Xavier Institute of Management
XIM University, Bhubaneswar, Odisha – 751013, India

Elective

Course Name	**SYSTEM THINKING AND BUSINESS DYNAMICS**
Programme	**MBA (Business Management)**
Batch	**2021-23**
Term	**V**
Credits	**3.0**
Course Instructor	**Prof. Santosh Kumar Prusty**

COURSE INTRODUCTION

Managers of the VUCA world requires in-depth understanding of "complexity" and "dynamics" of the business environment to devise "holistic" and "robust" strategies and implement for superior performance. The understanding residing in their "mental models" guides the manager in managing business. However, managers as human beings are limited in their "capability" to understand the complexity of nature because of their "bounded rationality". Hence, they do many of the times take "sub-optimal" "quick-fix" decisions that fail to generate "sustainable competitive advantage" for the firm in a long run. System Thinking skill becomes a significant competence of managers and leaders to understand the complexity of dynamics of business and devising high leverage strategies for improvement of performance.

System thinking is a process of understanding how things influence each other within an implicit boundary as a whole. System thinking focuses on cyclical rather than linear cause and effect and on how small catalytic events can cause large changes in complex systems. Because an improvement in one area of a system can adversely affect another area of that system, this practice promotes organizational communication at all levels.

"System Dynamics" methodology, originated during 1950 at Massachusetts Institute of Technology, USA by Professor Jay Forrester, provides an effective way for understanding "complexity" of "systems" and enhancing System Thinking skills in a dynamic business context. System Dynamics provides a holistic approach to analysis and problem solving that views "problems" as parts of an overall system, rather than in isolation. In brief, System Dynamics is a framework and set of tools for understanding, modelling, and analysing the change and complexity of a dynamic system—any system—over time.

The current course "System Thinking and Business Dynamics (STBD)" is designed for MBA participants to understand business as a "system" and to understand its complexity in a time-varying context and develop system thinking skills. The course is positioned within the purview of "Strategic Management and Policy" domain of organizations.

The course is conceptualized with a blend of knowledge from strategic management domain and principles of System Dynamics Modeling methodology as the way to learn about complex business dynamics and to inculcate system thinking skills. The course will be helpful for MBA participants who are aspiring to take carrier choices in strategy, general management, management consulting, and overall leadership roles. The participants those who aspire to become consultants, to join strategy roles in near or future are going to benefit the most out of the course in terms conceptualizing the organization problem as holistic problem and generating a better understanding of the root-cause of the problem, and devising suitable policy interventions for improvement.

In this course, we focus on developing objective skills of a manager like:

- *how to identify and define a dynamic strategic problem,*
- *how to build and visualize systemic view of the problem,*
- *how to identify policy intervention nodes,*
- *how to forecast what would be the consequences of decisions,*
- *how to communicate strategy formulated.*

Participants will be introduced to "Vensim" software—a platform for modeling complex systems and executing the system in a "flight-simulator" fashion—to understand complexity and dynamic behaviors. The pedagogy will be mostly lecture, discussion, and demonstration method. The students are expected to invest in practicing model building off-the class as per the advice of the course instructor. This is a "skill" focusing course hence "learning-by-doing" is to be "*mantra*" for acquiring the skill.

COURSE OBJECTIVES

1. To understand dynamic complexity in the context of business and strategy,
2. To acquire systems thinking skill, i.e., to be able to think in terms of interconnections (including feedback connections), non-linearity and delay in "cause and effect" within a "whole",
3. To aid strategy through System Dynamics modeling.

COURSE CONTENT

The content of the course is understanding the followings.

