## Title
Overthrowing Game Engine Tyranny: Games from Scratch with C++

## Cluster Title PO 07
To be filed by focus managers u.u.

 MEP9 Advanced Informatics

## Cluster Title PO 2012
To be filed by focus managers u.u.

 ME2_11 Advanced System Technology

## Cluster Title PO 2014
To be filed by focus managers u.u.

 Game Development

## Date of first course event / first organizational meeting with students****/ Room
10.4.17 NN F17/105

## Kind of room if not indicated above
Hörsaal Seminarraum Labor

Belegung über OBS 23.3.17 – 28.3.17

## Course Data
<table>
<thead>
<tr>
<th>Credit Points</th>
<th>5 credit points</th>
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<tbody>
<tr>
<td>Workload/semester</td>
<td>125-150 h</td>
</tr>
<tr>
<td>Presence/week on average**</td>
<td>4 SWS</td>
</tr>
<tr>
<td>Group size according to cnw</td>
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<tr>
<td>Min. size</td>
<td>8 students</td>
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## Course Contents
This course shows you how to develop an SNES-style game like Zelda or StreetFighter2 from ground up! Many game studios still have their own in-house engines written in C++ and using own Frameworks. Therefore it is still required to have solid C++ skills and knowledge of low-level engine procedures. Modern engines like Unity and Unreal are cloaking those deep features from their programmers. Our goal will be to uncover the underlying mechanisms and write our own engine, using nothing but Visual Studio and Spine (for Assets)

This course covers the C++ language and basic development of a 2D game

## Course Portrait
**Lecturer(s) Name(s)** Dipl.-Inf. Stephan Jacob

**Lecturer(s) email** stephan.jacob@h-da.de

**Contact Prof. @ fbmd** Tilmann.kohlhaase@h-da.de

**Teaching Method** lecture lecture + seminar seminar project

**Course Contents**

Design Informatics / Technology Economy / Business Culture

Time frame in case of blocked event jewells 12:30 – 15:30
engine with an existing (DirectX-based) - Framework. Through several Input
sessions, some of the key elements of basic C++ development are addressed.
This includes:
- Compiler & Linker settings
- Data Types
- Dynamic Arrays
- (Smart) Pointers
- OOP
- Templates
- Special C++-Keywords
- Memory management.

All examples will be created on-the-fly, while developing a basic 2D game
without an existing engine.

Upon successful completion of this module, students will be able to:
- Understand the C++ language and their originalities
- Read and rewrite existing C++ code
- Understand the basics and low level routines of game engines:
  - Game loops
  - Draw call & orders
  - Resource Management
  - Using external Assets (textures, Spritesheets, Spine, …)
  - Entity Components
  - Scene Management
  - Camera & Viewport
  - Input Handling
  - State Stacks
  - GUI
  - Effects (Particles, RenderStates)
  - Music & Sound implementation

<table>
<thead>
<tr>
<th>Type of Exam</th>
<th>homework</th>
<th>work+presentation</th>
<th>X</th>
<th>paper</th>
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<tr>
<td>Milestones if known</td>
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<tr>
<td>End of Elective</td>
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<td>Examination / Presentation</td>
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<tr>
<td>Suitability</td>
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<td>advanced course</td>
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| Preconditions         |          | basic programing skills like
|                       |          | - Variables and data types
|                       |          | - Classes and inheritance
|                       |          | - Loops and conditions

* According to our examination law, the course titles have to be matched to a given catalogue with common
course titles. This title will appear in the Transcript of Record and the Bachelor Certificate. Field has to be filed
by Focus Managers, all clusters can be found below
** The official presence-time is 3 SWS for the whole semester. As the elective period is condensed to 12 weeks instead of 16 weeks, the presence time for the electives is 4 SWS.

*** Courses and focal points: dm = Digital Media, oj = Online Journalismus; wj = Wissenschaftsjournalismus, blank field = please insert appropriate course. (check as many as apply)

**** Block 1 = 8.30 - 10.00 Uhr, Block 2 = 10.15 - 11.45 Uhr, Block 3 = 12.00 - 13.30 Uhr, Block 4 = 14.15 - 15.45 Uhr, Block 5 = 16.00 - 17.30 Uhr, Block 6 = 17.45 - 19.15 Uhr

***** In case that the course does not start in the first week 6.10.2014 there has to be a first organisational meeting to finalize the application process

Elective Start: 10.04.17
Free Days: 17.4.17, 25.5.17, 4.6.17, 15.6.17
Electives End 24.6.17 [electives have to be finished! Please avoid time consuming blocks in June!]

