

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 Communication Theory 2022-23"
- Panopto (video recordings of the Lectures):
<https://imperial.cloud.panopto.eu>
 - ▶ directory:
ELEC970045 Advanced Communication Theory (Autumn 2022-2023)

Coursework and other Important Information

- Coursework

- ▶ Compulsory - Matlab based
- ▶ Coursework weight = **50%**
 - ★ Part-A = 35%.
 - ★ Part-B = 15%;

- Examination

- ▶ Exam weight = **50%**
- ▶ Examination Date: Week SU-1 after Easter Break,
- ▶ 3 hour closed book written examination, or 2 hour remote (MCQ) examination
- ▶ **Past Examination Papers** are **not** available for this course.
- ▶ **A large number of MCQ exercises** are available for supporting this course/exam

- **Classes (online):**

- ▶ GTAs: Nadeem Dar and Yunhao Liu


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	3 Oct. 2022	9 Oct. 2022	-	-
Week-A2	10 Oct. 2022	16 Oct. 2022	3h	-
Week-A3	17 Oct. 2022	23 Oct. 2022	3h	-
Week-A4	24 Oct. 2022	30 Oct. 2022	3h	-
Week-A5	31 Oct. 2022	6 Nov. 2022	3h	-
Week-A6	7 Nov. 2022	13 Nov. 2022	3h	-
Week-A7	14 Nov. 2022	20 Nov. 2022	3h	-
Week-A8	21 Nov. 2022	27 Nov. 2022	3h	-
Week-A9	28 Nov. 2022	4 Dec. 2022	-	3h
Week-A10	5 Dec. 2022	11 Dec. 2022	-	3h
Week-A11	12 Dec. 2022	18 Dec. 2022	-	3h
		16th Dec. 2022, 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.

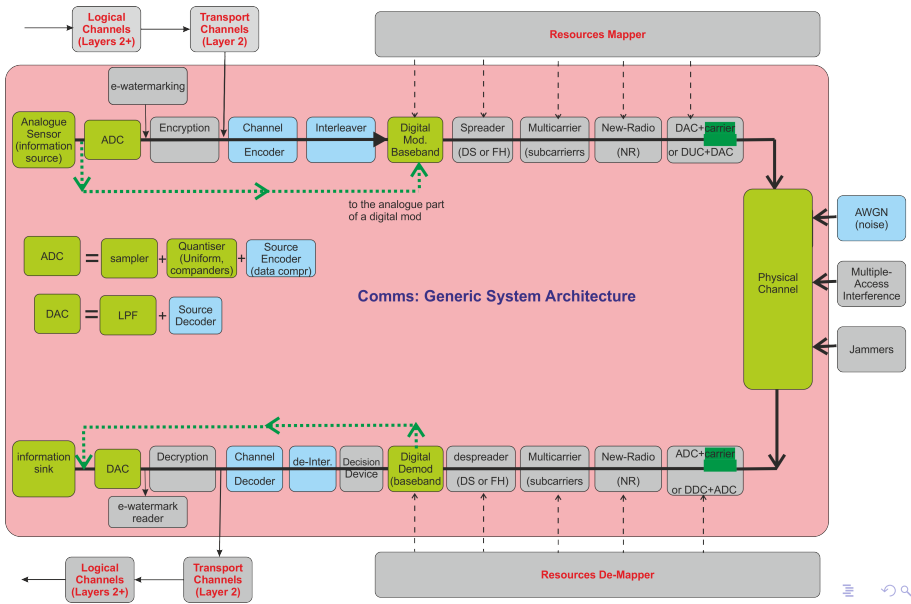
 A. Manikas,
"Interference Cancellation Techniques Experiment",
<http://skynet.ee.ic.ac.uk/am1.zip>

 E303 Communication Systems Lecture Notes.
Introductory useful material (optional), available in OneNote Class
Notebook entitled
"Prof A Manikas E303 Communication Systems 2021-22"

Topics

- ① **An Introductory Overview**
- ② **Principles of Diversity Theory**
- ③ **SIMO, MISO, MIMO**
- ④ **Array Receivers for SIMO and MIMO**
 - ▶ Detection Problem
 - ▶ Estimation Problem
 - ▶ Reception Problem
- ⑤ **Localisation of Wireless Signals**
 - ▶ Localisation System Architectures
 - ▶ Localisation Algorithms:
TOA, TDOA, RSSI, DOA, LAA, Hybrid, Fingerprinting
- ⑥ **Other Antenna Array Comm Architectures**
 - ▶ Antenna Arrays with Increasing the Degrees-of-Freedom,
 - ★ Massive Wireless Systems (massive MIMO/SIMO/MISO),
 - ★ Spatiotemporal Wireless Communications
 - ▶ mm-Wave Wireless Communications and Beamforming
 - ▶ Distributed Antenna Arrays and 5G

Topics in "Block" Structure (cont.)



Topics in "Block" Structure (cont.)

