Course title: Risk analysis and implementation management			
Course code: BSI 185	**No. of credits:** 3	**L-T-P:** 36-06-0	**Learning hours:** 42
Pre-requisite course code and title (if any):			
Department: Department of Business Sustainability			
Course coordinator:	**Course instructor:**		
Contact details:			
Course type: Elective	**Course offered in:** Semester		

Course description

This course provides a holistic view of risks associated within and across infrastructure projects, including the emergent and resource-based sectors. The content focuses on strategies and implementation management that can be utilized to create a strong risk culture across projects and evaluate potential risks to ensure problems are identified at an early stage to avoid reworks and delays which can cause cost blow- outs!

Course objectives

Public and private sector executives tasked with the delivery of major infrastructure projects will have the answers to the problems they face when looking to integrate risk into the design and delivery of their infrastructure project.

Course content

Sr No	Topic	L	T	P
1.	**Risk management process**	**2**	**0**	**0**
	▪ Risk identification			
	▪ Risk assessment			
	▪ Risk allocation			
	▪ Risk mitigation			
2.	**Risk measures techniques**	**3**	**1**	**0**
	▪ Sensitivity analysis			
	▪ Scenario analysis			
	▪ Break even analysis			
	▪ Simulation analysis			
	▪ Decision tree analysis			
	▪ Network analysis			
	▪ Value at Risk (VaR)			
	▪ Risk modelling			
	▪ Risk-software			
3.	**Strategy implementation**	**3**	**1**	**0**
	▪ The concept of strategy			
	▪ Goals, values and performance			
	▪ Business and industry environment: The fundamentals			
	▪ Analyzing resources and capabilities: Understanding the internal environment			
	▪ Developing resources and capabilities			
	▪ Organization structure and management systems: The fundamentals of strategy implementation			

4.	**Implementation management**	**3**	**0**	**0**
	▪ Transformation processes			
	▪ Operations strategy and competitiveness			
	▪ Product design			
	▪ Process analysis			
	▪ Facility location			
	▪ Facility layout			
	▪ Strategic capacity management			
	▪ Project management			
	▪ Operations technology			
5.	**How project structures create value**	**2**	**1**	**0**
	▪ Structural Attributes			
	▪ Project Organization Structure			
	▪ Contracts and Models			
	▪ Economic Impact of Infrastructure Project – The ERR			
	▪ Complexities in Valuing Large Projects			
6.	**Managing risks in infrastructure sector**	**3**	**0**	**0**
	▪ Construction Risk-Time overrun, Cost overrun			
	▪ Operating Risks			
	▪ Market Risks			
	▪ Interest Rate Risks			
	▪ Foreign Exchange Risks			
	▪ Payment Risks			
	▪ Regulatory Risks			
	▪ Political Risks			
	▪ Right of way			
7.	**Managing cost risk and uncertainty in infrastructure projects**	**3**	**1**	**0**
	▪ Exploring the challenges			
	▪ The project life cycle and risk			
	▪ Useful tools and approaches			
	▪ Forward program			
	▪ Risk breakdown structures			
	▪ Recommendations			
8.	**Common language is essential to communications about uncertainty and its management**	**3**	**0**	**0**
	▪ Overview			
	▪ Glossary listing			
	▪ Case study			
9.	**Project and emerging risks in infrastructure financing**	**3**	**1**	**0**
	▪ Risk management in project finance			
	▪ Nature of credit risk and project finance			
	▪ Refinancing risk			
	▪ Institutional sharing of risk origination and risk taking-syndicated loan market			
	▪ Emerging risk and garret's ranking			

	▪ Debt rating criteria			
	▪ Key issues in emerging markets			
10.	**Risk management in resource sector infrastructure projects**	**3**	**0**	**0**
	▪ Planning and conducting risk assessments in advance of appropriate project milestones or activities to allow identification and resolution of risks without disrupting the project schedules			
	▪ The integration of risk and value management as inputs into a robust decision making process			
	▪ Understanding the effects of uncertainty on project objectives			
	▪ Approaches taken to manage the project planning and controls on a project			
11.	**Risk sensitive investment and resilient infrastructure**	**2**	**1**	**0**
	▪ RISE initiative – Risk sensitive investment			
	▪ UN disaster resilient scorecard			
	▪ Integrating climatic risk into infrastructure projects			
	▪ Pricing risk and resilience into design			
12.	**An integrated approach to a successful infrastructure project – initiation, financing and execution**	**3**	**0**	**0**
	▪ Challenges for large scale projects			
	▪ Some typical causes of failure			
	▪ Project risk across the Infrastructure Life Cycle - (ERM)			
	▪ Selecting, planning and design phase			
	▪ Procurement and contractual design choices			
	▪ Construction delivery			
	▪ Asset operation			
13.	**Cutting through barriers to infrastructure project success**	**3**	**0**	**0**
	▪ Innovation (and its barriers)			
	▪ Finance			
	▪ Procurement practices			
	▪ Policy and planning risk			
	▪ Skills availability			
		36	**6**	**0**

Evaluation criteria

- Class participation 10%
- Project 30%
- Minor tests 20%
- Major test 40%

Learning outcomes

An understanding of the risk management processes and techniques in today's context. An understanding of project risks and emerging risks in infrastructure financing. The capability to be able to assess and suggest ways and means to address the practical challenges around the financial estimation of risk in infrastructure projects.

