



Model Institute of Engineering
& Technology (Autonomous)
Course Handout

Kot Bhalwal, Jammu

COURSE HANDOUT

Surveying and Geomatics
(CE- 404)
BE – 4th Semester [Branch: CE]
ACADEMIC YEAR (2024-25)

Dr. Bhagwan Das

Assistant Professor

Department of Civil Engineering



Department of Civil Engineering

Model Institute of Engineering & Technology (Autonomous)

Kot Bhalwal, Jammu 181122

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Dr. Arun K. Gupta Teaching-Learning Centre

Version 1.1

Please Do Not Print Unless Necessary



SYLLABUS

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
CE-404	Surveying and Geomatics	Core	4	3	1	0	50	100	150
Faculty Details	bhagwandas.civ@mietjammu.in								

COURSE OUTCOMES

At the end of the course the student will be able to:	
CO1	Learn techniques, skills, and applicable tools used in engineering and surveying activities.
CO2	Attain the knowledge pertaining to the implementation of infrastructure facilities.
CO3	Learn surveying with modern field survey systems.
CO4	Implement photogrammetry and stereo plotting for various ground control.
CO5	Comprehend remote sensing, data acquisition and visual image interpretation.

Section-A

Unit 1: Triangulation and trilateration: Theodolite survey: instruments, measurement of horizontal and vertical angle; horizontal and vertical control, methods, triangulation, network, signals. Baseline, choices, instruments and accessories, extension of base lines, corrections, satellite station, reduction to centre, intervisibility of height and distances, trigonometric levelling, axis single corrections.

(12 Hrs)

Unit 2: Curves: Elements of simple and compound curves, method of setting out, elements of reverse curve, transition curve, length of curve, elements of transition curve, vertical curves.

(6 Hrs)

Unit 3: Modern field survey systems: Principle of electronic distance measurement, modulation, types of EDM instruments, distomat. Total station: Parts of a total station, accessories, advantages and applications, field procedure for total station survey, errors in total station survey; global positioning systems, segments, GPS measurements, errors and biases, surveying with GPS, co-ordinate transformation, accuracy considerations.

(8 Hrs)

Section B

Unit 4: Photogrammetry surveying: Introduction, basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods; photographic mapping- mapping using paper prints, mapping using stereoplottling instruments, mosaics, map substitutes.

(8 Hrs)

Unit 5: Remote Sensing: Introduction, electromagnetic spectrum, interaction of electromagnetic radiation with the atmosphere and earth surface. Remote sensing data acquisition: platforms and sensors; visual image interpretation; digital image processing.

(8 Hrs)



Textbooks

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Advanced Surveying	Advanced Surveying: Madhu, N, Sathikumar, R and	Pearson India	2nd (2006)
2	Geomatics Engineering	Manoj, K. Arora and Badjatia	Nem Chand & Bros	1st (2011)
3	Surveying and Levelling Vol. I and Vol. II	Bhavikatti, S.S.	I.K. International	1st (2014)



Reference Books

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Higher Surveying	Chandra, A.M. New Age	New Age International (P)	3 rd (2002)

2	Remote sensing and Geographical information	Anji Reddy, M.	B.S. Publications	1 st (2012)
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COURSE PLAN

Unit-I Triangulation and trilateration

S.No.	Topics	Recommended Books
2	Theodolite survey: instruments, measurement of horizontal and vertical angle	Book 1, Ch.1
3	Horizontal and vertical control, methods,	Book 1, Ch.1
4	Triangulation, network, signals	Book 1, Ch.1
5	Baseline, choices, instruments and accessories	Book 1, Ch.1
6	Extension of base lines	Book 1, Ch.1
7	Corrections, satellite station, reduction to centre	Book 1, Ch.1
8	Intervisibility of height and distances	Book 1, Ch.1
9	Trigonometric levelling	Book 1, Ch.1
10	Axis single corrections.	Book 1, Ch.1

Unit-II Curves

11	Curves: Elements of simple and compound curves,	Book 1, Ch.2
12	Method of setting out	Book 1, Ch.2
13	Elements of reverse curve	Book 1, Ch.2
14	Transition curve	Book 1, Ch.2
15	Length of curve	Book 1, Ch.3
16	Elements of transition curve, vertical curves	Book 1, Ch.4

Unit-III Modern field survey systems

17	Principle of electronic distance measurement	Book 1, Ch.5
18	Modulation, types of EDM instruments, distomat.	Book 2, Ch.2



19	Total station: Parts of a total station, accessories,	Book 2, Ch.2
20	Advantages and applications, field procedure for total station survey, errors in total station survey	Book 1, Ch.6
21	Global positioning systems, segments, GPS measurements, errors and biases	Book 2, Ch.2
22	Surveying with GPS, co-ordinate transformation, accuracy considerations.	Book 2, Ch.2
Unit-IV Photogrammetry surveying		
23	Photogrammetry surveying: Introduction, basic concepts, perspective geometry of aerial photograph	Book 2, Ch.3
24	Relief and tilt displacements, terrestrial photogrammetry, flight planning	Book 2, Ch.4
25	Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods	Book 2, Ch.4
26	Photographic mapping- mapping using paper prints	Book 2, Ch.3
27	Mapping using stereoplottting instruments, mosaics, map substitutes.	Book 2, Ch.3
Unit-V Remote Sensing		
28	Introduction, electromagnetic spectrum	Book 2, Ch.8
29	Interaction of electromagnetic radiation with the atmosphere and earth surface	Book 2, Ch.8
30	Remote sensing data acquisition: platforms and sensors	Book 2, Ch.8
31	Visual image interpretation	Book 2, Ch.8
32	Digital image processing	Book 2, Ch.8

GRADING AND ASSESSMENT

- **Sessional Test:** 20 marks
- **Assignment:** 20 marks
- **Attendance:** 10 marks
- **Final Examination:** 100 marks

COURSE POLICIES

- **Attendance:** Minimum 75% attendance is mandatory to appear in the final examination of the course.
- **Academic Integrity:** MIET's academic integrity policies apply. Plagiarism will not be tolerated.
- **Late Submissions:** Assignments and projects must be submitted by the specified timelines.

FACULTY INFORMATION

- **Office Hours**
Monday (12:05 PM - 12:55 PM)
Friday (12:05 PM - 12:55 PM)
- **Contact Information** bhagwandas.civ@mietjammu.in