Advanced Digital Lighting
Text Book
- Digital LIGHTING & RENDERING
Basic principle of lighting

**Three points lighting** – Key light, Fill light, Rim light (Back light)
Basic principle of lighting
Use Depth Map shadows
Discussion about Lightings in Films
Soft shadow algorithms in general

- Fundamental problem in computer graphics
- Inherently difficult!
- Length of shadow by Time
Advanced Materials
• Arnold Rendering Concepts

Normalize ON

Light Samples 1 = 2sec render

 Normalize ON

Light Samples 3 = 9sec render
• Sampling and Ray depth
• Give extra tips and techniques through student’s work for midterm
• How to make simple scene setting in Maya
Discussion 2 about Lightings in Films
• How to create caustic effects with Arnold Lightings
• Creating 3D scenes to use caustic effects with reference images
• Creating Outdoor Lighting (Advanced Techniques)
• Exterior daylight with Physical Sky
• Explaining Rendering Layer and Compositing
• Explaining Rendering Layer and Compositing
• Creating cityscape with reference images
• Texturing and Lighting with Advanced Techniques
• **Texturing and Lighting with Advanced Techniques**
• Essential Practice Compositing with using After Effects
• Final works which are compositing objects to live action images
• Final works which are compositing objects to live action images
一、 기본정보

<table>
<thead>
<tr>
<th>과목명칭</th>
<th>ADVANCED DIGITAL LIGHTING</th>
</tr>
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<tbody>
<tr>
<td>영문명칭</td>
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<td>학과종류</td>
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<tr>
<td>적용 대상</td>
<td>한중뉴미디어대학 16학번</td>
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<td>과목설명</td>
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<td>전문영역</td>
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적용 대상: 한중뉴미디어대학 16학번  
과목담당자: Yoonjeong Han

과목설명: This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.

二、교육 목표 및 임무

- An overview about Digital Lighting  
- Essential trainings of lighting setting in Maya  
- Understanding of Arnold setting in Maya

三、교시 배치

- Explanation about Essential Techniques of Lighting Setting in Maya  
- Practice in Class Learning  
- Discussion about Lightings in Films by e-class to understand Digital Lighting

수업시간 배치

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<tr>
<th>주간</th>
<th>수업내용</th>
<th>수업형식 및 시간안배</th>
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<tr>
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<td>Introduction of the course</td>
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<td>3-4</td>
<td>An overview of Lighting Elements</td>
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<td>5-8</td>
<td>Introduction of Arnold Lightings</td>
<td>80</td>
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<td>9-11</td>
<td>Studio Lightings</td>
<td>90</td>
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<td>12-13</td>
<td>Environmental Lightings</td>
<td>100</td>
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<td>14-16</td>
<td>Final exam</td>
<td>80</td>
<td>100</td>
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</table>

四、 수업내용 및 수업요구

- An overview about Digital Lighting
- Essential trainings of lighting setting in Maya
  - Understanding of Arnold setting in Maya

五、 실험 / 실천내용

- Explanation about Essential Techniques of Lighting Setting in Maya
- Practice in Class Learning
- Discussion about Lightings in Films by e-class to understand Digital Lighting

六、 평가방식 및 요구

- Attendance : 10%
- Attitude in Class : 10%
- Discussion 01 : 5%
- Assignment 01 : 5%
- Midterm submission : 30%
- Discussion 02 : 5%
- Assignment 02 : 5%
- Final submission : 30%
추천 교재 및 참고서적

Digital LIGHTING&RENDERING(3rd Edition) – JEREMY BIRN by New Riders
중남재경정범대학
학사과정 수업 진도 계획표

( 2018 학년도 제 1 학기)

학원: 한중뉴미디어학원
강연교사: 韓潤精 YOONJEONGHAN
학과명칭: Advanced Digital Lighting
학과번호:
과정성질:
총 교 시: 3Hr

교육부 작성
| 기본 정보 |
|------------------|-----------------|
| 강연교사 | 韓潤精 YOONJEONGHAN |
| 직 위 | MFA |
| 수업대상 | 수업대상 (전공, 학년)  |
| Junior |
| 학과명칭 | Advanced Digital Lighting |
| 학과번호 | 학과번호 |
| 수업대상 | 수업대상 (전공, 학년) |
| 교시(학점) | 교시(학점) |
| 3 |
| 총 교시 | 그중 교실수업 ______교시; 실습수업 ______교시; 기타 수업(토론,견학) ______교시; 자습 ______교시 |
| 평가방식 | 시험□ 시찰□ 기타□ |
| 코스웨어 | 코스웨어 |
| 유□ 무□ |
| 시험형식 | open book□ closed book□ |
| 기타□ |
| 수업방식 | 수업방식 |
| 멀티미디어 및 실습수업 결합 |
| 교재명칭 | Digital LIGHTING&RENDERING (Third Edition) |
| 작 가 | 작 가 |
| JEREMY BIRN |
| 출판사 | New Riders |
| 출판연도 | 출판연도 |
| 2013 |

주요
참고서적

연구실
검토 의견

연구실 주임(싸인) 년 월 일

학과주임
검토 의견

학과 주임(싸인) 년 월 일

학원(부서)
검토의견

교수 주관 담당자(싸인) 학원도장 년 월 일
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<thead>
<tr>
<th>주간</th>
<th>수업내용 안배 (장,절 요점 기재)</th>
<th>수업형식 및 수단</th>
<th>수업 외 숙제 또는 지도 안내</th>
<th>집행 상황</th>
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</thead>
</table>
| Week01 | 1. Introduction of the class  
- Maya 2018  
2. Criteria of a Grade  
3. Level Test for Digital Lighting | Lecture with PPT file / Practice in Class / Analysis of Lighting in Film scene | 3 | |
| Week02 | 1. Fundamentals of Digital lighting (Theory)  
2. Lighting Basics and Practices (Theory)  
3. Understanding of Light Types  
- Controls and Options  
4. Collecting and analyzing Reference images | Lecture with PPT file / Practice in Class / Analysis of Lighting in Film scene | 3 | |
| Week03 | 1. Use Depth Map shadows  
2. Creating Effects Shadows  
- Shadowing with Light Fog  
- Shadowing with Paint Effects  
- Shadowing with Fur and Hair  
3. Share Subjects for Discussion 1 | Lecture with PPT file / Practice in Class / Analysis of Lighting in Film scene | 3 | Discussion 1 |
<table>
<thead>
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<th>Week</th>
<th>Topics</th>
<th>Lecture with PPT file / Practice in Class / Analysis of Lighting in Film scene</th>
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<td>Information of Midterm subject</td>
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<td>Week08</td>
<td>1. Submission of Midterm work 2. Critique for Midterm</td>
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<td>Week 9</td>
<td>1. Studio Lighting to use Arnold Area Light</td>
<td>Lecture with PPT file / Practice in Class</td>
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<td>2. Setting a Ai Area Lights Attributes</td>
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<td>3. Making a Spot light with Gobo</td>
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<td>4. Attenuation with Light Decay Filter</td>
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<td>Lecture with PPT file / Practice in Class</td>
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<td>Week 10</td>
<td>1. ai Surface Standard Material Basics</td>
<td>Lecture with PPT file / Practice in Class</td>
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<td>2. Controlling specular roughness</td>
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<td>3. Rendering Refractions with transmissions</td>
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<td>4. To inform Discussion 2</td>
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<td>Week 11</td>
<td>1. How to create caustic effects with Arnold Lightings</td>
<td>Lecture with PPT file / Practice in Class</td>
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<td>2. Rendering Glass with Arnold Lightings</td>
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<td>3. Creating underwater caustics</td>
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<td>Week 12</td>
<td>Creating 3D scenes to use caustic effects with reference images</td>
<td>Lecture with PPT file / Practice in Class</td>
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<td>Week 13</td>
<td>1. Environmental Lighting</td>
<td>Lecture with PPT file / Practice in Class</td>
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<tr>
<td></td>
<td>- Image based Lighting with Ai Skydome Light</td>
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<td>- Exterior daylight with Physical Sky</td>
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<td>Week 14</td>
<td>1. Know How to use light and object passes with AOV's</td>
<td>Lecture with PPT file / Practice in Class</td>
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<td></td>
<td>2. Compositing the render passes in After Effects</td>
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<tr>
<td>Week 15</td>
<td>Creating cityscape with reference images</td>
<td>Practice in Class</td>
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<td>Week 16</td>
<td>Information of Final subject</td>
<td>Practice in Class</td>
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<td>Week 17</td>
<td>1. Submission of Final work</td>
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<td>2. Critique for Final</td>
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</tbody>
</table>
This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.

