

# EE401: Advanced Communication Theory

Professor A. Manikas  
Chair of Communications and Array Processing

Imperial College London

Course Information and Topics

# Useful Connections

- Professor Manikas' web site:  
<http://skynet.ee.ic.ac.uk/manikas.html>
- Lecture Notes and other course material:
  - ▶ Skynet:  
<http://skynet.ee.ic.ac.uk/notes/notes.html>
  - ▶ Blackboard:  
<https://bb.imperial.ac.uk>
  - ▶ OneNote - Class Notebook entitled:  
"Prof A Manikas E401 Advanced Communications Theory 2020-21"
- Panopto (video recordings of the Lectures):  
<https://imperial.cloud.panopto.eu>
  - ▶ directory:  
ELEC97004/97005 - Advanced Communication Theory (Autumn 2020-2021)

# Coursework and other Important Information


- Coursework = compulsory
- Coursework = **55%**
  - ▶ Part-A = 35%;
  - ▶ Part-B = 15%;
  - ▶ Class coursework = 5%;
- Examination = **45%**
- Examination Date: Week SU-1 (after Easter Break)
- Past Examination Papers are **not** available for this course.
- A large number of MCQ exercises are available for supporting this course


# Course Academic Weeks & Deadlines

- Table-1 shows the Autumn Term academic weeks (A1-A11) and the deadlines of the various parts of the coursework

Table-1				
Academic Weeks - Autumn Term			Lectures	Classes
Week-A1	5 Oct. 2020	11 Oct. 2020	-	-
Week-A2	12 Oct. 2020	18 Oct. 2020	2h	-
Week-A3	19 Oct. 2020	25 Oct. 2020	2h	1h
Week-A4	26 Oct. 2020	1 Nov. 2020	2h	1h
Week-A5	2 Oct. 2020	8 Nov. 2020	2h	1h
Week-A6	9 Nov. 2020	15 Nov. 2020	2h	1h
Week-A7	16 Nov. 2020	22 Nov. 2020	2h	1h
Week-A8	23 Nov. 2020	29 Nov. 2020	2h	1h
Week-A9	30 Nov. 2020	6 Dec. 2020	2h	1h
Week-A10	7 Dec. 2020	13 Dec. 2020	2h	1h
Week-A11	14 Dec. 2020	20 Dec. 2020	2h	2h
		11th Jan. 2021, 5:30pm	Coursework Deadline	

# Books and Other References

 D. Tse, P. Viswanath,  
"Fundamentals of Wireless Communication",  
Cambridge University Press, 2005.

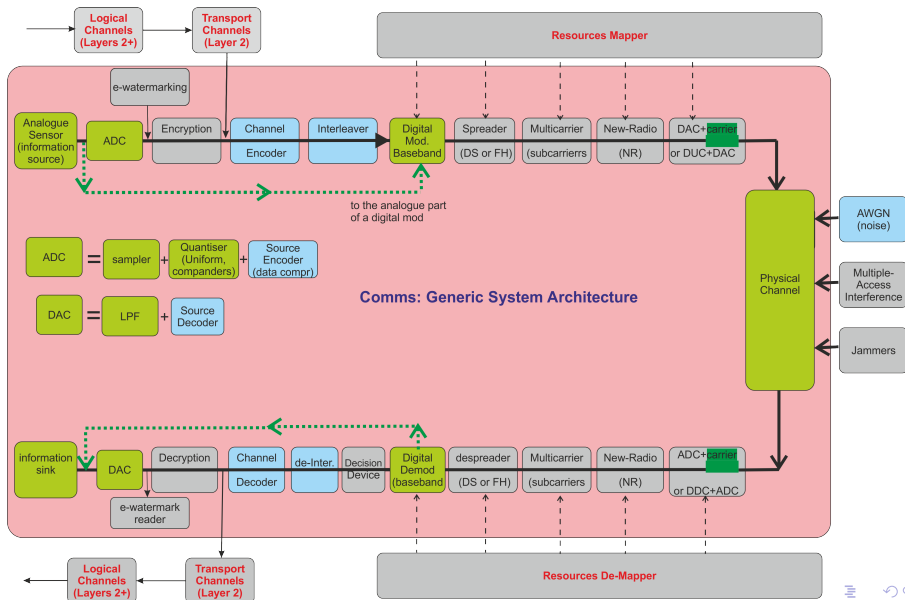
 A. Manikas,  
"Differential Geometry in Array Processing",  
Imperial College Press, 2004.

 A. Manikas,  
"Interference Cancellation Techniques Experiment",  
<http://skynet.ee.ic.ac.uk/am1.zip>

# Topics

- ➊ **An Introductory Overview**
- ➋ **Principles of Diversity Theory**
- ➌ **SIMO, MISO, MIMO**
- ➍ **Array Receivers for SIMO and MIMO**
  - ▶ Detection Problem
  - ▶ Estimation Problem
  - ▶ Reception Problem
- ➎ **Localisation of Wireless Signals**
  - ▶ Localisation System Architectures
  - ▶ Localisation Algorithms:  
TOA, TDOA, RSSI, DOA, LAA, Hybrid, Fingerprinting
- ➏ **Antenna Arrays with Increasing the Degrees-of-Freedom,**
  - ▶ Massive Wireless Systems (massive MIMO/SIMO/MISO),
  - ▶ Spatiotemporal Wireless Communications
- ➐ **mm-Wave Wireless Communications and Beamforming**
- ➑ **Distributed Antenna Arrays and 5G**

# Topics in "Block" Structure (cont.)



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