



29.MAY-21.JUL.2023

#### **SAP OVERVIEW**

This SAP aims to introduce numerical methods to undergraduate students with some basic Python programming language skills and some mathematics skills in differentiation and integration. Students should have some prior knowledge of working with a computer, editing files, and downloading and installing software.

The students will acquire general skills in elementary numerical analysis, and knowledge and techniques associated with problems and engineering sciences applications.

In this SAP we propose the use of the Python framework provided by Anaconda (www.anaconda.com) and the classes will be supported by Jupyter Notebook. It is assumed that if the students use their computers in class, they will already have installed the Anaconda framework in their computers.

#### LEARNING OUTCOMES

At the end of this RUN-EU SAP, you will be able to:

- Develop abstract thinking skills and acquire fundamental concepts associated with programming language.
- Know and understand the concepts of elementary numerical analysis and describe their properties.
- Apply the concepts of elementary numerical analysis in modelling and problem-solving.
- Use basic numerical methods and understand their properties.
- Use and implement specific software in numerical problem-solving.
- Use critical thinking in the analysis of the results obtained.
- Interpret and critically analyse text, which involves knowledge of numerical analysis.
- Achieve greater accuracy and clarity in thought and language.

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Organised by: Polytechnic of Leiria TUS

DATE From 29 May to 21 July 2023

Face-to-Face Week: TUS, Limerick, Ireland 17-21 July

MODE OF DELIVERY Blended

**LANGUAGE OF INSTRUCTION** English

**ECTS CREDITS** 3

#### **ACADEMIC RECOGNITION**

To be defined by each home higher education institution. Generally, most students will have this SAP certified in their diploma supplement, as a minimal condition.

#### **ELIGIBLE PARTICIPANTS**

All RUN-EU undergraduate students.

#### **HOW TO APPLY**

Fill in the application form (QR or website)



#### **DEADLINE FOR APPLICATIONS**

28 April 2023

#### **CONTACT DETAILS**

carlos.campos@ipleiria.pt





















29.MAY-21.JUL.2023

#### **SELECTION CRITERIA**

Students will be selected based on the fulfilment of requirements, CV and information provided in a video and/or in a motivation letter.

A maximum of 5 places will be reserved for each of the two host institutions (IPL/ESTG and TUS) and a maximum of 3 places will be reserved for each of the five RUN-EU partners.

The total number of students to be selected is 25. Selection will always be based on requirements and submitted applications concerning motivation.

The selection team will also take steps toward ensuring diversity and representativity.

#### LEARNING AND TEACHING STRATEGY

Active learning, learner-centred teaching, collaborative methods.

Live sessions (whole class/group work), independent (group/individual) work + mentor support, site visits in Portugal

Platform: Teams

#### **COURSES LEADERS | LECTURERS**

Ana Lemos (Polytechnic of Leiria) Carlos Campos (Polytechnic of Leiria) Sajjad Sajjadi (TUS)

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#### PHYSICAL MOBILITY | SCHOLARSHIPS AVAILABLE

The selected students will receive travel grants based on the travel distance and the subsistence costs in the country the SAP is offered in.

#### Travel

Portugal - Ireland: 270€ Austria - Ireland: 270€ Finland - Ireland: 380€ Hungary - Ireland: 330€

Athlone/Thurles - Limerick: 36€ The Netherlands - Ireland: 260€

#### **Subsistence**

The subsistence grant for Ireland is 900€, except for students who already come from TUS Limerick.

#### **MEANS AND CRITERIA FOR ASSESSMENT**

Individual participation (attendance): 20% Group project: 80% (20% Interim Presentation + 60% Final presentation). Active participation from all students of each group is mandatory in both group presentations. Self-assessment, teacher assessment based on project outcomes.

#### **CERTIFICATION**

The participants who successfully complete this RUN-EU SAP will receive a Certificate of Participation and a Transcript of Records jointly issued by the organising institutions.





















