

AR324	Advanced Building Materials and finishes	HRS 4-0-0	CR-4
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Objective

The course intends to introduce different materials used in modern buildings, and innovative alternative materials that are being used to make the building more energy efficient and sustainable. Property, application and performance of each material is highlighted. To get hands on experience and idea about the material students are required to visit building material outlets and construction sites, and collect product information.

MODULE 1

INTRODUCTION AND ADVANCED CONCRETE

Introduction to advanced building materials in building industry.

Role of advance materials in building performance.

Contemporary materials in super structure.

Ultra high performance concrete, Ferrock, Liquid granite, Litracon etc.

High-Ductility Concrete for Resilient Infrastructures: Engineered Cementitious Composite (ECC), Engineered stone, etc.

MODULE 2

GLASS

Speciality Glass as a contemporary building material.

Types and categories of Glass and its application in building facades.

Laminated, curved and tempered glass, Kinetic glass, Smart glass and smart windows.

Introduction to Digital building facades: Building kinetics and facade engineering, sensor glasses for interiors.

MODULE 3

WOOD AND COMPOSITES

Wood as an advanced material for buildings: Reconstructed wood, cross laminated timber, Plyboards, composite boards, Acoustics boards, and panelling materials, laminates and veneers, wood foam.

Advanced fibre composite materials: Bamboo, glass-reinforced plastic (GRP), Fibre-reinforced polymers (FRP), Shape memory polymer composites.

Vacuum insulation panel (VIP), stretched fabric wall systems External Thermal Insulation Cladding System (ETICS), Insulated Vinyl Siding.

Different types of stainless steel applications, Polycarbonates.

Aluminium composite panels: application method in interior and exterior facades

MODULE 4

INTRODUCTION TO DIFFERENT BUILDING FINISHES

Paints and Varnishes: Properties and uses of ordinary paints, Varnishes and wood preservatives, method of distempering wall surfaces and painting of timber and metal work. Plastic paints, emulsion paints, cement paint and textured plaster. Enamel and epoxy paints.

Reflective indoor coatings and High reflectance and durable outdoor coatings.

Nano-materials for building construction and finishes.

Different types of flooring and wall cladding tiles, Antistatic Vinyl surfaces.

MODULE 5

Site visits for practical exposure to different advanced materials and their application in the building industry.

Case studies to be conducted for further documentation of the knowledge explored, and report to be submitted.

References

1. Al-homound, M.S., Performance Characteristics and Practical Applications of Common Building Thermal Insulation Materias, Building and Environment, Vol-40(3), 2005.
2. Duggal, S.K., Building Materials, New Age International Publishing Co., (3rd Ed.), 2008.
3. Varghese, P.C., Building Materials, PHI Learning Pvt. Ltd., 2005.
4. www.in.saint-gobain-glass.com

TENTATIVE
Likely to be Modified