First Year B. Tech

SCHOOL OF CIVIL ENGINEERING

Basic of Civil Engineering

Course Code:

LABORATORY MANUAL

20 - 20

Preface
Basic of Civil Engineering

The laboratory work for the subject Basic of Civil Engineering for F.Y. B. Tech. students of MIT-World Peace University covers experiments based on some conventional and advanced equipments used in survey, planning drawing sheet, some field experiment and presentations based on sustainable development. It includes the laboratory as well as the hands on experience on the field of each instrument. The safety precautions to be followed in the laboratory and on the ground are included in this manual. In order to help the students to properly grasp the basic knowledge of Civil Engineering is given. We hope that this course will provide hands on experience and lifelong learning to the students.

General Instructions to students

1. Always wear college identity-card.
2. Follow your time table strictly.
3. Always carry write-up of respective experiment of scheduled practical with you.
4. Always carry a rough notebook to record the results and to do calculations.
5. Be punctual in your laboratory work and submission.
6. Follow proper dress code in laboratory.
7. Do not eat food, drink beverages or chew gum in laboratory.
8. Do not litter the laboratory. Keep the laboratory premises clean and tidy.

Safety Instructions to be followed in Civil Engineering Laboratory

Surveying Laboratory has several expensive equipment and therefore certain precautions should be taken.

1. Perform the experiment in the presence of a practical batch in-charge.
2. Every student must handle all the surveying instruments and equipments carefully and observe discipline on field.
3. Handle the instruments with both hands while moving or removing the instrument from the stand.
4. Wear cap and shoes while doing practical on the field.
5. Keep water bottle with you during practical.
6. Do not play with Ranging rod, Instrument stand, Hammer etc.
7. Follow the instructions carefully and handle the instruments to avoid its breakage or damage.
8. Have only your notebook on the table and other things should be kept in the rack.
9. Before you leave the laboratory the instruments should be kept in proper location.
10. Report all accidents / mishaps to your teacher immediately even if you think it is a minor one.

Basic of Civil Engineering

I N D E X

Sr. No.	Name of the Experiment	Page	Date of performance	Signature of Batch I/C
1.	Study of any 4 types of maps and explaining their uses, study from Google earth.			
2.	Computation of Reduced Levels using Auto Level.			
3.	Comparative analysis between collimation plane method and Rise and Fall Method.			
4.	Application of Digital Level in contouring.			
5.	Measurement of angles using prismatic compass.			
6.	Measurement of area by Digital Planimeter of Toposheet.			
7.	Introduction to photogrammetry and Drone survey.			
8.	Developing and Drawing of plan, elevation and Section of a building.			
9.	Use of various functions provided in the Total Station.			
10.	Survey of current trend in Civil Engineering and application.			
11.	Application of GIS and GPS in Civil Engineering.			
12.	Use of Civil Engineering software.			
13.	Exercise on sustainable development.			

CERTIFICATE

Certified that Mr./Ms._____of Class **F.Y.B. Tech.** Division _____ Roll No._____ has completed the laboratory work in the subject **Basic of Civil Engineering** in during the trimester I/II/III of the academic year_____.

Signature of the Faculty **Seal of the Head of the Department**

Name:_____. Class:_____. Batch:_____.

Roll No.:_____ Expt. No. 1

Performed on:_____. Submitted on:_____. Teacher's Sign.:_____.

STUDY OF ANY 4 TYPES OF MAPS AND WRITING THEIR USES

Theory:

A map is a graphic representation of selected natural and manmade features of the whole or a part of the earth's surface on a flat sheet of paper on a definite scale and in their correct relative geographic positions and elevation, symbols, colour differentiations and contours help to show the physical features- mountains, valleys and plains in their true relationship to the land and to manmade features.

Map Scale:

Maps are drawn to scale. A scale is the ratio of the distance between any two points on a map to the actual distance between the corresponding points on the ground. The map scale may be expressed in any of the following three different ways:

1) By a statement (1cm= 1km)
2) By a numerical fraction

   Representative Factor RF (1: 100000)= Distance on the map / Distance on the ground

   The numerator 1 (unity) represents the distance on the map while the denominator indicates the actual distance on the ground measured in the same units.

   1/ 10, 000, 00 or 1:10, 000, 00.
3) Graphical Section or Linear Scale

   Scale is drawn on the map.

Steps: Study the following things and write down in the separate ruled sheets

1) Title of the map
2) Scale of the map
3) Purpose of the map
4) Symbols shown on the map
5) Salient Features shown on the map viz. boundaries of the state, city, rivers shown, contour lines , climate, earthquake zone etc
6) Measure the distance between any two places using scale
7) Any special feature shown on the map
8) Write 8-10 uses of each map

Exercise:-

Study of google maps.

Reference Maps :-

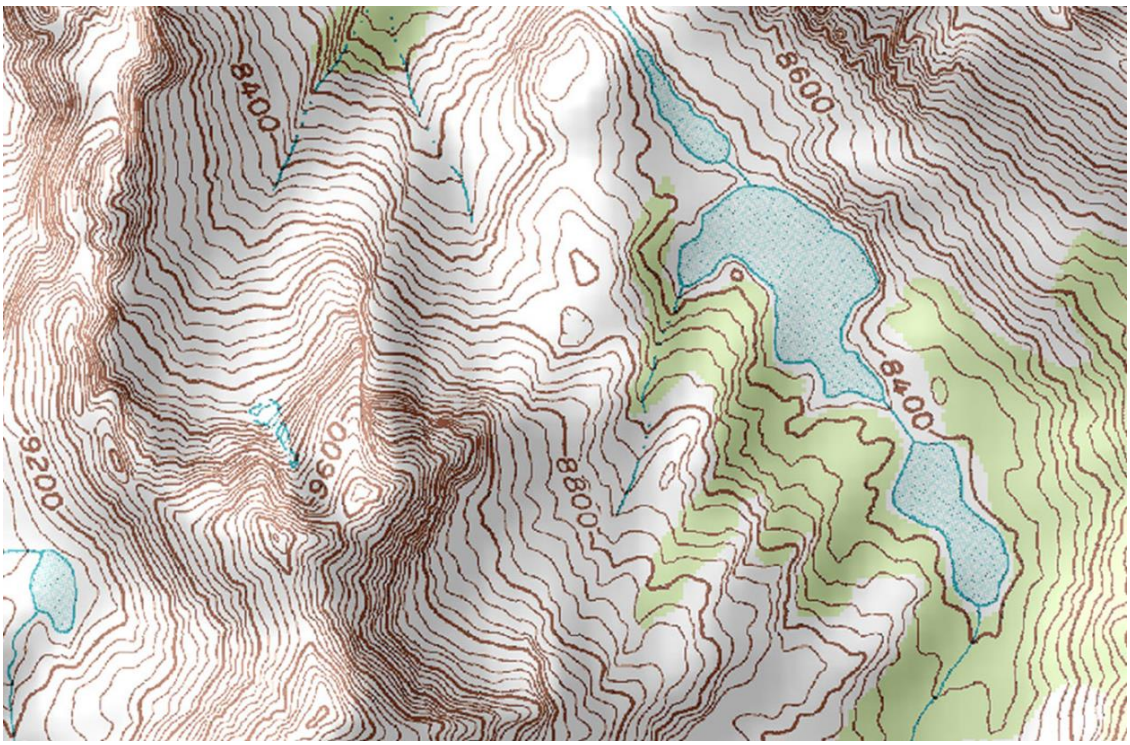

Fig. 1 Contour Map

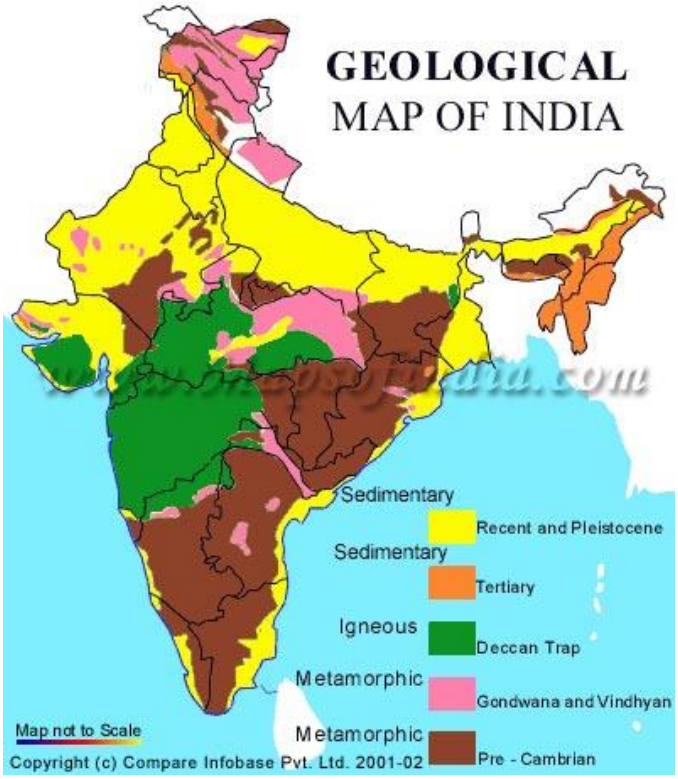

Fig. 2 Geological Map

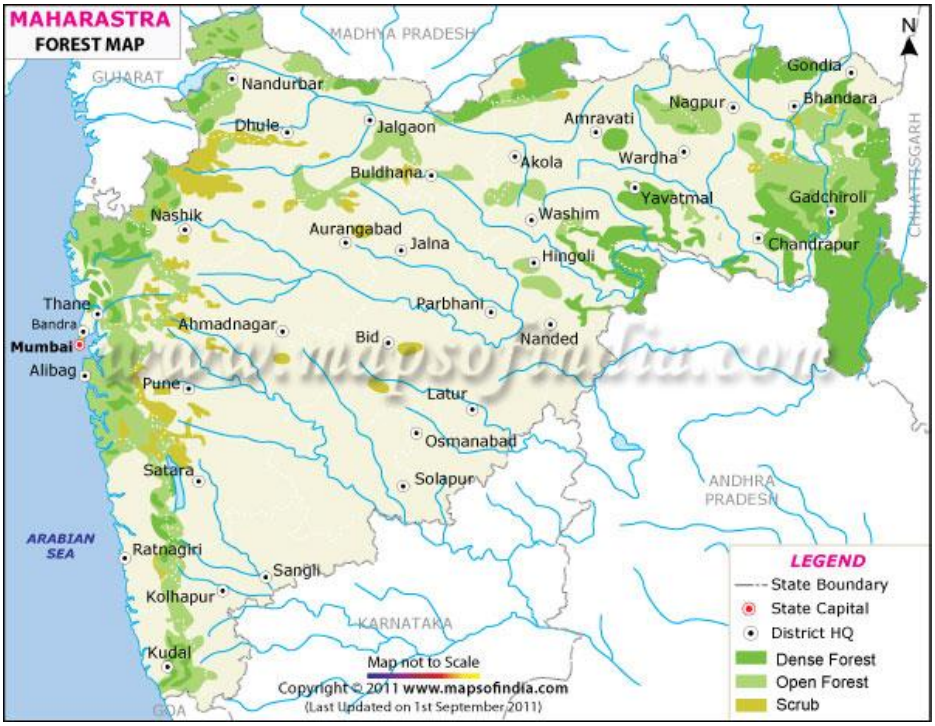

Fig. 3 Forest Map

Fig. 4 Location Map

R101

F.Y. B.Tech. Academic Year 20 - 20 Trimester:

SCIENCE & ENGG LABORATORY CONTINUOUS ASSESSMENT RUBRIC

COURSE: **EXPT NO.:**

EVALUATOR: **DATE:**

STUDENT:

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	1	2	3	4	5	
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Ethics	Copies the results from others	Completes the result analysis with help from others but forgets to acknowledge the help.	Completes the result analysis with help from others and acknowledges the help.	Produces his own result analysis but blames others for any inadequacy found during the examination	Produces his own result analysis faithfully and owns up the results without any manipulation	
					Total	

Teacher's Signature with Date: Student's Signature with Date :

Name:_____. Class:_____. Batch:_____.

Roll No.:_____ Expt. No. 2,3

Performed on:_____. Submitted on:_____. Teacher's Sign.:_____.

TO STUDY AND USE THE AUTO LEVEL

Task:

To find R.L. of at least 10-15 points by dumpy level using collimation plane method and rise and fall method.

Instruments:

Dumpy level/Auto level, leveling staff.

Theory:

Line of collimation: It is an imaginary line joining the intersection of cross hairs of diaphragm to the optical centre of object glass and its continuation.

Axis of telescope: It is the line joining the optical centre of the object glass and centre of eyepiece.

Axis of bubble tube: It is a straight line tangential to the longitudinal curve of the level tube at the centre of tube when telescope is perfectly horizontal.

Vertical axis: It is the axis about which the telescope can be rotated in a horizontal plane.

Adjustments of dumpy level

a) Permanent adjustments : (conditions)

1) Adjustment of the bubble tube: The axis of the bubble tube should be perpendicular to vertical axis.
2) Adjustment of cross hair ring: the horizontal cross hair should lie in a plane perpendicular to the vertical axis.
3) Adjustment of line of sight: the line of sight should be parallel to axis of the bubble tube.

b) Temporary adjustments :

Temporary adjustments are those adjustments that are required to the performed at each set-up of the level. They are necessary preparatory to like readings.

1) Setting up the level &
2) Focusing the Eye-piece and Object glass

1) Setting up the level : the level can be set up in the following way :

Fixing the instrument on tripod.

Legs adjustment:

i) Place the instrument over given station mark.

ii) Bring all the foot screw in the centre of their run.

iii) Spread the tripod legs well apart to get the required height of the instrument for easy sighting. Adjust the legs in such a way that the tribrach sprang is in level. (level the instrument first by adjusting the legs of tripod)

iv) Fix any two legs firmly in to the ground. Move the third leg to left or right till the main bubble is approximately in the centre. Then move it in or out until the bubble of the cross level is approximately in the centre.

v) Fix the leg in such a position that both (longitudinal and cross) bubbles are approximately in the centre of their run.

Levelling up:

i) Place the telescope parallel to any two foot screws and bring the bubble to the centre of its run by turning these screws equally either inwards or outwards.

ii) Turn the telescope through 90° so that it lies over the third foot screw. (Keep the telescope in the position perpendicular to the first position) Centre the bubble by turning this screw.

iii) Bring the telescope back to its original position without reversing the eye-piece and object glass ends.

iv) Again bring the bubble to the centre of its run and repeat these operations until the bubble remains in the centre of its run in both positions, which are at right angles to each other. If the instrument is in adjustment, the bubble will remain centre for all direction of the telescope.

