GUJARAT TECHNOLOGICAL UNIVERSITY

BACHELOR OF ENGINEERING SYLLABUS

Subject Code : 3155106

Subject Name : Numerical Concept in Food Engineering

WEF Academic Year :	2023-24
Semester :	5
Category of the Course :	Open Elective

Prerequisite: Nil

Rationale: Mathematical reasoning is an important skill for food engineer. Students will learncompletefundamentalsofbasicbalanceandtransportprinciplesusedinfoodengineering.

Course Scheme:

Teaching Scheme			Total Credits	Assessment Pattern and Marks				Total Marks
				Theory		Practical		
L	T	PR	C	ESE (E)	PA(M)	ESE (V)	PA (I)	
2	2	0	3	70	30	30	20	150

Course Content:

Sr. No.	Course Content	No. of Hours	% of Weightage
1	**Heat and Mass Transfer:** Steady state conduction and convection heattransfer,Convectiveheattransfercoefficients,Radiationheattransfer.Moleculardiffusion,Convectivemass transfer	8	25
2	**Mass and Energy balance:** Steady state operation with no reaction, and with chemical reaction, Unsteady state operation with noreaction. Saturated steam, Super heated steam and Enthalpy balances.	9	25
3	**Interpolation and Curve Fittings:** Single interpolation, Doubleinterpolation,Coordinatesystem,Logarithmictransformations-Semi-log graphand Log-log graphs	7	25
4	**Rheology of Foods:** Measurement of rheological properties, Continuity equations, determination of flow regime, flow of New to nianfluids in pipe and non-Newtonianfluidsflow.	8	25

Reference Book:

1. Math Concepts for Food Engineering by Richard W. Hartel
2. Introductionto Food Engineeringby SinghR. P.

3. ChemicalEngineeringHandBookbyPerryR.H.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level*
01	Understanding the numerical concepts in mass balance and energy balance	RM
02	Understanding the numerical concepts in heat transfer, mass transfer, gasses and vapors	UN
03	Understanding the modeling rheological behavior of foods and its measurement	AN

*RM: Remember, UN: Understand, AP: Apply, AN: Analyze, EL: Evaluate, CR: Create

Suggested list of tutorials:

1. Graphs and curve fittings
2. Interpolation of data in food engineering problems
3. Manipulations of equations and the rules of equations applied to food engineering
4. Numerical problems on Mass balance and Energy balance
5. Determination of flowergime in foods
6. Numerical problems on unsteady state heat transfer and Radiation heat transfer
7. Numerical problems on freezing off ood products
8. Molecular diffusion on food products
9. Numerical problems on convective mass transfer
10. Numerical problems on unsteady state heat transfer

Listofopensourcesoftware/learningwebsites

1. https://nptel.ac.in/courses/126/103/126103017/
2. https://www.youtube.com/watch?v=ZwBoZVrZxbk&list=PL2E9_TlQKsGRQy05HBihSowy1WP9HBtdy
3. https://www.digimat.in/nptel/courses/video/126105011/L12.html
4. https://nptel.ac.in/courses/126105015/

* * * * * * *