

Wireless Revolution

Course No: 14:332:301

Class Hours: Mon-Thu 8:30-9:50 AM (Room: RWH-206)

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Course Description: This “flipped” undergraduate course provides a broad view of how new technologies, economic forces, political constraints, and competitive warfare have created and shaped the “wireless revolution” in the last 50+ years. It offers a view inside the world of corporate management-- how strategies were created and why many have failed –and gives students a chance to develop their own strategic skills by solving real-world problems. The course includes a historical overview of communications and communication systems, basics of wireless technology, technology and politics of cellular, basics of corporate finance, economics of cellular systems and spectrum auctions, case studies in wireless business strategy, the strategic implications of unregulated spectrum, a comparison of 3G, 4G, 5G and WiFi, IoT and the wireless future (6G). Students are required to do classwork (answer a set of questions based on pre-lecture reading assignments) during the lectures in a flipped classroom setting – necessitating pre-lecture preparation, in-class attendance, and participation. This course is considered a Humanities/Social Science elective for Engineering students and a Technical elective for non-engineering students.

Topical Outline:

1. The age of instant communication
2. Mobile telephone systems before cellular
3. Channel Reuse- the Technology of Cellular
4. Cellular Economics- The Million-Dollar Cell
5. Profit and loss: an intro to corporate finance
6. Cellular politics: monopoly or competition
7. Spectrum and its cost: hearings, lotteries and auctions
8. The evolution of cellular: portability, digital voice and smart phones
9. Unlicensed spectrum: new products and economics
10. Frequency, wavelength and coverage in free space and the real world
11. The Technology of the G's (World of Digital Radio): 2G, 3G, 4G, 5G and 6G
12. Stock price, company growth, and financing with bonds
13. Case studies in strategy: One-2-One; Iridium; Starlink

Course Requirements:

Classwork (60%), Midterm Exam 1 (20%), Midterm Exam 2 (20%)

Reference Material:

1. Pre-lecture reading will be posted before each lecture on Canvas
2. Assorted reading material will be posted on the course website on Canvas