

Academic Course Description

<p style="margin: 0;">BHARATH UNIVERSITY</p> <p style="margin: 0;">Faculty of Engineering and Technology</p> <p style="margin: 0;">Department of Civil Engineering</p> <p style="margin: 0;">BCE052 - INDUSTRIAL STRUCTURES</p> <p style="margin: 0;">Fifth Semester, 2017-18 (Odd Semester)</p>
--

Course (catalog) description

The purpose of this course is to develop an in-depth knowledge in the area of design of industrial structure with the latest code of practice as per the Indian Standard. On completion of this course student gain good confidence in designing major industrial structures like bridge plate girders, industrial structures like gantry girders, water tanks, support structures, high rise chimneys and pre-engineered thin walled structures.

Compulsory/Elective course : Core Elective for Civil students

Credit / Contact hours : 3 credits / 45 hours

Course Coordinator : Dr.S.J.Mohan, Professor

Instructors :

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 : BCE404 - BASIC STRUCTURAL DESIGN

Assumed knowledge : Basic knowledge in STRUCTURAL DESIGNAL

Following courses : -Nil-

Syllabus Contents

UNIT I GENERAL

8

Specific equipments for industries like Engineering. Textile, Chemical etc., - Site layout and external facilities classification of industries minimum standards internal calculation – Materials – Works.

UNIT II FUNCTIONAL REQUIREMENTS

10

1. Lighting – Natural and artificial – protection from the sun – sky light. 2. Services, Layout, wiring fixtures, cable and pipe bridges – Electrical installations – lighting - Substations - effluent. 3. Ventilation and fire protection, ventilation & air – conditioning, fire escapes and, chutes, fire alarms, extinguishers and hydrants.

UNIT III PLANNING & DESIGN

9

(Requirement of factory and other rules) Layout stages. Loading Design of single bay and design of multi bay multi storied frames in RCC and steel – Analysis of industrial structures.

UNIT IV DESIGN OF APARTMENT STRUCTURES

10

Cranes - Different types - principles - design of girder – open web and solid web bunkers – silos – R.C. ducts.

UNIT V CONSTRUCTION TECHNIQUES

8

Expansion joints- design of machine foundations and other foundations as per I.S. Code - Water proofing – roof drainage – joints – sound, shock proof mountings.

TEXT BOOKS:

1. Purushothaman P ,”Reinforced Concrete Structural elements”, Tata McGraw-Hill, 1984.

REFERENCES:

1. Pasala Dayaratnam,”Design of Steel Structure”, Wheeler publishers Allahabad , 1990.
2. Planning industrial structures Dunham, Industrial Structures McGraw-Hill Book Co; 1st edition (1948)
3. Henn W. Buildings for Industry, vols.I and II, London Hill Books, 1995.
4. Handbook on Functional Requirements of Industrial buildings, SP32 – 1986, Bureau of Indian Standards, New Delhi 1990.
5. Course Notes on Modern Developments in the Design and Construction of Industrial Structures, Structural Engineering Research Centre, Madras, 1982.

Computer usage: Yes

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 st week	Session 1 to 14	2 Periods
2	Cycle Test-2	September 2 nd week	Session 15 to 28	2 Periods
3	Model Test	October 2 nd week	Session 1 to 45	3 Hrs
4	University Examination	TBA	All sessions / Units	3 Hrs.

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. Classification industrial structures based on the products	a,e,	b,d	
2. Functional requirements for service like power source, water source, sewer disposal, lighting , ventilation etc.	b	e	
3. Layout planning based on factory requirements and rules	a,e		
4. Preliminary design of bunkers, silos, towers, ducts etc.	a	d	
5. Connection detailing of structural joints like water proof joints, drainage, industrial waste lines etc.		e	

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

Draft Lecture Schedule

Session	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I GENERAL			
1.	Definition on Industries and their classification	No	[T1, R2]
2.	Problems	Yes	
3.	Setting out the layout as per the requirement of the product	No	
4.	Steel rolling mill industries problem	Yes	
5.	Standards and code of practice to be followed	No	
6.	Relevant environmental code of practice to be followed	No	
7.	Material control	No	
8.	Case study: Industry	Yes	
9.	Problem	Yes	
UNIT II FUNCTIONAL REQUIREMENTS			
10.	Natural protection of industries for climatic conditions	No	[T1, R2]
11.	Problem on site location	Yes	
12.	Problem on waste material disposal	Yes	
13.	Link services Highway network	No	
14.	Problem	Yes	
15.	power grid network	No	
16.	Estimation of requirements	Yes	
17.	Source of water	Yes	
18.	Safety protection like fire stations, hospitals, from natural disasters	No	
UNIT III PLANNING & DESIGN			
19.	Wind loads on industrial structures	Yes	[T1, R2]
20.	Problem	Yes	
21.	Analysis of single bay portal frame with sway condition	yes	
22.	Problem	yes	
23.	Design of single bay portal frame	yes	
24.	Problem	yes	
25.	Design of multi bay, multi-storied frames	Yes	
26.	Industrial column design in steel and concrete	Yes	
27.	Problem	Yes	
UNIT IV DESIGN OF APERTINANT STRUCTURES			
28.	Design of Gantry girders	Yes	[T1, R2]
29.	Problem	Yes	
30.	Bunker design steel	YES	
31.	Problem	Yes	
32.	Silo Design in R.C.C	Yes	

33.	Problem	Yes	[T1, R2]
34.	Design of ducts below floor level	Yes	
35.	Design of Structural foundation	Yes	
36.	Problem	Yes	
UNIT V CONSTRUCTION TECHNIQUES			
37.	Design of machine foundation	Yes	
38.	Problem	Yes	
39.	Shock and vibration protection	Yes	
40.	Problem	Yes	
41.	Problem	Yes	
42.	Locating the expansion joints and construction joints	No	
43.	Design of Rotary machine foundation	Yes	
44.	Problem	Yes	
45.	Roof drainage system	No	

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: 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