Academic Course Description

> BHARATH UNIVERSITY
> Faculty of Engineering and Technology
> Department of Civil Engineering
>
> **BCE058 - TALL STRUCTURES**
> **Sixth Semester, 2016-17 (Even Semester)**

Course (catalog) description

The design aspects and analysis methodologies of tall structures will be introduced. The stability analysis of tall structures is another important objective of this course.

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

Credit / Contact hours   :   3 credits / 45 hours

Course Coordinator   :   Ms.T.Aarthiharini, Assistant Professor

Instructors   **:**

Name of the instructor	Class handling	Office location	Office phone	Email (domain: @ bharathuniv.ac.in	Consultation
Ms.T.Aarthiharini		Civil Block			9.50 – 10.40 AM
		Civil Block			2.20 – 3.10 PM

Relationship to other courses:

Pre –requisites   **:**   BCE501 Structural analysis 1
Assumed knowledge   :   -
Following courses   :

Syllabus Contents

UNIT I GENERAL   **9**
Historical Development & Design Criteria: Design philosophy Loading, strength and stability. Stiffness and dirt limitations. Human comfort, Creep, shrinkage and temperature effects – Fire – Foundation -settlement – Soil structure interaction.

UNIT II LOADS   **9**
Gravity loading Methods and lively hood reduction- Impact loading - Construction loads – Wind loading – Static and dynamic approach – Analytical and experimental method – Earthquake loading – Model analysis.

UNIT III BEHAVIOUR SYSTEMS   **9**
Behaviour of Various Structural system: Factors affecting growth, height and structural form. High Rise behavior- Rigid frames - Braced frames - Infilled frames – Shear walls – Coupled shear walls – Walls frames – Tubular cores and hybrid mega systems.

UNIT IV ANALYSIS & DESIGN   **10**
Analysis & Design: Modeling – Analysis of building as total structural system considering overall integrity and major sub – system interaction. Analysis of member forces- Drift and twist - Computerised general three dimensional analysis - Section shapes, Properties and resisting capacity – Design of differential movement – Creep and shrinkage effects- Temperature effects and fiber resistance.

UNIT V STABILITY OF TALL BUILDINGS   **8**

Stability of Tall Buildings : Overall buckling analysis - Wall frames - Approximate methods – Second order effects – P – Delta – Simultaneous first – order and P – Delta analysis – Translational – Torsional instability – Out of plumb – Effect of foundation rotation.

TEXT BOOKS:

1. Wolfgang Schueller " High Rise Building Structures", John Wiley And Sons, NewYork, 1976.

REFERENCE:

1. Tung-Yen Lin &Sidney D. Stotesbury, "Structures Concept and Systems for Architects and Engineers", John Wiley & Sons, 1981
2. Lynn Baedle S., "Advances in Tall Buildings", CBS Publishers and Distributors. New Delhi, 1
3. Bryan Stafford Smith And Alex Coull, " Tall Building Structures ", Analysis And Design, Johr Wiley And Sons, Inc., 1991.

Computer usage: Nil

Professional component

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

Broad area:

Test Schedule

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	August 1st week	Session 1 to 14	2 Periods
2	Cycle Test-2	September 2nd week	Session 15 to 28	2 Periods
3	Model Test	October 2nd week	Session 1 to 45	3 Hrs
4	University Examination	TBA	All sessions / Units	3 Hrs.

Mapping of Instructional Objectives with Program Outcome

	Correlates to program outcome		
	H	M	L
1. To study about different materials used in masonry	C,d	-	-
2. To analyse the steel structures.	C,d	-	-
3. To design of trusses and their members.	C,d	-	-
4. To carry out the analysis of simple beams	C,d	a	-
5. To study about different loading conditions on trusses	C,d	-	-

Draft Lecture Schedule

S.NO	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I GENERAL			**9**
1.	Briefly explain historical Development of tall structures	YES	T1/R2
2.	Design philosophy Loading, strength and stability	YES	
3.	Briefly explain philosophy of strength and stability	YES	
4.	Concept of Stiffness and dirt limitations	YES	
5.	Concept of Creep	YES	
6.	Briefly explain shrinkage and temperature effects	YES	
7.	Concept of Foundation settlement Soil structure interaction.	YES	
8.	Briefly explain the settlement Soil structure interaction.	YES	
UNIT II LOADS			**9**
9.	Methods and lively hood reduction- -– Wind loading – Static and dynamic approach – Analytical and experimental method – Earthquake loading – Model analysis	YES	T1/R1
10.	Briefly explain Gravity loading		
11.	To study the various Methods and lively hood reduction	YES	
12.	Concept of Impact loading	YES	
13.	Concept of Construction loads	YES	
14.	Briefly explain Wind loading – Static and dynamic approach	YES	
15.	Analytical and experimental method Earthquake loading	YES	
16.	Concept of model analysis	YES	
UNIT III BEHAVIOUR SYSTEMS			**9**
17.	Concept of Factors affecting	YES	T1/R1
18.	Behaviour of Various Structural system growth, height and structural form.	YES	
19.	Briefly explain Infilled frames	YES	
20.	Concept of Shear walls Coupled shear walls	YES	
21.	Briefly explain Walls frames	YES	
22.	Concept of Tubular cores and hybrid mega systems.	YES	
UNIT IV ANALYSIS & DESIGN			
23.	Analysis of building as total structural system	YES	T1/R3
24.	Concept of considering overall integrity and major sub	YES	
25.	Analysis of member forces- Drift and twist	YES	
26.	Computerized general three dimensional analysis	YES	
27.	Properties and resisting capacity	YES	
28.	Design of differential movement	YES	
29.	Concept of Creep and shrinkage effects	YES	
30.	Concept Temperature effects and fiber resistance	YES	
UNIT V STABILITY OF TALL BUILDINGS			**9**
	Stability of Tall Buildings **and** Overall buckling analysis.	YES	T1/R1
31.	Wall frames	YES	
32.	Approximate methods – Second order effects – P – Delta	YES	
33.	Simultaneous first	YES	
34.	Translational	YES	
35.	Torsional instability	YES	
36.	Out of plumb	YES	
37.	Effect of foundation rotation.	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

- Laboratory sessions, which support the formal lecture material and also provide the student with practical construction, measurement and debugging skills.

Evaluation Strategies

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

Prepared by: Ms.T.Aarthiharini,   Assistant 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.

Course Teacher	Signature
Ms.T.Aarthiharini	

Course Coordinator   **HOD/Civil**