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# Summary

# Lecture 1 Introduction

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- Introduction of 1G, 2G, 3G, and 4G
- Key technology of 5G

# Lecture 2 Fundamentals

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- Model of Wireless Channel
- Capacity of AWGN channel
- Capacity of Frequency-selective Channel
- Time Diversity, Antenna Diversity, Space-time Codes

# Lecture 3 MIMO&OFDM

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- Multiple-Antenna System
- MIMO Capacity via SVD
- Capacity with precoding
- The principle of OFDM
- The capacity of OFDM

# Lecture 4 Massive MIMO

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- The concept of Massive MIMO
- Benefit of Massive Antenna
- Capacity of Massive MIMO systems

# Lecture 5 Cognitive Radio

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- The concept of cognitive radio
- Cognitive wireless networks
- Spectrum acquisition
- Spectrum sensing
- Cognitive wireless transmission

# Lecture 6 Visible Light Communication

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- VLC introduction
- VLC application
- Indoor application of VLC
- VLC Sources
- Channel modelling of VLC

# Lecture 7 Wireless Powered Communication

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- Wireless Power Transfer (WPT) technologies
- WPT Applications
- Three “Canonical” Models/Modes of Wireless Powered Communication
- Wireless Powered Communication Applications



# Lecture 8 UAV Communication

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- Integrating UAVs into Cellular: A Win-Win Technology
- Integrating UAVs into Cellular: Two Paradigms
- UAV-Ground Channel Models
- UAV applications

# Lecture 9 Optical fiber communication (光纤通信)

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- Introduction of optical fiber communication
- Digital Optical Fiber Communication System
- Transmission characteristics of optical fibers
- Modulation in optical fiber communication
- Optical Wavelength Division Multiplexing (WDM, 光波分复用)