2) Focusing the Eye-piece and Object glass :

a) Focusing the eye piece :

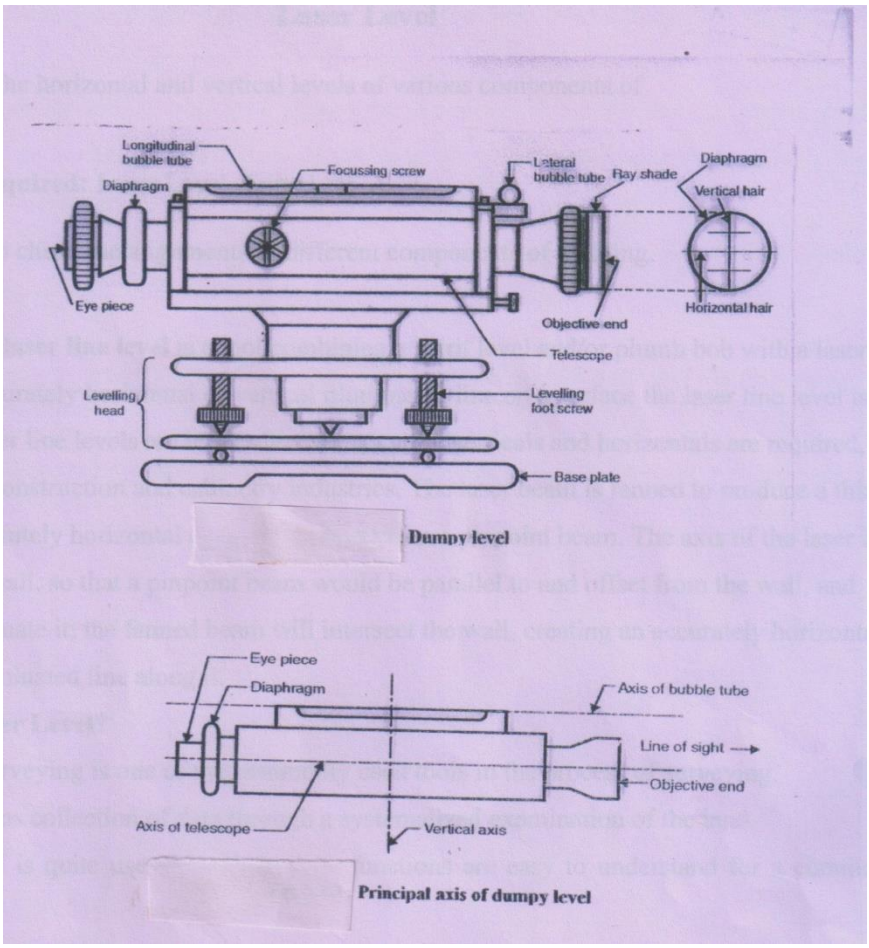
i) Remove the lid from the object glass and hold a white paper in front of it.

ii) Move the eye piece in and out until the cross hairs are distinctly seen. (care is to be taken not to take out the eye piece wholly)

b) Focusing of the object glass :

i) Direct he telescope towards the staff by looking through the eye piece and bring the image of the staff between the two vertical cross hairs.

ii) Move the eye up and down. The staff reading should not be change along with the movement of the eye. If so, it is said that parallax completely eliminated.


Longitudinal bubble tube
Focussing screw
Lateral bubble tube
Ray shade
Diaphragm
Vertical hair
Diaphragm
Eye piece
Objective end
Horizontal hair
Telescope
Levelling head
Levelling foot screw
Base plate
Dumpy level
Eye piece
Diaphragm
Axis of bubble tube
Line of sight
Objective end
Axis of telescope
Vertical axis
Principal axis of dumpy level


AL-28
No. 003217

Auto Level

Now the instrument is ready for taking the readings.

Student should find the R.L.s of given points by using either Rise and Fall method or Height of Instrument method. (10-15 staff stations with 1- 2 change point)

Reduced Levels by Collimation Plane Method:

Station	BS	IS	FS	Height of collimation plane(in m)	Reduced Level (in m)	Remark
1					500.000	BM
2						
3						
4						
5						
6						CP
7						
8						
9						
10						
11						
12						

Arithmetic check: ∑BS - ∑FS = Last RL – First RL

Sample calculation for collimation plane method

Reduced Levels by Rise and Fall method:

Station	BS	IS	FS	Rise	Fall	Reduced Level (in m)	Remark
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							

Arithmetic check: ∑BS - ∑FS = ∑Rise - ∑Fall =Last RL – First RL

Sample calculation for rise and fall method

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F.Y. B.Tech. Academic Year 20 -20 Trimester:

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Teacher's Signature with Date: Student's Signature with Date :

Name:_____. Class:_____. Batch:_____.

Roll No.:_____ Expt. No. 4

Performed on:_____. Submitted on:_____. Teacher's Sign.:_____.

Finding the RL of different points Using Digital Level

Instruments:

Digital Level, Digital staff, Tripod.

Procedure:

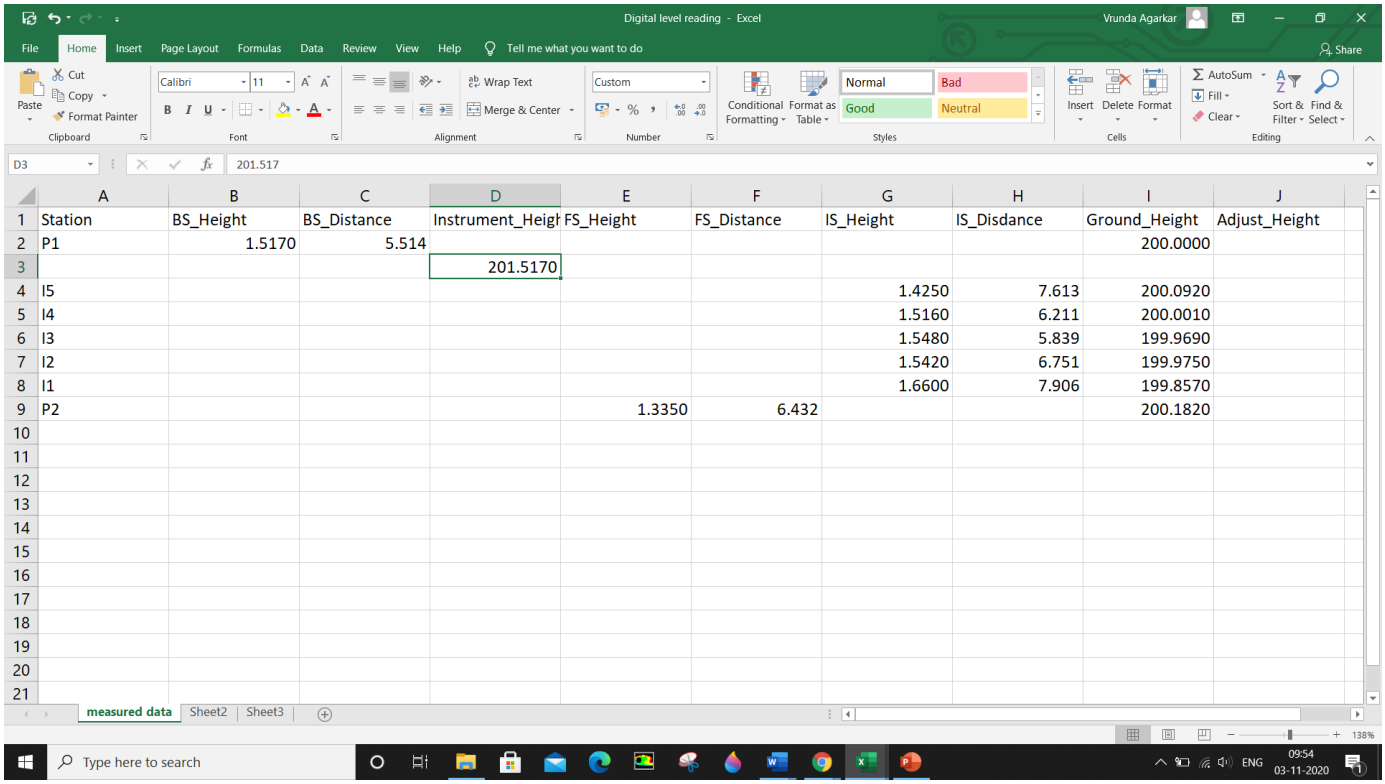
1) Centering :- If you need to measure an angle or alignment, please precisely center the instrument at a certain point with a plummet.
   i) Hang the plummet at the plummet hook of the central screw of the tripod.
   ii) Adjust the plummet line to the proper height
   iii) First, put the tripod on the known point approximately until the plummet is about 1 cm away from the point. Second, grasp two legs of the tripod and adjust the tripod by third leg until the head of tripod is leveled approximately with a proper height.
   iv) Expand the legs of the tripod and fix it on the ground firmly. Finally, observe the plummet and the hook and trample the legs into the ground.
   v) Slightly loosen the central screw of the tripod and move the instrument on the head until the plummet is centered at the known point. Tighten the tripod central screw.
2) Leveling up :-
   i) Centre the circular bubble by adjusting the tribrach screw.
   ii) First, put the tribrach as the below picture shown. Rotate 2 screws at the same time in opposite direction until the bubble moves to a position where the line between the bubble and screw C is perpendicular to the line between screw A and B (Refer Picture A).
   iii) Then rotate the screw C to move the bubble to the center of the central circle (Refer Picture B).
   iv) This procedure should be repeated for times until the bubble is centered on any directions.
3) Focusing :-
   i) Rotate the eyepiece slowly until the image of the cross hair becomes clear.
   ii) Sight at the digital staff with the rough collimator.

iii) Rotate the focusing screw until the image of digital staff becomes clear. Rotate the horizontal tangent screw to move the image of staff to the center of the vertical hair of the cross hair.

iv) Observe through the eyepiece. Move your eye slightly up, down, left and right to check whether relative position between the crosshair and the image of the staff is not changed. To remove the parallax, please repeat the procedure.

Fig. 6 Digital Level

Observation Table: Attach a printout of observation table .



Station	BS_Height	BS_Distance	Instrument_Height	FS_Height	FS_Distance	IS_Height	IS_Disdance	Ground_Height	Adjust_Height
P1	1.5170	5.514						200.0000	
			201.5170						
I5						1.4250	7.613	200.0920	
I4						1.5160	6.211	200.0010	
I3						1.5480	5.839	199.9690	
I2						1.5420	6.751	199.9750	
I1						1.6600	7.906	199.8570	
P2				1.3350	6.432			200.1820	

R101

F.Y. B.Tech. Academic Year 20 -20 Trimester:

SCIENCE & ENGG LABORATORY CONTINUOUS ASSESSMENT RUBRIC

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Name:_____. Class:_____. Batch:_____.

Roll No.:_____ Expt. No. 5

Performed on:_____. Submitted on:_____. Teacher's Sign.:_____.

MEASUREMENT OF BEARINGS USING PRISMATIC COMPASS

Task:

To find included Angle of the Triangle using Prismatic Compass.

Instruments:

Prismatic compass, ranging rod, chain, tape, peg Tripod stand , small pieces of stones.

Theory:

Prismatic compass is very valuable instrument. It is usually used for rough survey for measuring bearing and survey lines. The least count of prismatic compass is 30 min. It is graduated in clockwise direction from 0^0 to 360^0.the figures are written in inverted. Zero Is written at south end and 180 at north end and 270 at the east.

Whole Circle Bearing:

In whole circle bearing system, the bearing of a line is always measured clockwise from the north point of the reference meridian towards the line right round the circle. The angle thus measured between the reference meridian and the line is called Whole circle bearing of the line. Angles measured will have value between 0 to 360 degrees.

Conversion of W.C.B. in R.B

Case	W.C.B. between	R.B.	Quadrant
1	0^0 to 90^0	WCB	N-E
2	90^0 to 180^0	180-WCB	S-E
3	180^0 to 270^0	WCB-180^0	S-W
4	180^0 to 270^0	360-WCB	N-W

Reduced bearing (R.B): In this system of bearing of a line is measured clockwise or anticlockwise from north or south direction whichever is nearer to the line towards east or west. The concept of reduced bearing facilitates computations in traverse surveying.

Conversion of R.B in W.C.B.

case	R.B. In quadrant	Rule of W.C.B.	W.C.B. between
1	N-E	WCB=R.B	0^0TO90^0
2	S-E	WCB =180-R.B	90^0TO -180^0
3	S-W	WCB =R.B+180	180^0 TO -270^0
4	S-W	WCB =360-R.B	270^0 TO 360^0

Adjustment of the Prismatic Compass:

The compass should be fitted at the top of tripod having ball and socket arrangement. The adjustment of a compass is done in the following three steps.

1) Centering: - The compass fitted over the tripod is lifted bodily and placed approximately on the station peg by spreading the leg of a tripod equally, The centre of the compass is checked by dropping a small piece of stone from the centre of the bottom of the compass so that it falls on the top of the station peg. A plumb bob may be used to judge the centering either by attaching it with a hook provided at the bottom or otherwise by holding it by hand.

2) Levelling:-After the compass is centred, it is leveled by means of ball and socket arrangement so that the graduated circle may swing freely. It can be checked roughly by placing a round pencil on the top of the compass, when the pencil does not move, that is roughly the horizontal position.

3) Focusing the prism: - The prism attached is moved up and down so that graduation on the graduated circle should become sharp and clear.

Observation Table:

Sr. No	Station	Line	Observed bearing		Diff	Observed Included Angle	Correction	Corrected Included Angle	Corrected bearing		Remark
1		AB									
2		BC									
3		CA									
4											
						∑ =					

Sample Calculation:
Sum of Included angle = (2n-4) x Right angle
n= No of sides

Draw a Traverse –

Video Links :-

https://www.youtube.com/watch?v=iG6e4YeeGmw&t=193s

https://www.youtube.com/watch?v=TKzEBJ1qkz8

https://www.youtube.com/watch?v=afokWKWOMxY

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Name:_____. Class:_____. Batch:_____.

Roll No.:_____ Expt. No. 6

Performed on:_____. Submitted on:_____. Teacher's Sign.:_____.

TO MEASEURE AREA OF AN IRREGULAR FIGURE BY DIGITAL PLANIMETER

Instruments Required:

Digital Planimeter

Importance:

Digital Planimeter is used to measure area of any regular/ irregular figure on paper.

Measurement Procedure:

1) Fix the drawing paper containing the figure which area is to be measured.
2) Press "ON" key to switch on the supply.
3) Select unit -1 , it will show cm^2
4) To select scale as 1:1, Press 1 and then press scale key.
5) Mark a point on the outer periphery of the figure as a starting point.
6) Press START key , the buzzer sounds lightly, confirm that the display shows 0. Then trace figure by the tracing arm in the clockwise direction along the circumference and close on starting point.
7) Bigger areas are subdivided in two or three parts for convenience.
8) Following the same procedure area can be measured and number of times and its mean value can be obtained for greater accuracy.
9) Find out area of a regular figure , a figure combination of many regular figures and an irregular figure.
10) For practice, measure the area of any map and verify with the area given on the map.

