Master Degree in Information Technology Engineering for Health and Communication: Health Curriculum

Electromagnetic interactions and diagnostic

INTRODUCTION

Prof. A. Buono

INTRODUCTION

Overview:

- CFU: 12

- Duration: 96 hours

- Schedule: 20 september – 19 december 2023

- Classes: 4 classes per week, 2 hours each

- Time table:

  ➢ Tuesday, 9:11, Computer Room n. 4
  ➢ Wednesday, 14:16, Computer Room n. 4
  ➢ Thursday, 11:13, Room 9
  ➢ Friday, 14:16, Computer Room n. 4
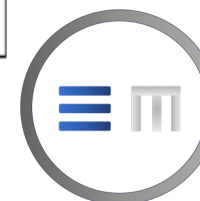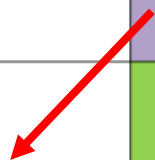
Prof. A. Buono

INTRODUCTION

Corso di studi in **INGEGNERIA DELLE TECNOLOGIE DELL'INFORMAZIONE PER LE COMUNICAZIONI E LA SALUTE**
(Laurea Magistrale) - A.A. 2023/2024

II ANNO - Curriculum Salute - I Semestre dal 20/09/2023 al 19/12/2023

Dalle	Alle	Lunedì	Martedì	Mercoledì	Giovedì	Venerdì	Dalle	Alle
09:00	10:00		Diagnostica e Interazioni Elettromagnetiche proff. Migliaccio/Buono Aula Inf. 4	Elaborazione Numerica dei Segnali Biomedici prof. Napolitano Aula Inf. 4	Bioingegneria per le Neuroscienze prof. Baselice Aula 13	**?**	09:00	10:00
10:00	11:00						10:00	11:00
11:00	12:00		Bioingegneria per le Neuroscienze prof. Baselice Aula Inf. 4	Analisi di Dati per la Diagnostica e la Biomedica proff. Pascazio/Schirinzi Aula 8 bis	Diagnostica e Interazioni Elettromagnetiche proff. Migliaccio/Buono Aula 9	Elaborazione Numerica di Segnali Biomedici prof. Napolitano Aula 7	11:00	12:00
12:00	13:00						12:00	13:00
13:00	14:00	**?**					13:00	14:00
14:00	15:00			Diagnostica e Interazioni Elettromagnetiche proff. Migliaccio/Buono Aula Inf. 4	Analisi di Dati per la Diagnostica e la Biomedica proff. Pascazio/Schirinzi Aula 8 bis	Diagnostica e Interazioni Elettromagnetiche proff. Migliaccio/Buono Aula Inf. 4	14:00	15:00
15:00	16:00						15:00	16:00
16:00	17:00			**?**		**?**	16:00	17:00

