chart, quarter-wave transformer, load matching, slotted line, lossy transmission line, waveguides, coaxial line, stripline, dispersion, microwave network, microwave resonators, power dividers, directional couplers, hybrids, microwave filter. | A,E |
| 4. Be able to use smith chart to solve transmission line problems | A,E |
| 5. Be able to relate microwave network analysis to scattering matrix | A,E,K |
| 6. Understand the effects of impedance matching on microwave systems. | A,B,C,D,E,G,K |
| 7. Be able to use the solution of Maxwell equation for find different modes of propagation through parallel plate, rectangular, and circular waveguides | A,E |
| 8. Understand and be able to apply the subject of electromagnetic theory to microwave theory problems | A,B,E,K |
| 9. Understand the principles of microwave filters | A,E |
| 10. Understand and be able to apply the solution of wave equation to propagation in different types of media | A,E |

Academic Honesty:

Cheating, plagiarism (submitting another person's materials or ideas as one's own), or doing work for another person who will receive academic credit are all-impermissible. This includes the use of unauthorized books, notebooks, or other sources in order to secure or give help during an examination, the unauthorized copying of examinations, assignments, reports, or term papers, or the presentation of unacknowledged material as if it were the student's own work. Disciplinary action may be taken beyond the academic discipline administered by the faculty member who teaches the course in which the cheating took place.

Students with Disabilities Policy:

It is the policy of Tarleton State University to comply with the Americans with Disabilities Act (ADA) and other federal, state, and local laws relative to the provision of disability services. Students with disabilities attending Tarleton State University may contact the Office of Disability Services at (254) 968-9478 to request appropriate accommodation. Furthermore, formal accommodation requests cannot be made until the student has been officially admitted to Tarleton State University.

Contribution of Course to Meeting the Professional Requirement:

Engineering Topics: 100%

Status of Continuous Improvement Review of this Course:

Prepared by: Falih Ahmad

Date: Saturday, March 21, 2009

Reviewed by:

Date:

