

SEMESTER <i>Eighth</i>	DEPARTMENT <i>Telecommunications Engineering</i>	COURSE TITLE <i>Wireless Communications</i>
COURSE CODE <i>ET805</i>	HOURS 3 UNITS 3	COURSE SPECIFICATIONS <i>Theoretical Content</i>
1. Performance Limits of Multiple-Input Multiple-Output Wireless Communication Systems: <ul style="list-style-type: none"> ➤ MIMO System Model. ➤ MIMO System Capacity Derivation. ➤ MIMO Channel Capacity Derivation for Adaptive Transmit Power Allocation. ➤ MIMO Capacity Examples for Channels with Fixed Coefficients. ➤ Capacity of MIMO Systems with Random Channel Coefficients. ➤ Effect of System Parameters and Antenna Correlation on the Capacity of MIMO Channels. 		
2. Space-Time Coding Performance Analysis and Code Design: <ul style="list-style-type: none"> ➤ Fading Channel Models. ➤ Diversity. ➤ Space-Time Coded Systems. ➤ Performance Analysis of Space-Time Codes. ➤ Space-Time Code Design Criteria. ➤ Exact Evaluation of Code Performance. 		
3. Space-Time Block Codes: <ul style="list-style-type: none"> ➤ Alamouti Space-Time Code. ➤ Space-Time Block Codes (STBC). ➤ STBC for Real Signal Constellations. ➤ STBC for Complex Signal Constellations. ➤ Decoding of STBC. ➤ Performance of STBC. ➤ Effect of Imperfect Channel Estimation on Performance. ➤ Effect of Antenna Correlation on Performance. 		
4. Space-Time Trellis Codes: <ul style="list-style-type: none"> ➤ Encoder Structure for STTC. ➤ Design of Space-Time Trellis Codes on Slow Fading Channels. ➤ Performance Evaluation on Slow Fading Channels. ➤ Design of Space-Time Trellis Codes on Fast Fading Channels. ➤ Performance Evaluation on Fast Fading Channels. 		

5. Space-Time Turbo Trellis Codes:

- Performance of Recursive STTC.
- Space-Time Turbo Trellis Codes.
- Decoding Algorithm.
- ST Turbo TC Performance.

6. Layered Space-Time Codes:

- LST Transmitters.
- LST Receivers.
- Comparison of Various LST Architectures.

7. Differential Space-Time Block Codes:

- Differential Coding for a Single Transmit Antenna.
- Differential STBC for Two Transmit Antennas.
- Differential STBC with Real Signal Constellations for Three.
- Differential STBC with Complex Signal Constellations for Three.
- Unitary Space-Time Modulation.
- Unitary Group Codes.

8. Space-Time Coding for Wideband Systems:

- Performance of Space-Time Coding on Frequency-Selective.
- STC in Wideband OFDM Systems.
- Capacity of STC-OFDM Systems.
- Performance Analysis of STC-OFDM Systems.
- Performance Evaluation of STC-OFDM Systems.
- Performance of Concatenated Space-Time Codes over OFDM Systems.
- Transmit Diversity Schemes in CDMA Systems.
- Space-Time Coding for CDMA Systems.
- Performance of STTC in CDMA Systems.
- Performance of Layered STC in CDMA Systems.

References:

1. *Space-Time Coding* by Branks Vucetic, Jinhong Yuan, 2003.