

MLPC3001 AGGLOMERATION PROCESSES ENGINEERING (3-0-0)

Course Objectives:

- To gain the fundamental knowledge of agglomeration techniques used for minerals specifically for iron ore.

Module-I: (06 Hrs)

Different types of agglomeration techniques. Necessity and scope of agglomeration, Bridging mechanisms, binders and other additives, Characteristics of raw material like chemical composition, size, surface area etc. Raw material preparation. Preferred locations of agglomeration industries.

Module-II: (06 Hrs)

Pelletization: Raw material, Green-ball formation: Mechanism and process parameters, testing of green-balls. Drying and firing of green Balls, testing of indurated pellets like Tumbler-test, Reducibility, Swelling index, Compressive strength etc., Cooling of indurated pellets.

Module-III: (06 Hrs)

Pelletization Equipment: conveyors and screens, Mixer, Pelletizer, Design of pelletizer. Different types of pellet-firing system: Shaft-furnace, Travelling Grate system and Grate Kiln System. Cooling systems.

Module-IV: (06 Hrs)

Sintering: Raw material preparation. Mechanism of Sintering, Types and properties of Sinter, Mineralogy and its effect on strength of sinter. Cooling, preparation of sinter before use in blast furnace.

Module-V: (06 Hrs)

Press agglomeration: Briquetting of ore, equipment and properties.

Agglomeration of other types of ore. Storage and transport of agglomerates, Advantages of agglomerates in Iron making, flowsheets, Pelletization and sintering plant practices in India. Comparison between agglomeration methods.

Course Outcome:

CO1: To understand the fundamental and types of agglomeration

CO2: To acquire the basic knowledge of pelletization process used for iron ore

CO3: To explore the working mechanism and construction of various equipment used in pelletization

CO4: To understand the key concepts of sintering process

CO5: To explore the principle of other agglomeration processes

Text Books

1. Meyer K., Pelletizing of iron ores, Springer Publication, New York
2. Pietsch W., Agglomeration Process: Phenomena, Technologies, Equipment, Wiley-VCH

Reference Books:

1. Tupkary R. H. and Tupkary V.R., An introduction to modern iron making, Khanna Publishers
2. Bhagat R. M., Agglomeration of Iron Ores, CRC Press, 2019