**COURSE TITLE:** Electronic Comm.  
**COURSE NO:** 605-151  
**CREDITS:** 3 (Lec:2, Lab:2)

**COURSE DESCRIPTION:** An introduction course in analog communication systems. Topics covered are AM/FM/SSBX microwave and laser transmission and reception. Theory is covered in block diagram level with additional theory and labs on representative circuits from the major blocks of a communication system.


**LABORATORY:** Electronic Communications, Lab-Volt C.B.T. Course

**PROJECT:** Each student will hand in a course notebook at the end of the 15th week. See detailed information in Appendix A

**REFERENCE:** Hardware Data Manuals and Handouts

**SECTION:** 605-151

**STARTING DATE:** August 25, 2004

**MEETING TIME:** M,T,W,Th,F 8:00am - 1:00pm or M,T,W,Th 5:00pm - 10:00pm

**LOCATION:** T415

**ENDING DATE:** December 21, 2004

**ASSIGNMENT & TEST:** See the Course Plan in Appendix B

**INSTRUCTORS:**  
Patrick E. Hoppe 262.619.6462 hoppep@gtc.edu  
Matthew Treu 262.619.6808 treum@gtc.edu  
Randy Reusser 262.619.6898 reusserr@gtc.edu

**PHONE**  
**EMAIL**

**OFFICE:**  
**ROOM:** T414, FAX: 262.7169

**OFFICE HOURS:** Will be posted outside the office door at the start of class. If our office hours do not fit into your schedule, please contact us and we will find a mutually convenient time to meet.
SPECIAL NEEDS STUDENT: If you have any special education needs or concerns, please contact your class-room instructor or Special Needs Instructor on campus (Linda Mahoney, or Peggy Jude @ 262-619-6228).

ATTENDANCE This course is delivered in a Self-Paced format. It is the responsibility of the student to allot sufficient time each week to complete this course before the send of the semester. Students should plan on spending 4 hours per week in the open lab. However, they may spend additional time and finish the course early.

GRADING All assignments, tests must show all work leading to the answer(s). They are graded from 0 to 100 points each. LabVolt Unit exams can only be taken up to three (3) times, the highest score will be used. If the exam is taken more than three times, the lowest score will be used.

- Each student must turn in his or her own work.

Point Value

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>FINAL EXAM</td>
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<tr>
<td>LABVOLT EXAMS</td>
<td>55%</td>
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<tr>
<td>Research Paper</td>
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Letter Grade

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<tr>
<td>D-</td>
<td>68% to 69%</td>
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<td>F</td>
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SUPPLIES - A Texas Instruments Engineering calculator (TI-86) or equivalent would be very helpful.
BROAD COMPETENCY

1. Demonstrate basic understanding of how an AM signal is generated and transmitted.
2. Assemble and test AM transmitter circuitry.
3. Demonstrate a basic understanding of how an FM signal is generated and transmitted.
4. Assemble and test FM circuitry.
5. Demonstrate a basic understanding of single-side-band communication transmission and reception principles.
7. Demonstrate a basic understanding of transceiver operation.
8. Understand the operation of mobile telephone at a block diagram level.
9. Demonstrate a basic understanding of microwave/laser principles.
10. Demonstrate a basic understanding of digital communications.

CORE ABILITIES

Gateway believes students need both technical knowledge and skills and core abilities in order to succeed in a career and in life. The following nine core abilities are the general attitudes and skills promoted and assessed in all Gateway programs; those followed by an asterisk are promoted and assessed in this course.

1. Act responsibly *
2. Communicate clearly and effectively *
3. Demonstrate essential computer skills *
4. Demonstrate essential mathematical skills *
5. Develop job-seeking skills
6. Respect self and others as members of a diverse society *
7. Think critically and creatively *
8. Work cooperatively *
9. Value learning *
Appendix A - Research Paper

The research paper will be on one of the modes of communication, either analog or digital. Your paper should cover the history of that particular mode, including:

- where it was first used
- when it was first used
- what it is
- how it works

The paper should be 3 to 5 pages in length, double spaced. (Longer is ok) Please include a cover sheet and be sure to document your sources. Your paper will be graded on technical content, spelling and punctuation.
## Appendix B - Course Plan

<table>
<thead>
<tr>
<th>UNIT</th>
<th>TOPIC</th>
</tr>
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</table>
| 1    | AM Transmission  
- Amplitude Modulation  
- RF Power Amplifier |
| 2    | AM Reception  
- RF Stage  
- Mixer, IF Filter, and Envelope Detector |
| 3    | SSB Transmission  
- Balanced Modulator, LSB Filter  
- Mixer, RF Power Amplifier |
| 4    | SSB Reception  
- RF Stage, Mixer, and IF Filter  
- Product Detector and AGC |
| 5    | Angle Modulation and Demodulation  
- Frequency and Phase Modulation |
| 6    | Phase-Locked Loop  
- PLL Circuits & Operation  
- FM Detection with PLL |
| 7    | Pulse-Amplitude Modulation  
- PAM Signal Generation  
- PAM Signal Demodulation |
| 8    | PAM Time-Division Multiplexing  
- PAM-TDM Transmission  
- PAM-TDM Reception |
| 9    | Pulse-Time Modulation (PTM)  
- PTM Signal Generation  
- PTM Signal Demodulation |
| 10   | Pulse-Code Modulation (PCM)  
- Generation and Demodulation  
- Time Division Multiplexing |
| 11   | Delta Modulation (DM)  
- DM Transmitter  
- DM Receiver and Noise |
| 12   | Line Coding  
- Encoding  
- Decoding |
Electronic Communications

13 Frequency-Shift Keying
   - FSK Signal Generation
   - FSK Asynchronous Detection
   - FSK Synchronous Detection

14 Phase Shift Keying
   - PSK Signal Generation
   - Synchronous Detection

15 Amplitude Shift Keying
   - ASK Signal Generation
   - ASK Signal Detection

Final Exam
Technical Paper Due
## Appendix B - Assignment Schedule

<table>
<thead>
<tr>
<th>Unit</th>
<th>Topic</th>
<th>Reading</th>
<th>LabVolt</th>
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<tbody>
<tr>
<td>1</td>
<td>AM Transmission</td>
<td>73 - 88</td>
<td>Intro to Analog Comm AM Transmission</td>
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<tr>
<td>2</td>
<td>AM Reception</td>
<td>108 - 128</td>
<td>AM Reception</td>
</tr>
<tr>
<td>3</td>
<td>SSB Transmission</td>
<td>89 - 98</td>
<td>SSB Transmission</td>
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<tr>
<td>4</td>
<td>SSB Reception</td>
<td>129 - 134</td>
<td>SSB Reception</td>
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<tr>
<td>5</td>
<td>Angle Modulation &amp; Demodulation</td>
<td>141 - 181</td>
<td>Angle Modulation &amp; Demodulation</td>
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<tr>
<td>6</td>
<td>Phase-Locked Loop</td>
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<td>Pulse-Amplitude Modulation</td>
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<td>Pulse-Amplitude Modulation</td>
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<td>8</td>
<td>PAM Time-Division Multiplexing</td>
<td>299 - 320</td>
<td>PAM Time-Division Multiplexing</td>
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<td>9</td>
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<td>11</td>
<td>Delta Modulation (DM)</td>
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<td>Line Coding</td>
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<tr>
<td>15</td>
<td>Amplitude Shift Keying</td>
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### Homework

The homework is optional. However, the Review questions are an excellent way to determine if you understood the chapter. The final exam is an “open book - open note” exam. The homework would be of great benefit during the exam.

Answer the Review questions at the end of each section of assigned reading.