

SYLLABUS

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| DATE OF LAST REVIEW: | 09/2019 |
| CIP CODE: | 15.1201 |
| SEMESTER: | Departmental Syllabus |
| COURSE TITLE: | Voice and Data Communication |
| COURSE NUMBER: | ENGR-0225 |
| CREDIT HOURS: | 4 |
| INSTRUCTOR: | Departmental Syllabus |
| OFFICE LOCATION: | Departmental Syllabus |
| OFFICE HOURS: | Departmental Syllabus |
| TELEPHONE: | 913-334-1100 |
| PREREQUISITE(S): | None |
| EMAIL: | <i>KCKCC issued email accounts are the official means for electronically communicating with our students.</i> |

REQUIRED TEXT AND MATERIALS: Please check with the KCKCC bookstore, <http://www.kckccbookstore.com/>, for the required texts for your particular class.

COURSE DESCRIPTION: A detail study of voice and data communication network systems. A study of receivers, transmitters, station equipment and transmission media in telephone industries. Students will also learn about switching and networking, and will perform experiments in modulation, sampling, multiplexing and the telephone lines.

METHOD OF INSTRUCTION: A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, and panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE OUTLINE:

I. Unit 1. An Overview of the Industry

- A. Background
- B. Organizations
- C. Hardware
- D. Trends for the Future

II. Unit 2. Basic Telecommunications Technology: Telegraphy

- A. Basic Electricity and Magnetism
- B. Transmitting Information by Telegraph

III. Unit 3. Basic Telecommunications Technology: Telephony

- A. Receivers and Transmitters
- B. Inductance and Capacitance
- C. Impedance and Its Importance to Telephony
- D. Power and Decibels

IV. Unit 4. Digital Telecommunications

- A. Basic Principles of Digital Information
- B. Computers and Digital Systems
- C. An Example of Data Communication

V. Unit 5. Private Telecommunications Systems

- A. Some Basic Questions
- B. A System Block Diagram
- C. PBX Hardware: What's Inside the Cabinet?
- D. Transmission Links
- E. Stations
- F. Options and Peripherals

VI. Unit 6. PBX Features and Functions

- A. Station Features
- B. Attendant Console Features
- C. System Features

VII. Unit 7. Station Equipment

- A. The Single-Line Telephone
- B. Multifunction Phones
- C. Optional Equipment Connected to Telephones
- D. Data Terminals

VIII. Unit 8. Transmission Media

- A. Media Characteristics
- B. Nonconductors and Insulators
- C. Coaxial Cable and Other Shielded Cables
- D. Waveguide
- E. The Wireless Medium
- F. Fiber-Optic Light Pipe

IX. Unit 9. Transmission Forms

- A. Analog and Digital Signals
- B. Frequency and Bandwidth
- C. Frequency-Division Multiplex
- D. Amplitude Modulation
- E. Frequency Modulation
- F. Phase-Shift Modulation
- G. Time-Division Multiplex
- H. Pulse-Amplitude Modulation
- I. Pulse Code Modulation
- J. Delta Modulation
- K. Simplex, Half-Duplex, and Full Duplex

X. Unit 10. Signaling

- A. Signaling over Telephone Transmission Links

- B. Signaling over E&M Tie Trunks
- C. Digital Signaling and Transmission

XI. Unit 11. Switching and Networking

- A. Mechanical Switching Principles
- B. Electronic Switching:
- C. Space-Division Multiplexed
- D. Electronic Switching:
- E. Time-Division Multiplexed
- F. Common Control
- G. Computer-Controlled Switching

XII. Unit 12. Private Networks and Routing

- A. A Single-Switch Configuration
- B. Multiple-Switch Configurations
- C. Routing in Multiswitch Networks
- D. Digital Switching in Private Networks

XIII. Unit 13. Emplacement of a Private

- A. Telecommunications System
- B. Design Coordination
- C. Planning
- D. Summary of Preparation and Installation

EXPECTED LEARNER OUTCOMES:

- A. Upon completion of the course the student will be able to identify the stages of a communication system.
- B. Upon completion of the course the student will be able to identify the major types of modulation used in communication systems.
- C. Upon completion of the course the student will be able to identify the most commonly used communication protocols.
- D. Upon completion of the course the student will be able to explain the differences between analog and digital signals.