1. System-Definition and Understanding
2. System Thinking
3. Dynamics of Business and System
4. Generic Behavior of Systems
5. Language for Modeling Dynamic Systems
6. Cause-and-Effect and Feedback Loops
7. System Archetypes
8. Stocks and Flows in Systems

9. Nonlinearities and Delays
10. Modeling Strategy

COURSE LEARNING OUTCOMES

The participants are expected to learn a fact-based structural approach to management of an organization and enhance their skill of visualizing the business as a system of interconnected and auto-correlated factors in a linear and non-linear fashion and together affecting the dynamic performance of the business. In particular, the participants are expected to learn and acquire:

1. **CLO 1**: Ability to identify a specific problem of the firm as a part of a dynamic behavior,
2. **CLO 2**: Ability to conceptualize the structure and system underlying the dynamic behavior,
3. **CLO 3**: Ability to develop a model of the structure and system in the form of a "Causal Loop Diagram (CLD)" and "Stock-Flow Diagram (SFD)".
4. **CLO 4**: Ability to convert the "Stock-Flow Diagram" as an executable computer model.
5. **CLO 5**: Ability to simulate the computer model, learn, and devise strategy.

COURSE REQUISITES

Participants need to have basic understanding of business strategy.

PEDAGOGY AND WORKLOAD

The course will follow a mix of Lecture, Hands-on-Exercise, and Case Discussion methodology. The instructor will use demonstrate and use **Vensim Software [http://vensim.com/free-download/]**. Three hours of homework is expected, on an average, from the students for a session of ninety-minute duration.

Special Instruction in On-Line Classes due to COVID-19

I request students to take special attention in the learning process of the course through virtual platform. We must accept that the uncertain circumstances of COVID-19 has pushed us into transform our activities over virtual platform without prior readiness. Hence, it is obvious that we from both sides will face hiccups in our learning laboratory. Particularly, in a "skill" building course like STBD, where focus is "learning-by-doing" under guided mentor/instructor, virtual platforms may create challenges. Hence, it would be my request to all the students, cooperation from both sides are required to mitigate technical challenges and to maximize learning efficiency. Please cooperate with each other while getting into discussion mode, neither obstruct nor withdraw because of technical resistances. We will try to minimize the technical glitches as much as possible and request you also to do so. **Have your Laptop/PC with you in addition, in case you connect through Mobile/Tablet while in Class.**

SCHEDULE OF SESSIONS

#	Topic	Learning Material (Textbook/Case/Article)	Learning Objective
1	• Understanding System	• Learning to Live with Complexity, HBS Article	• What is a System? How to define a system?

2	• Understanding System Thinking	• Chapter 1, Sterman (2000)	• What is system thinking and why do managers/decision makers require system thinking skills.
3	• Business Dynamics	• SPAR	• How every business problem is part of a dynamic problem.
4	• Dynamic Problem • "Reference Mode of Behavior"	• Chapter 1: Performance through Time • Case Exercise [Shrimp Industry Dynamics]	• To understand why "Performance-Through-Time" is critical
5-6	• Generic Behavior of Systems • System Archetypes	• Article: Generic Structure and Behavior of Systems • Case Exercise	• Linking dynamic problems (generic) to generic structures
7	• Critical Factors in a System	• Chapter 2: Resource: Vital Drivers of Performance	• To identify resource as the critical system variable, define, and measure. • To understand link between "resource" and "performance"
8-9	• Levels and Rates in Systems • Introducing Stock-Flow Modeling	• Chapter 3: Resource and Bathtub Metaphor	• To understand how managers can develop and manage resources in organizations.
10-11	• Cause-and-Effect	• Chapter 4: Driving the Machine: Handling Interdependence between Resources	• To understand interdependence of resources in the organization and how resource can drive their own growth and decline
12-13	• Causal-Loop-Diagram (CLD), Stock-Flow-Diagram (SFD), and Hybrid Diagrams as the Structures of System	• Chapter 5: Building and Managing the Strategic Architecture • Case Exercise: Microsoft Case	• To develop complete strategic architecture of organization involving performance, resources, and their interdependence that drives the dynamic behavior
14-15	• Attributes of Level	• Chapter 6: You Need Quality Resources as well as Quantity	• To assess the "quality of resources" and how to improve it.
16-17	• System Boundary and Exogenous Effect	• Chapter 7: Managing Rivalry for Customers and other Resources • Case Exercise: GM Leasing Policy	• To understand customer dynamics in presence of rivalry between the firm and the competitors
18-19	• Understand Strategy through System Dynamics Model	• Dogfight over Europe: Ryanair (C) [HBS Case]	• To understand the consequences of various choices made by Ryanair in 1991 towards low-cost strategy.
20	• Course Wrap Up	• Question and Answers	•

Though the course structure is designed in a "waterfall" structure, modeling is an iterative process and the outline will flow in an "agile" way. The above course-outline is one of many-ways of learning modeling and understanding system dynamics.

