

**SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY**

**SAULT STE. MARIE, ONTARIO**



**COURSE OUTLINE**

**COURSE TITLE:** Lighting/Rendering  
**CODE NO. :** VGA401 **SEMESTER:** 4  
**PROGRAM:** Video Game Art  
**AUTHOR:** Jeremy Rayment  
**DATE:** Semester 4 **PREVIOUS OUTLINE DATED:** none  
**APPROVED:** Brian Punch

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**CHAIR**

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**DATE**

**TOTAL CREDITS:** 4

**PREREQUISITE(S):** VGA303

**HOURS/WEEK:** 4

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*For additional information, please contact Brian Punch, Chair,*  
*School of Natural Environment/Outdoor Studies & Technology Programs*

(705) 759-2554, Ext. 2681

## **I. COURSE DESCRIPTION:**

At the end of this course students will be well versed in 3D lighting solutions with specific focus on learning lighting techniques for a variety of game art tasks. Fundamental topics will include lighting theory, light mapping, baking & rendering, and the application and uses of in-game lights.

## **II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

Upon successful completion of this course, the student will demonstrate the ability to:

1. Demonstrate the ability to effectively light and render 3d assets in an industry standard 3d content creation application.

### Potential Elements of the Performance:

Describe the foundational elements of traditional light theory.

Identify the key differences between traditional lights and digital lights as it pertains to industry standard 3d content creation applications.

Identify and analyze important light types.

Describe how colour can help set tone and mood in lighting.

Define and describe the use of the following terms:

3 point lighting, key light, fill light, rim light, global illumination, radiosity, fall off, shadows

2. Demonstrate the ability to effectively light, render and apply light maps to real-time 3d assets using an industry standard 3d content creation application.

### Potential Elements of the Performance:

Describe the importance and uses of lights and lighting in video game art.

Describe the importance and uses of light maps in video game art.

Use an industry standard 3d content creation application to generate a 2nd UV channel for light maps.

Define and describe the meaning of the following terms:  
Light map, UV, resolution, baking, ambient occlusion, shadow map, emissive map, per-vertex lighting, per-pixel lighting

Demonstrate the ability to fully light and light map a 3d game asset in an industry standard 3d content creation application.

3. Design, produce and light a basic real-time 3d game level using an industry standard 3d game development application.

Potential Elements of the Performance:

Define and describe the meaning of the following terms:  
Lightmass, Spot light, Point light, Directional light, Dominant lights

Develop and write a lighting plan.

Demonstrate the ability to use all major identified light types in practice.

Demonstrate the ability to integrate and light existing real-time game assets in an industry standard 3d game development application.

4. Demonstrate the ability to effectively compose, light, render, apply light maps and apply and use post process effects to real-time 3d assets inside an industry standard 3d game development application.

Potential Elements of the Performance:

Demonstrate the ability to create and use light maps from within an industry standard game development application.

Demonstrate the ability to create and use a second UV channel for light maps from within an industry standard 3d game development application.

Demonstrate the ability to add depth and effect to a game level using post process lighting effects.

Use colour on lights to add mood and tone.

5. Design, produce and light an optimized, advanced real-time 3d game level

combining an industry standard 3d game development application with 3d content creation application(s) and 2d image editing applications.

Potential Elements of the Performance:

Demonstrate the ability to use production proven pipeline techniques to assemble and produce an optimized, fully lit, interactive game level.

Explore the use of lights to help with user interactions and accessibility.

Present a finished game level to a group of video game artists.

Rationalize the creative/art direction of light choice, placement and function.

**III. TOPICS:**

1. The foundational elements of traditional light theory
2. The key differences between traditional lights and digital lights as it pertains to industry standard 3d content creation and game development applications.
3. Creative exploration on how colour can help set tone and mood in lighting.
4. The importance and uses of lights and lighting in video game art.
5. The key differences and functions between industry standard 3d game development applications and 3d content creation applications as it pertains to lighting video game art.
6. The importance of optimization and resource balance on lighting video game art for a variety of game platforms.

**IV. RECOMMENDED RESOURCES/TEXTS/MATERIALS:  
Suggested reading**

Digital Lighting & Rendering 2nd Edition (2006)

**Paperback:** 432 pages

**Publisher:** New Riders Press; 2 edition (May 7 2006)

**Language:** English

**ISBN-10:** 0321316312

**ISBN-13:** 978-0321316318

**V. EVALUATION PROCESS/GRADING SYSTEM:**

**Assignments/Projects = 100% of final grade**

Assignments/projects will constitute 100% of the student's final grade in this course. A missing assignment is equivalent to course objectives not achieved which results in an "F" (fail) grade for the assignment/project.