- An overview about Digital Lighting
- Essential trainings of lighting setting in Maya
- Understanding of Arnold setting in Maya

Each course requires that the student be present at and participate in class. English skills of students might be problem to take this class.

Practice in class training by themselves

1. Prepare images in film to analyze of lighting
2. PPT file for a class

Digital LIGHTING&RENDERING (Third Edition) – JEREMY BIRN
[Week01]

1. Introduction of the class
2. Criteria of a Grade
3. Level Test for Digital Lighting
## Course: Advanced Digital Lighting (Maya)

- **Course Code:**
- **Course Title:** Advanced Digital Lighting (Maya)
- **Teacher:** Yoonjeonghan
- **Time:** 180 minutes
- **Objective:**
  - An overview about Digital Lighting
  - Essential trainings of lighting setting in Maya
  - Understanding of Arnold setting in Maya
- **Notes:**
  - Each course requires that the student be present at and participate in class. English skills of students might be a problem to take this class.

### Teaching Methods

- Practice in class training by themselves

### Teaching Aids

1. Prepare images in film to analyze of lighting
2. PPT file for a class

### References

- Digital LIGHTING & RENDERING (Third Edition) – JEREMY BIRN
[ Week02 ]

1. Fundamentals of Digital lighting (40min)
2. Lighting Basics and Practices (40min)
3. Understanding of Light Types (50min)
   - Controls and Options
4. Collecting and analyzing Reference images (20min)
5. Question and Answer (30min)

2. Basic principle of lighting (Lecture - 40min)
   - **Three points lighting** – Key light, Fill light, Rim light (Back light)

   **Key light** - Every shot needs a key light, else it would end up with a dark image or, if your characters don’t have any key light on them, then they would be perceived as a silhouette. If there are no lights in your scene but one, no matter where that light comes from, it becomes your key light. **The key light is the main light source in your scene.**

   **Fill light** - The fill light is the light that "fills" the areas in shadow. **Fill lights serve to control the amount of contrast in your image.** Photographers usually use bounce cards and reflectors as fill lights. In computer graphics we can either create virtual bounce cards and use global illumination (usually noisier) or area lights simulating the same effect. **In Computer Graphics you may already get some GI bounced/fill light** in your characters from the set but there is nothing wrong on cheating extra lights on top of those for artistic purposes. Fill lights in CG usually has little or no specular component associated to them and the quality of those lights tends to be soft.

   **Rim Light** - Sometimes also called **back light** or even **hair light**, is a light source coming from the back which purpose is to separate the character from the background. Most of the times subtle rim lights are enough.

   - Share the example images of three points lighting
作业布置和作业出

教学后记 手写 (手写体式)
<table>
<thead>
<tr>
<th>教研室编号</th>
<th>任课教师</th>
<th>韩润精 YOONJEONGHAN</th>
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<tbody>
<tr>
<td>授课课题</td>
<td>Advanced Digital Lighting (Maya)</td>
<td>授课时间长度 180分</td>
</tr>
<tr>
<td>教学目标和要求</td>
<td>This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.</td>
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</table>
| 教学重点 | - An overview about Digital Lighting  
- Essential trainings of lighting setting in Maya  
- Understanding of Arnold setting in Maya |
| 教学难点 | Each course requires that the student be present at and participate in class. English skills of students might be problem to take this class. |
| 教学方法分析 | Practice in class training by themselves |
| 教学手段分析 | 1. Prepare images in film to analyze of lighting  
2. PPT file for a class |
| 参考资料 | Digital LIGHTING&RENDERING (Third Edition) – JEREMY BIRN |
[ Week03 ]

1. Use Depth Map shadows (30min)
2. Creating Effects Shadows (70min)
   - Shadowing with Light Fog
   - Shadowing with Paint Effects
   - Shadowing with Fur and Hair
3. Share Subjects for Discussion 1 to e-class (10min)
4. Practice in the Class (40min)
5. Questions and Answers (30min)

Discussion 1 about critiques of lightings in film

教学后记 수업 후기. (手写손으로쓰기)
This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.

