

## Academic Course Description

BHARATH UNIVERSITY  
Faculty of Engineering and Technology  
Department of Civil Engineering

**BCE402 Surveying II**  
**Third Semester, 2016-17 (Even Semester)**

### Course (catalog) description

This subject deals with geodetic measurements and Control Survey methodology and its adjustments. The student is also exposed to the Modern Surveying.

**Compulsory/Elective course** : Compulsory for Civil students

Credit / Contact hours : 3 credits / 45 hour

Course Coordinator : Ms.A.Ambica, Assistant Professor

**Instructors** :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@bharathuniv.ac.in)	Consultation
Ms.A.Ambica	Second year Civil	Civil Block		ambicacivil@bharathuniv.ac.in	9.00 - 9.50 AM
Mr.S.Vinoth Kumar	Second year Civil	Civil Block			12.45 - 1.15 PM

### Relationship to other courses:

Pre –requisites : Surveying I

Assumed knowledge : Basic knowledge in Instrumentation handling

Following courses : Transportation Engineering

### Syllabus Contents

#### UNIT I TACHEOMETRIC SURVEYING

9

Tacheometric systems - Tangential, stadia and subtense methods - Stadia systems - Horizontal and inclined sights - Vertical and normal staffing - Fixed and movable hairs - Stadia constants – Anellactic lens – Subtense bar.

#### UNIT II CONTROL SURVEYING

9

Working from whole to part - Horizontal and vertical control methods - Triangulation - Signals - Base line - Instruments and accessories - Corrections - Satellite station - Reduction to centre - Trigonometric leveling – Single and reciprocal observations - Modern trends.

#### UNIT III SURVEY ADJUSTMENTS

9

Errors - Sources, precautions and corrections - Classification of errors - True and most probable values -Weighted observations - Method of Equal shifts - Principle of least squares - Normal equation - Correlates- Level nets - Adjustment of simple triangulation networks.

**UNIT IV ASTRONOMICAL SURVEYING**

9

Celestial sphere - Astronomical terms and definitions - Motion of sun and stars - Apparent altitude and corrections - Celestial coordinate systems - Different time systems - Nautical almanac - Star constellations - Practical astronomy - Field observations and calculations for azimuth

**UNIT V MISCELLANEOUS**

9

Photogrammetry - Introduction - Terrestrial and aerial Photographs - Stereoscopy - Parallax - Electromagnetic distance measurement - Carrier waves - Principles - Instruments - Trilateration - Hydrographic Surveying - Tides - MSL - Location of soundings and methods - Three point problem - Study of Box - Sextants and station pointer - River surveys - Measurement of current and discharge - Cartography - Cartographic concepts and techniques - Cadastral surveying - Definition - Uses - Legal values - Scales and accuracies.

**TEXT BOOKS:**

1. Punmia B.C. "Surveying" Vols I and II & III Laxmi Publications, 2005.

**REFERENCES:**

1. Clark D., " Plane and Geodetic Surveying ", Vols. I and II, C.B.S. Publishers and Distributors, Delhi, sixth Edition, 1971.
2. James M. Anderson and Edward M. Mikhail, " Introduction to Surveying ", McGraw Hill Book Company, 1985.
3. Wolf P.R. " Elements of Photogrammetry", McGraw Hill Book Company, Second Edition, 1986.
4. Robinson A.H., Sale R.D. Morrison J.L. and Muehrche P.C., " Elements of Cartography ", John Wiley and Sons, New York, Fifth Edition, 1984.
5. Heribert Kahmen and Wolfgang Faig, " Surveying ", Walter de Gruyter, 1995.
6. Bannister A and Raymonds. "Surveying" ELBS. Sixth Edition, 1992.

**Computer usage:** Planning, marking Auto Cad

**Professional component**

General	-	0%
Basic Sciences	-	0%
Engineering sciences & Technical arts	-	0%
Professional subject	-	100%

**Broad area:** Modern surveying Methods

**Test Schedule**

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	February 1 <sup>st</sup> week	Session 1 to 14	2 Periods
2	Cycle Test-2	March 2 <sup>nd</sup> week	Session 15 to 28	2 Periods
3	Model Test	April 2 <sup>nd</sup> week	Session 1 to 45	3 Hrs
4	University Examination	TBA	All sessions / Units	3 Hrs.

## Mapping of Instructional Objectives with Program Outcome

This subject deals with geodetic measurements and Control Survey methodology and its adjustments. The student is also exposed to the Modern Surveying.	Correlates to program outcome		
	H	M	L
1. Have the fundamental knowledge to measure both horizontal distance and elevations without the use of sophisticated instruments.	a	d	
2. Acquires knowledge about the principle of control surveying.	a	e	
3. Have knowledge on the survey errors and its adjustments.	a	d	
4. Have knowledge in the advanced topics in astronomy.	a	b,c,d	
5. Have knowledge to modern methods of surveying like Photogrammetry, Total station, Hydrographic survey and cartography.	a	d	

