Photogrammetry Project

Photogrammetry is the science of making measurements from photographs.

The input to photogrammetry is photographs, and the output is typically a map, a drawing, a measurement, or a 3D model of some real-world object or scene. Many of the maps we use today are created with photogrammetry and photographs taken from aircraft.

Terrestrial and Close-range Photogrammetry, the camera is located on the ground, and hand held, tripod or pole mounted.

Usually this type of photogrammetry is non-topographic - that is, the output is not topographic products like terrain models or topographic maps, but instead drawings, 3D models, measurements, or point clouds. Everyday cameras are used to model and measure buildings, engineering structures, forensic and accident scenes, mines, earthworks, stock-piles, archaeological artifacts, film sets, etc. In the computer vision community, this type of photogrammetry is sometimes called Image-Based Modeling.

STEP ONE: SHOOT 50 - 360 degree photos of the model.

STEP TWO: FOLLOW these Rules for Shooting Photogrammetry:

ALIGNMENT: Subject should be perfectly still, (consider sitting) and overlap all photos. To make sure that you all your photos align as one 3D model, your pictures need to have overlap (at least 50%). Note: Not all photogrammetry subjects are created equal, it is best to avoid objects that are: untextured, completely flat, very thin, transparent, shiny, and/or reflective. Examples of difficult-to-capture objects are leafy plants, fur and hair, glass items, and shiny or sparkly Christmas ornaments.

LIGHTING: Keep the lighting consistent, your subject must be evenly lit - outside on an overcast/cloudy day or inside with diffuse 360 degree lighting. Consider simplifying background or use green screen or after taking photos convert all backgrounds to simple green colour.

STEP THREE: IMPORT your 50 capture photos of your subject into 3DF Zephyr Free software and then export as obj mesh model.

STEP FOUR: EDIT your obj mesh in Sculptris and/or Autodesk Meshmixer. WATCH tutorials in folder if necessary. (Meshmixer Intro – Basics, Meshmixer 101 - Make Solid for 3-D printing, Meshmixer Clean a Scan etc)

STEP FIVE: CONVERT your model in Autodesk Meshmixer to SOLID TO PRINT before printing on 3D printer.

STEP SIX: REFLECT by answering the following questions with your completed work:

1. What part of your finished project did you find most successful and why? 2. What part of your finished project did you find least successful and why? 3. If you had to do this project, what part would you change or improve on and why?
Artistic Statement Template

Artwork Title: __________________________________________

K/U: What is Photogrammetry?

1. Define the concept of Photogrammetry. (1)

2. Using 6 elements and principles of design and analyse an on-line example of Photogrammetry. (6)

A) Influences from past and present works:

B) Mixed Media techniques used in my work and how they support my intended visual message:

C) Reflect on the following questions:

