# A First Course on Kinetics and Reaction Engineering
## Unit 20. Optimization of Batch Reactor Processes

### Definitions

net rate of (batch reactor) production - The number of moles of a species produced in a batch process divided by the sum of the processing time and the turnaround time, that is, the effective rate of production factoring in both processing and turnaround times.

### Nomenclature

$n_i^f$      final number of moles of species $i$ at the completion of the full operational protocol

$n_i^0$      initial number of moles of species $i$ at the start of the full operational protocol

$r_{i,net}$      net rate of (batch reactor) production of species $i$

$t_{process}$      total time required to complete the full operational protocol

$t_{turnaround}$ turnaround time required between batches for reactor draining, cleaning, filling, etc.

### Equations

$$r_{i,net} = \frac{n_i^f - n_i^0}{t_{process} + t_{turnaround}}$$

(20.1)