

E U E R A S M U S V R / A R



TECHNICAL DRAWINGS

TD2: SECTIONING, PROJECTIONS AND PERSPECTIVES

Authors

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This unit content is produced by “Virtual and Augmented Reality (V&AR) in Design for Manufacture” Project under EU Erasmus+ strategic partnership Project Funds Project No: 2017-1-TR01-KA202-45941

January 2019

Introduction

This module addresses the use of low cost mobile Virtual and Augmented Reality (V/AR) tools developed with the support of animation and simulation tools alongside text based teaching methods. This unit was produced by the results of an international needs analysis of Technical Drawings training requirements conducted to determine the subject areas lacking in teaching the concepts of basic, advanced standards and principles used in manufacturing and engineering.

The main purpose of this curriculum development study was to develop a competency-based and target-oriented Technical Drawings training programme with the collaboration with the academic and the industrial partners. That's is why it was concluded that not only current teaching methods have led to a deficit in the quality of Technical Drawings training but also using up to date V/AR and animation technologies could help to improve it.

It is envisaged that the use of V/AR technologies, which will help to gain skills for visual memory during these advanced studies, will make a significant contribution to the learning performance of the trainee.

How to Use

Use of Animations:

Users first watch related video or animation/visualization to understand basis of the subjects.

Use of AR apps: A virtual object would be superimposed over a live video feed from a camera of a mobile device. The use of ARCore can only work with new mobile phones that have (Android 7.0+).

Use of VR apps: The requirements for the student/teacher for VR apps would be: HTC VIVE Virtual Reality System or VR Glasses

These animation and A/VR applications can be found at the project web site and can be downloaded free.

<http://vrindesign.org/>

VRINDESIGN TECHNICAL DRAWINGS

Module Code: TD2

Module Title: SECTIONING, PROJECTIONS AND PERSPECTIVES

Course Content	Sections Sectioning Methods; Full (single plane full section, full section with parallel offset, full section with angle plane, profile section), half, broken-out and special sections. Cross-section display rules (scan, arrows, symbols, view direction). Cross-section diagram transition from three views or perspective drawings of machine parts. Basic section drawing elements; section plane, section planes.	
	Projections and Perspectives Views extraction methods, orthographic projections, first and third angle projections. An overview of perspective drawings. Perspective types; axonometric perspective (isometric perspective, dimetric perspective), oblique perspective. Different standards of Perspective drawings (BSI, DIN, ANSI and JIS) and their applications. Methods used in perspective drawing using part views.	
Learning Outcomes	2.1	Learners Know the sectioning methods. Know what type of drawing is better suited to in which type of section. Can read sectioning according to the method in complex drawing. Can visualize in their mind section views from three views or perspective drawings of machine parts.
	2.2	Learners Can show suitable techniques for section views of body, nets, rims, fasteners, shafts and keyway grooves on assembly part for example a bicycle.
	2.3	Learners Can show the cutting plane line correctly and know the rules for lines in section views in different parts.
	2.4	Learners Can determine the appropriate the cutting plane line and use symbols for the given parts in the drawings.

	2.5	<p>Learners</p> <p>a) Can generate views according to ISO-E and ISO-A methods and read the views according to the standards. Know the differences between view drawings according to BSI, DIN, ANSI and JIS standards.</p> <p>b) Understands isometric and oblique perspective using AR applications.</p> <p>c) Know the types of line techniques used in section views</p>
Course hours	80 min	
V/AR Content	<p>Video / Animation</p> <p>Mobile AR Application</p> <p>VR with HTC Vive app</p>	
Teaching Learning Methods	<p>Teaching Methods for Trainers</p> <p>These applications and animations should be used as supporting materials during theoretical lecture to teach the course content. Suggested methods are:</p> <ul style="list-style-type: none"> - Use general PowerPoint slides to teach theoretical content, - Use /show related video or animation where the related subject presentation to visualization can be shown, - Learners can use their own AR apps to create these subjects as 3D environment if possible, - Or use AR apps via projections to show the details to the learners, - Learners can use their own mobile device to see related VR apps to create these subjects as 3D environment via using VR glasses - Or trainers can use VR apps via HTC vive with the learners to understand related subject as 3D environment <p>Learning Methods for Individual Users</p> <ul style="list-style-type: none"> - Firstly watch related video or animation / visualization and understand basis of the subjects. - Use your AR apps to create these subjects in 3D environment - Use your mobile device to see related VR apps to practice these subjects as 3D environment via using VR glasses 	