



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

1	<b>Nama Mata Kuliah / Course Name</b> : Jaringan Komunikasi Nirkabel / <i>Wireless Communication Networks</i>
2	<b>Kode Mata Kuliah / Course Code</b> : EL234406
3	<b>Kredit / Credits</b> : 3 SKS
4	<b>Semester / Semester</b> : 4

#### Deskripsi Mata Kuliah / Course Description

Mata kuliah Jaringan Komunikasi Nirkabel mengenalkan sistem komunikasi nirkabel, model kanal propagasi bergerak, teknik modulasi dan akses jamak, standar teknologi dan arsitektur sistem komunikasi nirkabel. Selanjutnya dikenalkan rancangan jaringan komunikasi nirkabel dan analisis kinerja jaringan komunikasi nirkabel.

*The Wireless Communication Network course introduces wireless communication systems, mobile propagation channel models, modulation and multiple access techniques, technology standards and wireless communication system architectures. Next, wireless communication network design and performance analysis of wireless communication networks are introduced.*

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

1. (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.*
2. (CPL-06) Mampu merancang dan melaksanakan eksperimen laboratorium dan/atau lapangan, menganalisa dan menginterpretasi data, serta menggunakan penilaian yang obyektif untuk menarik kesimpulan.  
*(PLO-06) Able to design and conduct laboratory and/or field experiments as well as to analyze and interpret data to strengthen the engineering judgment to draw conclusions.*
3. (CPL-07) Mampu mengidentifikasi, memformulasikan, menganalisis, dan menyelesaikan permasalahan kompleks di bidang teknik telekomunikasi.

*(PLO-07) Able to identify, formulate, analyze, and solve the complex problems in the field of Telecommunication Engineering*

**Capaian Pembelajaran Mata Kuliah / Course Learning Outcomes**

1. Mampu menjelaskan sistem dan teknologi komunikasi nirkabel / *Able to explain wireless communication systems and technology.*
2. Mampu menganalisa teknologi dan rekayasa sistem komunikasi nirkabel / *Able to analyze wireless communication system engineering and technology.*
3. Mampu menyusun perencanaan jaringan komunikasi nirkabel / *Able to develop wireless communication network planning.*
4. Mampu mengevaluasi kinerja sistem dan jaringan komunikasi nirkabel / *Able to evaluate the performance of wireless communication systems and networks.*

**Pokok Bahasan / Contents**

1. Sistem komunikasi nirkabel / *Wireless communication system*
2. Model dan kapasitas kanal komunikasi nirkabel (bergerak) / *Mobile wireless communication channel models and capacity*
3. Teknik modulasi dan akses jamak sistem nirkabel / *Modulation techniques and multiple access in wireless systems*
4. Standard Teknologi dan arsitektur Komunikasi Nirkabel (Seluler) / *Wireless Communication Technology Standards and Architecture (Cellular)*
5. Konsep perencanaan sel dalam komunikasi nirkabel / *Cell planning concepts in wireless communication*
6. Perencanaan Jaringan komunikasi nirkabel / *Wireless communication network planning*
7. Kinerja Jaringan Komunikasi Nirkabel / *Wireless communication network performance*

**Prasyarat / Pre-requisite**

Sistem Komunikasi, Jaringan dan Rekayasa Trafik / *Communication Systems, Network and Traffic Engineering.*

**Pustaka / Reference**

Utama / Primary :

1. T.S. Rappaport, "Wireless Communications Principles and Practices", 2nd ed., Prentice-Hall, 2002.
2. Farid Dowla, HANDBOOK OF RF AND WIRELESS TECHNOLOGIES, Elsevier, 2004
3. Valery P. Ipatov, Spread Spectrum and CDMA Principles and Applications, John Wiley & Sons, 2005
4. L. Hanzo, OFDM and MC-CDMA: A Primer, John Wiley & Sons, 2006
5. Farooq Khan, LTE for 4G Mobile Broadband Air Interface Technologies and Performance, Cambridge UP, 2009
6. K Daniel Wong, Fundamentals of Wireless Communication Engineering Technologies, John Wiley & Sons, 2012
7. Haesik Kim, Design and Optimization for 5G Wireless Communications, John Wiley & Sons, 2020
8. Erik Dahlman, 5G NR: THE NEXT GENERATION WIRELESS ACCESS TECHNOLOGY, Elsevier, 2021

9. ...., The Mobile Broadband Standard. <https://3gpp.org>

Pendukung/ Support :

1. Daniel M. Dobkin, "RF Engineering for Wireless Networks: Hardware, Antennas, and Propagation" , Elsevier Inc., 2005
2. D. Tse, P. Viswanath, "Fundamentals of Wireless Communications", Cambridge University Press, 2005.
3. R. Prasad, A. Milhovska, New Horizons in Mobile and Wireless communications, Artech House, 2009
4. Yan Zhang, WiMAX Network Planning and Optimization-CRC Press, 2009
5. Harri Holma, Antti Toskala, HSDPA/HSUPA for UMTS, John Willey & Sons, 2006
6. K. Sharon Evans, Telecommunications Network Modelling, Planning and Design, The Institution of Engineering and Technology, 2004
7. Matthew Liotine, Critical Network Planning, Artech House, 2003
8. Janice Reynolds, Going Wi-Fi: A Practical Guide to Planning and Building an 802.11 Network, CMP, 2003