Prof. A. Buono

INTRODUCTION

Corso di studi in INGEGNERIA DELLE TECNOLOGIE DELL'INFORMAZIONE PER LE COMUNICAZIONI E LA SALUTE (Laurea Magistrale) - A.A. 2023/2024
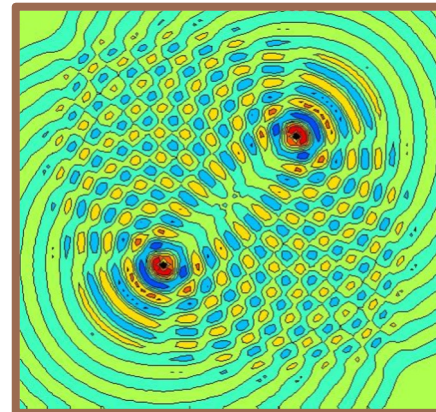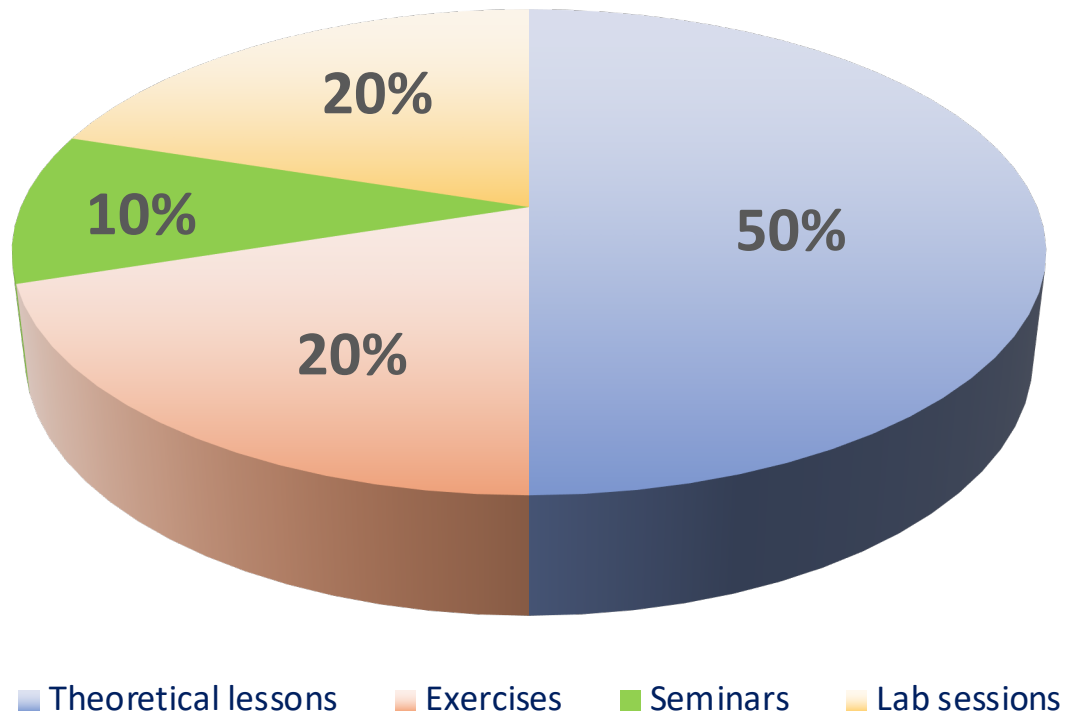
II ANNO - Curriculum Salute - I Semestre dal 20/09/2023 al 19/12/2023

Dalle	Alle	Lunedì	Martedì	Mercoledì	Giovedì	Venerdì	Dalle	Alle
09:00	10:00	Elaborazione Numerica dei Segnali Biomedici prof. Napolitano Aula Inf. 4		Bioingegneria per le Neuroscienze prof. Baselice Aula Inf. 4	Bioingegneria per le Neuroscienze prof. Baselice Aula 13	Analisi di Dati per la Diagnostica e la Biomedica proff. Pascazio/Schirinzi Aula 8 bis	09:00	10:00
10:00	11:00						10:00	11:00
11:00	12:00	Diagnostica e Interazioni Elettromagnetiche proff. Migliaccio/Buono Aula Inf. 4		Analisi di Dati per la Diagnostica e la Biomedica proff. Pascazio/Schirinzi Aula 8 bis	Diagnostica e Interazioni Elettromagnetiche proff. Migliaccio/Buono Aula 9	Elaborazione Numerica di Segnali Biomedici prof. Napolitano Aula 7	11:00	12:00
12:00	13:00						12:00	13:00
13:00	14:00	?					13:00	14:00
14:00	15:00	?		Diagnostica e Interazioni Elettromagnetiche proff. Migliaccio/Buono Aula Inf. 4	?	Diagnostica e Interazioni Elettromagnetiche proff. Migliaccio/Buono Aula Inf. 4	14:00	15:00
15:00	16:00						15:00	16:00
16:00	17:00						16:00	17:00

