MODULE HANDBOOK DESCRIPTION

Module designation	Special Topic on Telecommunication	
Code	FBC0009	
Semester(s) in which the module is taught	6 / third year	
Person responsible for the module	Made Sutha Yadnya, S.T., M.T.	
Language	Indonesian/English	
Relation to curriculum	Free Elective for Telecommunication Engineering.	
Teaching methods	Lectures, small group discussion, case base method.	
Workload (incl. contact hours, self-study hours)	Contact minutes every week, each week of the 16 weeks/semester: ● Lectures: 2 x 50 minutes ● Exercises and Assignments: 2 x 60 minutes ● Self-study: 2 x 60 minutes. Total study hours = 5 hours 40 minutes/week.	
Credit points	2 SKS (~ 3.2 ECTS)	
Required and recommended prerequisites for joining the module	-	
Module objectives/intended learning outcomes	1. Students are able to analyse The Wireless Channel: Propagation and Fading, SISO Channel Models, MIMO Channel Models, OFDM, Synchronization for OFDM, Channel Estimation, PAPR Reduction, and Inter-Cell Interference Mitigation Techniques.	PLO3

	2. Students are able to reconstruct MIMO: Channel Capacity, Antenna Diversity and Space-Time Coding Techniques, Signal Detection for Spatially Multiplexed MIMO Systems, Exploiting Channel State Information, and Multi User MIMO.	PLO4
	3. Students are able to summarize specific technical knowledge on telecommunications systems and their mitigation for lifelong learning needs.	PLO9
Content	Part I presents the fundamental concepts and MATLAB_ programs for simulation of wireless channel modeling techniques, including large-scale fading, small-scale fading, indoor and outdoor channel modeling, SISO channel modeling, and MIMO channel modeling. Part II presents the fundamental concepts andMATLAB_ programs for simulation ofOFDM transmission techniques including OFDM basics, synchronization, channel estimation, peak-to-average power ratio reduction, and intercell interference mitigation. Part III presents the fundamental concepts and MATLAB_ programs for simulation of MIMO techniques including MIMO channel capacity, space diversity and space-time codes,	
Examination forms	- Written case study - Midterm and final test	
Study and examination requirements	The final grade in the module is composed of: 1. Attendance: 10% 2. Case assessment: 4 x 15% = 60% 3. Midterm assessment: 15% 4. Final assessment: 15% Students must have a final grade of 65% or higher to pass	

Reading list	1. Rappaport, T.S., 2001, Wireless Communications: Principles and Practice 2/E, Prentice Hall. 2. IEEE, 2001, 802.16.3c-01/29r4. Channel Models for Fixed Wireless Applications. 3. 3GPP, 2007, TR 25.996, v7.0.0. 3rd Generation Partnership Project; Technical Specification Group Radio 4. Access Network; Spatial Channel Model For Multiple Input Multiple Mutput Simulations (Release 7). 5. Xinmin, D., Haimovich, A.M., and Garcia-Frias, J., May 2003, Decision-directed iterative channel estimation forMIMO systems. IEEE ICC'03, vol. 4, pp. 2326–2329. 6. Hoeher, P. and Tufvesson, F., 1999, Channel estimation with superimposed pilot sequence. IEEE GLOBECOM'99, pp. 2162–2166.