### **PROGRAMME AT A GLANCE**

#### **WEEK 1 • 29.MAY-2.JUNE.2023 • ONLINE**

GMT+2	11h00		12h00		13h00		14h00		15h00		16h00		17h00		20h00		21h00		22h00		23h00
GMT+1	10h00		11h00		12h00		13h00		14h00		15h00		16h00		19h00		20h00		21h00		22h00
GMT	9h00	ı	10h00	ı	11h00	ı	12h00	ı	13h00	ı	14h00	ı	15h00	ı	18h00	ı	19h00	ı	20h00	ı	21h00
MONDAY 29/5															OP	WELC ENING	OME & i SESSION		SAP PRESEI	NTATIO	ON
TUESDAY 30/5																	ı	ECTU.	JRE		
WEDNESDAY 31/5																	TE	AM W	ORK		
THURSDAY 1/6																	TE	AM W	ORK		
FRIDAY 2/6																	L	ECTU	IRE		



















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## NUMERICAL **METHODS WITH PYTHON PROGRAMMING**



### **PROGRAMME AT A GLANCE**

WEEK 2 - 5-7.JUNE.2023 - ONLINE

GMT+2	11h00	12h00	13h00	14h00	15h00	16h00	17h00	20h00	21h00	22h00	23h00
GMT+1	10h00	11h00	12h00	13h00	14h00	15h00	16h00	19h00	20h00	21h00	22h00
GMT	9h00	10h00	11h00	12h00	13h00	14h00	15h00	18h00	19h00	20h00	21h00
MONDAY 5/6									LEC	TURE	
TUESDAY 6/6									TEAN	I WORK	
WEDNESDAY 7/6									LEC	CTURE	























### **PROGRAMME AT A GLANCE**

### WEEK 3 - 12-14.JUNE.2023 - ONLINE

GMT+2	11h00	12h00	13h00	14h00	15h00	16h00	17h00	20h00	21h00	22h00	23h00
GMT+1	10h00	11h00	12h00	13h00	14h00	15h00	16h00	19h00	20h00	21h00	22h00
GMT	9h00	10h00	11h00	12h00	13h00	14h00	15h00	18h00	19h00	20h00	21h00
MONDAY 12/6									TE/	AM WORK	
TUESDAY 13/6									L	ECTURE	
WEDNESDAY 14/6									LI	ECTURE	





















### **PROGRAMME AT A GLANCE**

#### WEEK 4 - 20-23.JUNE.2023 - ONLINE

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GMT+1	10h00		11h00		12h00		13h00		14h00		15h00		16h00		19h00		20h00		21h00		22h00
GMT	9h00	ı	10h00	1	11h00	ı	12h00	ı	13h00	ı	14h00	ı	15h00	ı	18h00	ı	19h00	ı	20h00	1	21h00
TUESDAY 20/6																	TE	AM W	ORK		
WEDNESDAY 21/6																	ı	ECTU	RE		
THURSDAY 22/6																	ı	ECTU	RE		
FRIDAY 23/6																	TE/	AM W	ORK		





















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### **PROGRAMME AT A GLANCE**

### WEEK 5 - 28-30.JUNE.2023 - ONLINE

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GMT+1	10h00		11h00		12h00		13h00		14h00		15h00		16h00		19h00		20h00		21h00		22h00
GMT	9h00	ı	10h00	ı	11h00	I	12h00	I	13h00	I	14h00	I	15h00	ı	18h00	ı	19h00	ı	20h00	I	21h00
WEDNESDAY 28/6																	TE	AM W	ORK		
THURSDAY 29/6																		_ECTU	RE		
FRIDAY 30/6																	CLOS	ING SE	ESSION		





