Prof. A. Buono

INTRODUCTION

Organization: Part I

- ■ Theoretical lessons
- ■ Exercises
- ■ Seminars
- ■ Lab sessions

50%

20%

10%

20%

Prof. A. Buono
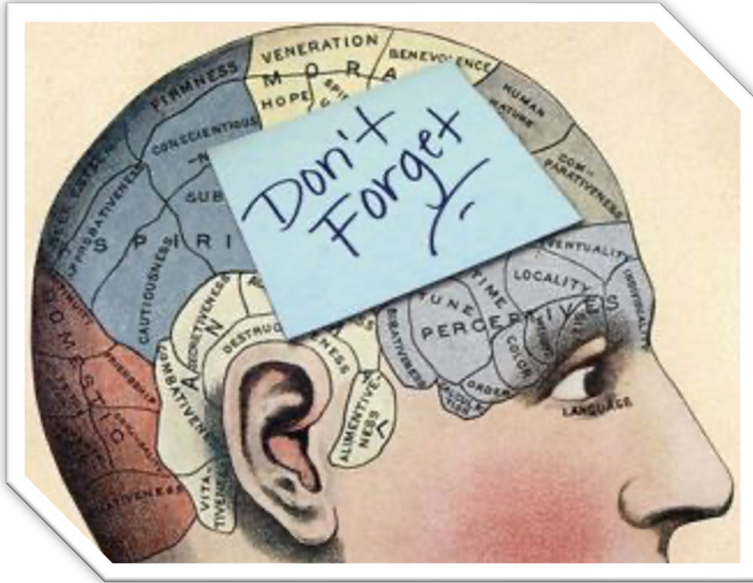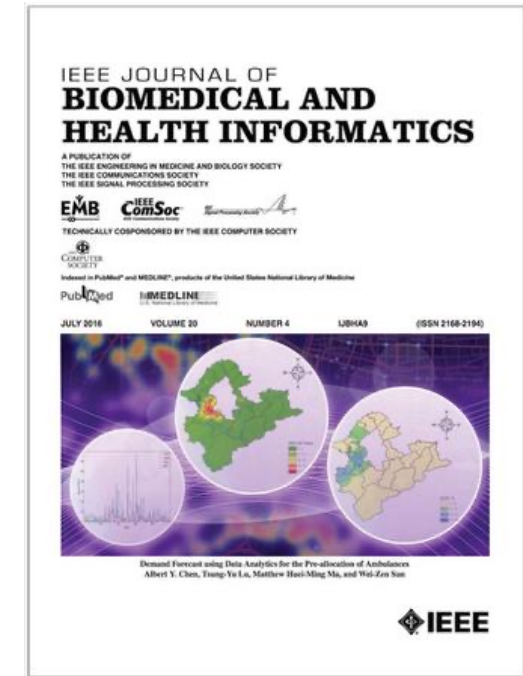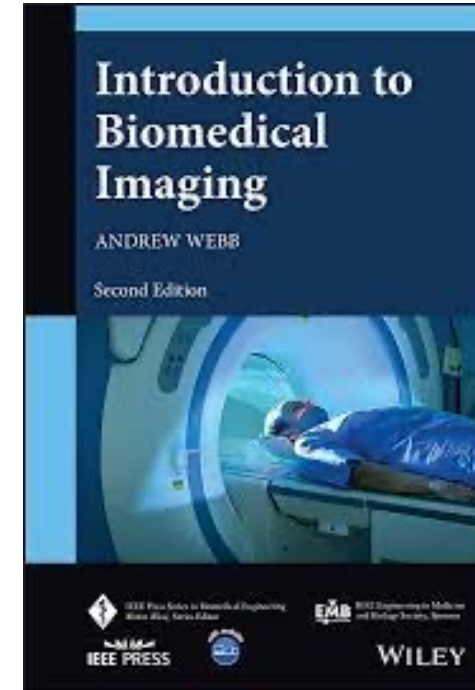
INTRODUCTION

Background:

- ✓ Knowledge on ING-INF/02 topics

- ✓ Knowledge on ING-INF/06 topics

- ✓ **Attention**

- ✓ **Engagement**

Prof. A. Buono

Supporting material:

- Slides (e-learning)

- Notes

- Suggested textbooks

- Suggested scientific papers

Prof. A. Buono

INTRODUCTION

Supporting material:

- Slides (e-learning)

- Notes

- **Suggested textbooks**

- Suggested scientific papers

❑ A. Webb, "Introduction to Biomedical Imaging", IEEE Press-Wiley

❑ A. Vander Vorst *et al.*, "RF/Microwave Interaction with Biological Tissues", IEEE Press-Wiley

❑ J. C. Lin, "Electromagnetic Interaction with Biological Systems", Plenum Press

❑ L. F. Chen *et al.*, "Microwave Electronics: Measurements and Materials Characterization", Wiley

INTRODUCTION

Exam: oral interview

Prof. A. Buono

INTRODUCTION

Contacts:

andrea.buono@uniparthenope.it

Prof. A. Buono

INTRODUCTION

Evaluation questionnaires:

1) Is your background enough to understand the topics addressed during the course?

