



Subject : Prefabricated Techniques and Management - METCP11508

Type of course: Minor Stream

Prerequisite: NIL

Rationale: Prefabricated techniques and management in construction offer significant advantages by streamlining the building process and enhancing efficiency. Prefabrication involves manufacturing building components off-site in a controlled environment, which ensures higher quality control, precision, and consistency. This method reduces on-site labor, minimizes waste, and shortens construction timelines, leading to cost savings and faster project completion.

Effective management of prefabrication requires meticulous planning, coordination, and logistics to ensure seamless integration of prefabricated components on-site. This includes detailed design, precise scheduling, and robust communication among all stakeholders to avoid delays and mismatches.

Prefabrication also enhances safety by reducing on-site construction activities, which decreases the risk of accidents and injuries. Additionally, it supports sustainability by optimizing material use and reducing environmental impact.

Overall, the adoption of prefabricated techniques and their efficient management result in higher quality buildings, improved safety, reduced costs, and faster project delivery, making it an increasingly popular choice in the construction industry.

Teaching and Examination Scheme:

| Teaching Scheme | | | Credits | Examination Marks | | | | | Total Marks |
|-----------------|---|---|---------|-------------------|--------------|----|-----------------|-----|-------------|
| CI | T | P | | C | Theory Marks | | Practical Marks | | |
| | | | ESE | | MSE | V | P | ALA | |
| 4 | 0 | 2 | 5 | 60 | 30 | 10 | 20 | 30 | 150 |

Legends: CI-Class Room Instructions; T – Tutorial; P - Practical; C – Credit; ESE - End Semester Examination; MSE- Mid Semester Examination; V – Viva; CA - Continuous Assessment; ALA- Active Learning Activities.



Continuous Assessment:

| Sr. No | Active Learning Activities | Marks |
|--------------|--|-----------|
| 1 | Multistory Building Prepare the design of multistory building with all necessary requirement. And upload on GMIU Web Portal. | 10 |
| 2 | Design of Bunker Prepare the detail design of given size bunker. And upload on GMIU Web Portal. | 10 |
| 3 | Case study Prepare the detail report on the prefabricated building in your region. And upload on GMIU Web Portal. | 10 |
| Total | | 30 |

Course Content:

| Sr. No | Course content | Hrs | % Weightage |
|--------|---|-----|-------------|
| 1 | Introduction Types of prefabrication, prefabrication systems and structural schemes- Disuniting of structures- Structural behaviour of precast structures - Specific requirements for planning and layout of prefabrication plant - IS Code specifications. Precast Cast Elements Handling and erection stresses- Application of prestressing of roof members; floor systems two way load bearing slabs, pre stressed beam , Precast column -precast shear walls Wall panels, hipped plate and shell structures. | 18 | 30% |
| 2 | Prefabricated Design Designing and detailing prefabricated units for 1) industrial structures 2) Multistory buildings and 3) Water tanks, silos bunkers etc., 4) Application of prestressed concrete in prefabrication. Joints Basic mechanism- Dimensioning and detailing of joints for different structural connections; compression joint-shear joint - tension joint | 17 | 28% |
| 3 | Connections Pin jointed connection-moment resisting connections- beam to column- column foundation connections Prefabricated Buildings Production, Transportation & erection- Shuttering and mould design Dimensional tolerances- Erection of R.C. Structures, Total prefabricated buildings assembly Process | 15 | 25% |



| | | | |
|---|---|-----------|------------|
| 4 | Machinery and Equipment Plant machinery, casting yard- casting and stacking | 10 | 17% |
| | Total | 60 | 100 |

Suggested Specification table with Marks (Theory):60

| Distribution of Theory Marks (Revised Bloom's Taxonomy) | | | | | | |
|--|--------------------|----------------------|--------------------|----------------|-----------------|---------------|
| Level | Remembrance (R) | Understanding (U) | Application (A) | Analyze (N) | Evaluate (E) | Create (C) |
| Weightage | NA | NA | NA | NA | NA | NA |

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Course Outcome:

| | |
|--|--|
| After learning the course, the students should be able to: | |
| CO1 | Describe various structural systems and standard organizing requirements. |
| CO2 | Identify and differentiate structural behaviour of building elements. |
| CO3 | Design building elements and applications. |
| CO4 | Identify and describe working principles of various joints, working principal of various connection, and various tools in assembling and erection of building. |
| CO5 | Apply principles and describe assembling process. |
| CO6 | Design and detail precast and activities by innovation. |

List of Assignment

Student will submit assignment base on above topics.

Instructional Method:

The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

From the content 10% topics are suggested for flipped mode instruction.

Students will use supplementary resources such as online videos, NPTEL/SWAYAM videos, e-courses, Virtual Laboratory



The internal evaluation will be done on the basis of Active Learning Assignment

Practical/Viva examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

Text Books:

1. Kim S. Elliot (2017), Precast Concrete Structures, CRC Press

Reference Books:

1. Handbook of Precast Concrete Buildings (2016) ICI publications.
2. Ryan E. Smith, (2010), Prefab Architecture: A Guide to Modular Design and Construction, John Wiley and Sons, London.
3. Hubert Bachmann and Alfred Steinle, (2011), Precast Concrete Structures, Wiley VCH.

