1 Introduction

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1.1 Motivation

1. Signals travel without wires
   (a) In this module, signals travel as radio waves (optical and acoustic systems ignored)
2. Applications are mostly in communications
   (a) Signals modulated to carry information
   (b) Many familiar applications such as radar, navigation, etc.

Example: Modern smart phone has approximately 9 distinct wireless systems. Try identifying them?

1. NFC
2. Cellulars
   (a) 2G
   (b) 3G
   (c) 4G
   (d) 5G
3. GPS
4. Bluetooth
5. WiFi
6. UWB
7. Lidar

Advantages of Wireless

- Mobility

- Good for one-to-many transmission
- High-capacity point-to-point links (cheaper than wired) (e.g. to serve remote areas)

Advantages of Wired

- Very little leakage
- No interference
- Multiple systems can operate adjacently without issue

but wired has much, much larger overheads.
Wired used for super high capacity lines (eg. fibre-optic transatlantic cables)

1.2 The Wireless Spectrum

The EM spectrum is a shared and limited resource.
Mostly regulated by government agencies.

1.3 Assessment & Delivery

Component	**Timing**	**Weight**
Lab Assignments	Varied (4 labs)	25%

1.4 Module Outline

1.5 Textbooks