

## Academic Course Description

BHARATH UNIVERSITY  
Faculty of Engineering and Technology  
Department of Civil Engineering

**BCE302 Surveying I**  
**Third Semester, 2017-18 (Odd Semester)**

### Course (catalog) description

The purpose of this course is to develop a strong foundation in the principles of various surveying methods and applications to Civil Engineering projects.

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

Credit/ Contact hours : 3 credits / 45 hours

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
Ms.L.MariaSubashini	Second year Civil	Civil Block			12.45 - 1.15 PM

### Relationship to other courses:

Pre –requisites : BEE103 Basic Mechanical Engineering

Assumed knowledge : Basic knowledge in Instrumentation handling

Following courses : BCE3L1 Surveying practical I, BCE402 Survey II, BCE4L1 Survey Practical II

### Syllabus Contents

#### UNIT I INTRODUCTION AND CHAIN SURVEYING

9

Definition – Principles – classification-field & office work-scales-conventional signs – survey instruments – care & adjustment – ranging & chaining – Reciprocal Ranging – setting perpendiculars – well- conditioned triangles – traversing – plotting – enlarging & reducing figures.

#### UNIT II COMPASS & PLANE TABLE SURVEYING

9

Prismatic compass – Surveyors compass - bearing systems & conversions- local attraction- magnetic declination – Dip – Traversing – Plotting – adjustment – Plane table Surveying - Methods of Radiation – intersection, Resection – traversing – Adjustments- Errors in plane tabling.

#### UNIT III LEVELING APPLICATION

9

Level line-Horizontal line-levels & Staves – spirit level – sensitiveness-bench marks – temporary and permanent adjustments– fly & check leveling – Booking – reduction – Curvature and refraction reciprocal leveling – longitudinal and cross sectioning – plotting –

calculation of areas and volumes – contouring – methods – characteristics – and uses of contours – plotting-earth work volume – capacity of reservoirs.

**UNIT IV THEODOLITE SURVEYS**

9

Theodolite-vernier and microptic-description and uses – temporary and permanent adjustments of vernier transit – Horizontal angles – vertical angles – closing error and distribution – Gale’s. Table- Omitted measurement

**UNIT V ENGINEERING SURVEYS**

9

Reconnaissance-preliminary and location surveys for Engineering Projects – Layout – Setting out work- Route surveys for highways, railways and water ways – curve ranging – Horizontal and vertical curves – Simple Curves – setting with chain and tapes, tangential angles by theodolite, double theodolite-compound and reverse curves - Transition curves-functions and requirements-sight distances- mine surveying- instruments – tunnels correlation of underground and surface surveys .

**TEXT BOOKS:**

1. Punmia B.C.”Surveying” Vols I and II & III Laxmi Publications, 1999.

**REFERENCE:**

1. Kanekar T.P.”Surveying and Levelling” VOIs. I and II, united book corporation, Pune, 1994.
2. Chandra A.M, “Plane Surveying and Higher Surveying”, New Age International (P) Limited, Publishers, Chennai, 2002.
3. Heribert Kahmen and wolfgang Faig “surveying” Walter de Gruyter, 1995
4. 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:** Measuring| Leveling | Set outs| Marking

**Test Schedule**

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	August 1 <sup>st</sup> week	Session 1 to 14	2 Periods
2	Cycle Test-2	September 2 <sup>nd</sup> week	Session 15 to 28	2 Periods
3	Model Test	October 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 Course is to introduce the principles of various surveying methods and applications to Civil Engineering projects.	Correlates to program outcome		
	H	M	L
1. Carry out preliminary surveying in the field of civil engineering applications	a,e,	b,d	
2. Plan a survey, taking accurate measurements, field booking, plotting and adjustment of traverse using various conventional instruments	b	e	
3. Plan a survey for applications such as road alignment and height of building.	a,e		
4. Take horizontal and vertical angles precisely by an optical distance measurement using Theodolite.	a	d	
5. Set out curves, buildings, culverts and tunnels		e	

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

### Draft Lecture Schedule

Session	Topics	Problem solving (Yes/No)	Text / Chapter
<b>UNIT I INTRODUCTION AND CHAIN SURVEYING</b>			
1.	Definition, principles - classification	No	[T1, R1&R2]
2.	Field & office work	Yes	
3.	scales-conventional signs	Yes	
4.	Care & adjustment of survey instruments	No	
5.	Ranging & chaining -Reciprocal Ranging	Yes	
6.	Chain & Tape corrections	Yes	
7.	Setting perpendiculars ,Well- conditioned triangles	Yes	
8.	Traversing-plotting	Yes	
9.	Enlarging & reducing figures	Yes	
<b>UNIT II COMPASS &amp; PLANE TABLE SURVEYING</b>			
10.	Prismatic compass	No	[T1, R1&R2]
11.	Surveyors compass	No	
12.	Bearing systems & conversions	Yes	
13.	Local attraction - magnetic declination	Yes	
14.	Dip – Traversing-plotting & adjustment	Yes	
15.	Plane Table surveying- Methods of Radiation	Yes	
16.	Methods of intersection & Traversing	Yes	
17.	Plane table Surveying – Resection	Yes	
18.	Adjustments - Errors in plane tabling	Yes	
<b>UNIT III LEVELING APPLICATION</b>			
19.	Level line-Horizontal line-levels-& staves sprit level sensitiveness	No	[T1, R1 & R2]
20.	Bench marks & its types	No	
21.	Temporary and permanent adjustments	No	
22.	Fly & check leveling – Booking – reduction – Curvature and refraction	Yes	
23.	Reciprocal leveling – longitudinal and cross sectioning	Yes	
24.	Contouring & its Methods	Yes	
25.	Characteristics and uses of contours	No	
26.	Plotting of contours	Yes	
27.	Earth work volume – capacity of reservoirs	Yes	

<b>UNIT IV</b>	<b>THEODOLITE SURVEYS</b>		
28.	Theodolite-vernier and microptic	No	[T1, R1 ]
29.	Description and uses	No	
30.	Temporary and permanent adjustments of vernier	No	
31.	Horizontal angles	Yes	
32.	vertical angles	Yes	
33.	Methods of Traverse	Yes	
34.	Closing error and distribution	Yes	
35.	Gale's table	Yes	
36.	Omitted measurement	Yes	
<b>UNIT V</b>	<b>ENGINEERING SURVEYS</b>		
37.	Reconnaissance-preliminary and location surveys for Engineering Projects	No	[T1, R1 & R2]
38.	Layout – Setting out work	Yes	
39.	Route surveys for highways, railways and water ways	No	
40.	Curve ranging – Horizontal and vertical curves – Simple Curves	Yes	
41.	Setting with chain and tapes	Yes	
42.	Tangential angles by Theodolite & double theodolite	Yes	
43.	compound and reverse curves	Yes	
44.	Transition curves- functions and requirements- sight distances	Yes	
45.	Mine surveying- instruments – tunnels correlation of underground and surface surveys	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%

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**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	
Ms.L.MariaSubashini	

**Course Coordinator**

**HOD/CIVIL**