### PROGRAMME AT A GLANCE

#### WEEK 6 • 17-21.JULY.2023 • FACE-TO-FACE WEEK • LIMERICK

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GMT+1	10h00	11h00	12h00	0	13h00		14h00		15h00		16h00		17h00		18h00		19h00		20h00
LOCAL TIME	9h00	10h00	11h00	0	12h00	ı	13h00	ı	14h00	ı	15h00	ı	16h00	ı	17h00	ı	18h00	ı	19h00
MONDAY 17/7		OPENING SESSION PRES	DENTATION		WORKING ING COAC		IPS		LUNCH BREAK						LOPMENT RAMMING				
TUESDAY 18/7			PROJECT D PYTHON PR						LUNCH BREAK						LOPMENT RAMMING				
WEDNESDAY 19/7			PROJECT D PYTHON PR						LUNCH BREAK				CULT	URAL	VISITS				
THURSDAY 20/7			ENTERP	PRISE VISI	ITS				LUNCH BREAK			PR	EPARATIOI	N OF F	PRESENTAT	ION			
FRIDAY 21/7			PROJECT P	PRESENT <i>A</i>	ATION				LUNCH BREAK		G		LEARNING ECTION	à	OVERALI ASSES	. QUALI SMENT			

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WEEK 1 +INFO: www.run-eu.eu

	29 MA	Y		MO	NDAY	<b>′</b> 18hC	0-21h	100 G	MT - (	ONLIN	JE
GMT+2	11h00	12h00	13h00	14h00	15h00	16h00	17h00	20h00	21h00	22h00	23h00
GMT+1	10h00	11h00	12h00	13h00	14h00	15h00	16h00	19h00	20h00	21h00	22h00
GMT	9h00	10h00	11h00	12h00	13h00	14h00	15h00	18h00	19h00	20h00	21h00
MONDAY 29/5									WELCOME & ENING SESSION	SAP PRESE	NTATION

### **Welcome & Opening Session SAP Presentation**

- (h) 18h00-21h00
- Group Work
- Ana Lemos (Polytechnic of Leiria) Carlos Campos (Polytechnic of Leiria) Sajjad Sajjadi (TUS)
- In this welcome and opening session, the participants will do their individual presentations. Afterwards, professors will present the objectives, programme, and schedule of the course.





















WEEK 1 +INFO: www.run-eu.eu

30	-31 N	/IAY			18h	00-2	21h	00 G	M	T - (	10	ILIN	١E			
GMT+2	11h00	12h00	13h00	14h00	15h00	16	100	17h00		20h00		21h00		22h00		23h00
GMT+1	10h00	11h00	12h00	13h00	14h00	15	ո00	16h00		19h00		20h00		21h00		22h00
GMT	9h00	10h00	11h00	12h00	13h00	141	100	15h00	ı	18h00	1	19h00	ı	20h00	ı	21h00
TUESDAY 30/5												L	ECTUI	RE		

### **Python Reviewing**

- (h) 18h00-21h00
- Lecture
- Carlos Campos (Polytechnic of Leiria) + Sajjad Sajjadi (TUS)
- In this lecture, we will start reviewing Python data types, functions, and control structures. During the lecture, several examples will be presented, and the students will have the opportunity to solve programming exercises about this topic.

WEDNESDAY			TEAM WORK
31/5			TEAM WORK

### **Python Reviewing**

- 18h00-21h00
- Team Work
- Sajjad Sajjadi (TUS) + Carlos Campos (Polytechnic of Leiria)
- In this lecture, we will continue overviewing Python programming language topics such as lists, tuples and traditional Python modules, namely, the modules math, random and numpy. During the lecture, several examples will be presented, and the students will have the opportunity to solve programming exercises about this topic.























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1-3	2 JUN	<b>JE</b>			18h(	00-21	h00 (	AMT •	ONLI	<b>NE</b>	
GMT+2	11h00	12h00	13h00	14h00	15h00	16h00	17h00	20h00	21h00	22h00	23h00
GMT+1	10h00	11h00	12h00	13h00	14h00	15h00	16h00	19h00	20h00	21h00	22h00
GMT	9h00	10h00	11h00	12h00	13h00	14h00	15h00	18h00	19h00	20h00	21h00
THURSDAY 1/6									TE	AM WORK	

#### **Python Reviewing**

- (h) 18h00-21h00
- Team Work

WEEK 1

- Sajjad Sajjadi (TUS) + Carlos Campos (Polytechnic of Leiria)
- In this lecture, we will finish our overview of Python programming language with dictionaries, graphics, text and comma-separated values (CSV) files. During the lecture, several examples will be presented, and the students will have the opportunity to solve programming exercises about this topic.

