The Legal House – International Business College
School of Electrical and Computer Engineering

7 Greenfield Parade
Bankstown 2200 NSW Australia

Satellite Communications Systems
SECE 109

Subject Coordinator and Lecturer: Professor Minh Hung Le
The Legal House – International Business College
School of Electrical and Computer Engineering
7 Greenfield Parade
Bankstown 2200 NSW Australia
Tel: (02) 9790 3300
Fax: (02) 9790 3302
Emails: m.le@sece-unsw.org or minhle@ieee.org

Aim of Unit:

The aim of this unit is to provide students knowledge of the principles and techniques used in satellite communication systems. It explores the architecture of satellite communications links. This unit comprises chapters on orbital mechanics, spacecraft construction, satellite-path radio wave propagation, modulation techniques, multiple access, and a detailed analysis of the communications link.

Unit Outline:

- Introduction to Satellite Communications.
- Orbital Mechanics and Launchers.
- Satellites.
- Satellite Link Design.
- Modulation and Multiplexing Techniques for Satellite Links.
- Multiple Access.
- Error Control for Digital Satellite Links.
- Propagation Effects and their Impact on Satellite-Earth Links.
- VSAT SYSTEMS.
- Low Earth Orbit and Non-Geostationary Satellite Systems.
- Direct Broadcast Satellite Television and Radio.
- Satellite Navigation and the Global Positioning System.

Mode of Delivery:

Two hours lecture per week.
One hour tutorial per week.

Unit Assessment:

Attendance at Lectures and Tutorials	20 %
Assignments, Laboratories	40 %
Final Presentation	40 %

Assessment Requirements:

Students must receive 50% or more for each component of Unit Assessment in order to pass the subject.

Student Workload:

Students will have 3 hours per week face-to-face learning during semester. Students are expected to work at least 5 hours per week out of class.

Text Book:

1. Timothy Pratt, Charles W. Bostian, Jeremy E. Allnutt, "Satellite Communications", 2nd edition, John Wiley, 2002

Recommended References:

1. Gérard Maral, Michel Bousquet, "Satellite Communications Systems: Systems, Techniques and Technology", 4th edition, John Wiley, 2002
2. W. L. Pritchard et al**,** "Satellite Communication Systems Engineering", 2nd edition, Prentice Hall, 1993

Subject Schedule

Weeks	Lecture/Tutorial Topics	Assignments/Labs/ Excursion	Reading from Text Book
1	Introduction to Satellite Communications	Lab #1	Chapter 1
2	Orbital Mechanics and Launchers	Lab #1	Chapter 2
3	Satellites	Assignment #1	Chapter 3
4	Satellite Link Design	Lab #1, Assignment #1	Chapter 4
5	Modulation and Multiplexing Techniques for Satellite Links	Lab #1, Assignment #1	Chapter 5
6	Multiple Access	Collect Lab #1, Excursion to Telecom. Companies	Chapter 6
7	Error Control for Digital Satellite Links	Collect Assignment #1	Chapter 7
8	Propagation Effects and their Impact on Satellite-Earth Links	Lab #2	Chapter 8
9	VSAT SYSTEMS	Assignment #2	Chapter 9
10	Low Earth Orbit and Non-Geostationary Satellite Systems	Lab #2, Assignment #2	Chapter 10
11	Direct Broadcast Satellite Television and Radio	Collect Lab #2	Chapter 11
12	Satellite Navigation and the Global Positioning System	Collect Assignment #2	Chapter 12
13	Preparing for Final Presentation		
14	Final Presentation		

Subject Description

UNIT	SECE109 Satellite Communications Systems

FIELD	Analyse and Design

DESCRIPTION	This unit describes the competency required to ensure the client requirements are developed as a strategy to designing and understanding the satellite communication system.

RELATED COMPETENCY STANDARDS	The project lifecycle, Telecommunications and Computer Systems methodologies employed will determine which particular units of competency are relevant to this unit. Some include SECE101, SECE112, SECE105, SECE106, SECE108, SECE111.

	ELEMENT	PERFORMANCE CRITERIA
1	Satellite Communications.	• Introduction to Satellite Communications. • Comprehensive treatment of Orbital Mechanics and Launchers. • Coverage of essential elements of Satellite Link Design, Modulation and Multiplexing Techniques for Satellite Links.
2	Error Control for Digital Satellite Links	• Full coverage of Error Control for Digital Satellite Links. • Implementation of Multiple Access, Propagation Effects and their Impact on Satellite-Earth Links.
3	VSAT SYSTEMS	• Comprehensive treatment of VSAT SYSTEMS. • Detailed specifications of Low Earth Orbit and Non-Geostationary Satellite Systems.
4	Broadcast Satellite Television and Radio	• Determine Direct Broadcast Satellite Television and Radio. • Figure out Satellite Navigation and the Global Positioning System.