

# DAILY ASSESSMENT FORMAT

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Course:	Satellite Photometry And Its Courses	USN:	4AL17EC090
Topic:	Programmetric products from satellite stereo images	Semester & Section:	6 <sup>th</sup> sem & B sec
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## FORENOON SESSION DETAILS

### Image of session

The screenshot shows the E-CLASS interface during a live session. On the left, there is a sidebar with navigation options: Live Session, Offline Session, Study Material, Attendance Status, Course Guidelines, and Feedback. The main content area displays a slide titled "Algorithms for Digital Ortho-rectification" from the Indian Institute of Remote Sensing, Dehradun. The slide text describes Differential Rectification as a well-known standard procedure in aerial photogrammetry for generating orthophotos in a non-flat terrain. It explains that to apply this method to a single image, the parameters of the interior and exterior orientation of the camera, as well as the underlying digital terrain model (DTM), must be known. It also states that Digital rectification assigns a gray value to each grid-element of the digital elevation model (DEM), so that both elevation and density of the surface are stored at the same planimetric location. Below the slide, there is a prompt to "Please rate this session:" with five stars. On the right, there is a chat window with several messages and a "Type your message" input field.

This screenshot shows the E-CLASS interface during a live session, similar to the one above but with a different slide content. The sidebar on the left remains the same. The main content area displays a slide titled "Algorithms for Digital Ortho-rectification" from the Indian Institute of Remote Sensing, Dehradun. The slide text describes the indirect method for digital differential orthorectification, which uses the collinearity principle to generate the digital orthoimage. It states that the process starts from the object space, by taking the 3D ground coordinates of each orthoimage pixel center (or ground element). A diagram illustrates the collinearity principle, showing a camera at the top, a ground element (point P) in the middle, and its projection (point p) on the image plane. The text explains that point P is then projected backwards onto the image space through the collinearity equations to determine its image coordinates (point p). Below the slide, there is a prompt to "Please rate this session:" with five stars. On the right, there is a chat window with several messages and a "Type your message" input field. The bottom of the screenshot shows a Windows taskbar with various application icons and a system clock indicating 16:51 on 03-07-2020.

## Report:

There are several basic manipulations that can be done with ArcMap. This involves tools under Spatial Analyst > Surface (the Spatial Analyst extension needs to be turned on in order for this to work properly).

**Slope:** The DEM can easily be transformed into a slope map with the Slope tool. This map describes the slope for each raster cell in degrees based on the elevation at each point.

- **Aspect:** Another derivative is the aspect map. This map displays the aspect of each raster cell grouped into compass directions (north, northwest, etc.).
- **Hillshade:** This tool creates a map with a shade-effect (fig. 2.3) based on the input parameters that are entered in the tool. The resulting map is easier to interpret than the original DEM, because some topographic features are better visible (on small scale especially).
- **Curvature:** The curvature map (fig. 2.4) is calculated by using the curvature tool. This basically calculates the relative change in slope, could be seen as a second order DEM derivative.
- **Contour:** Topographic contour lines can be plotted with the contour tool (fig. 2.6). Based on the user defined parameters the new map will display (elevation based) contour lines.
- **Viewshed & Observer Points:** These tools are used to calculate a (set of) positions relative to a user defined (point) feature (fig. 2.7). This is useful to determine the visibility of a location.
- **Another useful way to display a DEM** is to use the "Select attribute" feature (fig. 2.8). By inserting a query and selecting a threshold, it is possible to select certain elevations on the map and display the location of these points.
- If you want to go a step further, maybe in order to classify the DEM based on elevation, you could use the reclassify tool. With the reclassified map it is possible to do a raster calculation in order to calculate a function for each raster cell (with each variable having its own map with values). Other possibilities with a DEM include interpolations. With certain tools it is possible to calculate unknown values based on known values that surround these unknown values. There are several ways to interpolate. It is also possible to convert the raster DEM to a vector map, and use vector related manipulations. This will however decrease the quality of the elevation data. The 3D Analyst tool can also be used to make a topographic profile of a section line in the DEM. This line can be drawn with the 3D analyst tool, and the profile can be made or customized with this tool as well (fig. 3).

## In-Depth Analysis:

DEMs are good for landscape analysis. There are many more advanced and specialized functions and applications in ArcMap that can be used for analysis. This includes, but is not limited to, hydrologic analysis, geologic and geomorphic analysis and landscape development.

It is also possible to do calculations with raster data. The DEM elevation values can be used for this, but another option is to reclassify the map and give each class a certain value that is used in a function. This can easily be displayed in a model, which can also be made in ArcMap.

