## IT3DDEV 3D Developer: 9 op

## Perustiedot

**Tunnus**
IT3DDEV

**Voimassaoloaika**
21.2.2023 - 31.7.2032

**Kesto (vuotta)**
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**Pääasiallinen opetuskieli**
englanti

## Tarkennukset

**Luokittelu**
IT and Digitalisation (ENG) Minor Packages

**Yksikkö**
IT-Tradenomi

## Kuvaus

## Sisällön valinnaisuus, esitietovaatimukset ja tarjontatiedot

**Sisällön valinnaisuus**
Kaikki pakollisia

## DIG012AS2AE Basic 3D Design with Blender: 3 op

**Laajuus (op)**
3 - 3

**Koulutus**
TRATI Tradenomi tietojenkäsittely

**Vastuuhenkilöt**
Heikki Hietala

**Opetuskieli**
englanti

**Osaamistavoitteet**
Upon successful completion of the course, the student knows how to create valid and complete 3D meshes for use in visualisation, games design, and 3D printing.

**Sisältö**
Introduction to 3D modeling
Blender installation and environment
3D Modeling Basics
Learning to use the Blender environment
Transforming objects in Blender
Tool Shelf and Properties window
Adding and moving more objects in Blender
Subdivision and Extrusion
Subdivision Surface
Using curves and background images
Materials and textures using Blender internal renderer
Using the Simple Deformers
Basic Lighting and Cameras
Modifiers and Add-Ons
Rendering the scene
Basic UV Mapping Introduction to 3D modeling
Blender installation and environment
3D Modeling Basics
Learning to use the Blender environment
Transforming objects in Blender
Tool Shelf and Properties window
Adding and moving more objects in Blender
Subdivision and Extrusion
Subdivision Surface
Using curves and background images
Materials and textures in meshes
Using the Simple Deformers
Basic Lighting and Cameras
Modifiers and Add-Ons
Rendering the scene in EEVEE and Cycles
Basic UV Mapping

**Lähtötaso ja sidonnaisuudet muihin opintojaksoihin**
No demands on previous courses.
Followed by an extended, problem-based learning course DIG006AS3AE Extended 3D.
This course is a NECESSARY PREREQUISITE for DIG005AS3AE 3D Printing.

**Assessment criteria**

**Assessment criteria - grade 1**
The student has limited understanding of 3D and Blender. Meshes created are very simple and texturing is rudimentary.
The student has satisfactory skills to produce small, textured meshes and rendered scenes in Blender.
The student shows satisfactory activity and initiative in learning process.

**Assessment criteria - grade 3**
The student knows partly the Blender application. Meshes created are more complex and have good texturing.
The student has good skills to produce intermediately complex meshes and scenes.

The student shows activity and initiative in learning process. He/she is willing to develop his/her 3D skills further.

**Assessment criteria - grade 5**
The student understands the Blender system to a large extent and can produce complex and well textured meshes.
The student shows activity and initiative in learning process. He/she is willing to develop his/her 3D skills further.
The student shows excellent activity and initiative in the learning process. He/she is independently taking his/her skills further using other online tutorials than those in the course.

**Assessment criteria, approved/failed**

Grades 1 - 5.

## DIG005AS3AE 3D Printing: 3 op

**Laajuus (op)**
3 - 3

**Koulutus**
TRATI Tradenomi tietojenkäsittely

**Vastuuhenkilöt**
Heikki Hietala

**Opetuskieli**
englanti

**Osaamistavoitteet**
Upon successful completion of the course, the student is able to
operate and maintain the various printer types of the 3D LAb
design a mesh in Blender
export it to STL file format
check the manifold properties of the mesh
use RepetierHost or Cura to manage the printing process
adjust the mesh and re-export the mesh until perfect

**Sisältö**
Understanding 3D printing
Understanding the path from Blender meshes via manifold checking to STL file and printer
Printer materials (ABS, PLA, nylon)
Fused Deposition Manufacturing type printers (MiniFactory, CoLiDo models, BCN3D)
RepetierHost printer management software and using memory card for transferring print jobs
Managing the printing process
Hands-on training on a variety of 3D printer models

**Lisätiedot**
Should a student already possess the knowledge and practice of 3D printing, it is possible for that student to design a mesh in the 3D package of his/her choice and then take it through the

printing process from the STL file stage onwards. If the person has 3D prints that he/she has printed previously and individually, these can be considered at the teacher’s contact hour.

