ADVANCED HEAT AND MASS TRANSFER

Prof. G. CARUSO – A.A. 2020/2021

Rev. 1 - 21/09/2020

Tentative scheduling of the course: eventual changes will be communicated during lessons and on the web site.

30 Lectures (Units), 8 in-class exercises (E = Exercises); 8 in-class and by home evaluation tests (SET = Self Evaluation Tests using Moodle), 2 in-class official tests (ET = Evaluation Test for exam)

Week	Unit	date	day	hour	Subject
1	U1	29/09/2019	Tuesday	08:00-10:00	Course introduction - Fundamental and energy units - Units conversion
	U2	01/10/2019	Thursday	13:00-16:00	Review on Thermodynamics
	U3	02/10/2019	Friday	13:00-14:30	Thermophysical and transport properties
	U4_SET-0			14:30-16:00	Dimensionless Numbers Home SET- (Units 1-4)
2	U5	06/10/2019	Tuesday	08:00-10:00	Conduction heat transfer - The heat equation
	U5	08/10/2019	Thursday	13:00-16:00	Conduction heat transfer - Examples
	U6	09/10/2019	Friday	13:00-14:30	Steady heat conduction in special conditions and geometries
	E1			14:30-16:00	*Exercises Units 5-6*
3	U7	13/10/2019	Tuesday	08:00-10:00	Transient conduction
	U8	15/10/2019	Thursday	13:00-16:00	Numerical Analysis of heat conduction
	E2_SET-1				*Exercises Units 7-8 - SET-1 (Units 5-8)*
	U9	16/10/2019	Friday	13:00-14:30	General conservation equations - Conservation of mass
	U10			14:30-16:00	General conservation equations - Conservation of momentum
4	U10	20/10/2019	Tuesday	08:00-10:00	General conservation equations - Conservation of momentum
	U11	22/10/2019	Thursday	13:00-14:30	General conservation equations - Conservation of energy
	E3			14:30-16:00	*Exercises Units 9-11*
	U12	23/10/2019	Friday	13:00-16:00	Convection transfer - Boundary Layers
5	U13	27/10/2019	Tuesday	08:00-10:00	External Flows in forced convection
	E4_SET-2	29/10/2019	Thursday	13:00-16:00	*Exercises Units 12-13 - SET-2 (Units 9-13)*
	U14	30/10/2019	Friday	13:00-16:00	Internal flows: Friction and heat transfer in forced convection

Week	Unit	date	day	hour	Subject
6	U15	03/11/2019	Tuesday	08:00-10:00	Turbulent flows
	U16	05/11/2019	Thursday	13:00-14:30	Natural convection
	E5			14:30-16:00	*Exercises Units 14 -16*
	U17_SET-3	06/11/2019	Friday	13:00-16:00	Radiation heat transfer - SET-3 (Units 14-17) - END OF FIRST PART
7	U18	10/11/2019	Tuesday	08:00-10:00	Heat Exchangers - I
	U19	12/11/2019	Thursday	13:00-14:30	Heat Exchangers - II
	E6_SET-4			14:30-16:00	*Exercises - Units 18-19 - SET-4 (Units 18-19)*
	U20	13/11/2019	Friday	13:00-14:30	Two-phase flows: characteristic variables and properties
	U21			14:30-16:00	Two-phase flows: momentum and energy equations
8	U22	17/11/2019	Tuesday	08:00-10:00	Flow regimes
	U23	19/11/2019	Thursday	13:00-16:00	Boiling: introduction - Bubble equilibrium, nucleation, dynamics
	ET-1	20/11/2019	Friday	13:00-16:00	Mid- Term Examination (Units 1-17; E1-E5)
9	U23_SET-5	24/11/2019	Tuesday	08:00-10:00	Boiling: introduction - Bubble equilibrium, nucleation, dynamics - SET-5 (Units 20-23)
	U24	26/11/2019	Thursday	13:00-16:00	Pool boiling - The boiling curve
	U25	27/11/2019	Friday	13:00-16:00	Subcooled and saturated flow boiling
10	*E7*	01/12/2019	Tuesday	08:00-10:00	*Exercises Units 24-25*
	U26	03/12/2019	Thursday	13:00-16:00	Critical heat flux and Post dry-out heat transfer
	U27_SET-6	04/12/2019	Friday	13:00-16:00	Pressure drops in Two-phase flows- SET-6 (Units 24-27)
11	U28	10/12/2019	Thursday	13:00-16:00	Condensation - The Nusselt's theory
	U29	11/12/2019	Friday	13:00-14:30	Condensation inside and outside tubes
	U30			14:30-16:00	Condensation in the presence of noncondensible gases
12	*E8*	15/12/2019	Tuesday	08:00-10:00	*Exercises Units 28-30*
	SET-7	17/12/2019	Thursday	13:00-16:00	Summary - SET-7 (Units 28-30) - END OF SECOND PART
	ET-2	18/12/2019	Friday	13:00-16:00	*End- Term Examination (Units 18-30; E6-E8)*