2) Does the study load match the CFU associated to the course?

3) Is the supporting material suggested and provided by the professor relevant to the topics?

4) How the exam will be undertaken is clearly explained?

5) Are you interested on the subject?

Prof. A. Buono

INTRODUCTION

Evaluation questionnaires:

1) Is the professor compliant with the course schedule and time table?

2) Does the professor push your interest on the subject?

3) Does the professor teach clearly?

4) Are integrative activities useful to understand the subject?

5) Does the subject match the information provided on the website?

6) Is the professor available for further explanations?

Prof. A. Buono

INTRODUCTION

Electromagnetic ~~interactions and diagnostic~~

❑ *Relating to the electrical and magnetic forces produced by an electric current*

❑ *Relating to or caused by magnetism that is produced by electricity*

❑ *Electromagnetic also means relating to the science that deals with the relationship between electricity and magnetism*

Cambridge Dictionary

Prof. A. Buono

INTRODUCTION

~~Electromagnetic~~ *interactions* ~~and diagnostic~~

❑ *An occasion when two or more people or things communicate with or react to each other*

❑ *A situation where two or more people or things communicate with each other or react to each another*

Cambridge Dictionary

INTRODUCTION

~~Electromagnetic interactions and~~ *diagnostic*

❑ *Methods or systems for discovering the cause of a problem, illness, etc.*

❑ *Identifying a particular illness using a combination of signs and symptoms*

❑ *Used for making a judgment about what a particular problem is*

❑ *Used for discovering the characteristics or cause of a problem in a system or machine*