Digital planimeter

Fig :-1 Regular square

Square of size 15 cm x 15 cm

Fig :-2 Irregular shape small

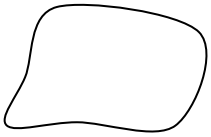
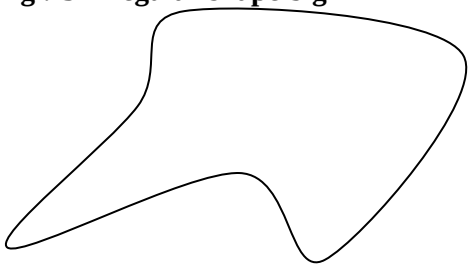


Fig :-3 Irregular shape big



Observation Table:

Fig No.	Repetition No	Scale	Unit	Area	Average Area
1	**1**	1:1	Sq. cm.	**225.2**	**225.4 cm^2**
	2	1:1	Sq. cm.	**226.1**	
	3	1:1	Sq. cm.	**224.9**	
2	**1**	1:1	Sq. cm.	**70.5**	**70.57 cm^2**
	2	1:1	Sq. cm.	**69.8**	
	3	1:1	Sq. cm.	**71.4**	
3	**1**	1:1	Sq. cm.	**330.4**	**330.97cm^2**
	2	1:1	Sq. cm.	**330.9**	
	3	1:1	Sq. cm.	**331.6**	

Result:

1) Average area of Fig No1:
2) Average area of Fig No2:
3) Average area of Fig No3:

Video Links :

https://www.youtube.com/watch?v=VBJzhkuoJsY
https://www.youtube.com/watch?v=CPQ_1DI5v80
https://www.youtube.com/watch?v=mxr4TQ09z_w

R101

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Regularity and punctuality	Did not Perform/ submit	Performed and submitted later than scheduled date with permission	Performed on schedule; submitted two weeks late	Performed on schedule; submitted one week late	Performed and submitted as per schedule	
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					Total	

Teacher's Signature with Date: Student's Signature with Date :

Name:_____. Class:_____. Batch:_____.

Roll No.:_____ Expt. No. 7

Performed on:_____. Submitted on:_____. Teacher's Sign.:_____.

INTRODUCTION TO PHOTOGRAMMETRY AND DRONE SURVEY

Aim :- A) To study the mirror stereoscope

B) To determine the air base distance for the given aerial photographs.

Instruments Required:

Mirror stereoscope, pair of stereo photographs (aerial), china glass pencil, scale etc.

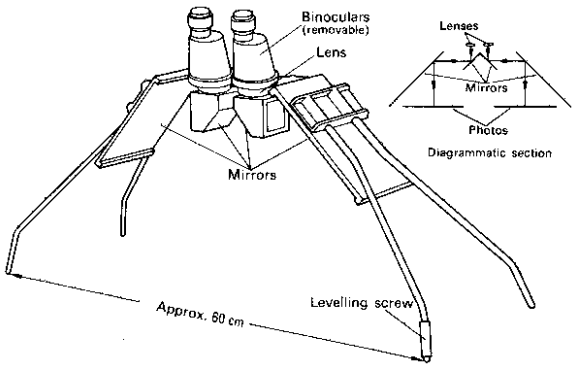
Procedure: -

A) To study the mirror stereoscope

Mirror stereoscope: -

The stereoscopic fusion is facilitated by the use of stereoscopes. The principal function of stereoscope is to accommodate a wide separation of the point in the left and right photograph, to the fixed length of the eye base. In mirror stereoscope two mirrors are used. As shown in the figure the separation of the points has been widened from

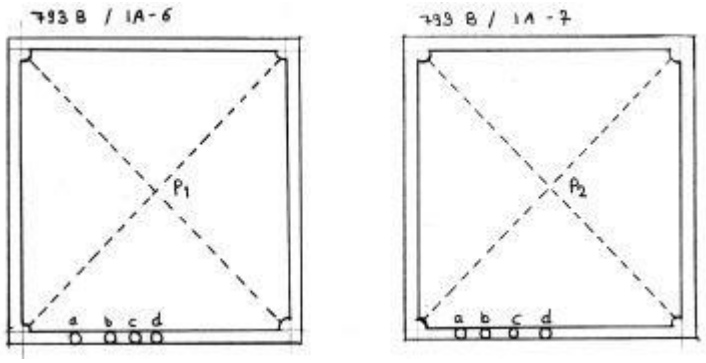
'a a_1' to 'a_2 a_3' and 'b b_1' to 'b_2 b_3'. Although lens or prism stereoscopes are compact and convenient for use in the field, the mirror stereoscope allows greater area of photographs to be covered. The ray diagram explains the optics with the help of which the fusion that is the three-dimensional view is obtained through the stereoscope.



Mirror stereoscope

Viewing The Aerial Photographs & Its Mutual Orientation-

The aerial, photograph is also called as stereo grams. Mark center point (i.e Principal point, at intersection of straight lines connecting fudicial frame mark .Mow place the both photographs below stereoscope in direction of flight. Both photos are now shifted & swung until marked object in two pictures appear to be one & on line parallel to base. In other words photographs are shifted & swung till 3d view is obtained. This procedure of obtaining 3d view is called as 'fusing' photographs.



P1 & P2 – Principal points (Fiducial Mark) 793B (793 B – Identification no for area)

Phototgraph no – 1A-6 (Serial no for strip)

a - Date
b - Time
c - Pressure
d - Direction of flight

Procedure

There are four basic methods of determining scale of an aerial photography which is in decreasing order of accuracy are as follows:

- The relation between two points on ground of known distance and same two points on photo.
- The relation between two points on map and same two points on photo.
- The relation between an object on ground where dimensions are known same object on photograph.
- The relationship between focal length of camera lens and altitude of camera lens.

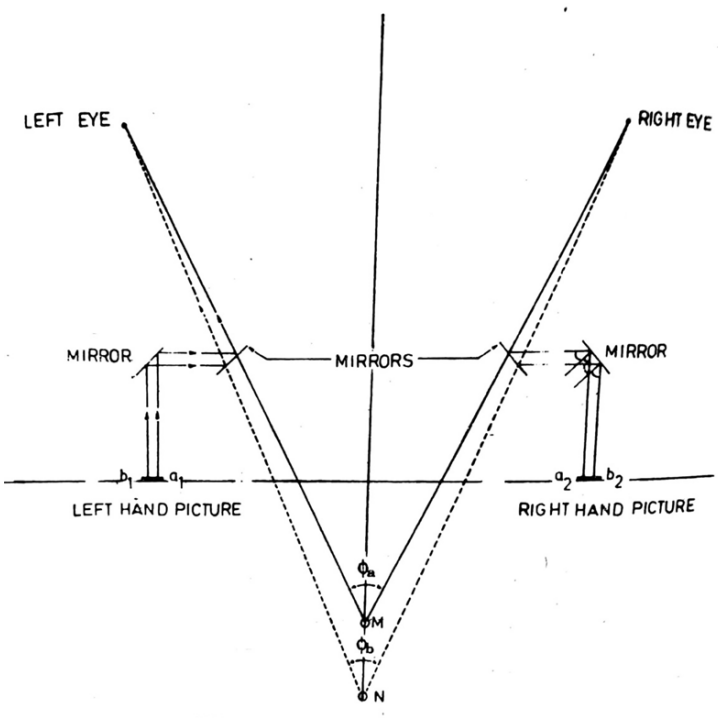
E.g. focal length (f) = 15m
Altitude (H) = 1500m
Scale = 15/1500x100 = 1:10000

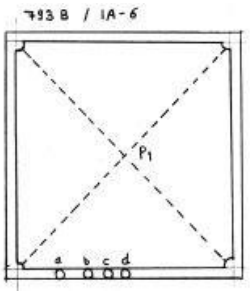
B) To determine the air base distance for the given aerial photographs.

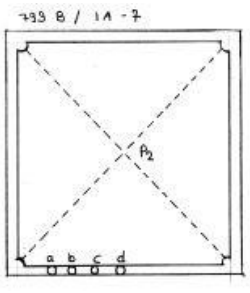
Measurement **of Air Base Distance:-**

1. A pair of consecutive aerial photographs is taken and the principal points 'P_1' on the left photograph and 'P_2' on the right photograph are marked with china pencil, taking the help of the markings on the photographs.
2. The photographs are placed under the stereoscopes and the photographs are moved until they fuse and a clear three-dimensional picture of the terrain photographed is seen.
3. By keeping the point of one pencil on the principal point P'_1 of the left photograph and by moving the point of the other pencil the corresponding position of P'_1 is obtained on the right photograph in such a way that the points of the two pencils fuse with each other. This point will be marked on the right photograph and called P'_1. By following the similar proceduresP'$_2$ on the right photograph is transferred to the corresponding point P'_2 on the left photograph.
4. The points P_1, P'_2 and P'_1, P_2 are joined. These distances are expected to be of same length. They are measured and the average taken which in called as principal base line.
5. The average base line distance is multiplied by the scale of the photograph to obtain the air base distance.

Diagram:-







P_1 = Principle point of Left Photograph	P_2 = Principle point of Right Photograph
P_2' =Transferred Principle point of Right Photograph	P_1'=Transferred Principle point of Left Photograph

Observed Photo No.	**Photo Base Distance (1)** P_1P_2'	**Photo Base Distance (2)** $P_1'P_2$	**Mean**	**Scale**	**Air Base Distance**

Observations:-

Show calculations for air base distance measurement.

$P_{1,}\ P_2$ =_____cm

$P'_{2,}\ P_1$ =_____cm

$$Mean\ base\ \text{distance} = \frac{(P_1\ P'_2 + P'_1\ P_2)}{2} = \text{----------cm}$$

$$Air\ base\ \text{distance} = \text{Mean air base distance} \times \text{scale of photograph} = \text{.....cm} = \text{.....km}$$

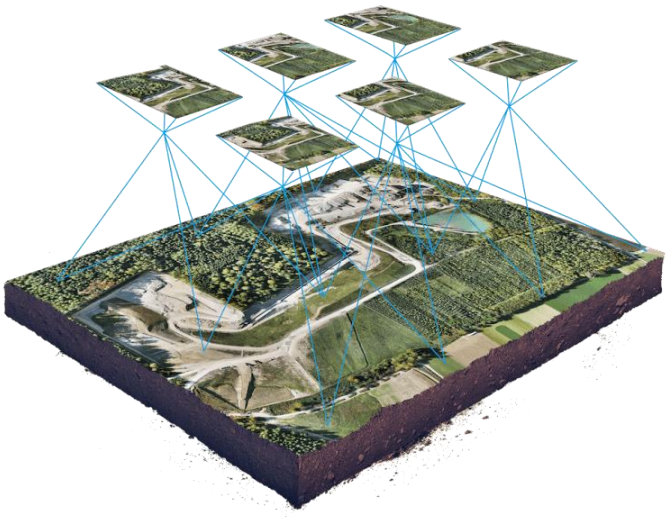
Introduction to Drone Technology:-

Aim: To study the use of drone in surveying.

Theory:

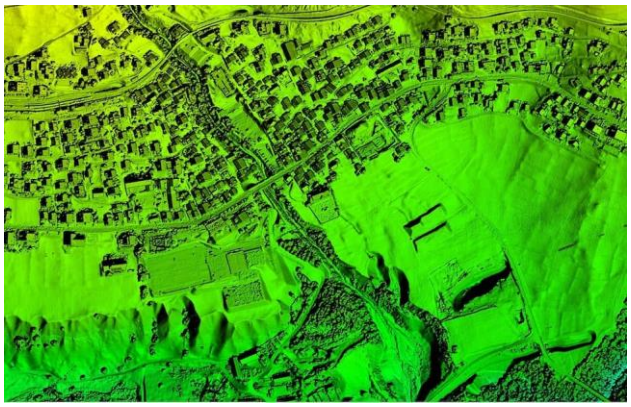
A drone survey refers to the use of drone, or unmanned aerial vehicle (UAV), to capture aerial data with downward-facing sensors, such as RGB or multispectral cameras, and LIDAR payloads. During a drone survey with an RGB camera, the ground is photographed several times from different angles, and each image is tagged with coordinates.

Survey drones generate high-resolution orthomosaics and detailed 3D models of areas were low-quality, outdated or even no data, are available. They thus enable high - accuracy Cadastral maps to be produced quickly and easily, even in complex or difficult to access environments. Surveyors can also extract features from the images, such as signs, curbs, road markers, fire hydrants and drains.

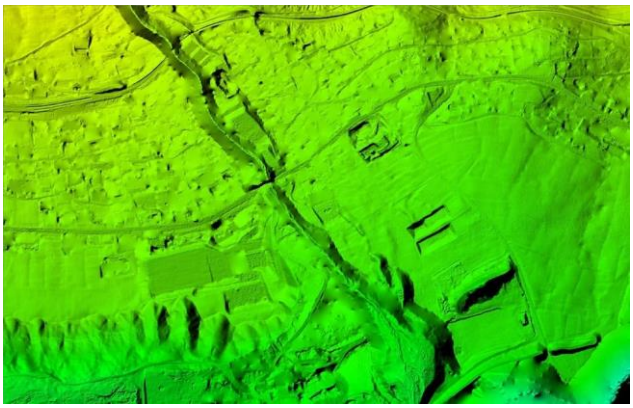


Orthomosiac Maps

3D Points Cloud

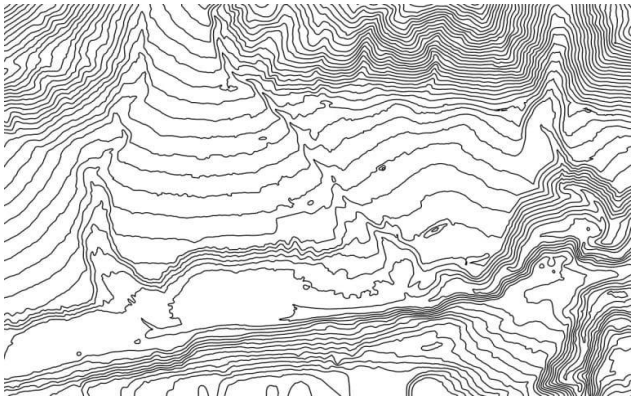


Digital Surface Model (DSM)



Digital Terrain Model (DTM)

3D Textured Mesh



Contour Lines

Procedure of Drone Survey:

1. Check before you leave the office: Check the local regulations and make sure taht you are allowed to fly your drone at the planned location. Also, make sure that the weather is suitable, meaning no rain, fog, snowfall or strong winds. Check that the battery of your drone and connected devices such as tablets are fully charged and that the memory card of your drone camera has sufficient empty space to capture the entire project.

2. Plan your flight: You can create the survey flight plan with the drone flight planning app on the tablet. For this, just tap and drag the points around the area you want to survey, or import a KML file. Make sure you account for tall objects within the flight plan, as well as altitude differences. If needed, you can adjust flight settings such as altitude, ground sampling distance (GSD), flight direction and images overlap.

3. Set up your flight in the field: During this step, you basically unpack and assemble the drone and make sure that it is ready to take off in safe conditions. Following the interactive check-list, you will one-by-one

check every parameter, like the calibration of the airspeed sensor and making sure the camera lid is removed.

4. Fly and collect images: After pushing the take-off button, the drone autonomously takes off, captures images and lands back where it started. In this step, the operator essentially makes sure that nobody approaches the drone during take-off or landing and that weather conditions stay optimal for the survey mission.

5. Geotag your Images: After one or several flights, import the images into WingtraHub software to geotag them. Geo-tagging assigns geographical position (X, Y, Z) information to the images either in a separate CSV file or in the images' meta-data.