Please upload in Moodle Course!

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to be filed by lecturer

An die Schwerpunktleiter: Bitte auch die Folgeseite beachten.
Clustertitle DM PO 2007:

MEP1 Advanced Animation
MEP2 Advanced Video Production
MEP3 Graphic and Identity Design
MEP4 Sound Design and Production
MEP5 Interaction Design
MEP6 Media Experiments
MEP7 Media Events and Marketing
MEP8 Advanced Media Technology
MEP9 Advanced Informatics
MEP10 Media Theory

Clustertitle DM PO 2012:

ME2_01 Advanced Animation
ME2_02 Advanced Game Design
ME2_03 Advanced Video
ME2_04 Advanced Post Production
ME2_05 Interaction & Interface Design
ME2_06 Media Installation
ME2_07 Dramaturgy and Storytelling for Linear and Interactive Media
ME2_08 Media Experiments
ME2_09 E-Learning
ME2_10 Advanced Media Systems
ME2_11 Advanced System Technology
ME2_12 Interface Technology
ME2_13 Mobile/Web Application
ME2_14 3D Interactive Environment
ME2_15 Music & Technology

ME2_16 Media Events & Marketing
ME2_17 Media Producing in Different Fields of Media
SuK2_18 Media and Entertainment Law

ME2_19 Media Art History
ME2_20 Cultures and Creative Practice in Digital Media
ME2_21 Media Environments and Spaces
ME2_22 Media Ethics and Philosophy
ME2_23 Media and Communication Theories
ME2_24 Play, Game, Act, Use: Concepts, History and Practices

Clustertitle Studiengänge PO 2014

A&G:

Game Development
Technical Art for Animations and Games
Animation and Game Design
Animation and Game Methodology
Animation and Game Research and Development

IMD:

ME-D_01 – Design Management & Strategy
ME-D_02 – Design Concept & Dramaturgy
ME-D_03 – Audio/Visual Design
ME-D_04 – User Experience & Usability
ME-D_05 – Media Arts
ME-D_06 – Interaction & Interface Design
ME-D_07 – Interaction in Space
ME-IT_01 – Advanced Media Systems
ME_IT_02 – Advanced System Technology
ME-IT_03 – Interface Technology
ME-IT_04 – Mobile/Web Application
ME-IT_05 – 3D Interactive Environment
ME-M_01 – Media Events & Marketing
ME-M_02 – Media Producing
ME-M_03 – StartUp and Funding
ME-M_04 – Entertainment and Media Law
ME-PH_01 – Media Art History
ME-PH_02 – Cultures and Creative Practices in Digital Media
ME-PH_03 – Media Ethics and Philosophy
ME-PH_04 – Media and Communication Theories

MP:

ME_01 – Advanced Video Production
ME_02 – Advanced Post Production
ME_03 – Advanced Montage
ME_04 – Film-Sound
ME_05 – Media Installation
ME_06 – Creative Writing, Dramaturgy and Storytelling for Linear and Interactive Media
ME_07 – Media Experiments
ME_08 – Advanced Film, AV and studio technology
ME_09 – Transmedia Technology
ME_10 – Media Events & Marketing
ME_11 – Media Producing in Different Fields of Media
SuK_12 – Media and Entertainment Law *
ME_13 – Media Art History
ME_14 – Cultures and Creative Practices in Digital Media
ME_15 – Media Environments and Spaces
ME_16 – Media Ethics and Philosophy
ME_17 – Media and Communication Theories
ME_18 – Play, Game, Act, Use: Concepts, History and Practices

SMP:

ME1 - Computational Audio and Simulation
ME2 - Spatial Audio and Interaction
ME3 - Music and Media Production
ME4 - Post-Production
ME5 – Media Installation and PA
ME6 - Music and Media Theory
ME7 - Media Culture
ME8 – Film, Theatre, and Game
ME9 - Free multimedia elective
ME10 – Media Management