YACHAY TECH UNIVERSITY

SYLLABUS

1. General Information					
A.	**SCHOOL**	Physical Sciences and Nananotechnology	**B.**	**MAJOR**	Physics
C.	**COURSE**	**Introduction to Astrophysics and Cosmology**	**D.**	**CODE**	PHYS902
E.	**SEMESTER**	9th	**F.**	**ACADEMIC TERM**	2022SEM02
G.	**CURRICULAR UNIT**	Professional	**H.**	**MODALITY**	Face to face
I.	**HOURS**	200	**J.**	**PROFESSORS**	Dra. Clara Rojas Dra. Helga Dénes
K.	**WEEKLY CLASS SCHEDULE**	Wed.: 12:00 – 14:00 Thur.: 12:00 – 14:00 Fri.: 12:00 – 14:00	**L.**	**WEEKLY TUTORING SCHEDULE**	**Fri.: 08:00 – 10:00**

2. Prerequisites and Corequisites

PREREQUISITES		COREQUISITES	
COURSES	**Code**	**COURSES**	**Code**

3. Course Description

This course covers two important topics in Physics: first, Astrophysics, that will show the student the current knowledge of astronomical objects such as stars, galaxies and galaxy clusters. Second, Cosmology that studies the origin of the Universe, its theoretical bases, and observational evidence. In addition, as part of this course we will perform calculations with the Symbolic manipulation Software.

4. Course Contribution to professional training

Teach to students theoretical, mathematical and observational bases of the current model of our Universe and mathematical tools to solve problems of Astrophysical and Cosmological interest.

5. Course objectives

- Understand the conceptual bases of Astrophysics and Cosmology.
- Acquire expertise with Tensor calculus.
- Learning symbolic algebraic manipulation of physical equations.

6. Units / Contents / Hours / Evaluation Instruments

CURRICULAR UNITS	CONTENTS	TEACHING HOURS	HOURS OF INTERNSHIP AND EXPERIMENTAL LEARNING	HOURS OF INDEPENDENT LEARNING	EVALUATION INSTRUMENTS
UC. 1	Introduction to astrophysics	4	0	4	Quiz No. 1
UC. 2	Radiative transfer	6	0	6	Quiz No. 2
UC. 3	Stellar astrophysics	8	0	8	Quiz No. 3
UC. 4	The end state of stellar evolution	4	0	4	Quiz No. 4
UC. 5	Interstellar medium	8	0	8	Quiz No. 5
UC. 6	Astrophysical plasmas	8	0	8	Quiz No. 6
UC. 7	Extragalactic astronomy	8	0	8	Quiz No. 7
UC. 8	Special relativity	8	0	8	Midterm
UC. 9	The Big Bang Cosmology	4	0	8	Quiz No. 8
UC. 10	Tensor Algebra	12	0	10	Quiz No. 9
UC. 11	Dynamics of the Universe	12	0	10	Quiz No. 10
UC. 12	Observational bases of the Big Bang Cosmology	8	0	4	Quiz No. 11
UC. 13	Inflation and the very early Universe	12	0	6	Quiz No. 12
UC. 14	Lambda-CDM model	4	0	2	Final
	TOTAL	106	0	94	

7. Learning outcomes of the course

LEARNING OUTCOMES		STUDENT IS REQUIRED TO: (EVIDENCE OF LEARNING)
A.	Astrophysics	Understand the basic concepts of astrophysics.
B.	Cosmology	Know the origin and evolution of our Universe

8. Methodology

1 Theoretical classes.
2 Solving problems sessions.
3 Mathematical symbolic computation program workshops.

9. Information Sources (Bibliography)

9.1 Main

Author/s	Title of Work	Edition	Year of Publication	Publishing house - Country	Availability at YACHAY TECH Library
Arnab Rai Choudhuri	Astrophysics for Physicists	Third	2011	United States of America	No
Barbara Ryden	Introduction to Cosmology	Second	2017	United States of America	Yes
Ray D'Inverno	Introducing Einstein's Relativity	Second	2022	United Kingdom	No

9.2 Complementary

Author/s	Title of Work	Edition	Year of Publication	Publishing house - Country	Availability at YACHAY TECH Library
Andrew R. Liddle and David H. Lyth	Cosmological Inflation and Large-Scale Structure	First	2000	United Kingdom	No
David Kay	Tensor Calculus	First	1988	United States of America	No
Barbara Ryden and Bradley M. Peterson	Foundations of Astrophysics	First	2010	United States of America	No
Dan Maoz	Astrophysics in a Nutshell	Second	2016	Princeton University Pres - United States of America	Yes

10.Student's Evaluation

10.1. Evaluation during the course*

Midterm Exam (MT)		Formative Evaluation (FO)		Laboratory (LAB) **		Final Exam (FI)		Total
Midterm	30	Quiz No. 1	4			Final	30	100 %
		Quiz No. 2	3					
		Quiz No. 3	3					
		Quiz No. 4	4					
		Quiz No. 5	3					
		Quiz No. 6	3					
		Quiz No. 7	3					
		Quiz No. 8	3					
		Quiz No. 9	4					
		Quiz No. 10	3					
		Quiz No. 11	3					
		Quiz No. 12	4					
Subtotal	30	Subtotal	40	Subtotal	**0**	Subtotal	30	

10.2. Makeup Exam

The recovery evaluation will be made during the academic period. (Art. 41 - Regulation on Academic Regime of Yachay Tech).

11. General considerations

Important dates:

- Midterm: 09/01/2023 – 13/01/2023
- Final Exam: 13/03/2023 - 16/03/2023

Based on the Academic Regime Regulation issued by the Higher Education Council (CES in Spanish) and the Academic Regime Regulation of Yachay Tech.
(*) The percentages of each item are established in Art. 35 of Academic Regime Regulation of Yachay Tech.
(**) In courses in which there is no laboratory item, place: N/A

Prepared by:	Reviewed by:	Approved by:
PROFESSOR - PROFESSORS	**MAJOR COORDINATOR - MAJOR DIRECTOR**	**DEAN – DIRECTOR**
SIGNATURE AND DATE: CLARA INES ROJAS CELY Digitally signed by CLARA INES ROJAS CELY Date: 2022.11.17 08:44:09 -05'00'	**SIGNATURE AND DATE:**	**SIGNATURE AND DATE:**

HELGA DENES ..
Digitally signed by HELGA DENES ..
Date: 2022.11.17 18:21:07 -05'00'