

Mike Ambach

# Fundamentals of Design

**Understanding, Creating & Evaluating Forms and Objects**

- 002 **Contents**
- 006 **Introduction**

## FORMS

### 010 **Basic construction of lines, surfaces and volumes**

developing objects, space, point, line, area, surface, 4-corner, 6-corner, 8-corner, n-corner, circle segment, circle, splines in the plane, vectors, closed splines, From the surface into space, 3d plane in space, simply curved, 2-fold curvature, detailing of a plane, 2d plane in space, 3d plane in space, representation as a net, grid, surface, volume

### 020 **Objects without dimension**

nothing, plane and surface, point, line, straight line, curved line, wave, curves, spiral (curve), spiral (straight), spline, Bèzier-curve/spline

### 028 **Boundaries of a surface**

corner, edge, vertex, matrix to corners and edges, matrix to objects with one corner, matrix to objects with two corners (convex, concave)

### 038 **Surfaces in the plane**

polygons, polynomials, basic form in the plane, 3-corner, circle segment,

### 040 **Known surfaces in the plane**

3-corner, 4-corner, 5-angular + parquet, 6-corner + parquet, n-corner, circle, ellipse, oval, closed spline objects

### 050 **Surface in space**

surfaces in space (point with one vector, two vectors, a third vector), move a point

**058 Known surfaces in space**

control surfaces, conoid, screw surface, ray surface, single-flat, spherical segment, unwindable surfaces, minimal surfaces, Seifert surfaces

**068 Known volumes**

sphere, ellipsoid, ovoid, ring, Moebius strip, Klein's bottle, cylinder, cone, sphericon, oloid, Steinmetz body, Gömböc

**079 Polyhedron**

Tetrahedron, pyramid, cuboid, prism, anti-prism, twisted body, scutoid, Platonic solids, Archimedean solids, Catalan solids, Kepler-Poinsot solids, Kepler-Poinsot solids, Johnson solids

**SHAPING OPERATIONS**

**104 Modelling**

technical, narrative, modelling, transforming  
add, subtract, Boolean operation, scaling, rotate,  
turning surfaces, bending, wrapping, symmetry, mirror,  
projection, morphological transition, arrangement, lining up,  
netting, parquetry, symmetries

**128 Transver**

transver

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## EVALUATION CRITERIA

### 132 Introduction

What is "design"?

### 134 Comparison

What is the cook's recipe,...

..., are the designer's models and technical drawings.

The comparison of "chef and designer" shows structural relatives.

### 140 Basic understanding

What is design?

Successful implementation of a design process

Can anyone do it?

### 140 Relationship/connection, the gestalter motif

Intelligence

How can we understand the work of a designer?

What is the use of this view?

Once again briefly reminded listed

The cross check

How can relationships be developed methodically?

### 148 Relations/Enumeration

Which variables can the designer relate?

What is being designed?

Relations serve positioning and orientation.

Orientation

**152 User**

Humans are constantly looking for new contexts.  
Intention and effect are two sides of the same coin.

**158 Framework conditions**

Responsibility is assumed with every project.  
Details of a successful design process.  
Requirements of the development partners.  
User requirement  
Good design is consistent.  
The designer is a cultural creator.  
The position of the designer.  
Designers always observe their surroundings with an alert eye.

**166 Comparison: constructor, designer, artist**

Constructor  
Designer  
Artist

**170 Conclusion**

**172 Further reading**

**174 Impressum**

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