

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 2021-22"
- Panopto (video recordings of the Lectures):
<https://imperial.cloud.panopto.eu>
 - ▶ directory:
ELEC97004/97005 Advanced Communication Theory (Autumn 2021-2022)

Coursework and other Important Information

- Coursework

- ▶ Compulsory
- ▶ Coursework weight = **50%**
 - ★ Part-A = 35%;
 - ★ Part-B = 15%;
 - ★ Class coursework = Pass/Fail;

- 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	4 Oct. 2021	10 Oct. 2021	-	-
Week-A2	11 Oct. 2021	17 Oct. 2021	2h	-
Week-A3	18 Oct. 2021	24 Oct. 2021	2h	1h
Week-A4	25 Oct. 2021	31 Oct. 2021	2h	1h
Week-A5	1 Nov. 2021	7 Nov. 2021	2h	1h
Week-A6	8 Nov. 2021	14 Nov. 2021	2h	1h
Week-A7	15 Nov. 2021	21 Nov. 2021	2h	1h
Week-A8	22 Nov. 2021	28 Nov. 2021	2h	1h
Week-A9	29 Nov. 2021	5 Dec. 2021	2h	1h
Week-A10	6 Dec. 2021	12 Dec. 2021	7 Lectures	3h
Week-A11	13 Dec. 2021	19 Dec. 2021	2h	1h
		10th Jan. 2022, 5:30pm	Coursework Deadline	

Books and Other References

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

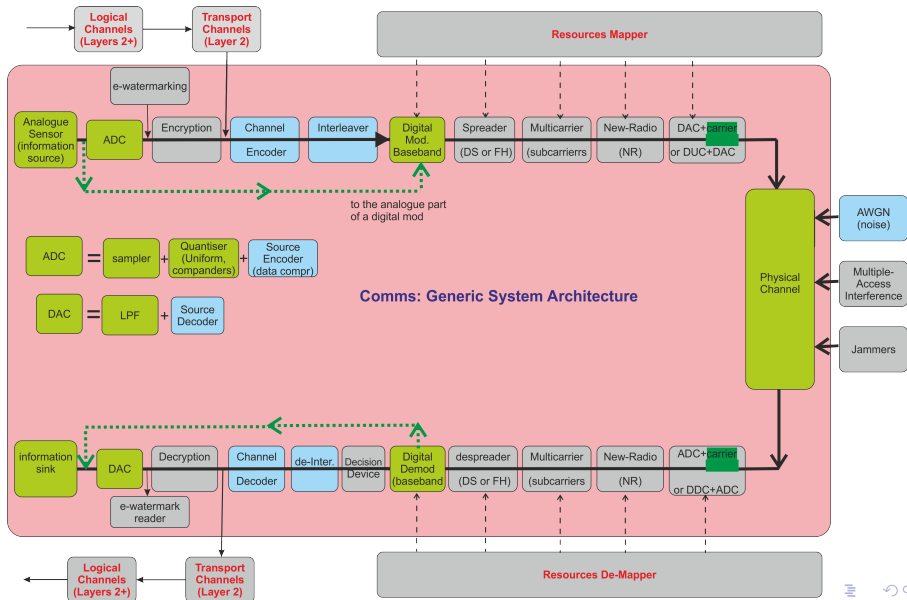
 A. Manikas,
"Differential Geometry in Array Processing",
Imperial College Press, 2004.

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

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 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.)

