Satellite Altimetry and Gravimetry: Theory and Applications

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References:

ERS-1/-2 Special Issue, Jl of Geophysical Research, 1997.
McCarthy et al., GEODYN II System Description, Volume , NASA/GSFC, 1983.
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Monday, 21 June 2004

• Orbital Dynamics and Orbit Determinations I (AM) By C.K. Shum
  – Keplerian motion, general perturbation, Kaula’s formulations
  – Periodic variations and resonances due to geopotential

• Introduction to Satellite Altimetry I (PM) By Alexander Braun
  – What is altimetry?
  – Basic principles of satellite altimetry and its history
  – Interdisciplinary applications of altimetry

• Tutorial on iGMT – a graphics tool (PM) By Alexander Braun
Satellite Altimetry and Gravimetry: Theory and Applications

Tuesday, 22 June 2004

- Orbital Dynamics & Orbit Determinations II (AM) By C.K. Shum
  - Nonlinear orbit determination & parameter recovery
  - Force, measurement, and Earth orientation models

- Satellite Altimetry II (AM) By C.K. Shum
  - Principles of satellite altimetry, mission design, waveforms
  - Geographically correlated orbit errors and POD
  - Instrument, media and geophysical corrections

- Altimeter Collinear Analysis (PM) By Alexander Braun
  - Stackfile method for oceanography and marine geophysics
  - Mean sea surface, marine gravity field determinations
  - Models accuracy evaluations and limitations

- Radar Altimeter Data Processing (PM) By Alexander Braun

- Tutorial on iGMT (continued) (PM) By Alexander Braun
Satellite Altimetry and Gravimetry: Theory and Applications

Wednesday, 23 June 2004

- Space Geodesy: An Interdisciplinary Science (AM) C.K. Shum

- 20th Century Sea Level Rise (AM) C.K. Shum

- Determination of Vertical Motion Using Satellite Altimetry and Tide Gauges (PM) Alexander Braun
Satellite Altimetry and Gravimetry: Theory and Applications

Thursday, 24 June 2004

• Ocean Tides from Satellite Altimetry
  (AM) C.K. Shum

• Temporal Gravity Field Observations with GRACE
  (AM) C.K. Shum
Satellite Altimetry and Gravimetry: Theory and Applications

Friday, 25 June 2004

- IceSat Research and Applications (PM) Alexander Braun
- Projects, future work discussions, All
- Evaluations and Critiques of the course, All
Satellite Altimetry and Gravimetry: Theory and Applications

• **Themes:**
  - Orbital dynamics and orbit determination
  - Instrument error budget and analysis
  - Geophysical inverse program
  - Interdisciplinary applications

• **Basic knowledge**
  - Orbital mechanics, dynamics, physical and satellite geodesy
  - Mathematical tools (linear algebra, statistics, numerical analysis, differential equations, approximate theory, adjustment)
  - Physics, astronomy, engineering
  - Instrument and their principles (radar, optical, electromagnetics)
  - Geophysics, oceanography, atmosphere, hydrology, glaciology