READING AND REFERENCES

- Warren, K. (2009). *Building Strategy and Performance through Time.* Business Expert Press. [**Available through HBS Educator**]
- Articles will be sent time to time as the course continues.
- Sterman, J. D. (2000). *Business Dynamics: Systems Thinking and Modeling for a Complex World.* Tata McGraw-Hill.

ASSESSMENT SCHEME

Component	Weightage (%)	Assessment of Course Learning Outcome(s) (CLO)
Class Participation	10%	✓ **CLO 1**: Ability to identify a specific problem of the firm as a part of a dynamic behavior ✓ **CLO 2**: Ability to conceptualize the structure and system underlying the dynamic behavior
Project*	30%	✓ **CLO 1**: Ability to identify a specific problem of the firm as a part of a dynamic behavior, ✓ **CLO 2**: Ability to conceptualize the structure and system underlying the dynamic behavior, ✓ **CLO 3**: Ability to develop a model of the structure and system in the form of a "Causal Loop Diagram (CLD)" and "Stock-Flow Diagram (SFD)". ✓ **CLO 4**: Ability to convert the "Stock-Flow Diagram" as an executable computer model. ✓ **CLO 5**: Ability to simulate the computer model, learn, and devise strategy.
Mid-term**	20%	✓ **CLO 2**: Ability to conceptualize the structure and system underlying the dynamic behavior, ✓ **CLO 3**: Ability to develop a model of the structure and system in the form of a "Causal Loop Diagram (CLD)" and "Stock-Flow Diagram (SFD)".
End-Term***	40%	✓ **CLO 2**: Ability to conceptualize the structure and system underlying the dynamic behavior, ✓ **CLO 3**: Ability to develop a model of the structure and system in the form of a "Causal Loop Diagram (CLD)" and "Stock-Flow Diagram (SFD)". ✓ **CLO 4**: Ability to convert the "Stock-Flow Diagram" as an executable computer model.

*The participants in a group of 4 need to choose an organization, study its problems, identify its dynamic problem, sense, and conceptualize its underlying structure, draw a CLD and SFD to

explain the problem (**Submit as Project Report in the form of Microsoft Word**). Then convert it to a Simulation Model over Vensim and generate different behaviors (**Submit the Model as Vensim File**). Based on your learning about the system, suggest recommendation for the organization. **Mid-term will be Quiz/Multiple Choice Type. ***The End-Term will be Caselet based. You will be provided with a dynamic problem in form of a narrated story. You will be asked to draw a CLD/SFD diagram in pen and paper.

IMPORTANT GUIDELINES: Laptops are required in most of the sessions. Participants are required to bring their own laptop to the sessions. **As per the instruction of the instructor, the participants are required to work on the laptop in the class-room with VENSIM Software installed on it.**

ACADEMIC DISCIPLINE AND INTEGRITY

"THE BASIC ASSUMPTION: We believe that everyone in the class is intelligent, capable, and cares about doing their best and wants to learn."

MAPPING COURSE LEARNING OUTCOMES (CLO) WITH PROGRAM LEARNING GOAL (PLG)

PLG#	Program Learning Goal	Trait	Addressed by Course	
			Yes	No
PLG1	Functional and Business Skills	The students will demonstrate understanding of elements of all functional areas	Yes	
PLG2	Analytical Skills	The students will use analytical techniques to identify a business problem, and suggest a solution	Yes	
PLG3	Collaboration and teamwork attributes	The students will exhibit voluntary cooperation and effective teamwork in a group setting	Yes	
PLG4	Ethical responsibility	The students will understand the ethical complexities of conducting business. The students will adopt techniques in scenarios involving ethical dilemma and offer resolution		No
PLG5	Communication	The students will produce reasonably good quality business documents. The students will become effective and confident communicators	Yes	