1. What part of your finished project did you find most successful and why?

2. What part of your finished project did you find least successful and why?

3. If you had to do this project, what part would you change or improve on and why?
<table>
<thead>
<tr>
<th>Knowledge/Understanding</th>
<th>Level 0</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstrates understanding of the elements &amp; principles of design in the Photogrammetry work</td>
<td>Work does not meet assignments expectations for this category. <strong>Incomplete.</strong></td>
<td>0</td>
<td>Student demonstrates limited understanding of the elements &amp; principles of design in the Photogrammetry work. <strong>0.25</strong></td>
<td>Student demonstrates some understanding of the elements &amp; principles of design in the Photogrammetry work. <strong>0.50</strong></td>
<td>Student demonstrates considerable understanding of the elements &amp; principles of design in the Photogrammetry work. <strong>0.75</strong></td>
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<table>
<thead>
<tr>
<th>Thinking/Inquiry</th>
<th>Level 0</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photogrammetry</td>
<td>Work does not meet assignments expectations for this category. <strong>Incomplete.</strong></td>
<td>0</td>
<td>Concept and context is unclear and/or weak. Meaning or ideas conveyed are not on level. <strong>0.25</strong></td>
<td>Concept and context is slightly unclear and/or weak. Meaning or ideas conveyed are below expectations for students grade level. <strong>0.50</strong></td>
<td>Concept and context is clear and valid. Meaning or ideas conveyed are on par with students grade level. <strong>0.75</strong></td>
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<tr>
<th>Communication</th>
<th>Level 0</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
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</thead>
<tbody>
<tr>
<td>Clarity: discusses research questions; artistic influences in the artistic statement</td>
<td>Work does not meet assignments expectations for this category. <strong>Incomplete.</strong></td>
<td>0</td>
<td>Student discusses research questions; influences in the artistic statement with limited clarity. <strong>0.25</strong></td>
<td>Student explains use of mixed media techniques in the artistic statement with limited clarity. <strong>0.25</strong></td>
<td>Student explains use of mixed media techniques in the artistic statement with some clarity. <strong>0.50</strong></td>
</tr>
<tr>
<td>Explains use of mixed media techniques in the artistic statement</td>
<td>Work does not meet assignments expectations for this category. <strong>Incomplete.</strong></td>
<td>0</td>
<td>Poor, yes/no answers/limited complete. <strong>0.25</strong></td>
<td>Somewhat coherent and somewhat complete. <strong>0.50</strong></td>
<td>Clear and substantial answers. <strong>0.75</strong></td>
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<tr>
<th>Reflective Questions</th>
<th>Level 0</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work does not meet assignments expectations for this category. <strong>Incomplete.</strong></td>
<td>0</td>
<td>Student discusses research questions; influences in the artistic statement with some clarity. <strong>0.50</strong></td>
<td>Student explains use of mixed media techniques in the artistic statement with considerable clarity. <strong>0.75</strong></td>
<td>Student explains use of mixed media techniques in the artistic statement with strong clarity. <strong>/1</strong></td>
<td></td>
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<tr>
<td>Work does not meet assignments expectations for this category. <strong>Incomplete.</strong></td>
<td>0</td>
<td>Student demonstrates some use of the elements &amp; principles of design and mixed media techniques to produce an art work of limited effectiveness. <strong>2-3</strong></td>
<td>Student demonstrates considerable effectiveness in demonstrating the creative process and following procedures. <strong>5-6</strong></td>
<td>Student demonstrates effective use of elements &amp; principles of design and mixed media techniques to produce a highly effective art work. <strong>5</strong></td>
<td></td>
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### A1. The Creative Process: apply the creative process to create a variety of artworks, individually and/or collaboratively;

**A1.1** use various strategies, individually and/or collaboratively, with increasing skill to generate, explore, and elaborate on original ideas and to develop, reflect on, and revise detailed plans for the creation of art works that address a variety of creative challenges (e.g., extend their skills in using brainstorming, concept webs, mind maps, and/or groups discussions to formulate original and innovative ideas for an art work on a social or personal
A1.2 apply, with increasing fluency and flexibility, the appropriate stages of the creative process to produce two- and three-dimensional art works using a variety of traditional and contemporary media (e.g., extend their skills in working with a range of media; demonstrate flexibility in revising their plans on the basis of reflection)

A1.3 document their use of each stage of the creative process, and provide evidence of critical inquiry, in a portfolio that includes a range of art works created for a variety of purposes (e.g., ensure that their portfolio includes the following: evidence of critical inquiry associated with idea generation and elaboration; evidence of research on how different artists approach specific themes and/or use particular techniques that can be adapted in their own work; preliminary and final works to show evidence of thoughtful revision), and review and reflect on the contents of their portfolio to determine how effectively they have used the creative process

A2. The Elements and Principles of Design: apply the elements and principles of design to create art works for the purpose of self-expression and to communicate ideas, information, and/or messages;

A2.1 apply the elements and principles of design with increasing skill and creativity to produce two- and three-dimensional art works that express personal feelings and communicate specific emotions (e.g., extend their skills in combining various elements and principles to convey a sense of fear, happiness, hopefulness, despair)

A2.2 apply the elements and principles of design as well as a wide range of art-making conventions with increasing skill and creativity to produce art works that comment and/or communicate a clear point of view on a variety of issues (e.g., extend their skills by manipulating elements and principles and using conventions in creative ways to produce an art work that conveys the point of view of a teenager living on the street or that comments on a current event or social issue)

A3. Production and Presentation: produce art works, using a variety of media/materials and traditional and emerging technologies, tools, and techniques, and demonstrate an understanding of a variety of ways of presenting their works and the works of others.