Processing of Drone Survey:

While surveying with drones, images of the ground are taken from multiple vantage points. Through processing these images, a Photogrammetry software can then create orthomosaics and 3D models, from which it can measure accurate distance, as well as surfaces and volumes of physical objects.

Data Outputs from the Drone:

Images taken by the drone are usually saved on a memory card (such as SD card), just like for any other camera. Depending on the technology used by the drone, the images are already Geo-tagged or can be imported in a Geo-tagging software, such as WingtraHub. According to the size of the survey site, you probably have between a few hundred images and a few thousand, and each image contains geographical information (X, Y, Z).

Importing into a Photogrammetry software: After importing or uploading the geo-tagged images in a Photogrammetry software such as Drondeploy, delair.ai., 3DR Sitescan or Pix4D, images will be stitched together to create 2D or 3D models of the surveyed site. Image processing can be a lengthy process depending on the number of images and the performance of your computer. Some Photogrammetry software are desktop-based.

How Drones Work

A typical unmanned aircraft is made of light composite materials to reduce weight and increase maneuverability. This composite material strength allows military drones to cruise at extremely high altitudes.

UAV drones are equipped with different state of the art technology such as infrared cameras, GPS and laser (consumer, commercial and military UAV).

Drones are controlled by remote ground control systems (GSC) and also referred to as a ground cockpit.

An unmanned aerial vehicle system has two parts, the drone itself and the control system.

The nose of the unmanned aerial vehicle is where all the sensors and navigational systems are present. The rest of the body is full of drone technology systems since there is no space required to accommodate humans.

The engineering materials used to build the drone are highly complex composites designed to absorb vibration, which decrease the sound produced. These materials are very light weight.

Radar Positioning & Return Home

The latest drones have dual Global Navigational Satellite Systems (GNSS) such as GPS and GLONASS.

Drones can fly in both GNSS and non satellite modes. For example, DJI drones can fly in P-Mode (GPS & GLONASS) or ATTI mode, which doesn't use GPS.

Highly accurate drone navigation is very important when flying, especially in drone applications such as creating 3D maps, surveying landscape and SAR (Search & Rescue) missions.

When the quadcopter is first switched on, it searches and detects GNSS satellites. High end GNSS systems use Satellite Constellation technology. Basically, a satellite constellation is a group of satellites working together giving coordinated coverage and are synchronized, so that they overlap well in coverage. Pass or coverage is the period in which a satellite is visible above the local horizon.

UAV Drone GNSS On Ground Station Remote Controller

The radar technology will signal the following on the remote controller display;

- Signal that enough drone GNSS satellites have been detected and the drone is ready to fly
- Display the current position and location of the drone in relation to the pilot
- Record the home point for 'Return To Home' safety feature

Most of the latest UAVs have 3 types of Return to Home drone technology as follows;

- Pilot initiated return to home by pressing button on Remote Controller or in an app
- A low battery level, where the UAV will fly automatically back to the home point
- Loss of contact between the UAV and Remote Controller, with the UAV flying back automatically to its home point

The latest Mavic Air2 technology can sense obstacles during automatic return to home.

Realtime Telemetry Flight Parameters

Nearly all drones have a Ground Station Controller (GSC) or a smartphone app, allowing you to fly the drone and to keep track of the current flight telemetry. Telemetry data showing on the remote controller many include UAV range, height, speed, GNSS strength, remaining battery power and warnings.

Many UAV drone ground controllers use FPV (First Person View), which transmit the video from the drone to the controller or mobile device.

No Fly Zone Drone Technology

In order to increase flight safety and prevent accidents in restricted areas, the latest drones from DJI and other manufacturers include a “No Fly Zone” feature.

The no fly zones are regulated and categorized by the Federal Aviation Authority (FAA). Manufacturers can change the no fly zone drone technology using UAV firmware updates.

Application of Drone Techonology

1. Aerial photography for journalism and film
2. Express shipping and delivery
3. Gathering information or supplying essentials for disaster m ..
4. Thermal sensor drones for search and rescue operations
5. Geographic mapping of inaccessible terrain and locations
6. Building safety inspections
7. Precision crop monitoring
8. Unmanned cargo transport
9. Law enforcement and border control surveillance
10. Storm tracking and forecasting hurricanes and tornadoes

R101

F.Y. B.Tech. Academic Year 20 -20 Trimester:

SCIENCE & ENGG LABORATORY CONTINUOUS ASSESSMENT RUBRIC

COURSE: **EXPT NO.:**

EVALUATOR: **DATE:**

STUDENT:

DIMENSION	SCALE					SCORE
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					Total	

Teacher's Signature with Date: Student's Signature with Date :

R101

F.Y. B.Tech. Academic Year 20 -20 Trimester:

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Teacher's Signature with Date: Student's Signature with Date :

Name:_____. Class:_____. Batch:_____.

Roll No.:_____ Expt. No. 8

Performed on:_____. Submitted on:_____. Teacher's Sign.:_____.

DEVELOPING AND DRAWING PLAN, ELEVATION AND SECTION OF A RESIDENTIAL BUILDING

Theory:

Planning of residential building

Importance of building drawing:

Building drawing is a graphical language of drawing, consist of lines (vertical horizontal, inclined and dotted). Drawing is a tool to convert requirement into reality. Knowledge of preparing and reading drawing is essential for preparing estimates and supervision of construction work. Correct drawing save cost, labour and time in office as well as on site.

Principles of planning:

These are the guidelines or planning the building to suit their functional requirements, various principles of planning are:

1. Aspect
2. Prospect
3. Privacy
4. Roominess
5. Grouping
6. Circulation
7. Elegance
8. Sanitation
9. Orientation
10. Economy

(This has to be understood and written in field book in detail by the student)

DETAILS:- 1BHK GROUND FLOOR FRAME STRUCTURE

Built up area – 50 to 60 sq. m.
Plot size – 200 to 250 sq. m.
Permissible FSI – 1.00
Minimum open spaces – Front – 4.5 m
Rear/side – 3.0m

In planning of residential building sheet various plans to be drawn.

1. Line plan
2. Elevation
3. Section XX

4. Key plan
5. Construction note
6. Schedules of doors and windows

1. Line plan

Line plan is the plan which shows only arrangement of different rooms without considering the thickness of brick wall. Line plan is nothing but the top view of building (Line plan of 1BHK building is expected to be drawn by the student).

Rooms included as follows (Generally drawn to a scale of 1:100**):**

1. Hall
2. Kitchen
3. Bed room
4. Bathroom
5. W.C. (Water Closet)
6. Varandah (1m wide)

2. Sectional plan

Sectional Plan is the plan which shows arrangement of various rooms by considering the thickness of brick wall. It is also the top view of building.

In this S.P. it is expected to show the plan in detail, show all window door, Chajja projection, columns, steps slab and projection write the labelling of room. Also show the section line which cuts the building at still level.

3. Elevation

Elevation is nothing but the front view of building (how the building looks from front) which includes:

1. Ground Level (G.L.) - (00 mm)
2. Plinth level (600 mm)
3. Still level (1500 mm)
4. Lintel level (2700 mm)
5. Slab level (3600 mm)

(In this elevation, it is expected to show all the levels in details by the students)

4. **Section XX**

If the building cuts at still level then how the building looks shows the section XX.

(Students is expected to draw all levels in details)

All windows, RCC Beam, Slab, type of foundation various levels in plinth.

1. P.C.C.
2. Rubble
3. Hard murum

5. **Key Plan**

Key plan is the plan which shows total plot area, how much distance should be left from front, side, back, rear.

Generally from front – 4.5 m

Side, rear, back – 3 m

(Student is expected to draw key plan to scale of 1:500 and show all the Built up area in detail)

Plot Area- Total Area of plot

BUA- It's the area on which a building is to be constructed.

F.S.I. – Floor Space Index

FSI = Built Up Area / Plot Area.

AREA STATEMENT:

SCALE :- 1:500
PLOT AREA : _____
BUILT-UP AREA :

A1 = _____
A2 = _____
A3 = _____

FSI = BUILT-UP AREA/PLOT AREA
= _____
= _____

6. Construction Note:

It is expected to write in details by the student

WRITE THE HEADING OF CONSTRUCTION NOTES IN **8MM** AND DETAILS OF THE CONSTRUCTION NOTES IN **6 MM**

1) TYPES OF CONSTRUCTION :- RCC FRAMED STRUCTURE

2) SECTION DETAILS :-

PLINTH	600MM
MARBLE MOSAIC FLOORING	50 MM
PCC BED (1:3:6)	150 MM
RUBBLE SOLING	230 MM
HARD MURUM	170 MM
STEPS	4 NO.
RISE	150 MM
TREAD	250 MM

3) PERMISSIBLE **FSI – 1.00**

4) SUBSTRUCTURE :- i) FOUNDATION HARD STRATA AT- 1500 MM
ii) RCC ISOLATED SLOPED FOOTING
iii) PCC BED FOR FOUNDATION- 150 MM (1:3:6)
iv) STEPPED WALL FOOTING IN RUBBLE MASONARY

5) SUPERSTRUCTURE :- BRICK MASONARY , EXTERNAL WALL- 230 MM
INTERNAL WALL -150 MM

6) MATERIALS USED :- CONCRETE M20 GRADE
MILD STEEL Fe 250
TOR STEEL Fe 415

7) RCC SLAB – 100 MM THICK

8) RCC BEAM – 230 MM X 400 MM

9) RCC COLUMN – 230MM X 450MM

10) FLOORING – MARBLE MOSAIC FLOORING

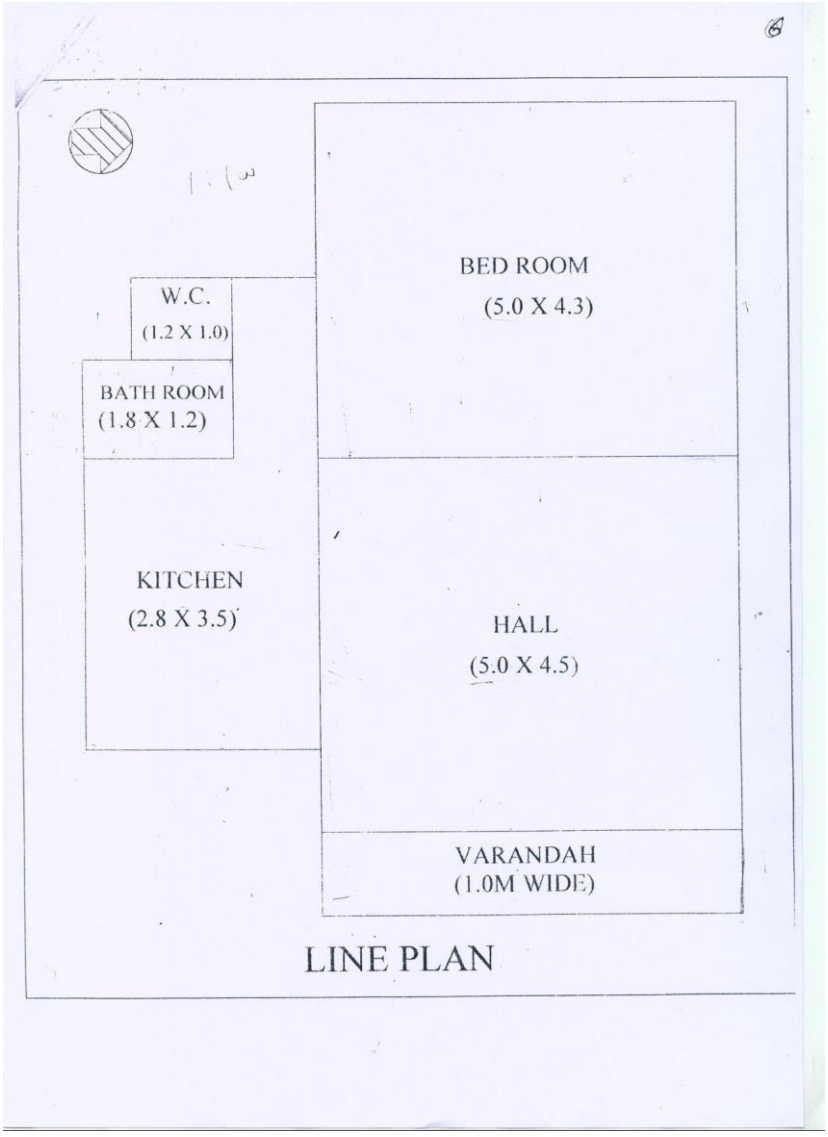
11) W.C. PAN – ORRISA TYPE PAN

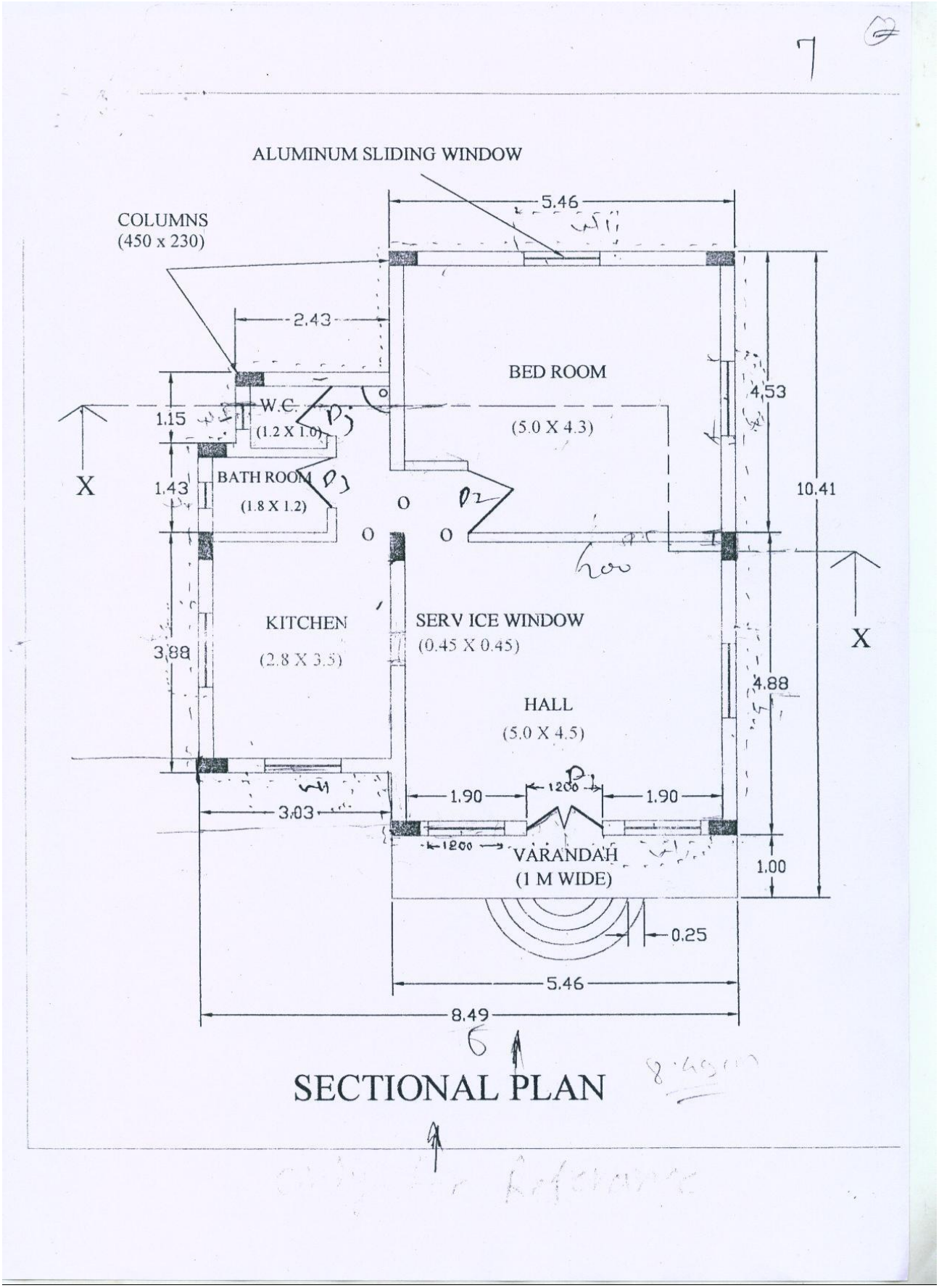
North direction arrow is expected to draw at top which shows the facing direction of building.