H: high correlation, M: medium correlation, L: low correlation

### Draft Lecture Schedule

Session	Topics	Problem solving (Yes/No)	Text / Chapter
<b>UNIT I TACHEOMETRIC SURVEYING</b>			
1.	Tacheometric systems	No	[T1, R1&R6]
2.	Tangential, stadia and subtense methods	Yes	
3.	Stadia systems - Horizontal sights	Yes	
4.	Stadia systems - inclined sights	Yes	
5.	Stadia systems - Vertical and normal staffing	Yes	
6.	Fixed and movable hairs	Yes	
7.	Stadia constants	Yes	
8.	Anallactic lens	Yes	
9.	Subtense bar	Yes	
<b>UNIT II CONTROL SURVEYING</b>			
10.	Working from whole to part - Horizontal and vertical Control methods.	No	[T1, R1&R6]
11.	Triangulation & its Types	No	
12.	Signals - Base line Measurements	Yes	
13.	Instruments and accessories	No	
14.	Corrections -Satellite station	Yes	
15.	Corrections - Reduction to centre	Yes	
16.	Trigonometric leveling and its classifications	Yes	
17.	Single and reciprocal observations	Yes	
18.	Modern trends	No	
<b>UNIT III SURVEY ADJUSTMENTS</b>			
19.	Errors & its Sources	No	[T1, R1 & R6]
20.	Precautions and corrections	Yes	
21.	Classification of errors- True and most probable values	Yes	
22.	Weighted observations	Yes	
23.	Method of Equal shifts	Yes	
24.	Principle of least squares	Yes	
25.	Normal equation	No	
26.	Correlates - Level nets	Yes	
27.	Adjustment of simple triangulation networks	Yes	
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UNIT IV	ASTRONOMICAL SURVEYING		
28.	Celestial sphere - Astronomical terms and definitions	No	[T1, R2&R6 ]
29.	Motion of sun and stars	No	
30.	Apparent altitude and corrections	Yes	
31.	Celestial co-ordinate systems	Yes	
32.	Different time systems	Yes	
33.	Nautical almanac	Yes	
34.	Star constellations	Yes	
35.	Practical astronomy	Yes	
36.	Field observations and calculations for azimuth	Yes	
UNIT V	MISCELLANEOUS		
37.	Photogrammetry - Introduction - Terrestrial and aerial Photographs	No	[T1, R2 & R4]
38.	Stereoscopy -Parallax	Yes	
39.	Electromagnetic distance measurement - Carrier waves - Principle - Instruments	No	
40.	Trilateration	Yes	
41.	Hydrographic Surveying – Tides - MSL	Yes	
42.	Location of soundings and methods - Three point problem - Study of Box - Sextants and station pointer	Yes	
43.	River surveys - Measurement of current and discharge	Yes	
44.	Cartography - Cartographic concepts and techniques	Yes	
45.	Cadastral surveying - Definition - Uses – Legal values -Scales and accuracies	Yes	

### Teaching Strategies

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:

- Formal face-to-face lectures
- Tutorials, which allow for exercises in problem solving and allow time for students to resolve problems in understanding of lecture material.
- Laboratory sessions, which support the formal lecture material and also provide the student with practical construction, measurement and debugging skills.
- Small periodic quizzes, to enable you to assess your understanding of the concepts.

### Evaluation Strategies

Cycle Test – I	-	5%
Cycle Test – II	-	5%
Model Test	-	5%
Assignment	-	5%
Attendance	-	10%
Final exam	-	70%

Prepared by: Ms.A.Ambica Professor , Department of Civil

Dated :

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**Addendum****ABET Outcomes expected of graduates of B.Tech / Civil / program by the time that they graduate:**

- a. An ability to apply knowledge of mathematics, science, and engineering
- b. An ability to design and conduct experiments, as well as to analyze and interpret data
- c. An ability to design a hardware and software system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- d. An ability to function on multidisciplinary teams
- e. An ability to identify, formulate, and solve engineering problems
- f. An understanding of professional and ethical responsibility
- g. An ability to communicate effectively
- h. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
- i. A recognition of the need for, and an ability to engage in life-long learning
- j. A knowledge of contemporary issues
- k. An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

**Program Educational Objectives****PEO1: PREPARATION**

Civil Engineering graduates will have knowledge to apply the fundamental principles for a successful profession and/or for higher education in Civil Engineering based on mathematical, scientific and engineering principles, to solve realistic and field problems that arise in engineering and non engineering sectors

**PEO2: CORE COMPETENCE**

Civil Engineering graduates will adapt to the modern engineering tools and construction methods for planning, design, execution and maintenance of works with sustainable development in their profession.

**PEO3: PROFESSIONALISM**

Civil Engineering Graduates will exhibit professionalism, ethical attitude, communication and managerial skills, successful team work in various private and government organizations both at the national and international level in their profession and adapt to current trends with lifelong learning.

**PEO4: SKILL**

Civil Engineering graduates will be trained for developing soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, inter personal relationship, group discussion and leadership skill to become a better professional.

**PEO5: ETHICS**

Civil Engineering graduates will be installed with ethical feeling, encouraged to make decisions that are safe and environmentally-responsible and also innovative for societal improvement.

<b>Course Teacher</b>	<b>Signature</b>
Ms.A.Ambica	
Mr.S.Vinoth Kumar	

**Course Coordinator**

**HOD/CIVIL**