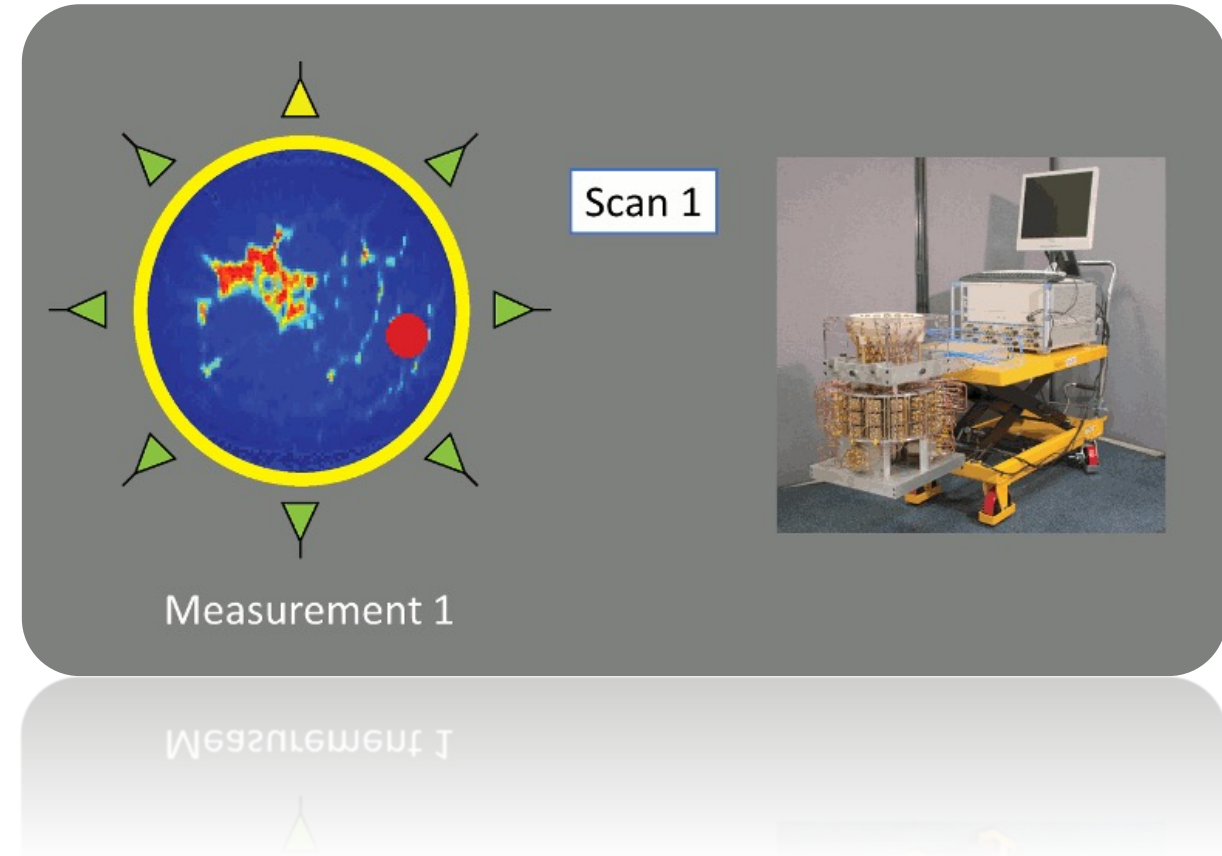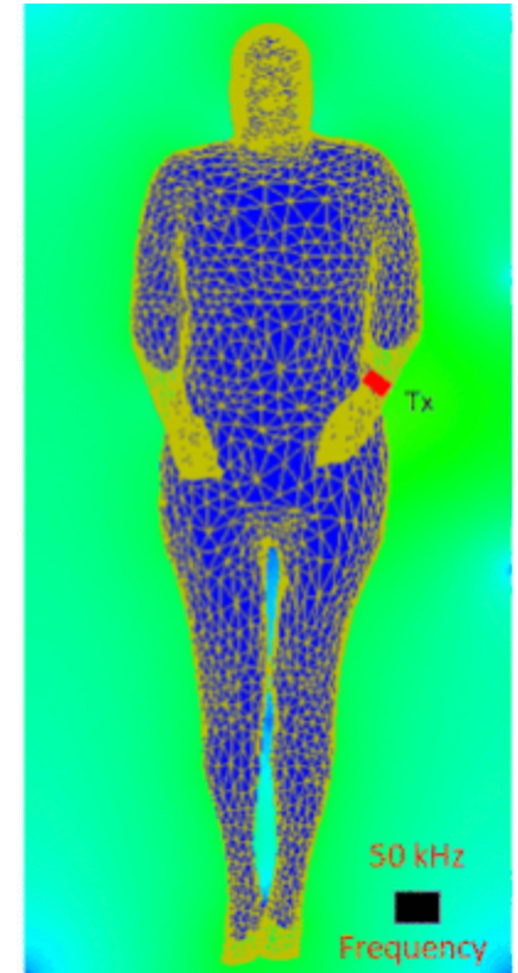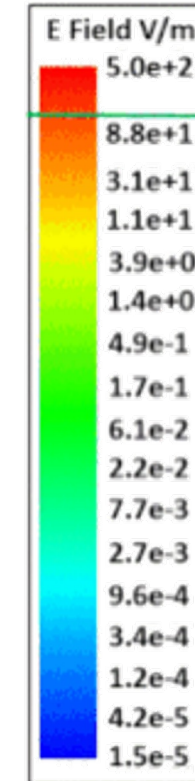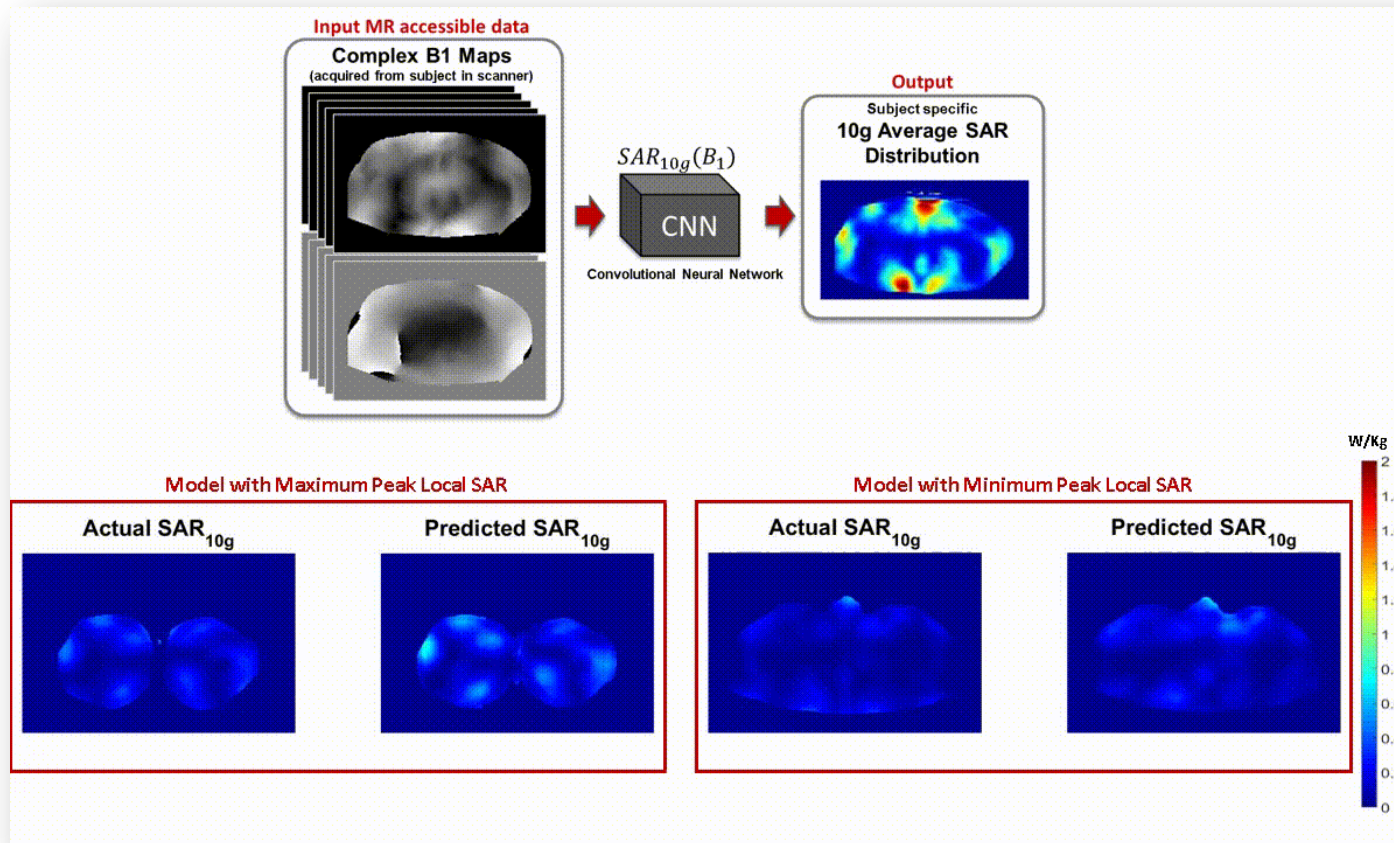❑ *Used for discovering the type or cause of an illness or other problem*

