



## ELX 211– ELECTRONICS COMMUNICATION 2

### UNIVERSITY VISION

A leading University in advancing scholarly innovation, multi-cultural convergence, and responsive public service in a borderless Region.

### UNIVERSITY MISSION

The University shall primarily provide advanced instruction and professional training in science and technology, agriculture, fisheries, education and other related fields of study. It shall also undertake research and extension services, and provide progressive leadership in its areas of specialization.

### UNIVERSITY STRATEGIC GOALS

- a. Deliver quality service to stakeholders to address current and future needs in instruction, research, extension, and production
- b. Observe strict implementation of the laws as well as the policies and regulations of the University
- c. Acquire with urgency state-of-the-art resources for its service areas
- d. Bolster the relationship of the University with its local and international customers and partners
- e. Leverage the qualifications and competences in personnel action and staffing
- f. Evaluate the efficiency and responsiveness of the University systems and processes

### INSTITUTIONAL OUTCOMES (IO)

- a. Enhance competency development, commitment, professionalism, unity and true spirit of service for public accountability, transparency and delivery of quality services
- b. Provide relevant programs and professional trainings that will respond to the development needs of the region
- c. Strengthen local and international collaborations and partnerships for borderless programs
- d. Develop a research culture among faculty and students
- e. Develop and promote environmentally-sound and market-driven knowledge and technologies at par with international standards
- f. Promote research-based information and technologies for sustainable development
- g. Enhance resource generation and mobilization to sustain financial viability of the university

### PROGRAM OUTCOMES (PO) COMMON TO ALL PROGRAMS AND ITS RELATIONSHIPS TO INSTITUTIONAL OUTCOMES

A graduate of the BlndTech program can:	INSTITUTIONAL OUTCOMES (IO)						
	a	b	c	d	e	f	g
a. Analyze broadly defined industrial technology processes by using analytical tools that enhance creativity, innovativeness, and intellectual curiosity to improve methods, processes, and systems that meet the industry standards;	✓	✓				✓	
b. Design and implement broadly defined industrial systems, components, products, or processes to meet specific industry needs with proficiency and flexibility in the area of specialization in accordance with global standards;	✓	✓		✓		✓	

c. Apply appropriate techniques, resources, and state-of-the-art industrial technology tools to meet current industry needs and use these modern tools and processes to improve and increase entrepreneurial activities upholding the safety and health standards of business and industry;	✓		✓	✓	✓		
d. Communicate with diverse groups of clienteles the appropriate cultural language with clarity and persuasion, in both oral and written forms, including understanding and giving of clear instructions, high comprehension level, effectiveness in delivering presentations and writing documents, and articulating technological innovation outputs;	✓	✓	✓	✓	✓		
e. Develop leadership and management skills in a team-based environment by making informed decisions, keeping the team motivated, acting and delegating responsibility, and inspiring positive changes in the organization by exercising responsibility with integrity and accountability in the practice of one's profession;	✓	✓	✓	✓	✓		
f. Practice the moral responsibilities of an industrial technologist to manage and balance wider public interest and uphold the norms and safety standards of the industrial technology profession;				✓	✓	✓	✓
g. Demonstrate enthusiasm and passion for continuous personal and professional development in broadly defined industrial technology and effecting positive changes in the entrepreneurial and industrial endeavor; and	✓	✓	✓	✓	✓	✓	✓
h. Recognize the need for, and an ability to engage in lifelong learning.	✓	✓	✓	✓	✓	✓	✓

1 COURSE CODE ELX 211

2 COURSE TITLE Electronics Communication 2

3 PREREQUISITE ELX 122

4 CREDITS 3 units

### 5 COURSE DESCRIPTION

This course provides an overview of data communications technology, terminology, hardware, software, modems, multiplexers, concentrators, switches, computer front-end processors, and services. Students will learn the principles, technologies, and applications of satellite communication systems. It includes topics on satellite orbits, space and earth segments, link design, access methods, and various satellite applications.

