INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS)
FAKULTAS TEKNOLOGI ELEKTRO DAN INFORMATIKA CERDAS
DEPARTEMEN TEKNIK ELEKTRO
Program Studi Sarjana (S1) Teknik Telekomunikasi

1	**Nama Mata Kuliah / Course Name**	:	Jaringan Satelit, Pengindraan Jauh, dan Navigasi / *Satellite Network, Remote Sensing and Navigation*
2	**Kode Mata Kuliah / Course Code**	:	EL234711
3	**Kredit / Credits**	:	3 SKS
4	**Semester / Semester**	:	Pilihan / Elective Course

Deskripsi Mata Kuliah / Course Description

Mata kuliah Jaringan Satelit, Penginderaan Jauh, dan Navigasi membahas konsep sistem dan jaringan satelit beserta pemanfaatannya dalam sistem komunikasi, sistem pengindraan jauh, dan sistem navigasi. Bagian pertama membahas dasar teori dan perancangan sistem dan jaringan satelit, dengan fokus pada satelit telekomunikasi. Bagian kedua membahas sistem penginderaan jauh dan sistem navigasi berbasis jaringan satelit, dengan fokus pada konsep teknologi dan aplikasinya.

The course of Satellite Network, Remote Sensing, and Navigation discusses the concepts of satellite systems and networks, along with their utilization in communication systems, remote sensing systems, and navigation systems. The first part covers the basic theories and design of satellite systems and networks, with a focus on telecommunication satellites. The second part covers remote sensing systems and navigation systems based on satellite networks, with a focus on technological concepts and their applications.

Capaian Pembelajaran Lulusan (CPL) Yang Dibebankan Mata Kuliah / Program Learning Outcomes Charged to The Course

1. (CPL-02) Mampu mengkaji dan memanfaatkan ilmu pengetahuan dan teknologi dalam rangka mengaplikasikannya pada bidang Teknik Telekomunikasi, serta mampu mengambil keputusan secara tepat dari hasil kerja sendiri maupun kerja kelompok dalam bentuk laporan tugas akhir atau bentuk kegiatan pembelajaran lain yang luarannya setara dengan tugas akhir melalui pemikiran logis, kritis, sistematis dan inovatif.
   (PLO-02) Be able to study and utilize science and technology in order to apply it to the field (study program expertise), and able to make appropriate decisions from the results of their own work or group work in the form of a final project report or other forms of learning activities whose output is equivalent to a final project through logical, critical, systematic, and innovative thinking.*

2. (CPL-04) Mampu menerapkan ilmu pengetahuan alam dan matematika serta teknologi dan rekayasa informasi untuk memperoleh pemahaman komprehensif pada bidang Teknik Telekomunikasi.
   (PLO-04) Able to apply knowledge of sciences, mathematics, and information technology to acquire comprehensive understanding of engineering principles in Telecommunication Engineering

3. (CPL-05) Mampu merancang komponen, sistem, dan proses yang logis dan realistis sesuai dengan spesifikasi yang ditentukan dengan mempertimbangkan aspek keselamatan, sosial, budaya, lingkungan, dan ekonomi.
   (PLO-05) Able to design components, systems, and/or processes to meet desired needs within realistic constraints in such aspects as law, economic, environment, social, politics, health and safety, sustainability as well as to recognize and/or utilize the potential of local and national resources with global perspective

Capaian Pembelajaran Mata Kuliah / Course Learning Outcomes

1. Mampu menjelaskan konsep orbit, penentuan posisi satelit, pengarahan antena stasiun bumi, sistem dan subsistem satelit, link budget, konstelasi satelit, jaringan satelit multi-beam, akses jamak, interferensi, dan regulasi satelit. / *Able to explain the concept of orbit, satellite positioning, earth station antenna pointing, satellite systems and subsystems, link budget, satellite constellation, multi-beam satellite network, multiple access, interference, and satellite regulations.*
2. Mampu mendesain link satelit, sistem komunikasi satelit, dan jaringan satelit / *Able to design satellite links, satellite communication systems, and satellite networks.*
3. Mampu menjelaskan konsep sistem pengindraan jauh, sensor, dan pengindraan jauh berbasis satelit / *Able to explain the concept of remote sensing systems, sensors, and satellite-based remote sensing.*
4. Mampu menjelaskan konsep navigasi dan sistem navigasi berbasis jaringan satelit. / *Able to explain the concept of navigation and satellite-based navigation systems.*
5. Mampu menggagas dan mendesain aplikasi berbasis satelit untuk telekomunikasi, pengindraan jauh, dan/atau navigasi / *Able to propose and design satellite-based applications for telecommunications, remote sensing, and/or navigation.*

Pokok Bahasan / Contents

1. Konsep, sistem, dan subsistem satelit / *Concept, systems, and subsystems of satellites*
2. Orbit satelit dan pengarahan antena stasiun bumi / *Satellite orbit and earth station antenna pointing*
3. Konstelasi satelit dan jaringan satelit multi-beam / *Satellite constellation and multi-beam satellite network*
4. Link budget untuk komunikasi satelit / *Link budget for satellite communication*
5. Sistem komunikasi akses jamak dan interferensi / *Multiple access communication systems and interference*
6. Konsep dan sistem penginderaan jauh beserta jenis-jenis sensor / *Remote sensing concept and system, including types of sensors*

7. Penginderaan jauh dan pemetaan berbasis satelit / *Satellite-based remote sensing and mapping*
8. Konsep navigasi dan sistem komunikasi terestrial LORAN C / *Navigation concept and LORAN C terrestrial communication system*
9. Sistem navigasi berbasis satelit / *Satellite-based navigation system*
10. Aplikasi sistem komunikasi, pengindraan jauh, dan navigasi berbasis satelit / *Applications of satellite-based communication systems, remote sensing, and navigation.*

Prasyarat / Pre-requisite

Sistem Komunikasi, Elektronika Komunikasi, Antena dan Propagasi Radio / *Communication Systems, Telecommunication Electronics, Antenna and Radio Propagation*

Pustaka / Reference

Utama / Primary :

1. Gerard Maral, Michel Bousquet, Zhili Sun, Satellite Communications Systems: Systems, Techniques and Technology, ed. 6, Wiley, 2020.
2. Erich Lutz, Markus Werner, Axel Jahn, Satellite Systems for Personal and Broadband Communications, Springer-Verlag, 2012.
3. James Campbell, Randolph Wynne, Introduction to Remote Sensing, ed. 6, Guilford Press, 2022.
4. Laurie Tetley, David Calcutt, Electronic Navigation Systems, ed. 3, Routledge, 2015.

Pendukung / Support :

1. Dennis Roddy, Satellite Communications, ed. 4, McGraw-Hill, 2012.
2. Timothy Pratt, Charles Bostian, Satellite Communications, ed. 3, Wiley, 2019.
3. Arthur Cracknell, Ladson Hayes, Introduction to Remote Sensing, ed. 2, CRC Press, 2007.