COURSE COMPETENCIES:

Upon completion of the course the student will be able to identify the stages of a communication system.

- 1. Upon completion of the course the student will be able to identify the stages of voice communication systems.
- 2. Upon completion of the course the student will be able to identify the stages of data communication systems.

Upon completion of the course the student will be able to identify the major types of modulation used in communication systems.

- 3. Upon completion of the course the student will be able to identify the differences between amplitude modulation and frequency modulation.
- 4. Upon completion of the course the student will be able to explain the differences between amplitude modulation and frequency modulation.
- 5. Upon completion of the course the student will be able to explain the differences between analog and digital signals and the characteristics of each.

Upon completion of the course the student will be able to identify the most commonly used communication protocols.

- 6. Upon completion of the course the student will be able to identify TCP/IP, IPX..., and where the protocols are used.

Upon completion of the course the student will be able to explain the differences between analog and digital signals.

7. Upon completion of the course the student will be able to give an overview and discuss the communication industry.
8. Upon completion of the course the student will be able to discuss the basic electricity and magnetism applications in voice communications.
9. Upon completion of the course the student will be able to discuss the basic electricity and magnetism applications in data communications.
10. Upon completion of the course the student will be able to explain the operation of receivers.
11. Upon completion of the course the student will be able to explain the operation of transmitters.
12. Upon completion of the course the student will be able to demonstrate and apply power formulas.
13. Upon completion of the course the student will be able to demonstrate and apply decibels formulas.
14. Upon completion of the course the student will be able to explain the basic principles of digital communications.
15. Upon completion of the course the student will be able to discuss the operation of computers.
16. Upon completion of the course the student will be able to discuss the operation of digital systems.
17. Upon completion of the course the student will be able to draw a telecommunications systems block diagram.
18. Upon completion of the course the student will be able to identify the different types of transmission links.
19. Upon completion of the course the student will be able to discuss the different types of transmission links.
20. Upon completion of the course the student will be able to explain the operation of PBX (features and functions).
21. Upon completion of the course the student will be able to demonstrate the operation of data terminals.
22. Upon completion of the course the student will be able to identify the types of transmission media.
23. Upon completion of the course the student will be able to identify the different types of transmissions.
24. Upon completion of the course the student will be able to discuss signaling.
25. Upon completion of the course the student will be able to demonstrate switching and networking techniques.
26. Upon completion of the course the student will be able to discuss the operation of private networks.
27. Upon completion of the course the student will be able to discuss the operation of routing.
28. Upon completion of the course the student will be able to identify components in telecommunications systems.
29. Upon completion of the course the student will be able to explain the operation of components in telecommunications systems.

ASSESSMENT OF LEARNER OUTCOMES:

Assessment methods may include, but are not limited to, the following: Homework, Assignments, Quizzes, Class Participation, Chapter Tests, and Final Exam. The grading scale and the process for calculating the course grades are to be determined by the individual instructors. This information will be included in each instructor's syllabus.

SPECIAL NOTES:

This syllabus is subject to change at the discretion of the instructor. Material included is intended to provide an outline of the course and rules that the instructor will adhere to in evaluating the student's progress. However, this syllabus is not intended to be a legal contract. Questions regarding the syllabus are welcome any time.

Kansas City Kansas Community College is committed to an appreciation of diversity with respect for the differences among the diverse groups comprising our students, faculty, and staff that is free of bigotry and discrimination. Kansas City Kansas Community College is committed to providing a multicultural education and environment that reflects and respects diversity and that seeks to increase understanding.

Kansas City Kansas Community College offers equal educational opportunity to all students as well as serving as an equal opportunity employer for all personnel. Various laws, including Title IX of the Educational Amendments of 1972, require the college's policy on non-discrimination be administered without regard to race, color, age, sex, religion, national origin, physical handicap, or veteran status and that such policy be made known.

Kansas City Kansas Community College complies with the Americans with Disabilities Act. If you need accommodations due to a documented disability, please contact the disabilities services office at (913) 288 - 7664.

All enrolled students at Kansas City Kansas Community College are subject to follow all rules, conditions, policies and procedures as described in both the Student Code of Conduct as well as the Student Handbook. All Students are expected to review both of these documents and to understand their responsibilities with regard to academic conduct and policies. The Student Code of Conduct and the Student Handbook can be found on the KCKCC website.