FRIDAY					
2/6					LECTURE

#### **Solutions of Equations in One Variable**

- 18h00-21h00
- Lecture
- Ana Lemos (Polytechnic of Leiria) + Sajjad Sajjadi (TUS)
- The lecture will start with an introduction to the topic of nonlinear equations and their solution by numerical methods. After learning how to locate roots by the graphical method, two numerical methods to find numerical solutions of a nonlinear equation in one unknown are presented: the bisection method and the fixed-point method. Examples will be given for each method and the students will have the opportunity to solve some exercises.























WEEK 2 +INFO: www.run-eu.eu

	5 JUI					18h	00	)-21h	า0	0 G	M	T • (	10	ILIN	JE						
GMT+2	11h00		12h00		13h00		14h00		15h00		16h00		17h00		20h00		21h00		22h00		23h00
GMT+1	10h00		11h00		12h00		13h00		14h00		15h00		16h00		19h00		20h00		21h00		22h00
GMT	9h00	1	10h00	ı	11h00	ı	12h00	ı	13h00	ı	14h00		15h00	ı	18h00	ı	19h00	ı	20h00	ı	21h00
MONDAY 5/6																	LI	ECTUI	RE		

### **Solutions of Equations in One Variable**

- (h) 18h00-21h00
- Lecture
- Ana Lemos (Polytechnic of Leiria) + Carlos Campos (Polytechnic of Leiria)
- The lecture will start with an overview of the last lecture and afterwards, the Newton-Raphson method for solving nonlinear equations in one unknown will be presented. Some examples will be given, and the students will have the opportunity to solve exercises on this topic. The lecture will continue with the implementation of the algorithms corresponding to the numerical methods studied using Python programming and their use in practical applications.





















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6-	-7 JUI	VE.			18h	00-21	h(	00 G	M	T - (	10	ILIN	ΙE			
GMT+2	11h00	12h00	13h00	14h00	15h00	16h00		17h00		20h00		21h00		22h00		23h00
GMT+1	10h00	11h00	12h00	13h00	14h00	15h00		16h00		19h00		20h00		21h00		22h00
GMT	9h00	10h00	11h00	12h00	13h00	14h00		15h00	ı	18h00	ı	19h00	ı	20h00	ı	21h00
TUESDAY 6/6												TE/	AM WO	ORK		

#### **Solutions of Equations in One Variable**

(h) 18h00-21h00

WEEK 2

- Team Work
- Carlos Campos (Polytechnic of Leiria) + Sajjad Sajjadi (TUS)
- In this lecture, we will continue developing Python programming implementations of the numerical methods studied and their use in practical applications.

WEDNESDAY		LECTURE
7/6		LECTURE

### **Polynomial Interpolation**

- 18h00-21h00
- Lecture
- Ana Lemos (Polytechnic of Leiria) + Sajjad Sajjadi (TUS)
- The lecture will start with a preview of the topic of polynomial interpolation. Afterwards, the lecture will develop with the presentation of the Lagrange interpolation method, divided differences and the Newton interpolation method with divided differences. Examples of the application of these methods will be studied and the students will have the opportunity to solve some exercises.





















WEEK 3 +INFO: www.run-eu.eu

12-	-13 JU	NE			18h	00-21h	า00 G	MT - (	ONLIN	<b>IE</b>	
GMT+2	11h00	12h00	13h00	14h00	15h00	16h00	17h00	20h00	21h00	22h00	23h00
GMT+1	10h00	11h00	12h00	13h00	14h00	15h00	16h00	19h00	20h00	21h00	22h00
GMT	9h00	10h00	11h00	12h00	13h00	14h00	15h00	18h00	19h00	20h00	21h00
MONDAY 12/6									TE/	AM WORK	

#### **Polynomial Interpolation**

- (h) 18h00-21h00
- Team Work
- Sajjad Sajjadi (TUS) + Carlos Campos (Polytechnic of Leiria)
- In this lecture Python programming implementations of Lagrange interpolation, divided differences and Newton interpolation are developed and practical applications will be presented.



