



# INTERNATIONAL SCHOOL ON LIDAR TECHNOLOGY

31 March to 4 April 2008  
Indian Institute of Technology Kanpur, INDIA

30-Mar	Morning onwards						6.30-8.00PM	8.00 PM onwards
	Arrival at Visitor's Hostel IIT Kanpur						Icebreaker & Registration	Dinner
31-Mar	8.30-9.00 AM	9.00-10.15 AM	10.15-11.30 AM	11.30-1.00 PM	1.00-2.00 PM	2.15-5.30 PM	6.30-8.00 PM	8.00 PM onwards
	Registration	Inaugural and High Tea	Lecture 1 (MB)	Lecture 2 (RS)	Lunch	Laboratory 1 (BL,SG,SB,SA,RB)	Informal	Dinner
1-Apr	8.30-9.45 AM	9.45-11.00 AM	11.00-11.30 AM	11.30-1.00 PM	1.00-2.00 PM	2.15-5.30 PM	6.30-8.00 PM	8.00 PM onwards
	Lecture 3 (RS)	Lecture 4 (NP)	Tea	Lecture 5 (MB)	Lunch	Laboratory 2 (BL,SG,SB,SA,RB)	Informal	Dinner
2-Apr	Lecture 6 (NP)	Lecture 7 (BL)	Tea	Lecture 8 (NP)	Lunch	Laboratory 3 (BL,SG,SB,SA,RB)	(Gp Photo at 6 PM) Informal	Dinner
3-Apr	Lecture 9 (YK)	Lecture 10 (NP)	Tea	Lecture 11 (YK)	Lunch	Laboratory 4 (BL,SG,SB,SA,RB)	Informal	Gala Dinner
4-Apr	Lecture 12 (YK)	Lecture 13 (GK)	Tea	Discussion (MB, TE, RCP, AJ, NP, BL)	Lunch	2.00- 3.30 PM	3.30-4:30 PM	4.30 PM Onwards
						Lecture 14 ( IIC-HL )	Valedictory and High Tea	Departure
5-Apr	Departure							





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## Day 1- 31<sup>st</sup> March

Time	Activity	Instructor	Details	Venue
8.30-9.00 AM	Registration			PBCEC
9.00-10.15 AM	Inaugural and High Tea			PBCEC
10.15-11.30 AM	Lecture 1: Introduction to airborne altimetric LIDAR	Manos Baltsavias	History of development, brief about principle, multiple return, bathymetry, operation, available commercial systems and specifications, applications, advantages and limitations, example of data	PBCEC
11.30-1.00 PM	Lecture 2: Data acquisition techniques and mission planning	Rajive Sharma	Critical elements of mission planning and use of mission planning software	PBCEC
1.00-2.00 PM	Lunch			VH
2.00 PM	Bus departs to Computer Centre (CC)			
2.15-5.30 PM	Laboratory 1	BL,SG,SB,SA,RB	LAS format, coordinate setting, import trajectories, Read data, visualization and measurements, create projects and save	CC
6.30-8.00 PM	Informal			VH
8.00 PM onwards	Dinner			VH





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Day 2- 1<sup>st</sup> April

Time	Activity	Instructor	Details	Venue
8.30-9.45 AM	Lecture 3: Integrating GPS/IMU/Laser and visualization	Rajive Sharma	Optech workflow for processing of GPS and INS data for trajectory, Algorithm to combine trajectory data with laser range, instantaneous scan angle, and attitude values to yield ground coordinates in LAS format.	PBCEC
9.45-11.00 AM	Lecture 4: Strip adjustment and DSM computation	Norbert Pfeifer	Need for strip adjustment, available algorithms, implementation using software, digital surface model computation	PBCEC
11.00-11.30 AM	Tea			
11.30-1.00 PM	Lecture 5: Physical principles of LiDAR technology	Manos Baltsavias	Laser and property, laser pulse and property, laser interaction with material, principle of time measurement using laser, LiDAR equation, footprint size and dependence on ground type	PBCEC
1.00-2.00 PM	Lunch			
2.00 PM	Bus departs to CC			
2.15-5.30 PM	Laboratory 2	BL,SG,SB,SA,RB	Project for calibration, measure match, find correction and apply, find z correction and apply, cut overlapping points	CC
6.30-8.00 PM	Informal			
8PM onwards	Dinner			





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## Day 3-2<sup>nd</sup> April

Time	Activity	Instructor	Details	Venue
8.30-9.45 AM	Lecture 6: Waveform digitization and exploitation	Norbert Pfeifer	Concept of waveform digitization, algorithms to understand the waveform and exploitation for terrain understanding.	PBCEC
9.45-11.00 AM	Lecture 7: Building extraction	Bharat Lohani	Basic approaches and their underlying principles, examples of few methods in details, parameters and their effect.	PBCEC
11.00-11.30 AM	Tea			
11.30-1.00 PM	Lecture 8: Bare earth model, break lines and thinning	Norbert Pfeifer	Classification of LiDAR points on ground and on above ground objects, basic approaches, details of a few algorithms, significance and use of breaklines and thinning	PBCEC
1.00-2.00 PM	Lunch			
2.00 PM	Bus departs to CC			
2.15-5.30 PM	Laboratory 3	BL,SG,SB,SA,RB	Classify points in ground, vegetation, buildings, isolated points, visible utilities	CC
6:00 PM	Group Photograph			
6.30-8.00 PM	Informal			
8 PM onwards	Dinner			





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## Day 4-3<sup>rd</sup> April

Time	Activity	Instructor	Details	Venue
8.30-9.45 AM	Lecture9: LiDAR System overview and instrument calibration	Yuji Kuwano	Components of LiDAR instrument, data collection procedure, requirement of instrument calibration, calibration procedure in general	PBCEC
9.45-11.00 AM	Lecture 10: Vegetation and Power line extraction	Norbert Pfeifer	Vegetation characterisation using LiDAR data, basic algorithms and examples, Power line representation in LiDAR data, basic approaches for powerline extraction	PBCEC
11.00-11.30 AM	Tea			
11.30-1.00 PM	Lecture 11: GNSS/IMU data workflow and LAS file creation	Yuji Kuwano	Leica workflow for processing of GPS and INS data for trajectory, Algorithm to combine trajectory data with laser range, instantaneous scan angle, and attitude values to yield ground coordinates in LAS format.	PBCEC
1.00-2.00 PM	Lunch			VH
2.00 PM	Bus departs to CC			
2.15-5.30 PM	Laboratory 4	BL,SG,SB,SA,RB	Classify points in ground, vegetation, buildings, isolated points, visible utilities	CC
6.30-8.00 PM	Informal			VH
8.00 PM onwards	Gala Dinner			VH





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## Day 5-4<sup>th</sup> April

Time	Activity	Instructor	Details	Venue
8.30-9.45 AM	Lecture 12: LiDAR and aerial image	Yuji Kuwano	Concept of generation of orthophoto using LiDAR data, advantages of fusion of image and LiDAR data, examples	PBCEC
9.45-11.00 AM	Lecture 13: Successful LiDAR projects in Asia, Asia-Pacific	Geokosmos	Details of a few projects end to end to show the utility of LiDAR data in Asia and Asia-Pacific and successful use of these data	PBCEC
11.00-11.30 AM	Tea			
11.30-1.00 PM	Discussion	MB, TE, RCP, AJ, NP, BL	Panel discussion on the course and other related issues	PBCEC
1.00-2.00 PM	Lunch			VH
2.00-3.30 PM	Lecture 14: Operator's view and Experience on LiDAR Data processing	HL-IIC Pvt. Ltd.	LiDAR data processing status in India. The projects completed and experiences learnt	PBCEC
3.30-4.30 PM	Valedictory and High Tea			
4.30 PM onwards	Departure			





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Laboratory	Instructor	Details
1	BL, SG, SB, SA, RB	LAS format, coordinate setting, import trajectories, Read data, visualisation and measurements, create projects and save
2	BL, SG, SB, SA, RB	Project for calibration, measure match, find correction and apply, find z correction and apply, cut overlapping points
3	BL, SG, SB, SA, RB	Classify points in ground, vegetation, buildings, isolated points
4	BL, SG, SB, SA, RB	Building modelling and generation of contours
Course Instructors	MB	Manos Baltasvias
	NP	Norbert Pfeifer
	YK	Yuji Kuwano
	RS	Rajive Sharma
	BL	Bharat Lohani
	GK	Geokosmos (Abhineet Jain)
	IIC	IIC Pvt. Ltd. (Murli Mohan)
	HL	Hunsa Luftbild (Thomas Eckart)
Laboratory Instructors	BL	Bharat Lohani
	SB	Susham Biswas
	SG	Suddhasheel Ghosh
	SA	Surya Aditya

