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

INSTITUT TEKNOLOGI SEPULUH NOPEMBER (ITS)
FACULTY OF INTELLIGENT ELECTRICAL & INFORMATICS TECHNOLOGY
DEPARTMENT OF ELECTRICAL ENGINEERING
Bachelor Degree Program in Telecommunication Engineering

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

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 Satellite Networks, Remote Sensing, and Navigation course discusses the concepts of satellite systems and networks and their utilization in communication systems, remote sensing systems, and navigation systems. The first part discusses the theoretical basis and design of satellite systems and networks, with a focus on telecommunication satellites. The second part discusses satellite network-based remote sensing and navigation systems, with a focus on technology concepts and 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. / *Able to study and utilize science and technology in order to apply it in the field of Telecommunication Engineering, and be able to make decisions appropriately from the results of one's own work and 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. / *Able to apply natural science and mathematics as well as technology and information engineering to gain a comprehensive understanding of the field of*

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. */ Able to design logical and realistic components, systems, and processes in accordance with the specified specifications by considering safety, social, cultural, environmental, and economic aspects.*

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.
2. Mampu mendesain link satelit, sistem komunikasi satelit, dan jaringan satelit
3. Mampu menjelaskan konsep sistem pengindraan jauh, sensor, dan pengindraan jauh berbasis satelit
4. Mampu menjelaskan konsep navigasi dan sistem navigasi berbasis jaringan satelit.
5. Mampu menggagas dan mendesain aplikasi berbasis satelit untuk telekomunikasi, pengindraan jauh, dan/atau navigasi

1. *Able to explain the concept of orbit, satellite positioning, ground station antenna alignment, satellite systems and subsystems, link budget, satellite constellation, multi-beam satellite network, multiple access, interference, and satellite regulation.*
2. *Able to design satellite links, satellite communication systems, and satellite networks.*
3. *Able to explain the concepts of remote sensing systems, sensors, and satellite-based remote sensing*
4. *Able to explain the concept of navigation and satellite network-based navigation systems.*
5. *Able to initiate and design satellite-based applications for telecommunication, remote sensing, and/or navigation.*

Pokok Bahasan / *Contents*

1. Konsep, sistem, dan subsistem satelit
2. Orbit satelit dan pengarahan antena stasiun bumi
3. Konstelasi satelit dan jaringan satelit multi-beam
4. Link budget untuk komunikasi satelit
5. Sistem komunikasi akses jamak dan interferensi
6. Konsep dan sistem penginderaan jauh beserta jenis-jenis sensor
7. Penginderaan jauh dan pemetaan berbasis satelit
8. Konsep navigasi dan sistem komunikasi terestrial LORAN C
9. Sistem navigasi berbasis satelit
10. Aplikasi sistem komunikasi, pengindraan jauh, dan navigasi berbasis satelit

1. *Satellite concepts, systems, and subsystems.*
2. *Satellite orbit and ground station antenna alignment .*
3. *Satellite constellations and multi-beam satellite networks.*
4. *Link budget for satellite communications.*
5. *Multiple access communication systems and interference.*
6. *Remote sensing concepts and systems and types of sensors .*
7. *Satellite-based remote sensing and mapping .*
8. *Concept of navigation and terrestrial communication system LORAN C.*
9. *Satellite-based navigation system.*
10. *Applications of satellite-based communication, remote sensing and navigation systems.*

Prasyarat / *Pre-requisite*

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

Pustaka / *Reference*

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