## Courses in English

### Course Description

<table>
<thead>
<tr>
<th>Department</th>
<th>09 Engineering and Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course title</strong></td>
<td>3D-printing &amp; nano-3D-printing design</td>
</tr>
<tr>
<td><strong>Hours per week (SWS)</strong></td>
<td>3</td>
</tr>
<tr>
<td><strong>Number of ECTS credits</strong></td>
<td>4</td>
</tr>
</tbody>
</table>

### Course objective

Students:
- Deepen their knowledge on the technical aspects of Fused Deposition Modeling (FDM) & nano 3D printing
- Expand their ability to develop projects from concept to sketch to software to actualization
- Develop iterative design acumen through creative problem solving
- Build hands on skills in 3-D fabrication including FDM & nano-3D-printing, prototyping, layout sketching and post production
- Apply critical design terminology and concepts to problems and analysis
- Complete designs for individual problems solving and group projects with interdependent components

### Prerequisites

Previous Design Courses recommended e.g. Solid Works

### Recommended reading

- BEECH, Rick. The Origami Handbook.
- LIDWELL, HOLDEN & BUTLER. The Universal Principles of Design.
- ROTH/PENTAK. Design Basics 3D.
- SINGH, Sandeep. Beginning Google Sketchup for 3D printing.
- ZELANSKI, FISCHER. Shaping Space –The Dynamics of Three Dimensional Design.
- VOON, Claire. Artists Covertly Scan Bust of Nefertiti and Release the Data For Free Online
- THE TECHNOLOGY HOUSE. 3D Printing Glossary.

### Teaching methods

Lecture, Class Discussion, Demonstrations, Supervised Studio Development Individual and Group Project

### Assessment methods

- Weekly Design Analysis, Project Work, Group Critiques and final Presentations
- **Weekly Design Analysis** 25%
- **Projects** 50%
- **Final Project/Presentation** 25%

### Language of instruction

English

### Name of lecturer

Prof. Matthew Burnett, Prof. Matthias Rebhan

### Email

matthias.rebhan@hm.edu

### Course content

Through weekly analysis and primarily through hands on problem solving, students will develop their 3d conceptual problem solving as they develop competency with the software, equipment and process of Fused Deposition Modeling & nano-3D-printing.

The course will build on weekly readings and analysis, with students developing and applying their knowledge of analytical design concepts. A weekly digital journal of sketching and analysis from real world examples (from internet, from text, from direct observation) will provide the opportunity to share and critique ideas as we are working on long term assignments.

Much of class time will be devoted to work time, where student teams will be supervised as they develop sketches and digital models, then print them on FDM printers and on nano-3D-printer.

The projects will begin with individual and conclude with group component works, with final presentations during exams week.