School Logo **University Logo**

Science of investment: financial economics groundings

(general elective)

Course Information

Course Duration: Full semester
General elective 'science of -investment' Prerequisites: basic introductory undergraduate economics and mathematics

Brief Bio of the Instructor

Dr Sudip Patra, Designation: Associate Professor, JSGP, founding member, CEASP. Other affiliation: Fellow, Jindal India Institute.

Education: PhD, Adam Smith Business School, University of Glasgow, Scotland, Associate Fellow HE, UK, M.Sc., Coventry University, UK.

Research Specialization: Quantum-like modelling in decision theory, applications in social sciences, and complexity economics. Other research interest: Foundations/ Philosophy of Science. Dr Sudip Patra's research work lies in quantum-like modelling in cognitive science or particularly in decision theory, with applications in economics and other social sciences. Quantum-like modelling is a novel paradigm of interface between mathematical-philosophical foundations of quantum science (particularly information theory) and cognitive science. Quantum-like modelling is a novel framework of non-Boolean decision theory, which describes decision making at large (including AI) under ambiguity or 'radical uncertainty'. Other research interests: Complex adaptive systems, complexity economics, philosophy of science.

Recent Book publications

Ghose, P., & Patra, S. (2023). An Interdisciplinary Approach to Cognitive Modelling: A Framework Based on Philosophy and Modern Science (1st ed.). Routledge.

Co-Edited book: https://link.springer.com/book/9783031388323

Recent Book chapter in: https://dkprintworld.com/product/quantum-and-consciousness-revisited/?utm_source=rss&utm_medium=rss&utm_campaign=quantum-and-consciousness-revisited

Dr Patra has been invited for talks at prestigious institutions, for eg, Chapman University, US, Ohio State Uni, US, IIT Bombay, Aston University, UK, Chengmai University, Vietnam. Visitor at JNU, India,

Forthcoming / Ongoing Book Project: Contemporary Realities and the Quantum World, With Menas C Kafatos, Routledge.

Teaching interests

Dr Patra provides Masters and PhD level courses in complexity economics, and foundational thinking for example 'Unity of Knowledge' which is a co-taught course at PhD level. UG courses include behavioral economics and allied topics.

PhD supervision

Ongoing, as principal or co-supervisor. Areas include: quantum-like modelling in decision theory related to financial systems, complex adaptive systems in health policy making.

Research Profile: https://www.researchgate.net/profile/Sudip-Patra

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There would be guest lecture sessions as well, from India and abroad.

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Course Description

Science of investment
Financial Economics groundings

Outline

The very course is a thorough and accessible introduction to science of investment, with necessary groundings in financial economics. Investment in itself has become a vast literature with insights and contributions from several social and natural sciences. Investment thus is truly an interdisciplinary domain in the current world. There are insights from mathematical economics, behavioural economics, cognitive science, to evolutionary biology. The current course provide a necessary first course for approaching foundational aspects of investments. The course will introduce foundational concepts of financial investments, and corporate finance, for example dividend pay out models. The course will also explore core financial economics groundings of investment science, for example, efficiency market theory, Arrow-Debreu economy, CAPM and Black Scholes asset and option pricing models. The course will also venture into the international financial markets for Hedging instruments. Suitable case studies of Hedging and financial crises will aim to provide a comprehensive overview of financial systems.

1. Course Intended Learning Objectives (Aim)

Course Intended Learning Outcomes	Teaching and Learning Activities	Assessments/ Activities
Clarity of concepts relevant for understanding financial investments	Regular group exercises, quantitative and mini cases	
Designing detailed group assignments on financial markets	Group presentations, assignments	Critical evaluation by the instructor, and Q&A sessions from rest of the class
Clarity of relevant underlying frameworks	Midterm and end term exams	
Add more lines as needed		

2. Scheme of Evaluation and Grading

Evaluation breakup

60% internal: group projects and midterm exam.
40% external: written exam.

Grade Definition

Distinction: requires clarity of understanding of foundational concepts, good command on quant abilities, plus original thinking as reflected in assignments, and group participation.

