

Academic Course Description

BHARATH UNIVERSITY
 Faculty of Engineering and Technology
 Department of Civil Engineering
BCE069 - MATRIX METHODS AND STRUCTURAL ANALYSIS
Sixth Semester, 2016 -17 (Even Semester)

Course (catalog) description

To bring about an understanding of the prefabrication and construction techniques adopted and the standardization tolerances-system for prefabrication an also Understand the Pre-casting and handling techniques

Compulsory/Elective course : Compulsory for Civil students

Credit/ Contact hours : 3 credits / 45 hours

Course Coordinator : Mr.P .Sathishkumar, Assistant Professor

Instructors : Dr.S.J.Mohan,

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@bharathuniv.ac.in)	Consultation
Dr.S.J.Mohan,	Final year Civil	Civil Block		mohansjm@yahoo.com	2.30 – 3.30 PM

Relationship to other courses:

Pre –requisites : BCE057 - DESIGN OF R.C.FRAME STRUCTURES

Assumed knowledge : Basic knowledge in CONCRETE DESIGNAL

Following courses : -Nil-

Syllabus Contents

UNIT I ANALYSIS OF INDETERMINATE STRUCTURES 9

Concept of Indeterminate Structural Analysis –Indeterminacy - flexibility method stiffness method – choice of method.

UNIT II STIFFNESS METHOD 9

Stiffness Method: Three dimensional structures – space trusses – grid structures – rigid frame structures.

UNIT III ANALYSIS OF SUBSTRUCTURE 9

Analysis of Structural system using substructure: Basic concepts – analysis of substructure – simple examples.

UNIT IV FLEXIBILITY METHOD 9

Flexibility method: Trusses, beams and space frames.

UNIT V COMPUTER APPLICATIONS 9

Preparation of Computer Programmes: Trusses – beam – space frames

TEXT BOOK

L.S. Negi & R.S. Jangid, "Structural Analysis", Tata McGraw-Hill Publications, New Delhi, 2003

REFERENCES:

BhaviKatti, S.S, "Structural Analysis – Vol. 1 Vol. 2", Vikas Publishing House Pvt. Ltd., New Delhi, 2008 William Weaver,"Computer Programs for Structural Analysis",Van Nostrand,1967)

Rubinstein M.E, "Matrix Computer Analysis of Structures", Prentice Hall, 1969

Computer usage: Planning, marking Auto Cad

Professional component

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

Broad area: Design | Analysis | Structures

Test Schedule

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	February 1 st week	Session 1 to 14	2 Periods
2	Cycle Test-2	March 2 nd week	Session 15 to 28	2 Periods
3	Model Test	April 2 nd 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 design methods and applications to Civil Engineering projects.	Correlates to program outcome		
	H	M	L
1. Apply the basic concepts of matrix methods in structural Analysis	C,e	A c,d	
2. Find out the deflections in beams and trusses using various methods	c	A,c,d	
3. Analyze the structures using flexibility and stiffness method	c	A,c,d	
4. Determine member forces using element and system matrices for determinate	c	A,c,d	
5. and indeterminate structures	c	A,c,d	
	c	A,c,d	

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

Draft Lecture Schedule

Session	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I INTRODUCTION			
1.	Concept of Indeterminate Structural Analysis	Yes	[T1, R2]
2.	Concept of Indeterminate Structural Analysis	Yes	
3.	Concept of Indeterminate Structural Analysis	Yes	
4.	Concept of Indeterminate Structural Analysis	Yes	
5.	Indeterminacy	No	
6.	flexibility method stiffness method	Yes	
7.	Indeterminacy	Yes	
8.	choice of method	No	
9.	choice of method	Yes	
UNIT II DESIGN OF SPECIAL RC ELEMENTS			
10.	Stiffness Method	No	[T2, R4]
11.	Three dimensional structures	Yes	
12.	Stiffness Method	Yes	
13.	Three dimensional structures	Yes	
14.	Three dimensional structures	Yes	
15.	Three dimensional structures	Yes	
16.	Stiffness Method	Yes	
17.	space trusses	Yes	
18.	space trusses	Yes	
19.	grid structures – rigid frame structures.	yes	
20.	rigid frame structures.	yes	
UNIT III ANALYSIS OF SUBSTRUCTURE			
21.	Concept of substructure	yes	[T1, R3]
22.	Space trusses	Yes	
23.	Basic concepts analysis of sub structures	No	
24.	Problems for substructure	Yes	
25.	Fixed problems solved for structures	Yes	
26.	Simply supports problems solved	Yes	
27.	Basic concepts analysis of sub structures	NO	
28.	Problems for substructure	NO	
29.	Problems for substructure	Yes	
UNIT IV FLEXIBILITY METHOD			
30.	Basic concept of Flexibility method	Yes	[R1]
31.	Basic concept of Trusses	Yes	
32.	Basic concept of beams	Yes	
33.	Basic concept of space frames	Yes	

34.	Problems solved Trusses	Yes	
35.	Problems solved beams	Yes	
36.	Problems solved beams	Yes	
37.	Problems solved space frames	Yes	
38.	Problems solved space frames	Yes	
UNIT V UNIT V COMPUTER APPLICATIONS			
39.		Yes	[T1, R3]
40.	Preparation of Computer Programmes	Yes	
41.	Computer programmerProblems solved	Yes	
42.	Trusses	Yes	
43.	space frames space frames	yes	
44.	Problems solved	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%
Attendance	-	10%
Assignment	-	5%
Final exam	-	70%

Prepared by: Dr. S.J.Mohan Professor , Department of Civil

Dated :

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
Dr. S.J.Mohan	

Course Coordinator

HOD/CIVIL