### 6 COURSE LEARNING OUTCOMES (CLO) AND ITS RELATIONSHIPS TO PROGRAM OUTCOMES

Course Learning Outcomes (CLO)		Program Outcomes						
At the end of the course, a student can:		a	b	c	d	e	f	g
a. Understand SKSU-VGMO, Classroom Policies, Course Overview, Course Requirements and Grading System;		✓	✓	✓	✓	✓	✓	✓
b. Explain the principles of data communication systems and components;		✓	✓	✓	✓	✓	✓	✓
c. Analyze various modulation techniques used in data transmission;		✓	✓	✓	✓	✓	✓	✓
d. Evaluate the performance of communication systems using different signal formats;		✓	✓	✓	✓	✓	✓	✓
e. Understand the fundamentals of satellite orbits and analyze geostationary and non-geostationary orbits.;		✓	✓	✓	✓	✓	✓	✓
f. Understand and learn about the design and performance parameters of satellite links.		✓	✓	✓	✓	✓	✓	✓
g. Explore satellite applications in communication, navigation, and broadcasting.		✓	✓	✓	✓	✓	✓	✓

## COURSE CONTENTS

WEEK	CONTENT	INTENDED LEARNING OUTCOMES( ILOs)	TEACHING AND LEARNING ACTIVITIES (TLA)	OUTCOMES-BASED ASSESSMENT (OBA)	COURSE LEARNING OUTCOME S (CLOs)
1	<b>Course Orientation</b> <i>SKSU VMGO, Classroom Policies, Course Overview, Course Requirements, Grading System</i>	At the end of the week, the student can: a. Discuss the University's VMGO, classroom policies, course overview, requirements and grading system	Discuss the VMGO of the University, the classroom policies, scope of the course, course requirements and grading system	a. Participation in discussions	abcdefg
2	<b>Introduction to Data Communications</b>  a. Understand basic concepts and terminology.	At the end of the week, the students can: a. Understand fundamental concepts of data communication, including network topologies, transmission media, and communication protocols. b. Analyze and compare different data communication technologies and their suitability for various applications; c. Differentiate the three classes of nutrients. d. Identify and explain different network topologies and their advantages and disadvantages.	a. Video/PowerPoint presentation b. Conduct an interactive lecture c. Hands-On Workshop on Network Topologies d. Activity 2.1 Group Research Project on Communication Protocols	a. Quiz b. participation c. Activity outputs d. Practical lab e. Reflection Paper on Security Principles	abcdefg
3	<b>Modulation Techniques</b>  a. Analyze ASK, FSK, QAM, PSK, and CDMA systems.	At the end of the week, the students can:  a. Define modulation and explain its importance in communication systems.  b. Compare and contrast various modulation techniques, including AM, FM, and phase modulation (PM).  c. Explain performance metrics related to modulation techniques, such as bandwidth, power efficiency, and signal-to-noise ratio (SNR).	a. Video/PowerPoint presentation b. Conduct an interactive lecture c. Practical Demonstration d. Activity 3.1 Group Research Project on Modulation Techniques	a. Conceptual Quiz b. participation c. activity outputs d. Group Presentation and Report	abcdefg

4	<b>Signal Processing</b>  a. Generalized orthogonal signals and their applications.	At the end of the week, the students can:  a. Understand and define key concepts in signal processing, including types of signals, systems, and basic operations. b. Analyze and compare time-domain and frequency-domain representations of signals.	a. Video/PowerPoint presentation b. Conduct an interactive lecture c. Practical Demonstration d. Activity 4.1 Filtering Techniques Lab	a. Quiz b. participation c. activity outputs d. Practical lab e. Lab Report Submission	abcdefg
5	<b>Data Transmission</b>  a. Understand data transmission methods and protocols.	At the end of the week, the students can:  a. Understanding the Fundamentals of Data Transmission. b. Compare and contrast various data transmission methods, including serial and parallel transmission.	a. Video/PowerPoint presentation b. Conduct an interactive lecture c. Practical Demonstration d. Activity 5.1 Group Research Project on Transmission Methods	a. Quiz b. participation c. activity outputs d. Conceptual Quiz e. Group Presentation and Report	abcdefg
5	<b>MIDTERM EXAM</b>				
6	<b>Satellite Orbits</b>  a. Basics of satellite orbits. b. Introduction to satellite communication.	At the end of the week, the students can:  a. Explain the basic principles of orbital mechanics, including the laws of motion and the forces acting on satellites. b. Identify and describe various types of satellite orbits, including geostationary, polar, and elliptical orbits. c. Evaluate the applications of different satellite orbits in various fields, such as telecommunications, Earth observation, and navigation.	a. Video/PowerPoint presentation b. Conduct an interactive lecture c. Practical Demonstration d. Activity 6.1 Hands-On Calculations Workshop	a. Quiz b. participation c. Activity outputs d. Conceptual Quiz e. Calculation Assignment	abcdefg
7	<b>Space Segment and Satellite Link Design</b>  a. Earth station technology and tracking systems. b. Link power budget calculations. c. Transmission losses and amplifier noise..	At the end of the week, the students can:  a. Identify and describe the key components of the space segment in satellite communication systems. b. Calculate and analyze a satellite link budget, considering factors such as gain, loss, and signal-to-noise ratio	a. Video/PowerPoint presentation b. Conduct an interactive lecture c. Link Budget Calculation Workshop d. Activity 7.1 Satellite System Design Project	a. Quiz b. participation c. activity outputs d. Design Report and Presentation	abcdefg