### **Polynomial Interpolation**

- ① 18h00-21h00
- R Lecture
- Carlos Campos (Polytechnic of Leiria) + Sajjad Sajjadi (TUS)
- The lecture will start with an overview of the last lecture. Afterwards, the theoretical concepts and examples of inverse interpolation and Hermite interpolation will be presented.
  - The students will work on the solution of exercises which include practical applications.
  - The lecture will finish with Python programming implementations of these methods and with practical applications.





















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14	4 JUN	ΙE			18h	00-21	hC	00 G	MT •	10	VLIN	ΙE			
GMT+2	11h00	12h00	13h00	14h00	15h00	16h00		17h00	20h00		21h00		22h00		23h00
GMT+1	10h00	11h00	12h00	13h00	14h00	15h00		16h00	19h00		20h00		21h00		22h00
GMT	9h00	10h00	11h00	12h00	13h00	14h00	ı	15h00	18h00	ı	19h00	ı	20h00	1	21h00
TUESDAY 14/6											LI	ECTU	RE		

#### **Discrete Least Squares Approximation**

(h) 18h00-21h00

WEEK 3

- Lecture
- Ana Lemos (Polytechnic of Leiria) + Sajjad Sajjadi (TUS)
- The lecture will start with an introduction to the topic of function approximation, in particular to the topic of discrete least squares.
  - Afterwards, we will study the concepts concerning the linear model and the polynomial model. Linearization techniques and their application to exponential and power models will be addressed. Finally, more general linear models are described.
  - Examples of the application of these methods will be studied and the students will have the opportunity to solve some exercises with applications.





















WEEK 4 +INFO: www.run-eu.eu

20	-21 JU	INE			18h(	)0-21h	า00 G	MT - (	ONLIN	<b>JE</b>	
GMT+2	11h00	12h00	13h00	14h00	15h00	16h00	17h00	20h00	21h00	22h00	23h00
GMT+1	10h00	11h00	12h00	13h00	14h00	15h00	16h00	19h00	20h00	21h00	22h00
GMT	9h00	10h00	11h00	12h00	13h00	14h00	15h00	18h00	19h00	20h00	21h00
TUESDAY 20/6									TE/	AM WORK	

### **Discrete Least Squares Approximation**

- (1) 18h00-21h00
- Sajjad Sajjadi (TUS) + Carlos Campos (Polytechnic of Leiria)
- In this lecture, we will develop Python programming implementations of the linear, polynomial, exponential, power, and general models. The implemented scripts are applied to solve practical applications.



### **Discrete Least Squares Approximation**

- 18h00-21h00
- Lecture
- Carlos Campos (Polytechnic of Leiria) + Sajjad Sajjadi (TUS)
- The lecture will start with an overview of the last lecture, and we will continue with Python programming implementations of the discrete least squares methods studied. Afterwards, we will study theoretical concepts and examples of multiple linear regression. The students will have the opportunity to solve application exercises on these topics. The lecture will continue with the implementation of these numerical techniques using Python programming implementations followed by practical applications.























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22-	23 JU	JNE			18h(	00-21	า00 G	MT -	ONLIN	<b>IE</b>	
GMT+2	11h00	12h00	13h00	14h00	15h00	16h00	17h00	20h00	21h00	22h00	23h00
GMT+1	10h00	11h00	12h00	13h00	14h00	15h00	16h00	19h00	20h00	21h00	22h00
GMT	9h00	10h00	11h00	12h00	13h00	14h00	15h00	18h00	19h00	20h00	21h00
THURSDAY 22/6									L	ECTURE	

#### **Numerical Integration**

(h) 18h00-21h00

WEEK 4

- Lecture
- Ana Lemos (Polytechnic of Leiria) + Sajjad Sajjadi (TUS)
- The aim of this lecture is present some numerical methods to approximate definite integrals. The lecture will start with an introduction to the topic of numerical integration, followed by the presentation of the trapezoidal, Simpson and Gauss-Legendre rules, illustrated with examples. The students will have the opportunity to apply these concepts by solving the exercises provided.



