A. **TITLE**: Electronic Communications (II)

B. **COURSE NUMBER**: ELEC 386

C. **CREDIT HOURS**: 3

D. **WRITING INTENSIVE COURSE**: NO

E. **WEEKS PER SEMESTER**: 15

F. **SEMESTER OFFERED**: FALL

G. **HOURS OF LECTURE, LABORATORY, RECITATION, TUTORIAL, ACTIVITY**: 2 hours lecture and 2 hours laboratory per week

H. **CATALOG DESCRIPTION**: This course is the continuation of Electronic Communications (I), and is designed to prepare students for modern telecommunications industry. Topics include: Wireless digital communications, Optical communications, Cell phone communications, CDMA, OAS, Wireless technologies, Microwave and lasers, Antennas, and Waveguide and Radar

I. **PRE-REQUISITES/CO-COURSES**: ELEC 385 [Electronic Communications I] or permission of instructor.

J. **GOALS (STUDENT LEARNING OUTCOMES)**

**Institutional Students Learning Objectives (SLO)**

(1) Communication  (2) Critical Thinking  (3) Professional Competence

<table>
<thead>
<tr>
<th>Course Objectives / ABET (SLO)</th>
<th>Institutional SLO</th>
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<tbody>
<tr>
<td>An ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies.</td>
<td>3. Professional Competence</td>
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<td></td>
<td>2. Critical Thinking</td>
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<td>An ability to conduct standard tests and measurements; to conduct, analyze, and interpret experiments; and to apply experimental results to improve processes.</td>
<td>3. Professional Competence</td>
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<td>An ability to design systems, components, or processes for broadly-defined engineering technology problems appropriate to program educational objectives.</td>
<td>2. Critical Thinking 3. Professional Competence</td>
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<td>A commitment to quality, timeliness, and continuous improvement.</td>
<td>3. Professional Competence</td>
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</tbody>
</table>
K. TEXTS:

L. REFERENCES:

M. EQUIPMENT: Electronics laboratory is equipped to support this course.

N. GRADING METHOD: A-F

O. MEASUREMENT CRITERIA/METHODS: Examination performance, Assignments, and Laboratory projects

P. DETAILED TOPICAL OUTLINE:

1. Antennas
   a. Basic Antenna Theory
   b. Hertz Antenna
   c. Radiation Resistance
   d. Antenna Feed Lines
   f. Marconi Antenna
   g. Antenna Arrays
   h. Special Purpose Antennas

2. Waveguides and Radar
   a. Comparison of Transmission Systems
   b. Types of Waveguides
   c. Termination and Attenuation
   d. Directional Coupler
   e. Micro-integrated Circuit Waveguiding

3. Microwaves and Lasers
   a. Microwave Antennas
   b. Microwave Tubes
   c. Solid-State Microwave Devices
   d. Low-Noise Amplification

4. Transmission Lines/Optics
   a. Transmission Line Basics
   b. Standing Waves
   c. Circuit Elements
   d. Fiber Attenuation and Dispersion
   e. Light Sources
   f. Detectors
   g. Fiber Connectors
   h. Systems
1. Fiber-Optic LANs

5. Wireless Technologies
   a. Cellular Telephone Systems
   b. Digital Cell Phones Systems
   i. Wireless LANs and Personal Area Networks (PAN)
   j. PANs and Bluetooth
   k. Infrared Wireless
   l. Radio Frequency Identification
   m. Ultrawideband Wireless

6. Communication Tests and Measurements
   a. Communications Test Equipment
   b. Troubleshooting Techniques
   c. Electromagnetic Interference

Q. **LABORATORY OUTLINE:**

1. Basic Antenna Design
2. Optical Receiver/Transmitter
3. Microwave Devices Testing
4. Infrared Transmitter/Receiver
5. Wireless LAN
6. Troubleshooting Techniques
7. Final Project