Merit: requires clarity of understanding of foundational concepts, good command on quant abilities.

Pass: at least a relevant grasp on foundational concepts.

3. Academic Integrity

Academic Honesty, Cheating, and Plagiarism.
Participation/Attendance Policy

Use of phone/ texting/ laptop

As per University Norm, with 0 tolerance.

4. Keyword Syllabus

Financial investment, asset pricing, CAPM, diversification of risk, hedging, derivatives, complexity and quantum-like approaches (very brief intro).

Refs

TEXTS REFS

Bodie, Z., Kane, A., & Marcus, A. (2013). *Ebook: Essentials of investments: Global edition*. McGraw Hill.

Madura, J., Hoque, A., & Krishnamrti, C. (2018). *International financial management*. Cengage AU.

Redhead, K. (2008). *Personal finance and investments: a behavioural finance perspective*. Routledge.

Shiller, R. J. (2013). Finance and the good society.

Relevant journal articles

Stiglitz, J. E. (1969). A re-examination of the Modigliani-Miller theorem. *The American Economic Review*, *59*(5), 784-793.

DeAngelo, H., DeAngelo, L., & Stulz, R. M. (2006). Dividend policy and the earned/contributed capital mix: a test of the life-cycle theory. *Journal of Financial economics*, *81*(2), 227-254.

Shiller, R. J. (2014). Speculative asset prices. *American Economic Review*, *104*(6), 1486-1517.

Setiawan, S., Wahyudi, S., & Muharam, H. (2024). Determinants of bank's dividend policy: A life cycle theory test in Indonesia. *Managerial Finance*, *50*(8), 1409-1423.

Fama, E. F., & French, K. R. (2004). The capital asset pricing model: Theory and evidence. *Journal of economic perspectives*, *18*(3), 25-46.

Elbannan, M. A. (2015). The capital asset pricing model: an overview of the theory. *International Journal of Economics and Finance*, *7*(1), 216-228.

Ciorciari, J. D. (2019). The variable effectiveness of hedging strategies. *International Relations of the Asia-Pacific*, *19*(3), 523-555.

Wang, Y., Wu, C., & Yang, L. (2015). Hedging with futures: Does anything beat the naïve hedging strategy?. *Management Science*, *61*(12), 2870-2889.

Halkos, G. E., & Tsirivis, A. S. (2019). Energy commodities: A review of optimal hedging strategies. *Energies*, *12*(20), 3979.

Session Plan

Lecture No.	Topic	Instructor	REF/TEXT
1, 2, 3.	Overview of science of investment: discount rates, PV, NPV, IRR, MIRR calculations with real life examples. Introduction to EMH. Risk attitudes.	SP	Econophysics: An Introduction, Sinha et al Making sense of Chaos: Doyne Farmer
4,5.	Bond investments: pricing of bonds, maturity, bond markets.	SP	
6,7	Fixed income securities: pricing, portfolio management of securities	SP	-do-
8,9 ,10	Risky financial assets: pricing, portfolio management: Markowitz diversification	SP	-do-
11,12	CAPM and beyond: multifactor models, Fama-French models, behavioral asset pricing models.	SP	
13,14	Investment banking, Mergers and Acquisitions		
15.16	EMH: critiques of EMH, alternative	SP	

	frameworks		
17, 18	**Information asymmetry economics : Adverse selection and Moral Hazard in financial markets**	**SP**	
19, 20	**Introduction to modern corporate finance theory: Miller and Modigliani theorem of dividend irrelevance**	**SP**	
21, 22	**Modern dividend payout literature: dividend pay outs in information asymmetry, dividend life cycle, dividend smoothing**	**SP**	
22, 23	**Modern aspects of Hedging in financial markets Futures, forwards, pricing of options, SWAPS**	**SP**	
24	**Students presentations of case studies of Investment management, hedging.**	**SP**	
25	**A brief intro to quantum-like approach in finance**	**SP**	
26	**-DO-**	**SP**	