TIMETABLE for the Master ERASMUS MUNDUS in NUCLEAR PHYSICS in Spain

Academic year 2021-2022

The students have to follow the following topics in the first semester, all of them in Seville (except Nuclear Structure):

Quantum Physics (60 hours)
Atomic and Plasma Physics (60 hours)
Basic Experimental Nuclear Physics (45 hours = 30 h theory + 15 h lab (5 experiments x 3 h/exp))
Computing and Numerics (45 hours)
Nuclear Structure (30 h intensive during two weeks January 24-28, (on-line) and January 31-February 4 (in person), 2022) in Madrid

All lectures are synchronous in person (some of them are on-line but with all students connected in a synchronous learning). Synchronous **learning** is any type of learning that takes place in real time, where a group of people are engaging in learning simultaneously either all in person in a classroom or through the use of video conferencing and live chat or instant messaging.

We are organising an extra-curriculum course on Advanced Plasmas for all students in Sevilla during one week in February 2022 (invited lecturer Prof. Massimo Nocente, University Milano Bicoca, Italy).

Students from paths 1 and 3 are expected to be in Sevilla until February 20th.

During last week of February students in **path 1 (Experiments)** and **path 3 (Applications)** have to move to Padova and Catania, respectively. They are expected to be there by March 1st, 2022.

Second semester (for the **theory path-2**)
Relativistic Quantum Theory: Nuclear Processes (30 h intensive during the weeks February 21-25 (on-line) & Feb. 28- March 4 (in person), 2022) in Sevilla
Weak Interactions (30 h intensive during the weeks February 28-March 4 (on-line) & March 7-11 (in person), 2022) in Sevilla
Elective, one of the following

- **Nuclear Astrophysics** (30 h intensive during the weeks March 21-25 (on-line) & March 28-April 1 (in person), 2022) in Barcelona
- **Hadron Physics** (30 h intensive during the weeks March 14-18 (on line) & 21-25 (in person), 2022) in Barcelona

Many-Body Theories in Nuclear Physics (30 h intensive during the weeks April 4-8 (in person) & April 18-22 (on-line), 2022) in Madrid
Introduction to Nuclear Reactions (30 h intensive during two weeks May 16-27, 2022) in Sevilla

Acronyms:

QP = Quantum Physics
A&P = Atomic and Plasma Physics
BENP = Basic Experimental Nuclear Physics
C&N = Computing and Numerics
NS = Nuclear Structure: properties and models
MBT = Many-Body theories in Nuclear Physics
RQT = Relativistic Quantum Theory: Nuclear Processes
WI = Weak Interactions
HP= Hadron Physics*
NA = Nuclear Astrophysics*
NR = Nuclear Reactions
***Each student has to choose one of these subjects**

week

40: October 4-8	**41: October 11-15**	**42: October 18-22**
43: October 25-29	**44: November 1-5**	**45: November 8-12**
46: November 15-19	**47: November 22-26**	**48: Nov 29-Dec 3**
50: December 13-17		

Lectures	Monday	Tuesday	Wednesday	Thursday	Friday
10:00-13:00	BENP laboratory GROUP 1	BENP laboratory GROUP 2	BENP laboratory GROUP 3	BENP laboratory GROUP 4	BENP laboratory GROUP 5
	Weeks 42, 43, 44, 45 and 46				

Lectures	Monday	Tuesday	Wednesday	Thursday	Friday
15:00-17:00	A&P	QM	A&P	QM	QM
17:00-17:30					
17:30-19:00	BENP (theory)	C&N	BENP (theory)	A&P	C&N
19:00-19:45		C&N		A&P	C&N
	Weeks 40-50				

QM and A&P (60 hours)
Starting date: October 4, 2021 (Week number 40) – Ending date: December 17, 2021 (week: 50) (6 hours/week)
Exams period: January 10-14, 2022

BENP (45 hours)
Starting date:
THEORY (30 hours): October 4, 2021 (week number 40) – Ending date: December 17, 2021 (week: 50) (3 hours/week)
LAB Group 1 (15 hours): weeks 42-46,
LAB Group 2 (15 hours): weeks 42-46
Exams period: February 8, 2022

C&N (45 hours)
Starting date:
THEORY (45 hours): October 4, 2021 (week number 40) – Ending date: December 17, 2021 (week: 50) (4,5 hours/week)
Exams period: February 10, 2022

Week 3: January 17-21, 2022 visit to CAEN (France)

NS
Teaching period: weeks 4-5 January 24-28 (on-line) + January 31-Feb. 4 (in person), 2022 in MADRID
Exam: February 18, 2022 in Sevilla

SECOND SEMESTER

RQT
Teaching period: week February 21-25 (on-line) & Feb 28-March 4 (in person), 2022 in SEVILLA
Exam: April 22, 2022

WI
Teaching period: week Feb 28-March 4 (on-line) 2022 & March 7-11 (in person) 2022 in SEVILLA
Exam: April 29, 2022

HP*
Teaching period: week March 14-18 2022 (on-line) & March 21-25 2022 (in person) in BARCELONA
Exams period: May 6, 2022

NA*
Teaching period: week March 21-25, 2022 (on-line) & March 28-April, 2022 (in person) in BARCELONA
Exam: May 13, 2022

* each student has to select one of these topics

MBT
Teaching period: week April 4-8 (in person) 2022 & April 18-22 (on-line) 2022, in MADRID
Exam: May 20, 2022

NR
Teaching period: two weeks May 16-27, 2022 in SEVILLA
Exam: June 17, 2022

In case of fail in one or more subjects, the student will have one extra opportunity in the period June 27 to July 22, 2022. The exact dates for this extra exam will be fixed with the lecturers. In addition, extra curriculum activities will be programmed in June and July, 2022.
For S3, the lectures at Caen (France) start in September 1st, 2022

Subject	ECTs	Place	Dates	Character	EXAMS
Nuclear Structure: Properties and Models	6	Madrid	24-28 January 2022 (on-line) 31 Jan-4 Feb 2022 (in person)	Compulsory	18 February 2022
Relativistic Quantum Mechanics: Nuclear Processes	6	Sevilla	21-25 Feb 2022 (on-line) 28 Feb-4 March 2022 (in person)	Compulsory for path2 students	22 April 2022
Weak Interactions	6	Sevilla	28 Feb-4 March 2022 (on-line) 7-11 March 2022 (in person)	Compulsory for path2 students	29 April 2022
Hadron Physics*	6	Barcelona	14-18 March 2022 (in-person) 21-25 March 2022 (on-line)	Elective for path2 students	6 May 2022
Nuclear Astrophysics *	6	Barcelona	21-25 March 2022 (on-line) 28 March-April 1 2022 (in person)	Elective for path2 students	13 May 2022
Many-Body Theories in Nuclear Physics	6	Madrid	4-8 April 2022 (in person) 18-22 April 2022 (on-line)	Compulsory for path2 students	20 May 2022
Introduction to Nuclear Reactions	6	Sevilla	16-27 May 2022	Compulsory for path2 students	17/6/2022

*select one of these two subjects