Suerving Engineering

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Reference material

1. Elementary Surveying an Introduction Geomatics By Charles D. Ghilani. Paul R. Wolf/Thirteen Edition 2012
2. Springer Handbook of Geographic Information Kresse, Danko (Eds.) , Springer-Verlag Berlin Heidelberg 2012
3. Highway Surveying Manual / Washington State Department of Transportation Environmental and Engineering Service Center 2005
4. BASIC SURVEYING -THEORY AND PRACTICE, Unit Bend, Oregon.Surveying/ Dr A M Chandra Prof. of Civil Engineering NEW AGE Indian Institute of ideology Roorkee, Planning
5. Surveying / Fawzi Al-Khalisi

Course Outline

- Week 1 – DEFINITION OF SURVEYING
- Week 2 – UNITS AND SIGNIFICANT FIGURES
- Week 3 - Measurements and Theory of errors in Observations
- Week 4 – Adjustment of Measurements
- Week 5 – Most probable value
- Week 6 – Eliminating of Mistakes and Systematic Errors
- Week 7 – DISTANCE MEASUREMENT METHODS
- Week 8 – LEVELING:THEORY AND METHODS
- Week 9 – Direct differential leveling
- Week 10 – LEVELING-FIELD PROCEDURES AND COMPUTATIONS
- Week 11 – Profile leveling
- Week 12 – ANGLES, AZIMUTHS, AND BEARINGS
- Week 13 – Angles measuring Instruments
- Week 14 - Measuring horizontal angles
- Week 15 - Measuring vertical angles

Course Outline

- Week 16 – TRAVERSING
- Week 17 – TRAVERSING
- Week 18 - TRAVERSING
- Week 19 – CONSTRUCTION SURVEYS
- Week 20 – MAPPING SURVEYS
- Week 21 – Characteristics of contour lines
- Week 22 – Locating Topographic details
- Week 23 – Radiation using theodolite and substance bar
- Week 24 – Determining End Areas,
- Week 25 – Volume of earthwork
- Week 26 – Measuring Volumes of Water Discharge
- Week 27 – Horizontal curves
- Week 28 – Circular curve formulas
- Week 29 - Vertical curves
- Week 30 - Computation for an unequal-tangent Vertical curve

Course's objective

At the end of the course the students would be able to gain knowledge on the techniques of making measurements in surveying engineering.

Important!!!!!!

- The department has made a **policy on attendance.**

First Term Exam	15%
Quiz, attendance, discussion	10%
Second Term Exam	15%
Course work	10%
Final Exam	50%
Total	100%

Outline of lecture

- Definition – surveying
- Introduction to surveying Engineering
- History – how it evolves
- Scopes – Surveying, mapping and GNSS
- Metric linear units measurements
- Angular units measurements
- Theory of Errors in Observations

❑ Why engineers need to learn surveying?

Have you seen these before?

Digital level and rod

... others

Total station

Electronic theodolite

Laser scanner

Satellite receiver

1870's Surveyor's Steel Tape

Multi-sensor systems

http://www.trimble.com

www.topconpositioning.com

1) **Egypt: Start**
2) **Babel: Astronomical and surveying observation**
3) **Greek: Angles and distances**

Student activity

- What is Surveying**?**

What is Surveying?

هو العلم الذي يتم من خلاله اخذ قياسات حقلية او مكتبية على او قرب سطح الارض لتحديد مواقع اجسام الطبيعية او الغير طبيعية (من صنع الانسان) في بعدين او اكثر من خلال استخدام معدات واجهزة الكترونية او غير الكترونية.

محطة الرصد المتكاملة مزودة بمستقبل فضائي GPS

محطة الرصد المتكاملة مزودة بخاصية التحكم عن بعد

Surveying sub-disciplines?

- ☐ Photogrammetry
- ☐ Remote Sensing
- ☐ Geodesy
- ☐ Geographic Information System(GIS)
- ☐ Global Positioning System (GPS)
- ☑ Global Navigation Satellite System (GNSS)

Nova MS50 Leica | ES 105 Topcon | Set 4120 Sokkia | R1500N Pentax | NPL 322 Nikon | M3 Trimble

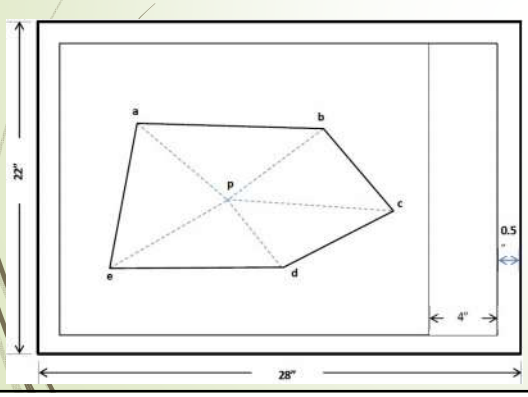
تنقسم المساحة إلى عدة أفرع

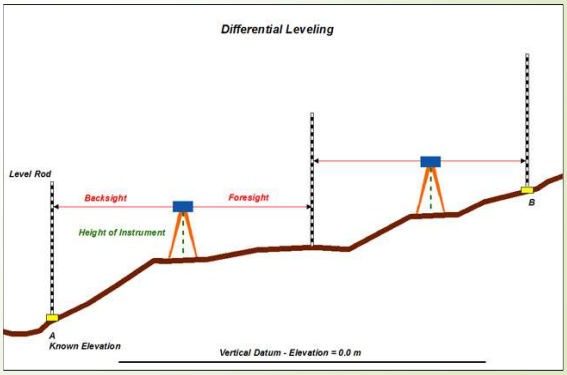
المستخدمة فيها: تبعا للغرض منها وكذلك نوع التقنية

Engineering Surveying	المساحة الهندسية
Construction Surveying	مساحة المنشآت
Aerial Surveying (Photogrammetry)	المساحة التصويرية والجوية
Geological Surveying	المساحة الجيولوجية
Mine Surveying	مساحة المناجم
Hydrographic Surveying	المساحة المائية
Route Surveying	مساحة الطرق
Tunnel Surveying	مساحة الأنفاق
Geophysical Surveying	المساحة الجيو فيزيائية
Astronomical Surveying	المساحة الفلكية
Global Positioning System	المساحة باستخدام الأقمار الصناعية
Remote Sensing	الإستشعار عن بعد (التحسس النائي)

Plane Survey

- **Assumes the Earth's surface to be a plane (flat) / coordinate system of (x, y) in dimensions (2D).**
- **Used with construction surveying, water resource ,military surveys, Hydrology surveys, determine legal boundaries and small-area topographic or control surveys.**





Geodetic Survey

- Takes into account the true **size, shape**, and **gravity fields** of the Earth.
- **coordinate of x, y, Z is referenced to datum (Ellipsoid or MSL)**
- **Establishes highly accurate control networks.**