#### **Numerical Integration**

- 18h00-21h00
- Team Work
- Sajjad Sajjadi (TUS) + Carlos Campos (Polytechnic of Leiria)
- In this lecture Python programming implementations of trapezoidal, Simpson and Gauss-Legendre rules are developed and applied in practical exercises.























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28-	-29 Jl	JNE			18h	00-21	hC	0 G	MT	- (	10	VLIN	۱E			
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GMT	9h00	10h00	11h00	12h00	13h00	14h00	ı	15h00	18	h00	ı	19h00	ı	20h00	ı	21h00
WEDNESDAY 28/6												L	ECTU	RE		

#### **Ordinary Differential Equations**

(h) 18h00-21h00

WEEK 5

- Lecture
- Ana Lemos (Polytechnic of Leiria) + Sajjad Sajjadi (TUS)
- The aim of this lecture is to introduce the numerical approximation of the solution of initial-value problems for ordinary equations.

Some theoretical concepts on this topic will be presented together with the Euler method and the Runge-Kutta methods. We will study examples and solve exercises involving the application of these numerical methods.



#### **Ordinary Differential Equations**

- 18h00-21h00
- Team Work
- Carlos Campos (Polytechnic of Leiria) + Sajjad Sajjadi (TUS)
- In this lecture, Python programming implementations of Euler and Runge-Kutta methods will be developed followed by the solution of practical applications, ways to present the solution and results discussion.





















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3	O JUN	JE			18h(	00-21	h00	) Gl	MT <b>-</b> (	ONL	NE			
GMT+2	11h00	12h00	13h00	14h00	15h00	16h00		17h00	20h00	21h	0	22h00		23h00
GMT+1	10h00	11h00	12h00	13h00	14h00	15h00		16h00	19h00	20h	0	21h00		22h00
GMT	9h00	10h00	11h00	12h00	13h00	14h00	ı	15h00	18h00	19h	00	20h00	1	21h00
FRIDAY 30/6										CL	OSING S	ESSION		

### **Closing Session**

(h) 18h00-21h00

WEEK 5

- Group Work
- Ana Lemos (Polytechnic of Leiria) + Carlos Campos (Polytechnic of Leiria) + Sajjadi (TUS)
- In this closing session, the participants will do their individual evaluation of the SAP lectures, and contents and will indicate the positive/negative aspects of this SAP. Afterwards, the professors will do the presentation about the 'Face-to-Face' or 'Erasmus Week' at TUS Limerick from 17 to 21 July.





















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	I7 JUI	LY				M	ON	ID	AY	9ŀ	າ30-	-18	3h0(	) -	LEI	RI	Α		
GMT+2	11h00	12h00	13h	00	114h00		15h00		16h00		17h00		18h00		19h00		20h00		21h00
GMT+1	10h00	11h00	12h	100	13h00		14h00		15h00		16h00		17h00		18h00		19h00		20h00
LOCAL TIME	9h00	10h00	11h	00	12h00	1	13h00	ı	14h00	ı	15h00	ı	16h00	ı	17h00	ı	18h00	ı	19h00
MONDAY 17/7		OPENING SESSION PRES	EENTATION		G WORKING NING COAG		JPS		LUNCH BREAK						LOPMENT RAMMING				

#### **Opening Session Presentation**

- 9h30-11h00
- **Team Building**
- All lecturers

### **Defining Working Groups Defining Coaching**

- 11h00-13h00
- Team Building
- Ana Lemos (Polytechnic of Leiria) Carlos Campos (Polytechnic of Leiria) Sajjad Sajjadi (TUS)
- Teaming, individual presentation, goals for the SAP and instructions for group work. Select the topics of the group projects and planning activities.

### **Project Development Python Programming**

- (h) 15h00-18h00
- Team Work, Coaching
- Ana Lemos (Polytechnic of Leiria) Carlos Campos (Polytechnic of Leiria) Sajjad Sajjadi (TUS)
- Project development and Python programming with coaching support.



