- An overview about Digital Lighting
- Essential trainings of lighting setting in Maya
- Understanding of Arnold setting in Maya

Each course requires that the student be present at and participate in class. English skills of students might be problem to take this class.

Practice in class training by themselves

1. Prepare images in film to analyze of lighting
2. PPT file for a class

Digital LIGHTING&RENDERING (Third Edition) – JEREMY BIRN
[ Week04 ]

1. The visual Functions of Shadows (20min)
2. Algorithms of shadows (20min)
3. Occlusion (20min)
4. Lighting a Flickering Fire Pit with Shadows (20min)
5. Faking shadows (20min)
6. Baking Lighting (20min)
7. Practice in the Class (40min)
8. Questions and Answers (20min)
This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.

- An overview about Digital Lighting
- Essential trainings of lighting setting in Maya
- Understanding of Arnold setting in Maya

Each course requires that the student be present at and participate in class. English skills of students might be problem to take this class.

Practice in class training by themselves

1. Prepare images in film to analyze of lighting
2. PPT file for a class

Digital LIGHTING&RENDERING (Third Edition) – JEREMY BIRN
[ Week05 ]

1. Advanced Materials (40min)
2. Reviewing Shading Models and Materials (30min)
3. Employing Samplers (20min)
4. Connecting Multiple Materials in One network (20min)
5. To Inform Assignment 1 (10min)
6. Practice in the Class (40min)
7. Questions and Answers (20min)

Assignment 1

教學後記 수업 후기. (手写손으로쓰기)
### Course Description

**Course Title:** Advanced Digital Lighting (Maya)

This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.

**Teaching Focus:**
- An overview about Digital Lighting
- Essential trainings of lighting setting in Maya
- Understanding of Arnold setting in Maya

**Teaching Issues:**
Each course requires that the student be present at and participate in class. English skills of students might be problem to take this class.

**Teaching Methods:**
Practice in class training by themselves

1. Prepare images in film to analyze of lighting
2. PPT file for a class

**Teaching Aids:**
- Lecture
- Multimedia
- Models
- Specimen
- Poster
- Sound
- Other

**Course Resources:**
- Digital LIGHTING&RENDERING (Third Edition) – JEREMY BIRN
1. Introducing Arnold (40min)
2. Arnold Rendering Concepts (20min)
3. Sampling and Ray depth (30min)
4. Practice in the Class (60min)
5. Questions and Answers (30min)

- Arnold is the new high end rendering engine in Maya.
  It is a base renderer from Maya 2017.
- Until Maya 2016, Arnold was plug-in renderer, and basic render was mental ray.
- The name of “Arnold” is from a famous bodybuilder and actor “Arnold schwarzenegger”.
- Arnold enables to make photorealism and artificial effects easier than ever.
- Arnold light has the additional function compare to standard Maya lights.

  - Area light
  - Mesh light : lighting by mesh
  - Sky dome light : Image based lighting. HDRI images
    http://www.hdrlabs.com/sibl/archive.html
  - Photometric light : use ies files
教学后记 提交后稿。（手写经由抄写）
<table>
<thead>
<tr>
<th>教研室</th>
<th>任课教师</th>
<th>韩籍 YOONJEONGHAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>号</td>
<td>담당자</td>
<td></td>
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<table>
<thead>
<tr>
<th>授课</th>
<th>Advanced Digital Lighting (Maya)</th>
<th>授课时间长度</th>
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</thead>
<tbody>
<tr>
<td>时间</td>
<td>180 分</td>
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**教学目标和要求**

This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.