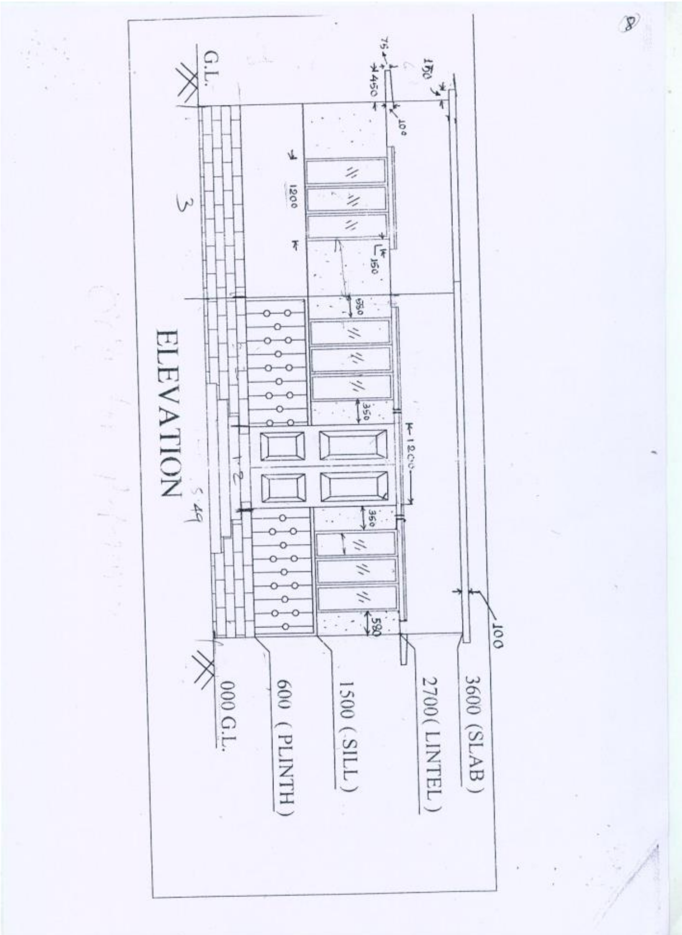
7. Schedule of Doors and Windows:

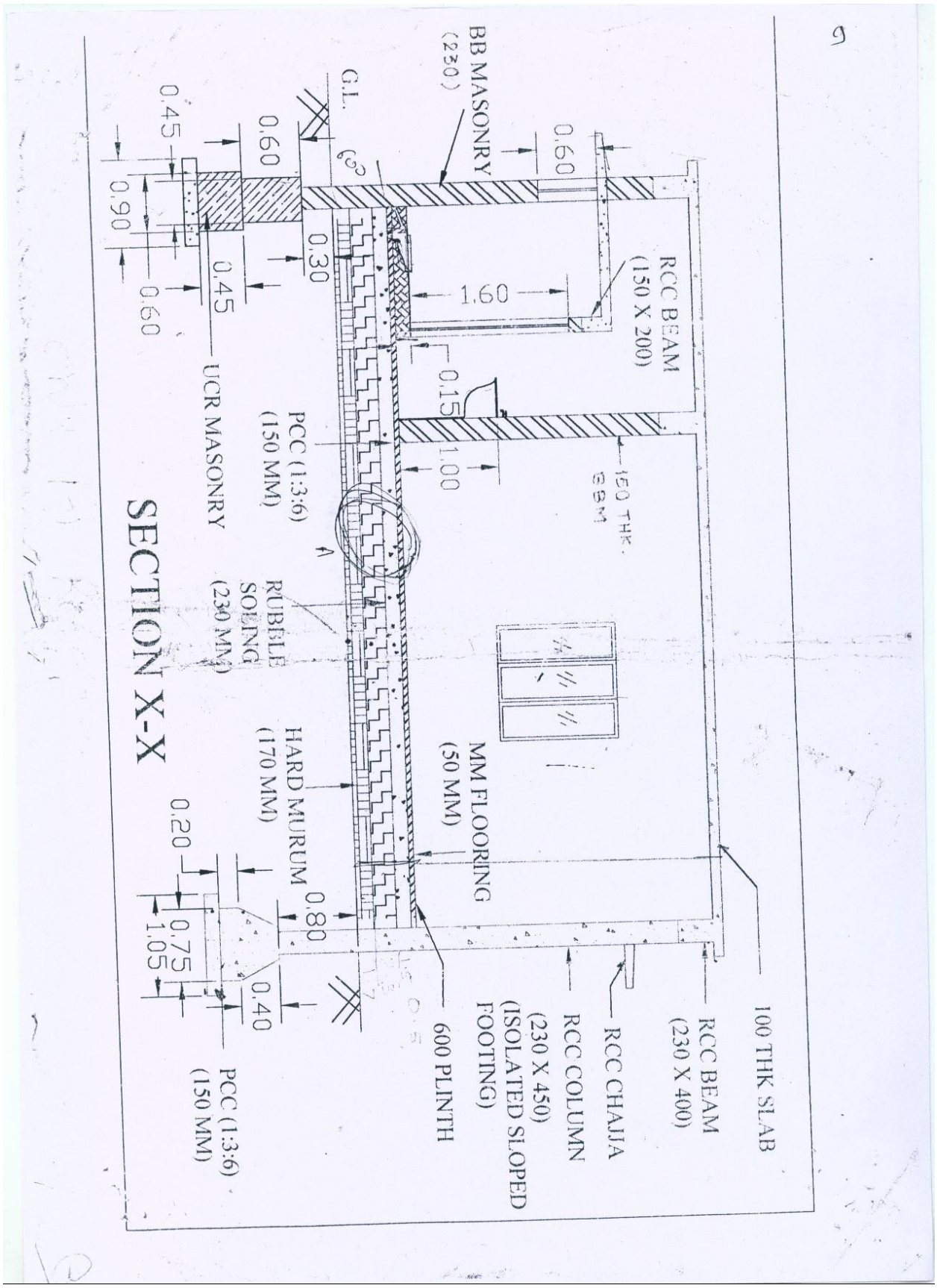
Student is expected to prepare a table showing sizes and quantity of doors, windows and ventilators to be provided in that building.

DOOR & WINDOWS	SIZE	TYPE	NO.
D1	1200 x 2100	MAIN TEAK WOOD DOOR	1
D2	1000 X 2100	INTERNAL / FLUSH DOOR	1
D3	800 X 1600	FLUSH DOOR	2
O	1000 X 1200	OPENING	3
W1	1200 X 1200	ALUMINIUM SLIDING WINDOWS	7
W2	450 X 600	STEEL LOUVERED WINDOWS	2
W3	450 X 450	SERVICE WINDOW	1




ALUMINUM SLIDING WINDOW
COLUMNS
(450 x 230)
5.46
2.43
BED ROOM
(5.0 X 4.3)
4.53
W.C.
(1.2 X 1.0)
1.15
BATH ROOM
(1.8 X 1.2)
1.43
X
10.41
KITCHEN
(2.8 X 3.5)
SERV ICE WINDOW
(0.45 X 0.45)
3.88
4.88
HALL
(5.0 X 4.5)
1.90
1200
1.90
3.03
1200
VARANDAH
(1 M WIDE)
1.00
0.25
5.46
8.49
SECTIONAL PLAN


ELEVATION
G.L.
3600 (SLAB)
2700 (LINTEL)
1500 (SILL)
600 (PLINTH)
000 G.L.


SECTION X-X
BB MASONRY (230)
G.L.
0.60
0.45
0.90
0.60
0.30
0.45
0.60
1.60
RCC BEAM (150 X 200)
0.15
1.00
100 THK. SBM
UCR MASONRY
PCC (1:3:6) (150 MM)
RUBBLE SOLING (230 MM)
HARD MURUM (170 MM)
MM FLOORING (50 MM)
0.80
0.20
0.75
1.05
0.40
PCC (1:3:6) (150 MM)
600 PLINTH
RCC CHAJJA
RCC COLUMN (230 X 450) (ISOLATED SLOPED FOOTING)
RCC BEAM (230 X 400)
100 THK SLAB

FIRST YEAR

BUILDING PLANNING SHEET

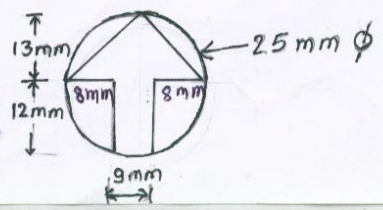
<table>
<tr><td rowspan="3">ELEV.</td><td colspan="2" rowspan="3">SEC.</td><td>NORTH
CONSTR. NOTES</td></tr>
<tr><td rowspan="2">KEY PLAN
&
AREA STATEMENT</td></tr>
<tr><td rowspan="2">NAME PLATE</td></tr>
<tr><td rowspan="2">LP</td><td colspan="2">SP</td></tr>
<tr><td>SCHEDULE
FOR
DOOR/WINDOW</td></tr>
</table>

1:500 scale

Scale: - 1:100

Note: -

1) LP---Line Plan—To be given by the teacher
2) ELEV—Elevation (With Levels)
   - i) Slab level 3600mm
   - ii) Lintel level 2700mm
   - iii) Sill level 1500mm
   - iv) Plinth level 600mm
   - v) Ground 000mm
3) SP—Sectional plan AT SILL LEVEL
4) SEC—Section thro' W. C.
5) NORTH 25 mm ϕ with 45^0 hatching



6) CONSTRUCTION NOTES Write the heading of Construction notes in 8 mm & details of the construction notes in 6 mm

Note: -

All drawings to be drawn in rough during the 2 practical turns individually by every student. The teacher should develop sectional plan and section in the class itself. Signatures on rough drawings to be given by the teacher.

DETAILS: -

composite

1-BHK GROUND FLOOR FRAME STRUCTURE

Built up AREA—50 to 60 sq. m.

PLOT SIZE—200 to 250 sq. m.

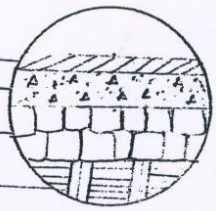
PERMISSIBLE FSI—1.00

Minimum OPEN SPACES—FRONT—4.5 m

Minimum REAR/SIDE—3.0 m

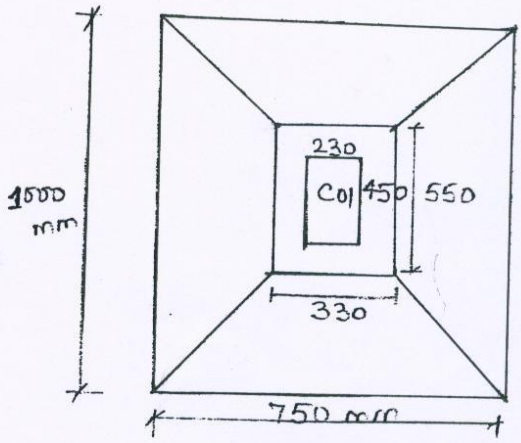
SECTION DETAILS:-

Plinth	600 mm
Marble mosaic flooring	50 mm
PCC BED (1:3:6)	150 mm
Rubble soling	230 mm
Hard Murum	170 mm
Steps	4 no.
Rise	150 mm
Tread	250 mm



Building Planning Sheet

COLUMN SIZE 230 mm x 450 mm



FOOTING DETAILS

Hard strata at	1.5 m below GL
PCC BED	150 mm (1:3:6)
Sloped isolated footing	

WALLS

External	230 mm
Internal	150 mm

SLABS AND BEAMS

R. C. (M20) Slab	100 mm thk.
R. C. (M20) Beam	230 mm X 400 mm
R. C. (M20) Lintel Beam	
For ext door	230mm X 200mm
For internal door	150 mm X 200 mm
Bearing for lintel	150 mm on each side

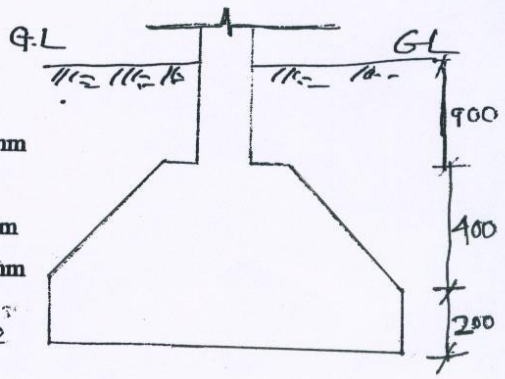
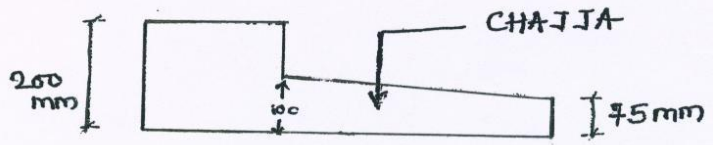


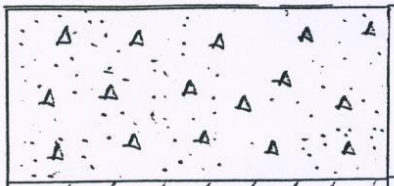
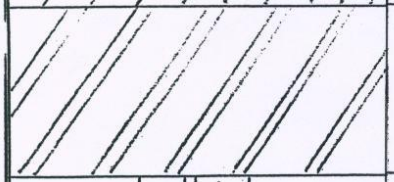
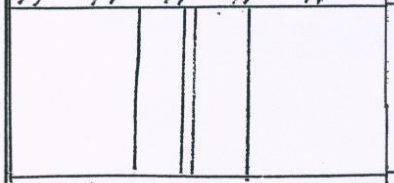
Fig.



