SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Chemical Engineering	LP: CH18704 Rev. No: 00 Date: 07.07.2024
B.E/B.Tech/M.E/M.Tech : B.Tech Regulation: 2018A PG Specialisation : NA Sub. Code / Sub. Name : CH18704/ Process Equipment Design II Unit : I	

Unit Syllabus: GENERAL DESIGN CONSIDERATIONS

Objective: To impart the knowledge on chemical engineering design considerations of process Equipments

Session No *	Topics to be covered	Ref	Teaching Aids
1	General Introduction	T2: Ch 4; P. no. 56 - 59	PPT/ BB
2	Stress created due to static and dynamic loads	T2: Ch 4; P. no. 59- 61	PPT/ BB
3	Elastic instability	T2: Ch 4; P. no. 61	PPT/ BB
4	Combined stress and theories of failures	T2: Ch 4; P. no. 62 - 63	PPT/ BB
5	Theories of failures	T2: Ch 4; P. no. 63	PPT/ BB
6	Fatigue	T2: Ch 4; P. no. 64	PPT/ BB
7	Brittle fracture	T2: Ch 4; P. no. 65	PPT/ BB
8	Creep	T2: Ch 4; P. no. 66	PPT/ BB
9	Temperature effects	T2: Ch 4; P. no. 66	PPT/ BB
10	Radiation effects	T2: Ch 4; P. no. 67	PPT/ BB
11	Effect of fabrication methods	T2: Ch 4; P. no. 67	PPT/ BB
12	Various fabrication methods	T2: Ch 4; P. no.67	PPT/ BB

Content beyond syllabus covered (if any):- Video lecture on various fabrication technology and trends in industries

* Session duration: 50 minutes

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Sub. Code / Sub. Name: CH18704/ Process Equipment Design II
Unit : II

Unit Syllabus: PRESSURE VESSELS
Objective: To study the mechanical design of Pressure vessels

	Topics to be covered	Ref	Teaching Aids
13	Codes & Standards	T2: Ch 6; P. no.114	PPT/ BB
14	Selection of material	T2: Ch 6; P. no.114 - 120	PPT/ BB
15	Vessels operating at low temperatures and elevated temperatures	T2: Ch 6; P. no.120 - 123	PPT/ BB
16	Design conditions and stress	T2: Ch 6; P. no. 123 - 127	PPT/ BB
17	Design of shell and its components	T2: Ch 6; P. no.127 -140	PPT/ BB
18	Design of shell internals its components	T2: Ch 6; P. no.140 -160	PPT/ BB
19	Various internals design	T2: Ch 6; P. no.160 -170	PPT/ BB
20	Shell Component Problems	T2: Ch 6; P. no.170 -176	PPT/ BB
21	Supports	T2: Ch 6; P. no.177- 178	PPT/ BB
22	Stress from local loads and thermal gradients	T2: Ch 6; P. no. 178 -179	PPT/ BB
23	Thermal stresses in cylindrical shell	T2: Ch 6; P. no. 179 - 181	PPT/ BB
24	Features of high pressure vessels	T2: Ch 12; P. no.351-356	PPT/ BB
25	Solid walled vessel	T2: Ch 12; P. no.357- 363	PPT/ BB
26	Vessel Closures	T2: Ch 12; P. no.367 -373	PPT/ BB
27	Jackets	T2: Ch 12; P. no.373- 377	PPT/ BB

Content beyond syllabus covered (if any): Recent modification in design of high pressure vessels

* Session duration: 50 mins

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Sub. Code / Sub. Name: CH18704/ Process Equipment Design II

Unit: III

Unit Syllabus: STORAGE VESSELS
Objective: To understand the mechanical design of storage vessel.

Session No *	Topics to be covered	Ref	Teaching Aids
28	Codes & Standards	T2: Ch 7; P. no. 191	PPT/ BB
29	Storage of fluids	T2: Ch 7; P. no. 191	PPT/ BB
30	Storage of non-volatile fluids	T2: Ch 7; P. no. 191 - 192	PPT/ BB
31	Storage of volatile fluids	T2: Ch 7; P. no. 192 - 196	PPT/ BB
32	Various types fluid storage tanks	T2: Ch 7; P. no. 196 - 200	PPT/ BB
33	Storage of gases	T2: Ch 7; P. no. 200	PPT/ BB
34	Design of rectangular tanks	T2: Ch 7; P. no. 201 - 202	PPT/ BB
35	Design of tanks	T2: Ch 7; P. no. 200 - 203	PPT/ BB
36	Design of various tanks	T2: Ch 7; P. no. 203 - 212	PPT/ BB
37	Nozzles and mountings	T2: Ch 7; P. no. 212 - 213	PPT/ BB
38	Problems in Nozzles and mounting design	T2: Ch 7; P. no. 213- 216	PPT/ BB
39	Large capacity storage tanks	T2: Ch 7; P. no. 216 -217	PPT/ BB