- An overview about Digital Lighting
- Essential trainings of lighting setting in Maya
- Understanding of Arnold setting in Maya

**教学重点**

Each course requires that the student be present at and participate in class. English skills of students might be problem to take this class.

**教学方法分析**

Practice in class training by themselves

**教学手段分析**

1. Prepare images in film to analyze of lighting
2. PPT file for a class

**参考资料**

Digital LIGHTING&RENDERING (Third Edition) – JEREMY BIRN
[ Week07 ]

1. Information of Midterm subject (20min)
2. Share examples of Midterm subject (30min)
3. Practice in the Class (100min)
4. Questions and Answers (30min)
This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.

- An overview about Digital Lighting
- Essential trainings of lighting setting in Maya
- Understanding of Arnold setting in Maya

Each course requires that the student be present at and participate in class. English skills of students might be problem to take this class.

Practice in class training by themselves

1. Prepare images in film to analyze of lighting
2. PPT file for a class

Reference:
Digital LIGHTING&RENDERING (Third Edition) – JEREMY BIRN
[ Week08 ]

1. Submission of Midterm work (30min)
2. Critique for Midterm (100min)
3. Questions and Answers (30min)
This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.

- An overview about Digital Lighting
- Essential trainings of lighting setting in Maya
- Understanding of Arnold setting in Maya

Each course requires that the student be present at and participate in class. English skills of students might be problem to take this class.

Practice in class training by themselves

1. Prepare images in film to analyze of lighting
2. PPT file for a class

Digital LIGHTING & RENDERING (Third Edition) – JEREMY BIRN
[ Week09 ]

1. Studio Lighting to use Arnold Area Light (30min)
2. Setting a Ai Area Lights Attributes (40min)
3. Making a Spot light with Gobo (20min)
4. Attenuation with Light Decay Filter (20min)
4. Practice in the Class (40min)
5. Questions and Answers (30min)
### Course Description:

This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.

### Teaching Focus:

- An overview about Digital Lighting
- Essential trainings of lighting setting in Maya
- Understanding of Arnold setting in Maya

### Teaching Difficulty:

Each course requires that the student be present at and participate in class. English skills of students might be problem to take this class.

### Teaching Method Analysis:

Practice in class training by themselves

### Teaching Material Analysis:

1. Prepare images in film to analyze of lighting
2. PPT file for a class

### Teaching Type

- Theory Class
- Discussion Class
- Experiment Class

### Teaching Tools

- Digital LIGHTING&RENDERING (Third Edition) – JEREMY BIRM

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**Advanced Digital Lighting (Maya)**

**Yoon Jeong Han**

**Course Duration:** 180 minutes
<table>
<thead>
<tr>
<th>Week10</th>
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<tbody>
<tr>
<td>1. ai Surface Standard Material Basics (40min)</td>
</tr>
<tr>
<td>2. Controlling specular roughness (20min)</td>
</tr>
<tr>
<td>3. Rendering Refractions with transmissions (20min)</td>
</tr>
<tr>
<td>4. To inform Discussion 2 (20min)</td>
</tr>
<tr>
<td>5. Practice in the Class (50min)</td>
</tr>
<tr>
<td>6. Questions and Answers (30min)</td>
</tr>
</tbody>
</table>
## Course Overview

This course is designed to develop digital lighting in Maya for exquisite 3D scenes that are believable.

### Course Focus
- An overview about Digital Lighting
- Essential trainings of lighting setting in Maya
- Understanding of Arnold setting in Maya

### Course Requirements
Each course requires that the student be present at and participate in class. English skills of students might be a problem to take this class.