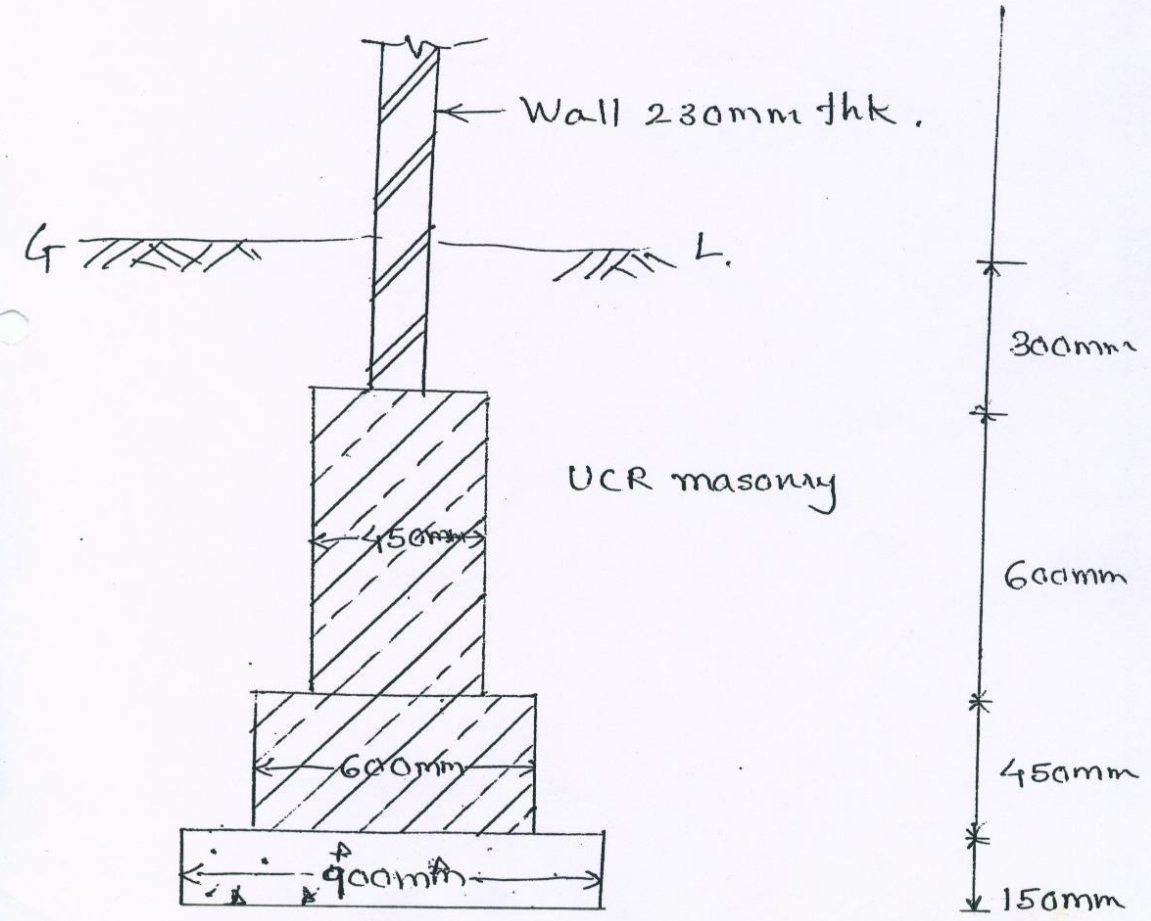
Schedule of Doors/Windows

D_1 (main door)	1200 mmX 2100mm Teak wood panelled
D_2 (internal door)	1000mm X 2100mm Flush door
D_3 (Toilets)	800mm X 1600mm Flush door
W_1	1200mm X 1200 mm Aluminum sliding 3 panelled
W_2	450 mmX 600mm steel louvered window
O	Opening

CONVENTIONS TO BE USED IN DRAWING

	P. C. C. or R. C. C
	U. C. R. masonary (uncoursed Rubble)
	B. B. masonary (Burnt Brick)
	Doors, Windows
	Assume Suitable additional data

SECTION THROUGH EXTERNAR WALL.



R101

F.Y. B.Tech. Academic Year 20 -20 Trimester:

SCIENCE & ENGG LABORATORY CONTINUOUS ASSESSMENT RUBRIC

COURSE: **EXPT NO.:**

EVALUATOR: **DATE:**

STUDENT:

DIMENSION	SCALE					SCORE
	1	2	3	4	5	
Regularity and punctuality	Did not Perform/ submit	Performed and submitted later than scheduled date with permission	Performed on schedule; submitted two weeks late	Performed on schedule; submitted one week late	Performed and submitted as per schedule	
Understanding the Objective	Neither shows any understanding of the objective nor can relate it to theory	States the objective very vaguely	Can only state the objective but shows poor understanding	Understands objective but cannot place it in context of a theory topic	Understands objective and can relate it to an appropriate theory topic	
Understanding of Procedure	Cannot follow the procedure and do any work	Follows the procedure half-heartedly	Follows right procedure; but cannot analyze data and interpret it	Follows right procedure, can analyze data but cannot interpret it	Follows right procedure, can analyze data and interpret it with justification	
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Ethics	Copies the results from others	Completes the result analysis with help from others but forgets to acknowledge the help.	Completes the result analysis with help from others and acknowledges the help.	Produces his own result analysis but blames others for any inadequacy found during the examination	Produces his own result analysis faithfully and owns up the results without any manipulation	
					Total	

Teacher's Signature with Date: Student's Signature with Date :

Name:_____. Class:_____. Batch:_____.

Roll No.:_____ Expt. No. 9

Performed on:_____. Submitted on:_____. Teacher's Sign.:_____.

USE OF VARIOUS FUNCTIONS PROVIDED IN THE TOTAL STATION

Task 1:

Find distance of line OA and OB and Horizontal angle AOB by using Total Station.

Step 1 – Do the centering and leveling of the instrument. For leveling use 3 foot screws provided to the instrument. Leveling is same as dumpy level. For centering optical plummet is provided on instrument. If the instrument is not properly level the total station will not display the results.

Step 2 – Fix the prism at required position say at point A and point B.

Step 3 – Press "ON" button.

Step 4 – Turn the telescope up and down. By using the horizontal and vertical clamping screw do the rough bisection. By moving the tangent screw (slow motion screw) bisects the point A.

Step 5 – then press "MEAS"button. The display will show the horizontal distance, vertical component and sloping distance. The display will give you the vertical angle(θ) also.

Step 6 – For line OA – Horizontal distance ( ) - _____.

Vertical component ( ) - _____.

Sloping distance () -_____.

Vertical angel -_____.

Set the OA line at 0° 0' 0" for measuring the horizontal angle by pressing " 0 set"(zero set) button twice.

Step 7 – Release the horizontal clamp and vertical clamp move the telescope and bisect the point B roughly. Clamp both the screws and by moving tangent screw (slow motion screw) bisect point B.

Step 8 – Press " MEAS" button. Write the readings for OB line.

For line OB – Horizontal distance () - _____.

Vertical component () - _____.

Sloping distance () -_____.

Vertical angle -_____.

Angle AOB, Horizontal angle - _____.

On the display unit, it will display horizontal angle AOB.

Task 2:

Find the R.L. of point A and point B

Step 9 – Press instrument code – 007 (directly)

Step 10 – Enter the command no. – 102(leveling).

(for performing different activity different command no is printed on total station)

Step 11 – New measurement, Press "ENT".

Step 12 – B.M. measurement (step 1), press " ENT".

Step 13 – Because we are on point B, enter the R.L. of point B (B.M.) as 100.00 mt. or assumed R.L. or actual R.L. (Press clear button to change the R.L. value).

Step 14 – Enter prism ht – 1.5 mt., Press "ENT".

Step 15 – Press "MEAS" button. So instrument will calculate the collimation plane or H.I. and store in memory, which is not displayed on unit.

Step 16 – Release horizontal and vertical clamp and bisect the pt. A.

Step 17 - Repeat step 11,12,14.

Step 18 – Press "MEAS" button.

Step 19 – Note down the readings.

Elev – R.L. of point A - _____.

BM – P – distance between point A and point B = AB= _____.

Step 20 – press Esc 3 times.

Task 3:

Find the Area

Step 21 – Press instrument code 007 (directly)

Step 22 – Enter the command no. 117(area)

Step 23- Enter the co-ordinates of instrument position. Here it is 'O'. For practical purpose we are taking O(0,0,0). Press "ENT" 3 times.

Step 24 – Press "ENT".

Step 25 – Press "MEAS" button.

Step 26 – Record co-ordinates of point A. for measuring co-ordinates move the telescope clockwise.

Step 27 – Release horizontal and vertical clamp and bisect point B.

Step 28 – Press "MEAS" button.

Step 29 – Record Area = _____.

P-P Dist AB = _____.

Observation Table:

Distance	OA (in m.)	OB (in m.)
Horizontal		
Vertical		
Sloping		

Co-ordinates:

Points	North	Earth	Zenith
O			
A			
B			

Video links :-

https://www.youtube.com/watch?v=d_DoEB4zWEQ

https://www.youtube.com/watch?v=Xg-IDbMfmdw

https://www.youtube.com/watch?v=hKWFieP941Y

R101

F.Y. B.Tech. Academic Year 20 -20 Trimester:

SCIENCE & ENGG LABORATORY CONTINUOUS ASSESSMENT RUBRIC

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					Total	

Teacher's Signature with Date: Student's Signature with Date :

Name:_____. Class:_____. Batch:_____.

Roll No.:_____ Expt. No. 10

Performed on:_____. Submitted on:_____. Teacher's Sign.:_____.

SURVEY OF CURRENT TRENDS IN CIVIL ENGINEERING AND APPLICATIONS

Task 1:

Write in detail about current trends in Civil Engineering and their Applications. Explain any one of them in Detail.

Observation Table:

Co-ordinates:

R101

F.Y. B.Tech. Academic Year 20 -20 Trimester:

SCIENCE & ENGG LABORATORY CONTINUOUS ASSESSMENT RUBRIC

COURSE: **EXPT NO.:**

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					Total	

Teacher's Signature with Date: Student's Signature with Date :

Name:_____. Class:_____. Batch:_____.

Roll No.:_____ Expt. No. 11

Performed on:_____. Submitted on:_____. Teacher's Sign.:_____.

APPLICATIONS OF GIS AND GPS IN CIVIL ENGINEERING

Task 1:

Enlist various applications of GIS and GPS in Civil Engineering. Explain any two of them in details for both GIS and GPS.

Observation Table:

Co-ordinates:

R101

F.Y. B.Tech. Academic Year 20 -20 Trimester:

SCIENCE & ENGG LABORATORY CONTINUOUS ASSESSMENT RUBRIC

COURSE: **EXPT NO.:**

EVALUATOR: **DATE:**

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Teacher's Signature with Date: Student's Signature with Date :

Name:_____. Class:_____. Batch:_____.

Roll No.:_____ Expt. No. 12

Performed on:_____. Submitted on:_____. Teacher's Sign.:_____.

DEMONSTRATION OF USE OF CIVIL ENGINEERING SOFTWARE

Name of the softwares :

AutoCAD
Ms Project
Primavera P6

AUTOCAD

Learning AutoCAD is a bit like trying to decide which came first – the chicken or the eggs. On one hand, you need to know many basics before you can start drawing. On the other hand, understanding those basics can be very difficult if you haven't had the experience of drawing something. By experiencing the drawing process first, the initial learning curve will be easier and smoother.

The major disciplines that use AutoCAD are

- Architectural, Engineering and Construction
- Mechanical
- Geographic Information Systems (GIS)
- Surveying and Civil Engineering
- Facilities management
- Electrical/electronics
- Multimedia
- Garment industry (pattern making)
- Sign making

Make the Transition from paper to CAD

1) Draw to scale
    - Drawing scale is something you consider when laying out your drawing. You establish scale differently in CAD than you do with manual drafting.
    - The scale compares the size of the actual object to the size of the model drawn on paper.
    - In AutoCAD, you first decide what units of measurement you will use, and then draw the model at 1:1 scale

2) Lay Out of Drawing
   - On paper, a layout is constrained by the sheet size you use. In Cad you are not limited to one particular layout or sheet size.
   - When you draft manually, you first select a sheet, which usually includes a preprinted border and title block. Then you determine the location for views-plans, elevations, sections and details. Finally you start to draw.
   - With AutoCAD, you first draw your design, or model, in a working environment called model space. You can then create a layout for that model in an environment called paper space.
3) Organize Drawing Information
   - In both manual drafting and CAD, you need a way to organize your drawing content – a method for deparating, sorting and editing specific drawing data.
   - With manual drafting, you can separate information on to individual transparent overlays. E.g. a building plan might contain deparate overlays for its structural, electrical, and plumbing components.
   - In AutoCAD, layers are equivatent to transparent overlays. Layers are equivalent to transparent overlays. As with overlays, you can display, edit, and print layers separately or in combination.
   - You can name layers to help track content, and lock layers so they can't be altered. Assigning settings such as color, linetype or lineweight to alyers helps you comply with industry standards.
4) Establish Drafting standards
   - Manual drafting requires meticulous accuracy in drawing linetypes, lineweights, text, dimensions, and more. Standards must be established in the beginning and applied consistently.
   - With AutoCAD, you can ensure conformity to industry or company standards by creating styles that you can apply consistently.
5) Draw Efficiently
   - Draw with less effort and recise with more speed: these are the two main reasons you use CAD.
6) Draw Accurately
   - Engineering and architectural drawings requires a high degree of accuracy. With CAD, you draft more accurately than with manual methods.

7) View your Drawing
   - The power of CAD makes it easy for you to quickly view different parts of your design at different magnifications.
8) Create Standard Symbols
   - Symbols have long been used in manual drafting as a way to represent real world objects in a simplified way. The ability to create and reuse standard symbols is one of CAD's greatest strength.
9) Create Dimensions and Text
   - Creating accurate dimensions and consistent, ligible text is a time- consuming task for the manual drafter. CAD provides ways to streamline this task.
   - When you work on paper, if wou resize any part of the drawing, you must erase and then redraw the dimensions. Changing text can often involve relettering the whole drawing
   - In AutoCAD, associative dimensions are tied to the underlying model. Changes to the model automatically update the dimension values.
10) Modify your drawing
   - AutoCAD eliminates tedious manual editing by providing a variety of editing tools.

Menus, Toolbars, and Tool Palettes

AutoCAD provides menus, shortcut menus, toolbars, and tool palettes for access to frequently used commands, settings and modes. The Standard, Object Properties, Draw and Modify toolbars are displayed by default. Shortcut menus display commands that are relevant to your current activity. Tool palette provide an efficient method for organizing and placing blocks and hatches.

