1. Interleaved FDMA and FDOSS – PAPR comparison with OFDMA and DFT-spread OFDMA
Ref: Presentation on GMC (pdf file) by instructor course URL.

2. Improving the performance of modified LS (m-LS) based channel estimation by using PDP knowledge and/or matrix regularization; study MSE improvement
Ref: Discuss with instructor and TAs

3. Improving the performance of FFT-based channel estimation by using PDP knowledge and/or windowing; study MSE improvement
Ref: Discuss with instructor and TAs

4. Filterbank Multicarrier (FBMC) block modulation study

5. Generalized Frequency Division multiplexing (GFDM) study

6. Universal Filtered Multicarrier (UFMC) study

For topics 4 thro 6, and for other 5G waveform candidates, see the contribution #162119 to 3GPP-RAN1 in April 2016. You can also see G. Wunder et al., “5GNOW – Non-orthogonal Asynchronous waveforms for future mobile applications,” pp.97-105, IEEE Communications Magazine, Feb.2014.

7. Blind / semi-blind / non-coherent OFDM receivers – study and compare with coherent receiver
Ref: See Hanzo’s book on MC-CDMA and OFDM; also discuss with instructor.

8. Biased estimator for OFDMA; as an example, look at the James-Stein estimator in the paper below

9. Space-time Block Codes and Space-frequency Block codes for OFDM links (e.g., Alamouti code). Comparision

10. Turbo-coded OFDM (convolutional turbo code mapped to various OFDM/OFDMA subcarriers

The next 3 topics are from Dr. Suman Kumar. The references are his research papers (contact him at suman@tenet.res.in if you want a copy).
11. PPP vs Hexagonal: Cellular networks are usually modeled by placing the base stations based on hexagonal tessellation. Recently, a new model has been proposed where base-stations are arranged according to homogeneous Poisson point process (PPP). The focus of this topic would be the comparison of both the models.  
*Ref:* A Tractable Approach to Coverage and Rate in Cellular Networks.

12. Impact of correlated interferers on rate: Typically, in practical scenarios correlation exists among the interferers. The focus of this topic would be to analyse the impact of these correlation among interferers on rate.  
*Ref:* Impact of Correlation between Interferers on Coverage Probability and rate in Cellular Systems

13. Optimal FFR: In FFR, the users are classified as cell-centre users and cell-edge users based on SINR threshold. FFR performance approaches frequency reuse 1 at low value of SINR threshold. Whereas, it approaches frequency reuse 1/3 at high value of SINR threshold. The focus of this topic would be to find the optimal choice of SINR threshold which maximize the FFR performance.  
*Ref:* Coverage Probability and Achievable Rate Analysis of FFR-Aided Multi-User OFDM-Based MIMO and SIMO Systems

14. Any MIMO detection algorithm from the below review paper:  
*Ref:* S. Yang and L. Hanzo, “Fifty years of MIMO detection: the Road to Large-scale MIMO,” see paper uploaded in course URL.

15. Multi-carrier Direct Sequence CDMA (MC-DS-CDMA) – frequency domain channel equalization followed by despreading  
*Ref:* See Hanzo’s book on MC-CDMA and OFDM; Kaiser’s book

16. Fading channel simulation using other PSDs – example: Laplacian PSD, Gaussian PSD, etc. Find out the references.