### Teaching Methods
Practice in class training by themselves

### Teaching Aids
1. Prepare images in film to analyze of lighting
2. PPT file for a class

### Reference Materials
Digital LIGHTING&RENDERING (Third Edition) – JEREMY BIRN
[Week11]

1. How to create caustic effects with Arnold Lightings (30min)
2. Rendering Glass with Arnold (20min)
3. Creating underwater caustics (30min)
4. Practice in the Class (70min)
5. Questions and Answers (30min)
<table>
<thead>
<tr>
<th>教案室</th>
<th>任课教师</th>
<th>韩教师 YOONJEONGHAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>授课课题</td>
<td>Advanced Digital Lighting (Maya)</td>
<td>授课时间长度</td>
</tr>
<tr>
<td>教学目标要求</td>
<td>This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.</td>
<td>英国中时间</td>
</tr>
<tr>
<td>教学重点</td>
<td>- An overview about Digital Lighting</td>
<td>180分</td>
</tr>
<tr>
<td>教学难点</td>
<td>- Essential trainings of lighting setting in Maya</td>
<td>- Understanding of Arnold setting in Maya</td>
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<td>教学方法</td>
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<td>English skills</td>
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<td>教学手段</td>
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<td>授课类型</td>
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<tr>
<td>参考资料</td>
<td>Digital LIGHTING &amp; RENDERING (Third Edition) – JEREMY BIRN</td>
<td></td>
</tr>
</tbody>
</table>
[ Week12 ]

1. Creating 3D scenes to use caustic effects with reference images (60min)
2. Practice in the Class (70min)
3. Questions and Answers (30min)
**课程号**:                 **课序号**:  

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**教学目标和要求**  
This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.

**教学重点**  
- An overview about Digital Lighting  
- Essential trainings of lighting setting in Maya  
- Understanding of Arnold setting in Maya

**教学难点**  
Each course requires that the student be present at and participate in class. English skills of students might be problem to take this class.

**教学方法分析**  
Practice in class training by themselves

**教学手段分析**  
1. Prepare images in film to analyze of lighting  
2. PPT file for a class

**参考资料**  
Digital LIGHTING&RENDERING (Third Edition) – JEREMY BIRN
[ Week13 ]

1. Environmental Lighting (80min)
   - Image based Lighting with Ai Skydome Light
   - Exterior daylight with Physical Sky
2. Practice in the Class (70min)
3. Questions and Answers (30min)

作业布置과제제출

Assignment 02

教学后记 수업 후기. (手写손으로쓰기)
**Course Title:** Advanced Digital Lighting (Maya)

**Teaching Goals and Requirements:**
This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.

**Teaching Focus:**
- An overview about Digital Lighting
- Essential trainings of lighting setting in Maya
- Understanding of Arnold setting in Maya

**Practice in class training by themselves**

**Teaching Means Analysis:**
1. Prepare images in film to analyze of lighting
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**Teaching Material Analysis:**
- Digital LIGHTING & RENDERING (Third Edition) – JEREMY BIRN
1. Know How to use light and object passes with AOV's (50min)
2. Compositing the render passes in After Effects (30min)
3. Practice in the Class (70min)
4. Questions and Answers (30min)
### Course: Advanced Digital Lighting (Maya)

**Course Description:**
This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.

**Teaching Methods:**
- Practice in class training by themselves

**Teaching Materials:**
1. Prepare images in film to analyze of lighting
2. PPT file for a class

**Teaching Tools:**
- Multimedia
- Models
- Digital LIGHTING & RENDERING (Third Edition) – JEREMY BIRN
[ Week15 ]

1. Creating cityscape with reference images (60min)
2. Creating Render passes and compositing (30min)
3. Practice in the Class (40min)
4. Questions and Answers (30min)
This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.

- An overview about Digital Lighting
- Essential trainings of lighting setting in Maya
- Understanding of Arnold setting in Maya

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Practice in class training by themselves

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Digital LIGHTING&RENDERING (Third Edition) – JEREMY BIRN
[ Week16 ]

1. Information of Final subject (20min)
2. Share Examples about Final subject (30min)
3. Practice in the Class (40min)
4. Questions and Answers (30min)
# Advanced Digital Lighting (Maya)

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**教学目标和要求**
This course is to develop digital lighting in Maya for exquisite 3D scenes that is believable.

**教学重点**
- An overview about Digital Lighting
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- Understanding of Arnold setting in Maya

**教学难点**
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**教学方法**
Practice in class training by themselves

**教学手段**
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**参考资料**
Digital LIGHTING&RENDERING (Third Edition) – JEREMY BIRN
[ Week17 ]

1. Submission of Final work (30min)
2. Critique for Final (40min)
3. Questions and Answers (30min)