Content beyond syllabus covered (if any): Design of cylindrical tanks

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Sub. Code / Sub. Name: Sub. Code / Sub. Name: CH18704/ Process Equipment Design II

Unit: IV

Unit Syllabus: MECHANICAL FIXTURES AND SUPPORTS
Objective: To gain knowledge on mechanical design of mechanical fixtures and supports.

Session No *	Topics to be covered	Ref	Teaching Aids
40	Vessel support	T2: Ch 13; P no 378 - 390	PPT/ BB
41	Saddle supports	T2: Ch 13; P no. 398 - 402	PPT/ BB
42	Numericals in Saddle supports	T2: Ch 13; P no. 402 - 410	PPT/ BB
43	Skirt supports	T2: Ch 13; P no 390- 398	PPT/ BB
44	Bolted flanged joints	T1: Ch 13; P no 858	PPT/ BB
45	Types of flanges and its selection	T2: Ch 13; P no 858-859	PPT/ BB
46	Gaskets, flange faces	T2: Ch 13; P no 859 -861	PPT/ BB
47	Flange design	T2: Ch 13; P no 861-862	PPT/ BB
48	Standard flanges	T2: Ch 13; P no 862 -865	PPT/ BB

Content beyond syllabus covered (if any):

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Sub. Code / Sub. Name: Sub. Code / Sub. Name: CH18704/ Process Equipment Design II

Unit: V

Unit Syllabus: COMMON INDUSTRIAL EQUIPMENT DESIGN
Objective: To appraise the industrial design practices of common equipments.

Session No *	Topics to be covered	Ref	Teaching Aids
49	Design of Cyclone Separator – Part I	R2: Ch 17; P. no. 28-32	PPT/ BB
50	Design of Cyclone Separator – Part II	R2: Ch 17; P. no. 28-32	PPT/ BB
51	Design of Cyclone Separator – Part III	R2: Ch 17; P. no. 28-32	PPT/ BB
52	Design of Cyclone Separator – Part IV	R2: Ch 17; P. no. 28-32	PPT/ BB
53	Filters and its classification & design aspects	T2: Ch 13; P no 862 -865	PPT/ BB
54	Constant Rate Filtration	T2: Ch 13; P no 862 -865	PPT/ BB
55	Constant Pressure Filtration	T2: Ch 13; P no 862 -865	PPT/ BB
56	Filter Design	T2: Ch 13; P no 862 -865	PPT/ BB
57	Thickener Design – Part I	T1: Ch 18; P. no. 66-73	PPT/ BB
58	Thickener Design – Part II	T1: Ch 18; P. no. 66-73	PPT/ BB
59	Thickener Design – Part III	T1: Ch 18; P. no. 66-73	PPT/ BB
60	Thickener Design – Part IV	T1: Ch 18; P. no. 66-73	PPT/ BB

Content beyond syllabus covered (if any):

TEXTBOOKS:

1. J.M.Coulson, J.Richardson, "Chemical Engineering", Vol. 6, Asian Books Printers, Fourth edition 2005.
2. M.V. Joshi, V.V. Mahajan, "Design of Process Equipment Design", Thirs edition, McMillan India, 1996.

REFERENCES:

1. Indian Standard Specifications IS-803, 1962; IS-4072, 1967; IS-2825, Indian Standards Institution, New Delhi. 1969
2. R.H.Perry,"Chemical Engineers Handbook", Seventh Edition, McGrawHill, 2004.
3. Suresh C.Maidargi ,"Chemical Process Equipment Design & Drawing, Volume 1, PHI Learning Ltd., 2015.
4. Brownell and Young, "Process Vessel Design", Wiley Eastern, 2009.
5. Ray Sinnott, Gavin Towler, Chemical Engineering Design - Principles, Practice and Economics of Plant and Process Design, Butterworth-Heinemann, 2007.

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