The following semester grades will be assigned to students:

<u>Grade</u>	<u>Definition</u>	<u>Grade Point Equivalent</u>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

**VI. SPECIAL NOTES:**

## *DEDUCTIONS – LATES, EXTENSIONS AND FAILS*

### **Lates:**

An assignment/project is considered late if it is not submitted at the time and date specified by the instructor. A late assignment/project will automatically be penalized by a 10% deduction. Late assignments/projects will not be accepted one week past their initial due date. Any assignments/projects not submitted within one week of their initial due date will automatically be assigned a fail grade (F).

### **Extensions:**

The instructor may grant extensions for assignment/projects under exceptional circumstances (e.g. death in the family or serious illness). An extension, when offered, will have a mutually agreed upon deadline that does not extend beyond the conclusion of the current semester.

### **Fail:**

A fail grade (F) is assessed to an assignment/project that has not been executed to a minimum satisfactory "D" grade level or in which the directions have not been followed correctly.

### Attendance:

Significant learning takes place in the classroom setting through an interactive learning approach; therefore students are expected to attend all classes and inform the instructor of an anticipated absence. Attendance is mandatory for this course to ensure the course requirements and objectives are met.

A total absence of 3 classes for the semester will be tolerated. After 3 absences penalties will take effect, an additional 10% will be deducted from the final grade for this course per class missed.

i.e. 4 classes missed = 10% deduction from final grade

5 classes missed = 20% deduction from final grade

All in class work is based on the instructor's observation and record of the student's performance in the following areas:

- ability to follow directions set forth by the instructor
- attitude and conduct - students should be courteous, respectful, teachable, and considerate of the instructor and other students. They should also strive for a creative atmosphere and keep the work place neat.
- participation in class projects and discussions
- attendance and handing in work on time

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Prior Learning Assessment:

Students who wish to apply for advance credit transfer (advanced standing) should obtain an Application for Advance Credit from the program coordinator (or the course coordinator regarding a general education transfer request) or academic assistant. Students will be required to provide an unofficial transcript and course outline related to the course in question. Please refer to the Student Academic Calendar of Events for the deadline date by which application must be made for advance standing.

Credit for prior learning will also be given upon successful completion of a challenge exam or portfolio.

Substitute course information is available in the Registrar's office.

Disability Services:

If you are a student with a disability (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Disability Services office. Visit Room E1101 or call Extension 2703 so that support services can be arranged for you.

Communication:

The College considers **WebCT/LMS** as the primary channel of communication for each course. Regularly checking this software platform is critical as it will keep you directly connected with faculty and current course information. Success in this course may be directly related to your willingness to take advantage of the **Learning Management System** communication tool.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Code of Conduct*. A professor/instructor may assign a sanction as defined below, or make recommendations to the Academic Chair for disposition of the matter. The professor/instructor may (i) issue a verbal reprimand, (ii) make an assignment of a lower grade with explanation, (iii) require additional academic assignments and issue a lower grade upon completion to the maximum grade “C”, (iv) make an automatic assignment of a failing grade, (v) recommend to the Chair dismissal from the course with the assignment of a failing grade. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Student Portal:

The Sault College portal allows you to view all your student information in one place. **mysaultcollege** gives you personalized access to online resources seven days a week from your home or school computer. Single log-in access allows you to see your personal and financial information, timetable, grades, records of achievement, unofficial transcript, and outstanding obligations. Announcements, news, the academic calendar of events, class cancellations, your learning management system (LMS), and much more are also accessible through the student portal. Go to <https://my.saultcollege.ca>.

Electronic Devices in the Classroom:

Students who wish to use electronic devices in the classroom will seek permission of the faculty member before proceeding to record instruction. With the exception of issues related to accommodations of disability, the decision to approve or refuse the request is the responsibility of the faculty member. Recorded classroom instruction will be used only for personal use and will not be used for any other purpose. Recorded classroom instruction will be destroyed at the end of the course. To ensure this, the student is required to return all copies of recorded material to the faculty member by the last day of class in the semester. Where the use of an electronic device has been approved, the student agrees that materials recorded are for his/her use only, are not for distribution, and are the sole property of the College.

Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session. *<Optional: It is the departmental policy that once the classroom door has been enclosed, the learning process has begun. Late arrivers will not be granted admission to the room.>*

Tuition Default:

Students who have defaulted on the payment of tuition (tuition has not been paid in full, payments were not deferred or payment plan not honoured) as of the first week of *<choose November, March, or June>* will be removed from placement and clinical activities. This may result in loss of mandatory hours or incomplete course work. Sault College will not be responsible for incomplete hours or outcomes that are not achieved or any other academic requirement not met as of the result of tuition default. Students are encouraged to communicate with Financial Services with regard to the status of their tuition prior to this deadline to ensure that their financial status does not interfere with academic progress.

*<include any other special notes appropriate to your course>*