Course Type	Course Code	Name of the Course	L	T	P	Credits
DC	CHC201	Chemical Process Calculations	3	0	0	9

Course Objective
This basic course aims to provide the students with an introduction to the principles and calculation techniques used in the field of chemical engineering and to acquaint them with the basics of material and energy balances.
Learning Outcomes
It is expected that this course will lay the foundation of basic knowledge and calculation skills that are frequently used in subsequent chemical engineering courses as well as in professional life.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	**Introduction to chemical process calculations:** Unit, unit conversion dimension, dimensionless number, dimensional consistency analysis, Steady-state and dynamic processes; lumped and distributed processes, intensive and extensive variables, degrees of freedom	**08**	Students will know the principles and calculation techniques
2	**Behaviour of gas, liquid and solid:** Terminologies, behaviour of ideal gases and gaseous mixtures, vapour pressure, humidity and saturation, Phase equilibrium, Processes involving vaporization and condensation	**10**	Basic understanding of the behaviour of gases, liquids and solids
3	**Material balance:** Introduction, material balances for processes without chemical reaction, material balances involving recycle, bypass and purge; application in chemical industries	**10**	Students will be acquainted with material balance in process industries
4	**Energy balances:** Introduction to energy balances, terminologies, Steady state energy balances for the processes without reaction, steady state energy balances for the processes with reaction	**08**	Students will be acquainted with basic energy balance in chemical and allied industries
5	**Combustion calculations:** Introduction, combustion stoichiometry, combustion calculations using solid, liquid and gaseous fuels	**06**	Preliminary calculations related to the combustion of various fuels, mainly fossil fuels

Textbooks:

1. Himmelblau, D. M. and Riggs, J. B. (2012). Basic Principles and Calculations in Chemical Engineering. 8th Ed., PHI, Eastern Economy Edition

Reference Books:

1. Hougen, O. A., Watson, K. M. and Ragatz, R. A. (2004). Chemical process principles, 2nd Ed., John Wiley and Asia Publishing

2. Perry, R. H. and Green, D. (Ed.) (2007). Perry' Chemical Engineering Handbook, 8th Ed., McGraw Hill

3. Sinnott, R. K. (2005). Coulson & Richardson's Chemical Engineering – Vol VI, Butterworth and Heinemann