		(SNR). c. Design a basic satellite communication system, including the choice of orbit, frequency band, and modulation scheme. d. Evaluate various performance factors affecting satellite links, including bandwidth, latency, and interference.			
8	<b>Earth Segment</b> a. Components of earth stations. b. Antenna systems and their configurations. c. Tracking systems and their functions.	At the end of the week, the students can: a. Identify and describe the key components of the Earth segment in satellite communication systems. b. Evaluate performance factors affecting the Earth segment, including signal processing, bandwidth, and latency. c. Explain the functionality and design considerations of user terminals in satellite communication systems.	a. Video/PowerPoint presentation b. Conduct an interactive lecture c. Practical laboratory d. Activity 8.1 Ground Station Design Workshop	a. Quiz b. participation c. activity outputs. d. Design Proposal	abcdefg
9	<b>Satellite Applications</b> a. INTELSAT and INSAT series. b. VSAT and DTH services. c. Digital audio broadcasting and satellite internet access.	At the end of the week, the students can: a. Identify and describe various applications of satellite technology in fields such as communications, navigation, and Earth observation. b. Analyze the impact of satellite communications on global connectivity and information dissemination. c. Evaluate the applications and significance of Earth observation satellites in environmental monitoring and disaster management.	a. Video/PowerPoint presentation b. Conduct an interactive lecture c. Practical laboratory d. Activity 8.1 Case Study Analysis of Earth Observation e. Activity 8.2 Research Project on Future Trends	a. Quiz b. participation c. Activity outputs. d. Case Study Report e. Research Presentation	abcdefg
10	<b>FINAL EXAMINATION</b>				

Total No. of Hours : 54

## COURSE REQUIREMENTS

### COURSE REQUIREMENTS AND COURSE POLICIES

Each student is required to:

1. submit accomplished assignments, and activities;
2. make a PowerPoint presentation, and a written summary of the assigned report;
3. participate actively in all discussion;
4. discuss an assigned topic to report and participate in class discussions; and
5. pass the major exams (midterm and final)

## COURSE POLICIES

**Attendance:** A student will be marked late if he/she enters the class 5 minutes after start of class period. Any student who comes to class 15 minutes after the scheduled time or always late for three consecutive meetings shall be marked absent.

**Missed work or exam:** Any student who missed to submit a work assignment or to take a test should consult the concerned instructor for immediate compliance

**Cheating and Plagiarism:** Any student who committed any form of academic dishonesty (e.g., copy-paste plagiarism) shall be given disciplinary action provided in the SKSU Student's Handbook

**Use of Technology:** Cell phones should be turned off while the session is in progress. Using laptops, notebook PCs, smart phones, and tablets shall be allowed only when needed. A scientific calculator (e.g. Casio fx-991ES) shall be utilized in solving.

## 9 GRADING SYSTEM AND RUBRICS FOR GRADING

### GRADING SYSTEM

Midterm Grade	
Midterm Examination	50%
Attendance/ Class Participation	5%
Quizzes	5%
Recitation	5%
Activity	20%
Report	15%
<b>TOTAL</b>	<b>100%</b>

Final Term Grade		FINAL
GRADE		
Final Term Examination	50%	Midterm Grade 50%
Attendance/Class Participation	5%	Final Term Grade 50%
Quizzes	5%	<b>TOTAL</b> 100%
Recitation	5%	
Activity	20%	
Report	15%	
<b>TOTAL</b>	<b>100%</b>	

**Materials used:** Laptop, PowerPoint presentations and video clips  
Books, Magazines, Online slides, Teacher-made slides

ferences:

- Stallings, W. (2015). *Data and Computer Communications*.  
Tanenbaum, A. S. (2011). *Computer Networks*.  
Bruce R. Elbert, "Satellite Communication Applications", Handbook, Artech House, 1997

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