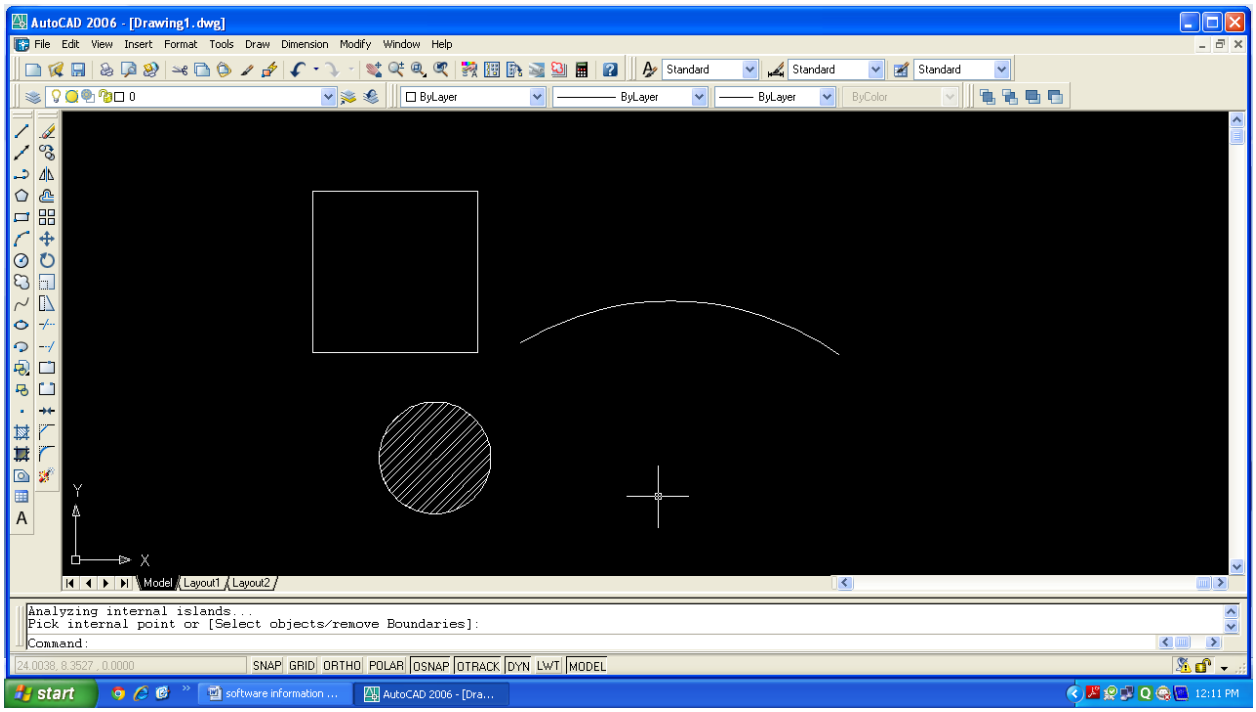
Tool palettes are tabbed areas within the Tool Palettes window. The items you add to a tool palette are called tools. You can create a tool by dragging any of the following, one at a time, onto your tool palette:

- Geometric objects such as lines, circles and polylines
- Dimensions
- Blocks
- Hatches
- Gradient fills
- Raster images

- External references (xrefs)

The command window

Commands, system variables, options, messages and prompts are displayed in a dockable and resizable window called the command window. The bottom line of the command window is called the command line. The command line displays the operation in progress and provides an inside view of exactly what the program is doing.



F1-Help

F2-Edit

F3-Search

F4-Tablet

F5-Isoplane

F6-Coordinates

F7-Grid

F8-Ortho

F9-Snap

F10-Polar

F11- Object Snap Tracking

Information about some basic commands

1. Line :- To draw line.
2. Polyline :- An object composed of one or more connected line segments or circular arcs treated as a single object. (Pline)
3. Object properties :- Settings that control the appearance and geometric characteristics of objects. Properties that are common to all objects include colour layer, linetype, linetype scale, and 3D thickness.
4. Dimension style :- A named group of dimension settings that determines the appearance of the dimension and simplifies the setting of dimension system variables. (DIMSTYLE)
5. Array:- Multiple copies of selected objects on a rectangular or polar (radial) pattern. (ARRAY)
6. Mirror:- To create a new version of an existing object by reflecting it symmetrically with respect to a prescribed line or plane. (MIRROR)
7. Properties palette:- Lists and changes properties of the selected object or set of objects or, if no objects are selected, the values of default properties common to all objects. (PROPERTIES)
8. Explode:- To disassemble a complex object, such as a block, dimension, solid or polyline, into simpler objects. (EXPLODE)
9. Fill:- a solid colour covering an area bounded by lines or curves.(FILL)
10. Layer:- a logical grouping of data are like transparent acetate overlays on a drawing. You can view layers individually or in combination.(LAYER)
11. Teselling lines:- Lines that help you visualize a curved surface.

Reference Video Link

https://www.youtube.com/watch?v=SrkXOpGXfWA

https://www.youtube.com/watch?v=R4-QOz6p6ZA

Microsoft Project

Microsoft Project is a project management software program, developed and sold by Microsoft, which is designed to assist a project in developing a plan, assigning resources to tasks, tracking progress, managing the budget, and analyzing workloads.

Microsoft Project was the company's third Microsoft Windows-based application, and within a couple of years of its introduction it became the dominant PC-based project management software.

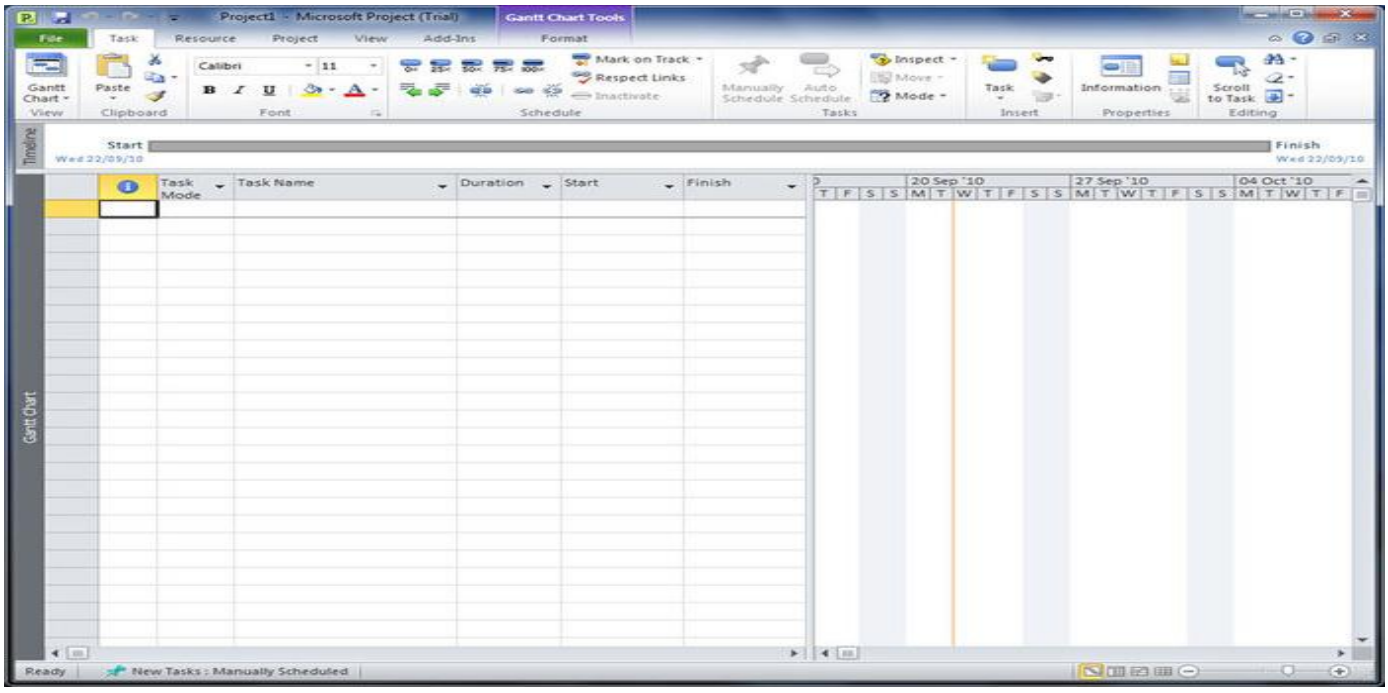
Microsoft Project and Microsoft Project Server are the cornerstones of the Microsoft Office enterprise project management (EPM) product.

Project creates budgets based on assignment work and resource rates. As resources are assigned to tasks and assignment work estimated, the program calculates the cost, equal to the work times the rate, which rolls up to the task level and then to any summary tasks and finally to the project level.

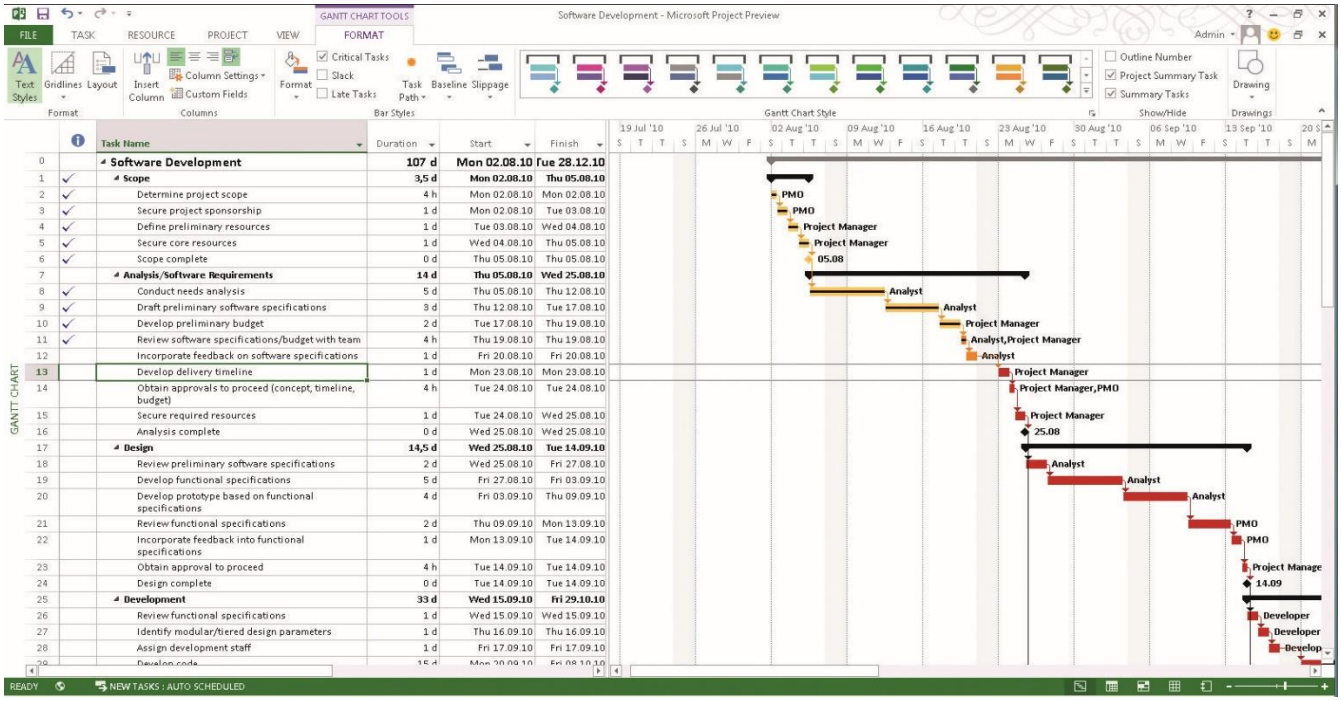
Resource definitions (people, equipment and materials) can be shared between projects using a shared resource pool. Each resource can have its own calendar, which defines what days and shifts a resource is available. Resource rates are used to calculate resource assignment costs which are rolled up and summarized at the resource level. Each resource can be assigned to multiple tasks in multiple plans and each task can be assigned multiple resources, and the application schedules task work based on the resource availability as defined in the resource calendars. All resources can be defined in label without limit. Therefore it cannot determine how many finished products can be produced with a given amount of raw materials.

This makes Microsoft Project unsuitable for solving problems of available materials constrained production. Additional software is necessary to manage a complex facility that produces physical goods. The application creates critical path schedules, and critical chain and event chain methodology third-party add-ons also are available. Schedules can be resource leveled, and chains are visualized in a Gantt chart.

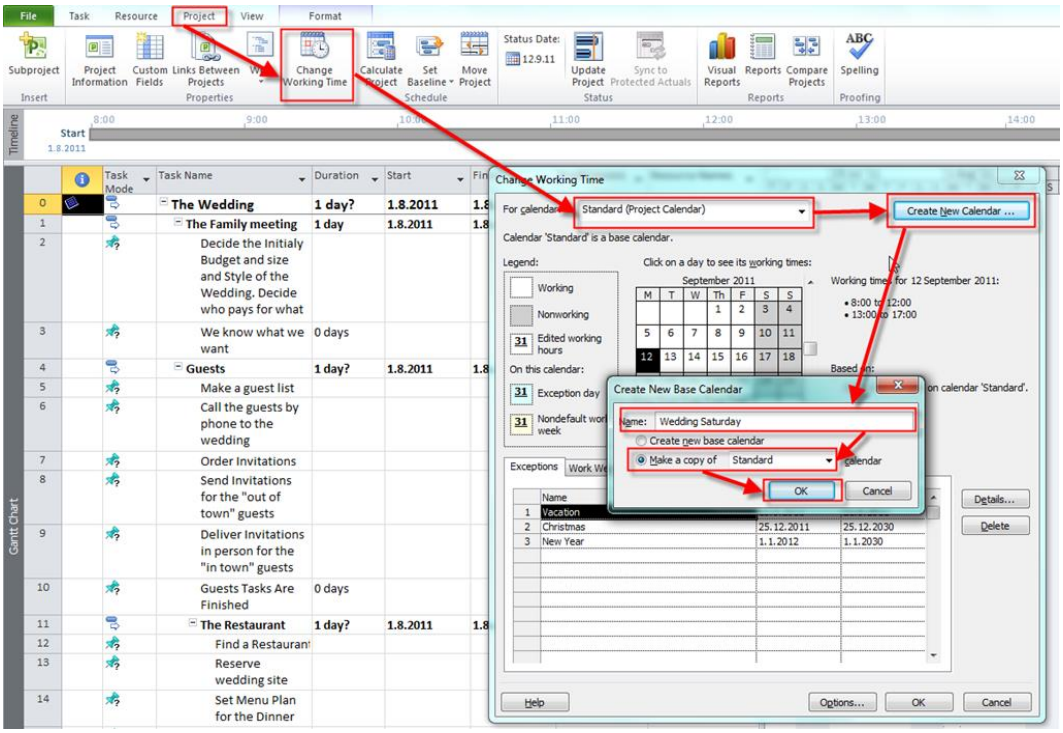
Additionally, Microsoft Project can recognize different classes of users. These different classes of users can have differing access levels to projects, views, and other data. Custom objects such as calendars, views, tables, filters, and fields are stored in an enterprise global which is shared by all users.



