

SRM Institute of Science and Technology

Faculty of Engineering and Technology

Department of Chemical Engineering

Course Code & Title: **15CH404M MULTI-DISCIPLINARY DESIGN**

Course Strategy Description

Course description:

Students of any specialization at an undergraduate level learn courses related to various sub-domains (Multi-disciplinary) of their specialization individually. They are not exposed to understanding how the various multi-disciplinary fields interact and integrate in real life situations. It is very common that an expert in a particular domain models and designs systems or products oblivious of the impact of other subsystems. This lack of multi-disciplinary thinking is very blatantly visible when the students take up their major project during their final year. This course aims to develop appropriate skills on systemic thinking on how to identify and formulate a problem, decompose the problem into smaller elements, conceptualize the design, evaluate the conceptual design by using scientific, engineering and managerial tools, select, analyze and interpret the data, consideration of safety, socio-politico-cultural, risks and hazards, disposal, regional and national laws, costing and financial model and undertake documentation and finally presentation.

Compulsory/Elective course: Compulsory for B.Tech. Chemical Engineering

Credit hours: 3 credits

Course coordinator(s): Mr. V. Ganesh, Assistant Professor (Sr. G), Department of Chemical Engineering

Instructor(s):

Name of the instructor	Room number	Email (@ktr.srmuniv.ac.in)	Consultations (day order/periods)
Mr. V. Ganesh	PGA 204	ganesh.v	Day – 1: 2 and 3
Dr. S. Sam David	CRE lab	samdavid.s	Day – 5: 3 and 4

Relationship to other courses

Course category: Professional Course

Prerequisite: Nil

Co-requisite: 15CH401J

Following courses: Mass Transfer Applications, Fundamentals of Membrane processes

Text book(s) and/or required materials:

1. “Systems Design and Engineering: Facilitating Multidisciplinary Development Projects”, G. Maarten Bonnema, Karel T. Veenvliet, Jan F. Broenink
December 15, 2015, CRC Press ISBN 9781498751261

Class schedule: A Slot; Four 50 minutes lecture sessions per week, for 15 – 16 weeks

DAY ORDER: HOUR	TIMING
DAY - 1: 10	4.05 PM – 4.55 PM
DAY - 3: 10	4.05 PM – 4.55 PM
DAY - 4: 1 AND 2	8 AM – 9:40 AM

Instructional Objectives (IOs) and Student Outcomes (SOs)

S.No.	Instructional Objectives	Student Outcomes				
1.	To subdivide a complex system into smaller disciplinary models, manage their interfaces and reintegrate them into an overall system model	a	c	e	f	i
2.	To rationalize a system architecture or product design problem by selecting appropriate design variables, parameters and constraints	a	c	e	f	i
3.	To design for value and quantitatively assess the expected lifecycle cost of a new system or product	a	c	e	f	i
4.	To take on the challenges of teamwork, prepare a presentation in a professional manner, and document all aspects of design work.	a	c	e	f	i

Teaching plan

Section	Topics	IOs	SOs	Problem solving (Y/N)
1.	Introduction: Facilitating Multidisciplinary Projects	1	a, b,c	Y
2.	Identifying and formulating a problem	1	a, b,c	Y
3.	System Modelling	1	a, b,c	Y
4.	Thinking perspectives: Decomposition–Composition Thinking Hierarchical Thinking, Organizational Thinking, Life-Cycle Thinking, Safety Thinking, Risk Thinking, Socio-politico-cultural thinking, Environment thinking	1	a, b,c	Y
5.	Decomposing a system – Identifying the major sub-systems	1-2	a, b,e	Y
6.	Mathematical Modeling and Governing equations for each sub systems	2	a, b,e	Y

7.	Objectives, Constraints and Design Variables	1-2	a, b,e	Y
8.	Conceptual Design	1-2	a, b,e	Y
9.	Collaborative Design – Disciplinary teams satisfy the local constraints while trying to match the global constraints set by the project coordinator.	3	a, b, c,e	Y
10.	Tools for modeling, designing, analysis, data interpretation, decision making etc	3	a, b, c,e	Y
11.	Design Analysis, evaluation and selection	3	a, b, c,e	Y
12.	Costing and Financial model	3	a, b, c,e	Y
13.	Documentation, reviewing and presentation	4	a, b, c,e, k	Y

Evaluation methods

S.NO.	Test	Topics covered	Marks	Test/Exam duration (min)
1.	Review – I	1 - 4	10	15
2.	Review – II	5 - 8	25	15
3.	Review – III	9 -13	25	15
4.	Review – IV	Questions from any units	40	25

Prepared by: Dr. S. Sam David, Research Assistant Professor, Department of Chemical Engineering

Dated: 26/06/2018

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Date of revision:

Revised by:

Course Coordinator

Academic Coordinator



HoD/Chemical