SUBJECT NO-AR20203, SUBJECT NAME- ADVANCED BUILDING MATERIALS AND COMPOSITES

LTP- 3-0-0,CRD- 3

SYLLABUS :-

AR22001: Advanced Building Materials and Composites Credits: 3 L-T-P: 3-0-0 Prerequisite: Building Materials Course Overview: This course is as an advanced level of Building Materials Composites taught in previous semester. The aim of this module is to introduce material used for modern buildings and structures especially for services and finishing. Property, application and performance of each material is highlighted which requires basic understanding of micro structure of material. To get the physical feeling of the materials and structures, students are advised to visit nearby construction sites and browse product brochures. Learning/Course Objectives: 1. Illustrate the production and properties of various metals and alloys. 2. Select various metals and alloys for building construction based on their properties. 3. Classify precast concrete structures according to use, shape and construction method. 4. Describe application of paints and varnishes in buildings. 5. Demonstrate glass production methods and classify them into various groups. 6. Employ different materials for heat and noise insulation. 7. Give example of various organic binders and bitumen along with their use. 8. Outline basic properties of plastics and polymers, their types and application in construction industry. Course Curriculum: Module 1 : Metal and metal components Extraction of metals, Basic Metallurgy of Iron Steel, composite grades of steel, heat treatment of steel, corrosion of metals and protection, non-ferrous metals-aluminium and aluminium alloys, copper, brass, bronze, lead, zinc, tin. Module 2 Glass and glazing Manufacturing of glass, types and uses, fixing of glass on different framing system Module 3 : Precast concrete Methods of preparation and uses. Fixing details of precast walling, flooring, foundation systems Module 4 : Polymers and polymer-based materials and components Polymers and plastics, polymer based building materials for walls, pipes, sanitary-ware, glues, mastics. commercial names of common products of respective companies. Module 5 : Paints Paints and varnishes- different types, uses, methods of application on different surfaces. Module 6 Composites Composites and their uses, advantages and application areas, nanotechnologies in building industryReading List: 1. Al-Homoud, M.S., Performance Characteristics and Practical Applications of Common Building Thermal Insulation Materials, Building and Environment, Vol-40(3), 2005, 2. Callister, W. D., Fundamentals of Materials Science and Engineering: An Integrated Approach, John Wiley Sons, New York, 2005. 3. Cavanaugh, W.J., Tocci, G.C. and Wilkes, J.A., Architectural Acoustics: Principles and Practice, John Wiley Sons, (2nd Ed.), 2009. 4. Duggal, S.K., Building Materials, New Age International Publishing Co., (3rd Ed.), 2008. 5. Moncmanova, A. (Ed.), Environmental Deterioration of Metals, WIT Press, Boston, 2007. 6. Nayar, A., The Steel Handbook, Mc-GrawHill, 2000. 7. Varghese, P.C., Building Materials, PHI Learning Pvt. Ltd, 2005. 8. Verhoeven, J.D., Steel Metallurgy for the Non-metallurgist, ASTM Int, 2007. 9. Whiteoak, D., Read, J. and Hunter, R., (Ed.), The Shell Bitumen Handbook, Thomas Telford, (5th Ed.),

2003. Online Study Materials: Extraction of iron and steel http://www.chemguide.co.uk/inorganic/extraction/iron.html Nasa Corrosion Technology Laboratory. http://corrosion.ksc.nasa.gov/corr_control_matsel.htm Saint Gobain Glass. www.in.saint-gobain-glass.com