

O2 - fun@science Study Circles

Study Circles

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<p>OBJECTIVES</p>	<ol style="list-style-type: none"> 1. Provide the basis of the 3D printing process. 2. Give a broad overview of 3D printing applications. 3. Propose the teaching Methods to be used for the implementation of the Training of the Students. 4. Develop knowledge, skills and attitudes on the participants for organizing and planning learning activities, working collaboratively with others, giving and receiving feedback and evaluating their own learning. 5. New pedagogical approaches to be explored, discussed and planned by the participants.
<p>RECRUITMENT PROCESS</p>	<ol style="list-style-type: none"> 1. The recruitment process can be done by approaching different educational centers from secondary and high-school levels as well as youth centers. 2. Candidates' profile: The teachers/trainers to participate on the study circle should have experience in subjects related to electronics, computers, physics. They should also have a good command of the English Language and Experience with Internet tools similar or related to the ones used in the 3D printing community. Additionally, they should have teaching experience with children from 10 to 18 years old. 3. Basic experience with 3D printing project is preferred but not required.
<p>LEARNING PROCESS</p>	<p>Peer learning methodology based on experiential and non-formal learning techniques: Participants will learn how they learn according to Kolb's learning styles and the experiential learning. The process will be controlled by neutral facilitators (moderators) who help participants to consider the training contents from many points of view related to the experience of each participant. Personal experience, different points of view and strategies for teaching should also be discussed.</p>
<p>CONTENTS</p>	<ol style="list-style-type: none"> 1. Intro to the Training: (1 hour) <ul style="list-style-type: none"> ● Presentation of the training,



- expectations and main challenges of the participants,
- get to know each other,
- identifying their learning styles and constructing a learning agreement.
- presenting best practices for teaching 3D printing coming from IO1.

2. Introduction to 3D printers. (3 hours)

1. The process of 3D printing: How the material is used in order to create a 3D shape. Different types of 3D printers.
2. Electrical and Mechanical Components: The principal components of the 3D printer are introduced and their function is explained. This will give a better idea of the overall 3D printing process.
3. Building a Printer: Based on a 3D printing kit, the assembly project is described. The most common mistakes are also mentioned.
 1. Calibration Process: The process of making sure everything is ready to print is described. We mention all the parameters that are checked in order to conclude that everything turned out as expected.
4. The process of printing
 1. Different materials used for printing: A description of available materials and what are they mainly used for.
 2. Finishing the object: Tools used to finish the objects once they are printed with supporting material etc.
5. Creating educational model 1: Participants in working groups will explore, create and suggest educational models of how 3D printing is related to the courses they teach.

3. 3D design: (2 hours)

Key concepts of geometry and 3D design are presented.

1. Software for designing 3D objects: Open source software for 3D design is presented and also principal actions that we can do with them.
2. 3D Scanners: We describe how objects that have a more complex shape can be scanned.
3. Slicing process: What is slicing and how it is related to the printing process. (surfaces, support, infill).
4. Creating educational model 2: Participants in working groups will explore, create and suggest educational models of how



3D design is related to the content they teach (teaching 3D design can be linked to other subjects for support, like maths).

4. Online Tools for the 3D printing Process: (2 hours)

Here we present some of the most important websites that are useful when we do 3D printing.

1. Introduction to Open Source Community.
2. Websites with 3D Objects.
3. Websites with Projects based on 3D printing.
4. Forums for support.
5. Creating educational model 3: Participants in working groups will explore, create and suggest educational models of how they can use the online tools to support 3D printing teaching.

5. 3D printing Applications: (1 hour)

Some practical and useful examples that used 3D printed objects are presented.

1. Arts
2. Medical and Social Applications.
3. Industrial and Mechanical Applications.
4. Creating educational model 4: Participants in working groups will explore, create and suggest educational models - what applications of 3D printing can be incorporated in a good educational model and How.

6. Teaching Methods: (2 hours)

How all this knowledge can be taught to the students.

1. Selecting the Students.
2. Teaching Methodologies and Practices.
 1. Learning Objectives of the Course.
 2. Methodologies.
 3. Activities.
 4. Learning Outcomes.
 5. Evaluating the results of the educational methodologies
3. Finalizing the educational model based on all the previous topics.



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	<p>7. Evaluation (1 hour)</p> <ul style="list-style-type: none">a. NFL activities for reflection and evaluation of the learningb. Evaluation forms (content, organization, facilitator, communication, etc)
TIME SCHEDULE	