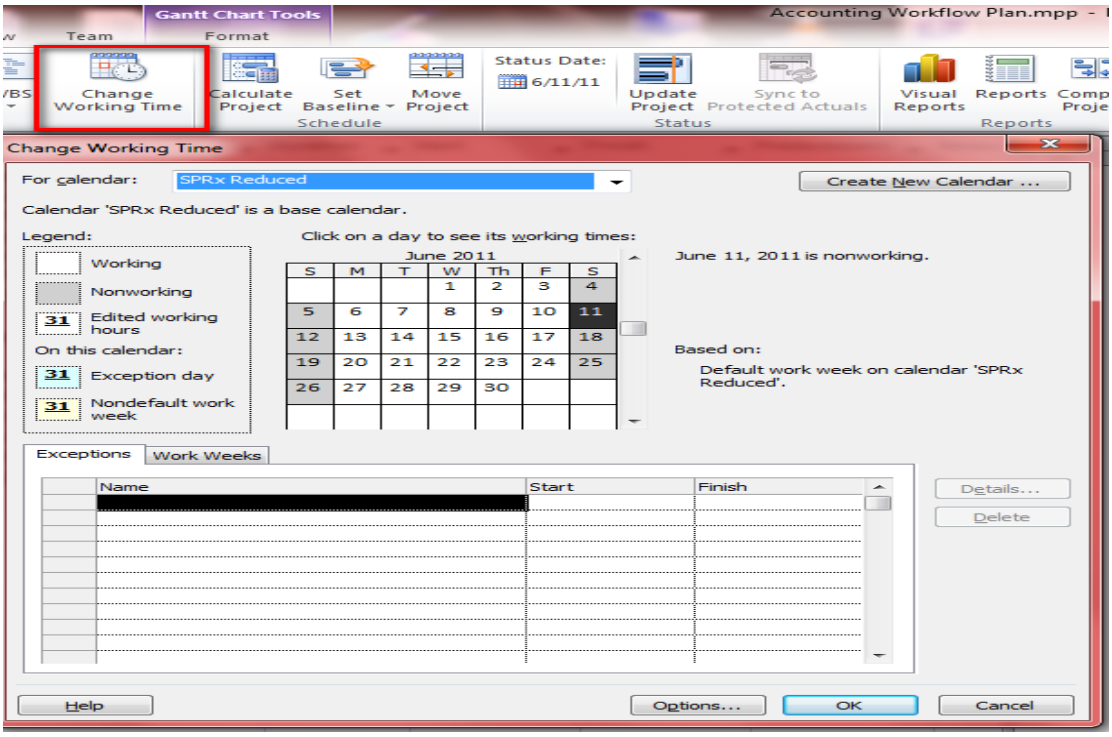
MSP sheet



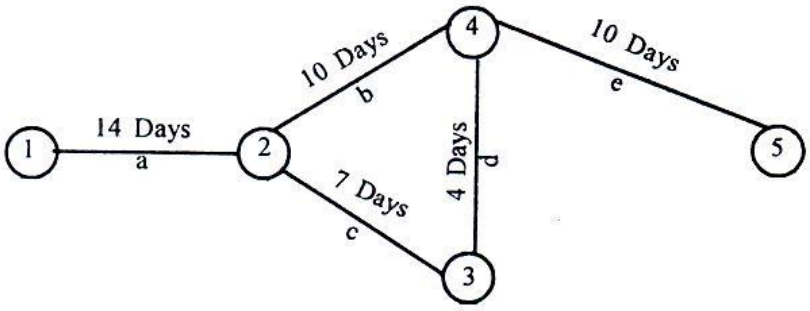
Construction activities with Gantt chart presentation



How to create calendar in MSP



Calendar in MSP

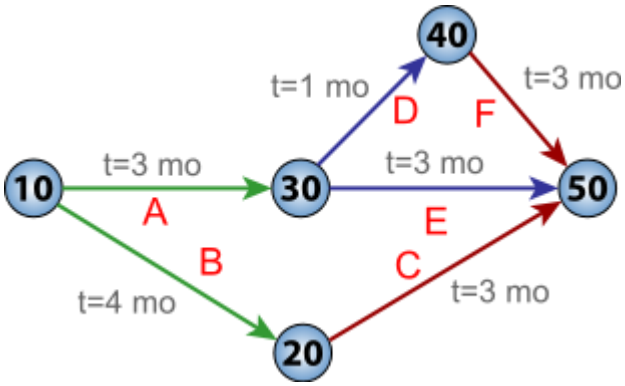


1. CPM Technique in MSP

The **Critical Path Method (CPM)** is one of several related techniques for doing project planning. CPM is for projects that are made up of a number of individual "activities." Activities are either in parallel or in series. Duration of an activity is the major criteria, decides the total project duration. Longest path of the network is the total project duration. Sequence of activities can be easily shown in with the help of MSP. Allocation of resources (4 M and time) also becomes easier with the help of software.

2. PERT Technique in MSP

The **Program (or Project) Evaluation and Review Technique**, commonly abbreviated **PERT**, is a statistical tool, used in project management, which was designed to analyze and represent the tasks involved in completing a given project. PERT technique is based on probabilistic approach where time required for each activity is not known due to its uncertainty. All the calculation for project duration and for resource allocation is similar to CPM network and hence can be easily done with the software.



Primavera P6

Primavera Systems provides project and program management software for the Architecture, Engineering and Construction industry. Focused on project portfolio management, or PPM, Primavera's solutions let users measure progress, assure governance, improve team collaboration and prioritize project investments and resources. Primavera software is very advanced software as compared to MS Project.

Primavera's software packages include P6, Prosight, Contract Manager, Cost Manager, Pertmaster, SureTrak, Evolve and Inspire. The newest addition to the suite of project management solutions is Primavera P6, which is an integrated PPM (project portfolio management) solution that provides a real-time view of portfolio performance. P6 also offers what-if scenario modeling, tabular scorecards and capacity analysis.

The hardware requirements of Primavera software vary depending on a client's specific needs, but some general technical specifications apply to all software packages:
- The application server must be supported by Apache Tomcat, BEA Web Logic, IBM Web Sphere.
- The database must be supported by Oracle 9i or 10g or Microsoft SQL Server 2000 and 2005.
- The client operating system must be Microsoft Windows XP Professional, Microsoft Windows Vista Business Edition or Citrix. For Web-based solutions, Internet Explorer 6 or 7 is required

Engineer/Architect/Designer As the project designer will use the module to track specifications and drawings, control the submittal review process, monitor progress by the design team, communicate with other team members, and coordinate the activities of outside consultants.

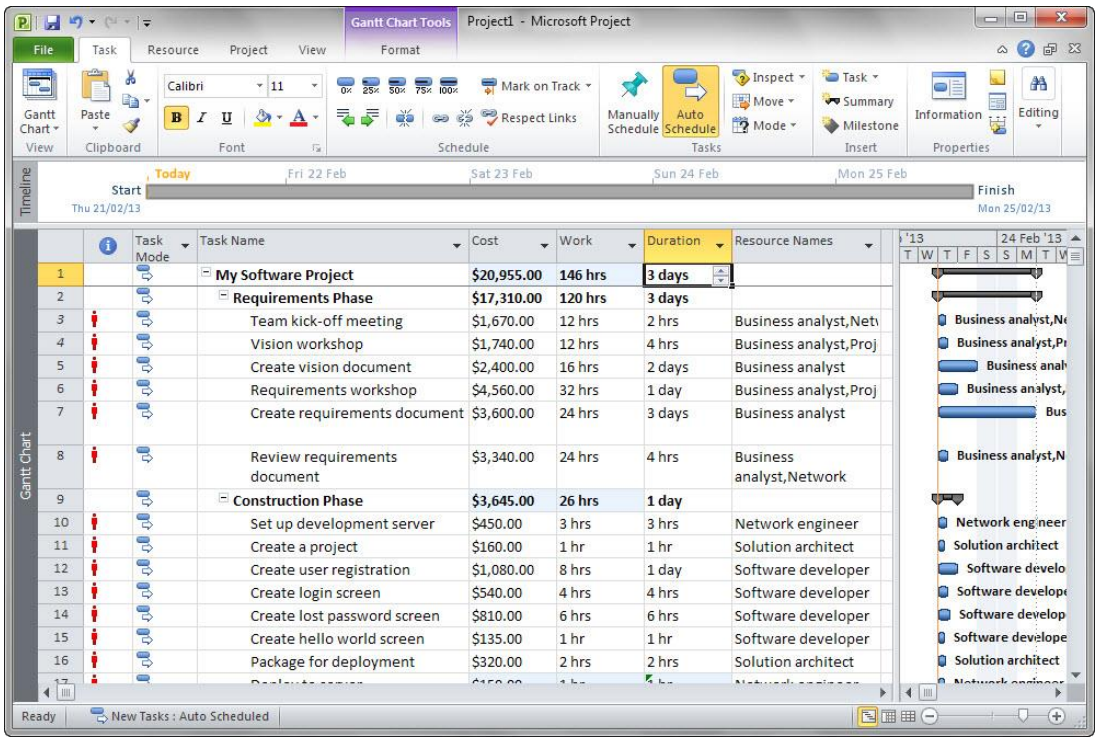
The following list includes tasks that are usually the responsibility of the designer in the contract process. Included with each task is the corresponding chapter/part in this manual where you can find more information about those tasks.

- Managing design and contract drawings – Tracking Drawings chapter
- Recording the design budget and expenses – Setting Up and Using the Cost Worksheet chapter Tracking changes in scope and their effect on the cost at completion – Working with Contracts, Project Costs, and ChangesQuickly finding all the documents you need to resolve open issues – Creating and Tracking Issues chapter
- Monitoring progress through written and verbal communications –Communicating Project Information
- Generating supporting reports – Printing Logs, Forms, and Reports

Applications of Primavera

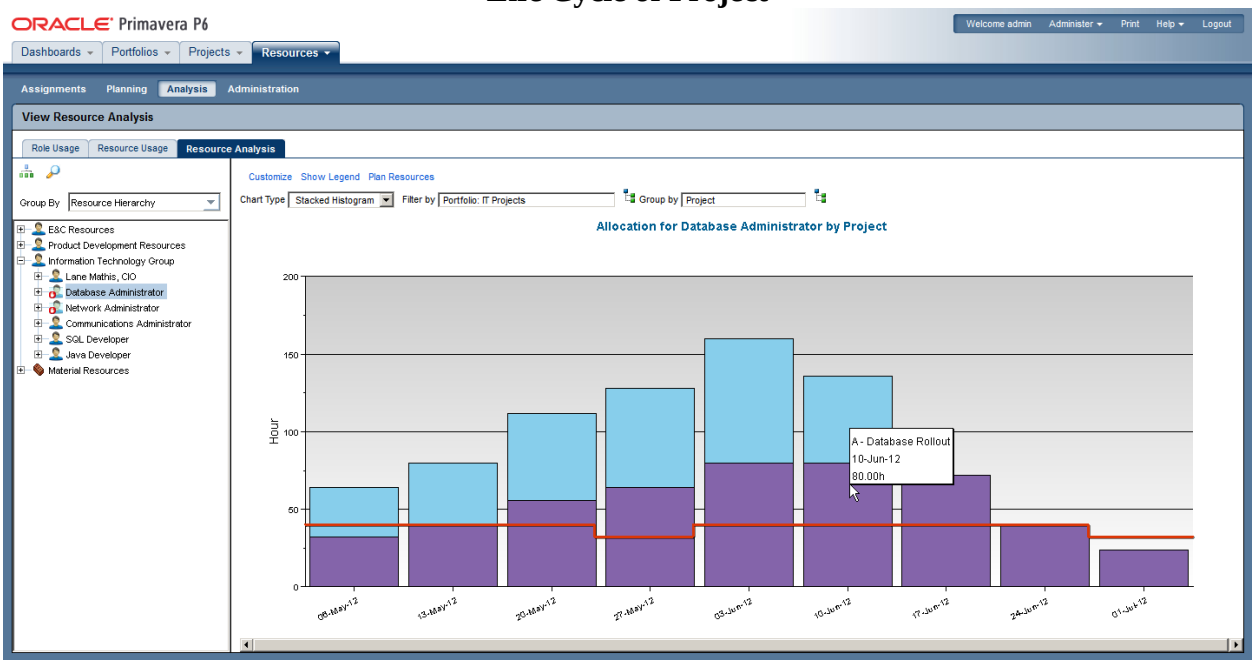
- Balance resource capacity

- Plan, schedule, and control complex projects
- Allocate best resources and track progress
- Monitor and visualize project performance versus plan
- Conduct what-if analysis and analyze alternative project plans



Work Breakdown Structure in Primavera Software

Life Cycle of Project



Resource analysis in Primavera

To complete any construction project basic 4-M's are required,

1) Men 2) Materials 3) Machineries 4) Money

This planning and its analysis can be done in Primavera software. It is also possible to compare planned resources and actual implemented resources which help to generate various reports. We can use this software in mechanical engineering, production engineering, polymer engineering etc.

For submission

Write the answers of following question.

1. What is Autocad?
2. Name the file format used in the design?
3. How can you hide the specific layers when plotting in AutoCAD?
4. Write application of Autocad and Microsoft Project in different field of Engineering.
5. List out the categories of tasks used in MS project?
6. Mention what is the characteristics of Gantt Chart Basics?
7. What activity we can do in MS Project?
8. Write the difference between MS Project and Primavera.

R101

F.Y. B.Tech. Academic Year 20 -20 Trimester:

SCIENCE & ENGG LABORATORY CONTINUOUS ASSESSMENT RUBRIC

COURSE: **EXPT NO.:**

EVALUATOR: **DATE:**

STUDENT:

DIMENSION	SCALE					SCORE
	1	2	3	4	5	
Regularity and punctuality	Did not Perform/ submit	Performed and submitted later than scheduled date with permission	Performed on schedule; submitted two weeks late	Performed on schedule; submitted one week late	Performed and submitted as per schedule	
Understanding the Objective	Neither shows any understanding of the objective nor can relate it to theory	States the objective very vaguely	Can only state the objective but shows poor understanding	Understands objective but cannot place it in context of a theory topic	Understands objective and can relate it to an appropriate theory topic	
Understanding of Procedure	Cannot follow the procedure and do any work	Follows the procedure half-heartedly	Follows right procedure; but cannot analyze data and interpret it	Follows right procedure, can analyze data but cannot interpret it	Follows right procedure, can analyze data and interpret it with justification	
Experiment Skills	Does not participate in the experiment	Performs the experiment only with the help from supervisor/others and is confused and untidy.	Performs the experiment with some supervisory help, forgets some crucial readings. Is confused and untidy.	Performs experiment on own without supervisor's help; records all the readings properly but is untidy.	Performs experiment on own without supervisor's help and records all the readings properly. Keeps the set-up clean and tidy.	
Ethics	Copies the results from others	Completes the result analysis with help from others but forgets to acknowledge the help.	Completes the result analysis with help from others and acknowledges the help.	Produces his own result analysis but blames others for any inadequacy found during the examination	Produces his own result analysis faithfully and owns up the results without any manipulation	
					Total	

Teacher's Signature with Date: Student's Signature with Date :

Name:_____. Class:_____. Batch:_____.

Roll No.:_____ Expt. No. 13

Performed on:_____. Submitted on:_____. Teacher's Sign.:_____.

EXERSICE ON SUSTAINBLE DEVELOPMENT

Task 1
Aim: Presentation in a group of four students any case study related to Sustainable Development.
Topic: Students have to select energy/environment rerated topics.
Name of the Group:
Power point /slides Presentation:

Task 2
Aim: Making a poster in a group of four students, related to Sustainable development.
Topic: Students have to select energy/environment rerated topics.
Name of the group:

R101

F.Y. B.Tech. Academic Year 20 -20 Trimester:

SCIENCE & ENGG LABORATORY CONTINUOUS ASSESSMENT RUBRIC

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					Total	

Teacher's Signature with Date: Student's Signature with Date :