**Project EE451: Mobile Communication Systems**

**School of Electrical Engineering and Computer Science**

**National University of Sciences and Technology**

**Fall 2023**

EE451 is a course in physical wireless communications. You must choose a project topic dealing with physical and MAC layer issues, i.e., Layers 1 and 2 in the OSI protocol stack. Topics dealing with Layer 3 and above, e.g, wireless networking protocols and architectures, mobility management, etc., outside the scope of this course! Usually, if your project includes some model of the wireless channel, it will be acceptable. If you have doubts about your project topic, please check with the instructor before proceeding.

**Some Possible Project Topics**

The following is a list of some possible project topics. You are free to choose your own topic as well.

Advanced channel modeling and simulation techniques.

Adaptive modulation and coding techniques

CDMA multiuser detection techniques.

Multicarrier techniques: OFDM, MC-CDMA, SC-FDMA (pick one)

Receiver time/frequency/sample synchronization.

Time domain equalization techniques.

Frequency domain equalization techniques.

Single antenna interference cancellation.

Space-time coding and diversity techniques.

Spatial multiplexing techniques.

Space division multiple access.

Multiuser diversity techniques.

Bit interleaved coded modulation.

Iterative receiver techniques.

Cooperative communications.

Cognitive radio spectrum sensing and/or dynamic spectrum management.

Vehicular communication.

Green radio.

LiFi, WiFI, WiMAX, LTE, LTE-A (pick one)

3G/4G/5G/6G (pick one)

Massive MIMOs

Heterogeneous Networks and Femtocells

Sensor and Mesh Networks

mmWave/THz Communications

NOMA

UAV communications

IRS

LEO and Satellite Communications

Quantum communications

Molecular Communications

A topic of your own - talk to me about it first!

**References**

You will need a good list of journal and conference publications for your project. Most of the following publications are available on-line through [IEEE Explore](http://gtsearch.library.gatech.edu/search/?base=databases&action=subject&subject=engineering-electrical-and-computer) which also has an excellent search capability.

IEEE Transactions on Vehicular Technology

IEEE Journal on Selected Areas in Communication

IEEE Transactions on Wireless Communications

IEEE Transactions on Communications

IEEE Communications Magazine

IEEE Communications Magazine