## Detailed Syllabus and lecture-wise breakup for

## Computational Modeling of Multiphase Reactive Flows

[Proposed LTP: 3–1–0]

- Computational fluid dynamics (CFD) for multiphase flow **[No. of lectures: 5]**
    - Modeling concepts: Averaging techniques, high resolution methods
    - Overview of multi-scale computational techniques
- Principles and derivation of multi-fluid models **[No. of lectures: 4]**
- Modeling concepts for multiphase reactive flow processes **[No. of lectures: 10]**
    - Dispersed flow, granular flow
    - Separated flow
    - Mixed flow
- Turbulent reacting flows **[No. of lectures: 6]**
    - Modeling approaches
    - Models based on Reynolds-averaged Navier–Stokes equations (RANS)
- Interfacial closure models **[No. of lectures: 6]**
    - Momentum closure
    - Heat and mass transfer closure
- Selected applications to rector design **[No. of lectures: 7]**
    - Fluidized bed
    - Bubble column
    - Fixed bed
- Simulation using CFD solver **[No. of lectures: 10]**
    - Multiphase flows
    - Turbulent flows
    - Reactive flows

**Total number of proposed lectures: 48**