A3.1 use with increasing skill a wide variety of media, including alternative media, and current technologies to create two- and three-dimensional art works for a variety of purposes (e.g., extend their skills in the manipulation of a variety of media and technologies to create a sculpture for an outdoor space, a mixed-media work for display on the Internet, an installation evoking their cultural heritage)

A3.2 use with increasing skill a wide variety of traditional and current materials, technologies, techniques, and tools to create original art works for a variety of purposes and audiences

A3.3 demonstrate a understanding of the appropriate standards and conventions for presenting art works for a variety of purposes (e.g., as samples in a portfolio to be viewed by prospective employers or postsecondary educational institutions; as part of a year-end exhibit by the senior class; as part of a thematic display in a cultural centre; for inclusion in a virtual gallery), and apply these standards and conventions when preparing various types of visual art works for presentation

B1. The Critical Analysis Process: demonstrate an understanding of the critical analysis process by examining, interpreting, evaluating, and reflecting on various art works;

B1.1 demonstrate the ability to support their initial responses to a variety of art works with informed understanding of the works’ artistic form and function (e.g., describe their initial response to an art work, and explain in detail how specific aspects of the work’s content, formal qualities, and media inform that response)

B1.2 deconstruct with increasing skill and insight the visual content and the use of elements and principles of design in their own art work and the work of others (e.g., extend their skills in identifying individual elements and principles and aspects of the visual content in an art work, interpreting their function, and analysing their effect; compare and contrast the use of shape, form, line, texture, space, and balance in Frank Lloyd Wright’s Falling Water and Moshe Safdie’s Habitat)

B1.3 explain in detail, with reference to a variety of historical and contemporary art works (e.g., the social scenes painted by Pieter Bruegel the Elder; Joseph Paxton’s Crystal Palace; works by Canadian war artists, such as Alex Colville’s Bodies in a Grave or Molly Lamb Bobak’s Private Roy, Canadian Women’s Army Corps), how knowledge of a work’s cultural and historical context, achieved through extensive research, has clarified and enriched their understanding and interpretation of a work’s intent and meaning

B1.4 describe in detail and reflect on with increasing insight the qualities of their art works and the works of others, and evaluate the effectiveness of these works using a wide variety of criteria (e.g., provide an informed explanation of why a work of art is, or is not, successful with respect to its ability to communicate a message or emotion, its technical and aesthetic conventions, its form and stylistic qualities, its originality)

B2. Art, Society, and Values: demonstrate an understanding of how art works reflect the societies in which they were created, and how they can affect both social and personal values;

B2.1 analyse, on the basis of research, the function and social impact of different kinds of art works in both past and present societies (e.g., how art works function to decorate private and public space, to investigate and draw attention to themes and issues, to criticize political policy and social norms, to satirize public figures, to memorialize people and commemorate events, to preserve aspects of a people’s culture; how works of art can symbolize political, religious, social, or economic power; the power of art to help change personal and public positions on social and political ideas)

B2.2 assess the impact of socio-economic, political, cultural, and/or spiritual factors on the production of art works (e.g., how artists are affected by oppression, persecution, censorship, or war, or by cultural, political, and/or religious beliefs; how access to locations, materials, technologies, and funding can affect the production of art works)

C1. Terminology: demonstrate an understanding of, and use correct terminology when referring to, elements, principles, and other components related to visual arts;

C1.1 extend their understanding of the elements and principles of design, and use terminology related to these elements and principles correctly and
appropriately when creating or analysing a variety of art works (e.g., when analysing how artists’ manipulation of space, movement, form, and proportion affects meaning in an installation or an environmental work)

C1.2 explain in detail terminology related to a wide variety of techniques, materials, and tools (e.g., techniques and materials associated with installation art; additive and subtractive techniques, digital manipulation, impasto, optical colour mixing, pointillism), and use this terminology correctly and appropriately when creating, analysing, and/or presenting art works

C1.3 explain in detail the stages of the creative process and the critical analysis process, and explain, using appropriate terminology, how these processes contribute to the successful creation and analysis of art works

C2. Conventions and Techniques: demonstrate an understanding of conventions and techniques used in the creation of visual art works;

C2.1 extend their understanding of a wide variety of techniques that artists use to achieve a range of specific effects (e.g., techniques used to create a range of textures in an art work, to develop the connection and relationship between forms in a composition, to draw attention to specific parts of a work)

C2.2 extend their understanding of the variety of conventions used in visual art (e.g., allegory, appropriation, juxtaposition, synectics; conventions associated with formalism, objective and non-objective abstraction, propaganda, realism, social commentary), and explain in detail how they are used in a variety of art works

C3. Responsible Practices: demonstrate an understanding of responsible practices in visual arts.

C3.2 demonstrate appropriate health and safety procedures and conscientious practices in the selection and use of various materials, techniques, tools, and technologies when producing or presenting art works (e.g., demonstrate safe practices when creating installations, assemblages, earthworks, constructions, multimedia projects; demonstrate appropriate protocols, deportment, and respect for others when working in a studio or visiting a presentation space)