**Lähtötaso ja sidonnaisuudet muihin opintojaksoihin**
DIG012AS2AE Basic 3D Design with Blender MUST be taken prior to this course with a good grade, or, the student must display adequate design competence using Blender, 3DS Max, or Cinema 4D.
Any other 3D package can be considered, if it exports STL file format files.

**Assessment criteria**

**Assessment criteria - grade 1**
The student

has a passable knowledge of the 3D design process
understands the use of different file formats
understands the significance of the concept of manifold objects
manages to create a very simple printable mesh
manages to take the object through the printing process and the result is a small and simple 3D printed object

**Assessment criteria - grade 3**
The student

has a good knowledge of the 3D design process
understands the use of different file formats and is able to move between file formats as necessary
understands the significance of the concept of manifold objects and uses tools to check for manifold properties
manages to create a more complex printable mesh
manages to take the object through the printing process and the result is a relatively complex 3D printed object

**Assessment criteria - grade 5**
The student

has an extensive knowledge of the 3D design process
understands the use of different file formats and is able to move between file formats as necessary
understands the significance of the concept of manifold objects and uses tools to check for manifold properties
manages to create a very complex or multi-part printable mesh
manages to take the object through the printing process and the result is a complex or multi-part 3D printed object
Assessment criteria, approved/failed
Grades 1 - 5.

## DIG006AS3AE 3D Extended Course: 3 op

**Laajuus (op)**
3 - 3

**Koulutus**
TRATI Tradenomi tietojenkäsittely

**Vastuuhenkilöt**
Heikki Hietala

**Opetuskieli**
englanti

**Osaamistavoitteet**
Upon successful completion of the course, the student has a deep understanding of one feature of Blender that he/she has researched, or, has produced work in the field of 3D to a client.

**Sisältö**
This course is a problem-based learning style course, in which the student selects a feature of Blender and produces a tutorial on it. Previous topics of choice have included, but are not limited to:
Rigging
Animation
Procedural materials
Compositing
Physics engine
Game engine
Node-based material systems
Cycles rendering engine
Geometry nodes

**Lisätiedot**
This course follows DIG008AS3AE Basic 3D Design with Blender, which must be passed before enrolling in this one.

**Lähtötaso ja sidonnaisuudet muihin opintojaksoihin**
This course follows DIG008AS3AE Basic 3D Design with Blender, which must be passed before enrolling in this one.

**Assessment criteria**

**Assessment criteria - grade 1**
The student has put together a very basic tutorial. Using the tutorial it is possible to gain a narrow idea of the topic.
The student has satisfactory skills to produce a small and limited-scope tutorial on his/her selected topic.
The student's work shows limited capability in the learning process.

**Assessment criteria - grade 3**
The student's tutorial makes it possible to see the potential of the subject matter. The tutorial provides a good scope of the subject matter.
The student has good skills to act as a tutor into using Blender in a more complex way.
The student shows activity and initiative in learning process. He/she is willing to develop his/her 3D skills further.

**Assessment criteria - grade 5**
The student provides a complete and well-functioning tutorial with which the reader can fully understand the potential of the subject matter and is able to go further with it.
The student has excellent skills to assist new learners into the subject matter of the tutorial. His/her skills provide a solid support for new users.
The student shows excellent activity and initiative in the learning process. He/she is independently taking his/her skills further and provides full coverage on he topic.

**Assessment criteria, approved/failed**

Grades 1- 5

| **Tunnus** | **Nimi** | **Summa** |
|---|---|---|
| **IT3DDEV** | **3D Developer** | **9** |
| DIG012AS2AE | Basic 3D Design with Blender | 3 |
| DIG005AS3AE | 3D Printing | 3 |
| DIG006AS3AE | 3D Extended Course | 3 |