Pedagogical approach A combination of class-room interactions, tutorials, assignments and projects.
Materials **Suggested readings** Project Finance in Theory and Practice by Stefano Gatti, Academic Press , ISBN-978-81-312-1664-4 Project Finance by Fresh fields Additional Reading -Corporate Finance by Ross,Westerfield & Jaffe **Journals**
Additional information (if any)
Student responsibilities Attendance, feedback, discipline: as per university rules.

Course reviewers:

Dr Madhu Vij, MDI

Mr SC Gupta, Former Director, Reliance Infrastructure

Module – wise Teaching Plan

Module 1- Risk Management Process

Success of infrastructure projects is greatly influenced by proper management of risk associated with the projects through adoption of appropriate risk management frame-work. This module wise the awareness among students about different stages of risk management process.

Module 2- Risk Measure Techniques

Though the awareness of risk management process is necessary but is not sufficient enough. In order to do appropriate project risk analysis, students need to understand various techniques applied for measurement of risk. This module facilitates to understand the perspective and quantum of risk associated with projects and how is risk analyzed and assessed in practice.

Module 3 - Strategy implementation

Strategy is about winning. The role of strategy in success has to be understood carefully. Strategy implementation is inherent in project implementation. This module provides the basic understanding of the role of various component of strategy in project implementation.

Students of exposed to them in order to comprehend the theoretical framework of project implementation.

Module 4 - Implementation management

A transformation process uses resources to convert inputs into some desire outputs. Physical as well as service infrastructure projects involved transformation process, for example, physical (in manufacturing), location (In transportation), exchange (in retailing),storage (in warehousing), physiological (in health care), informational (in telecommunication). This model provides understanding of various businesses in order to identify the risk involved in these businesses.

Module 5 - How projects structure create value

The structural attributes or infrastructure projects enable them to find financial and other resources students to needs to master the various structure the features of projects that enable lenders an equity holders to invest substantial funds. In this modules student shall develop rationale for, and various types of contracts and models that form the backbone of project financing transaction.

Module 6 – Managing Risk in Infrastructure Projects

This module looks at various risks like construction risk involving cost overrun, time overrun, And other risks like operating risk, market risk, interest risk, foreign exchange risk, payment risk, regulatory risk, political risk students in this module shall understand various types of risks involved and how to manage them.

Module 7 - Managing Cost Risk and Uncertainty in Infrastructure Projects

This module looks at the management of cost risk and uncertainty throughout the project life cycle for mitigating of risks. It also addresses the practical challenges around the financial estimation of risk. Students, in this module shall realize to feel the challenges related to risks in real practical words of infrastructure projects.

Module 8 - Common Language is Essential to Communications about Uncertainty andits Management

It is essential to communicating students, the concepts clearly and unambiguously. In this module attempt has been made to set of “defined terms” to ensure clarity to this course. We shall start with explanatory overview and then present a definition for each specialist term. This module provides the meaning and understanding to students of about fifty definitions and terminologies used in this course.

Module 9 - Project and Emerging Risks in Infrastructure Financing

Arranging cross-border infrastructure financing requires that projects participant assume certain risks, in addition to those common to infrastructure projects including currency risk, political risk, effects of tax policies, economic sensitivity, limited remedies and others, the students in module are made to understand emergent risks along with project risk involved in cross – border infrastructure projects

Module 10- Risk Management in Resource Sector Infrastructure Projects

Resource sector is termed as infrastructure sector dealing with natural resources like coal, metal and mining. This module deals with conducting risk assessments and integration of risk and value management for resource sector infrastructure projects. Students are exposed to assimilate risk assessment methodology used for sector-specific projects.

Module 11- Risk Sensitive Investment and Resilient Infrastructure

This module deals with risk rating criteria of projects. It also deals with disaster management and effect of climate risk in infrastructure projects. The students shall be required to add the said aspects in their knowledge of risk management of infrastructure projects.

Module 12- An Integrated Approach to a Successful Infrastructure Project-Initiation, Financing and Execution

Major infrastructure projects have a history of problems. Cost overruns, delays, failed procurement all unavailability of private financing or common. In this module a picture is painted about good risk - informed project management across the value chain in order to give clear picture to students about the difference with good and badly design infrastructure projects.

Module 13- Cutting through Barriers to Infrastructure Project Success

Various to success have been identifying in this module and exploring the ways to breakthrough has been mentioned. The content in this module provides the holistic view of key infrastructure projects and latest thinking to manage various and risk. Students are required to become familiar with latest thinking and trend in this area.