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1	8 JU	Ľ	Y					Τl	JES	SC	PAY	9ł	130	-18	3h0	<b>) -</b>	LE	RI	Α		
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TUESDAY 18/7					DJECT DEV THON PRO						LUNCH BREAK						LOPMENT RAMMING				

# **Project Development Python Programming**

- 9h30-13h00
- E Team Work, Coaching
- Ana Lemos (Polytechnic of Leiria)
  Carlos Campos (Polytechnic of Leiria)
  Sajjad Sajjadi (TUS)
- Project development and Python programming with coaching support.

# **Project Development Python Programming**

- (b) 15h00-18h00
- Heam Work, Coaching
- Ana Lemos (Polytechnic of Leiria)
  Carlos Campos (Polytechnic of Leiria)
  Sajjad Sajjadi (TUS)
- Project development and Python programming with coaching support.





















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1	9 JU	L	<b>/</b>				W	ÆΙ	DN	ES	SDA	Y	9h3	30 <sup>-</sup>	-18h	100	) • L	ΕI	RIA		
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LOCALTIME	9h00	ı	10h00	ı	11h00	ı	12h00	ı	13h00	ı	14h00	ı	15h00	ı	16h00	ı	17h00	ı	18h00	ı	19h00
WEDNESDAY 19/7					DJECT DEV HON PRO						LUNCH BREAK				CULT	'URAL'	VISITS				

### **Project Development Python Programming**

- 9h30-13h00
- E Team Work, Coaching
- Ana Lemos (Polytechnic of Leiria) Carlos Campos (Polytechnic of Leiria) Sajjad Sajjadi (TUS)
- Project development and Python programming with coaching support.

#### **Cultural Visits**

- (h) 15h00-18h00
- Group Work
- Ana Lemos (Polytechnic of Leiria) Carlos Campos (Polytechnic of Leiria) Sajjad Sajjadi (TUS)
- Guided tour of the city and historical monuments.





















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LOCAL TIME	9h00	10h00	11h00	12h00	13h0	0	14h00	ı	15h00	ı	16h00	ı	17h00	ı	18h00	19h00
THURSDAY 20/7			ENTERPRIS	SE VISITS			LUNCH BREAK			PRE	EPARATIOI	N OF P	RESENTA	ΓΙΟΝ		

#### **Enterprise Visits**

- (h) 15h00-18h00
- Ana Lemos (Polytechnic of Leiria) Carlos Campos (Polytechnic of Leiria) Sajjad Sajjadi (TUS)
- Enterprise visits.

### **Preparation of Presentation**

- (h) 15h00-18h00
- E Team Work, Coaching
- Ana Lemos (Polytechnic of Leiria) Carlos Campos (Polytechnic of Leiria) Sajjad Sajjadi (TUS)
- Preparation of presentation.







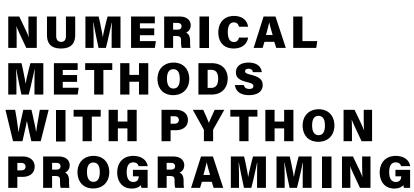














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	FRIDAY 9h30-18h00 - LEIRIA																				
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LOCAL TIME	9h00	ı	10h00	ı	11h00	ı	12h00	ı	13h00		14h00	ı	15h00	ı	16h00	ı	17h00	ı	18h00	ı	19h00
FRIDAY 21/7 PROJECT PRES							SENTATION				LUNCH BREAK			GROUP LEARNING REFLECTION			OVERALL QUALITY ASSESSMENT				

### **Project Presentation**

- 9h30-13h00
- Group Work
- Ana Lemos (Polytechnic of Leiria) Carlos Campos (Polytechnic of Leiria) Sajjad Sajjadi (TUS)
- Presentations of group work will be given by participants in this session.

### **Group Learning Reflection Overall Quality Assessment**

- (h) 15h00-18h00
- Group Work
- Ana Lemos (Polytechnic of Leiria) Carlos Campos (Polytechnic of Leiria) Sajjad Sajjadi (TUS)
- Group Learning Reflection (all)
  - Individual Learning Reflection Report
  - + Mobility Assessment (students)
  - SAP Self-reflection Report (SAP coordinators)
  - LearnWell















