CAT III REPORT

ENGINEERING GRAPHICS & INTRODUCTION TO
DIGITAL FABRICATION

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GALGOTIAS
UNIVERSITY
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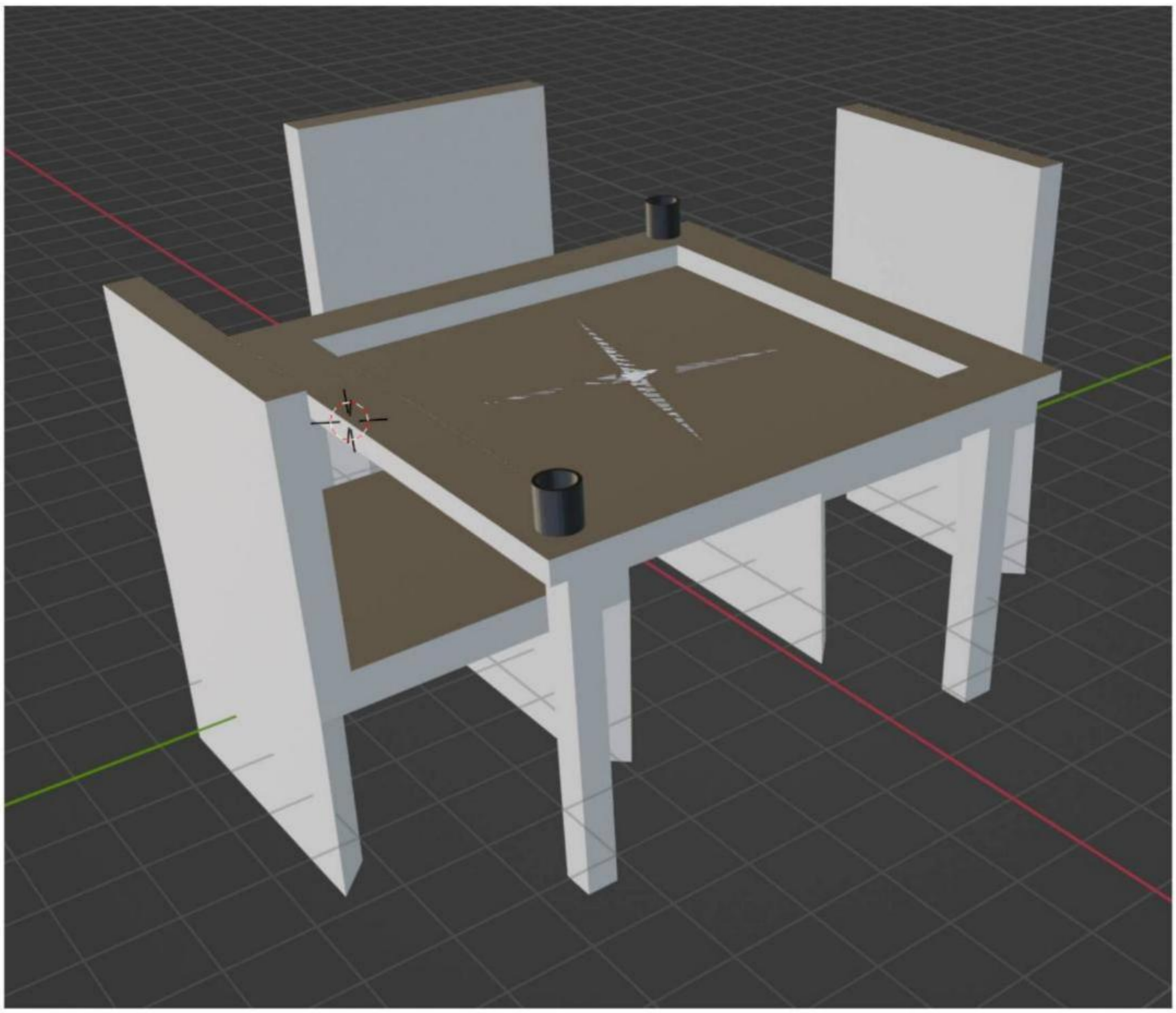
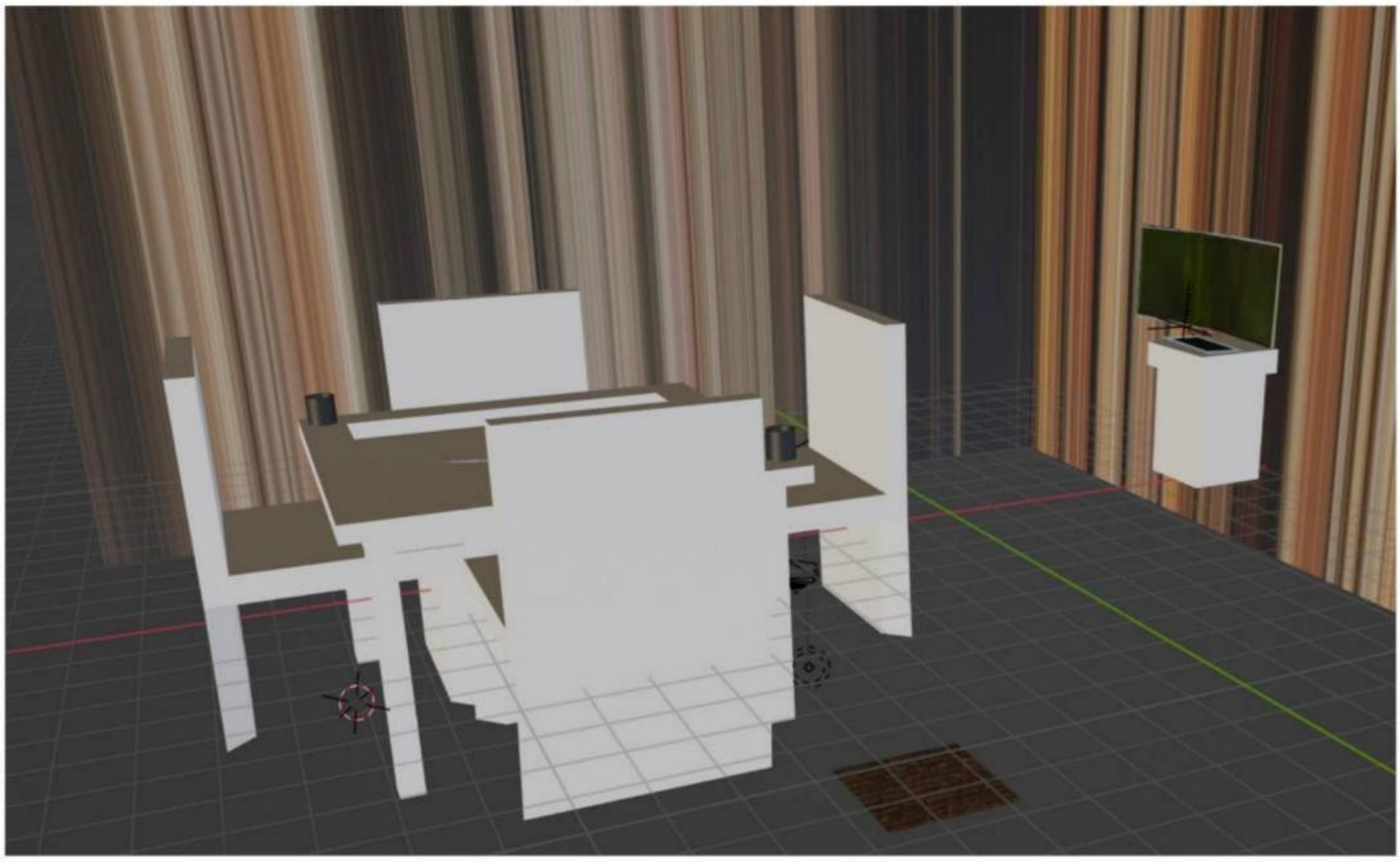
Model details:

A room with the use of primitive shapes.
The room features a table and a chair and a tv. For the table, I imported a cube and performed the scale and rotate and location transformations to change it’s shape to a flat table.



For the chair, I imported another cube and performed the scale operation on it again, to change its shape to a flat surface. I then performed extrude operation on the cube to make a sitting area of the chair, that's like the primary factory of the chair, for the 4 supporting pillars, I again added cube and scaled it and put it below the cube, chair is now formed.
For the tv, I got me a curved plane.
For the background, I made an isometric cube by importing a cube and deleting an edge which then had textures applied to it.
For the overall lighting, I added 3 point lighting system to make it look well lit.
The model is now complete.



WHAT IS ENGINEERING GRAPHICS

Engineering graphics is the creation of engineering drawings. These are Representations of physical objects/locations on paper (or in 2 dimensional or 3 Dimensional electronic format). In a typical introductory engineering graphics course it covers the basics of drawing view creation (left side, right side, etc.), presetantation of lines (Hidden, no hidden) and projections such as isometric. It also inlcudes things like dimensioning, tolerancing and other items required to properly communicate the concept to another person.

the three most necessary techniques of drawing/projection are:

1. **Orthographic Projection**: In this method the object is placed in space in such a way that the front view of it is captured in the vertical plane, and the top view of the same, is captured in the horizontal plane. The projections of the object are perpendicular with the planar screen, and hence, the name 'orthographic'.
2. **Perspective Projection**: This is a simple technique of drawing an object as how one views it. The observer's eye position, height, and distance from the object, all influence the outcome of the drawing. Two sub-methods are adopted for this projection technique, namely, Visual Ray Method and Vanishing Point Method.
3. **Isometric Projection**: This form of projection gives the total detail of the component under consideration. The basic principle behind isometric projection is that it involves the consideration of three axes that are inclined to each other making equal angles (thus the name since *iso-* means equal) with each other (120 deg). This is followed by transfer of actual dimensions to the isometric scale involving some basic trigonometric calculations.

In regards to projections, it is worth notice that other less conventional projections do exist, such as *dimetric* and *trimetric* projections, and these are distinguished by the angles used in contrast to 30 degrees for isometric projections. However, the most common and accepted is the orthographic projection.

As a practical way to remember how it works, one may imagine looking at a cube in an empty bowl on a table; the cube would have a face parallel to the top surface of the table. If one would grab the cube in the bowl and would rock it forward, a different side of the cube would become parallel to the table top.

Hence, engineering drawing plays a vital role both in manufacture and design, as it not only explains the string of arrangement in a machine, but also tells us about the method to be employed to manufacture the individual blocks.

An engineering drawing not only helps convey ideas and convert concepts into reality, an engineering drawing follows criteria and conventions to eliminate confusion by the standardization of nomenclature and practices, as a way to clearly relay the information to the individual who understands it when it is read, and very importantly, it indicates or hints how something is going to be manufactured.

WHAT IS BLENDER

Blender is a free and open-source 3D computer graphics software toolset used for creating animated films, visual effects, art, 3D-printed models, motion graphics, interactive 3D applications, virtual reality, and, formerly, video games. Blender's features include 3D modelling, UV mapping, texturing, digital drawing, raster graphics editing, rigging and skinning, fluid and smoke simulation, particle simulation, soft body simulation, sculpting, animation, match moving, rendering, motion graphics, video editing, and compositing.

Features

Modeling

Blender has support for a variety of geometric primitives, including polygon meshes, Bézier curves, NURBS surfaces, metaballs, icospheres, text, and an n-gon modeling system called B-mesh. There is also an advanced polygonal modelling system which can be accessed through an edit mode. It supports features such as extrusion, bevelling, and subdividing.[217]

Modifiers

Modifiers apply non-destructive effects which can be applied upon rendering or exporting, such as subdivision surfaces.

Sculpting

Blender has multi-resolution digital sculpting, which includes dynamic topology, "baking", remeshing, re-symmetrization, and decimation. The latter is used to simplify models for exporting purposes (an example being game assets)

Geometry nodes

Geometry Nodes Editor in Blender 2.92

Blender has a geometry node system for procedurally and non-destructively creating and manipulating geometry. It was first added to Blender 2.92, which focuses on object scattering and instancing.[218] It takes the form of a modifier, so it can be stacked over other different modifers.[219] The system uses object attributes, which can be modified and overridden with string inputs. Attributes can include positions, normals and UV maps.[220] All attributes can be viewed in an attribute spreadsheet editor.[221] The Geometry Nodes utility also has the capability of creating primitive meshes.[222] In Blender 3.0, support for creating and modifying curves objects was added to Geometry Nodes.[132] In Blender 3.0, the Geometry Nodes workflow was completely redesigned with fields, in order to make the system more intuitive and work like shader nodes.