Cambridge Dictionary

INTRODUCTION

Framework:

Prof. A. Buono

Framework:

Prof. A. Buono

INTRODUCTION

Table of content:

ELECTROMAGNETIC INTERACTIONS:

✓ Forward modeling and inverse scattering *

✓ Basis of bioelectromagnetism

✓ Interaction mechanisms and biological effects

✓ Characterization of biological tissues dielectric properties *^

* Exercises

^ Lab sessions

Prof. A. Buono

INTRODUCTION

Table of content:

ELECTROMAGNETIC DIAGNOSTIC:

✓ Human exposure to electromagnetic fields *^

✓ Electromagnetic security and protection ^

✓ NIR diagnostic tools (MRI, MWS, Tomography)

✓ Showcases

Exercises

^ Lab sessions

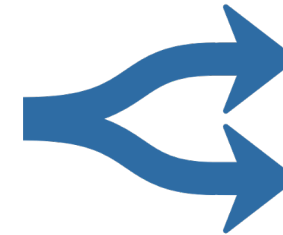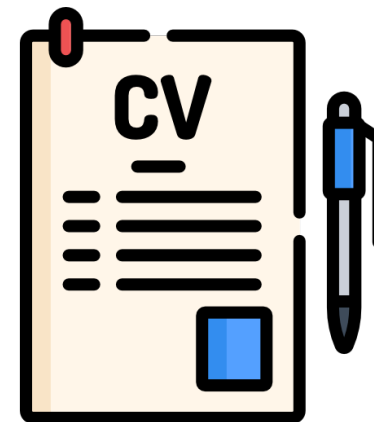Prof. A. Buono

INTRODUCTION

Introduce yourself:

ITICS

Prof. A. Buono