Indian Institute of Technology Kanpur

New Course Proposal

1. **Course Number:** MBAxxx 788 M
2. **Course Title:** Monte Carlo Methods in Finance
3. **Credits:** 3-0-0-0 [5]

   Duration of Course: Modular
4. **Proposing Department:** Department of Management Sciences

   Other Department/IDPs which may be interested in the proposed course:

   Other faculty members interested in teaching the proposed course:
5. **Proposing Instructor(s):** Sourav Majumdar
6. **Course Description:** This course focuses on the implementation of Monte Carlo algorithms to solve a variety of problems in finance and insurance. It begins with a brief introduction to no-arbitrage pricing and the dynamics of asset prices. The course also covers statistical inference for asset price models using real-world data. Students will study the pricing of standard and exotic financial derivatives across asset classes, along with model calibration and sensitivity analysis. Additionally, the course explores various loss-reserving techniques in life and non-life insurance.

   A) **Contents:**

S. No.	Broad Title	Topics	No. of Lectures
1.	Introduction to Monte Carlo methods	Review of Probability, Introduction to simulation	2
2.	Financial Derivatives	Review of financial derivatives, No-arbitrage pricing, Asset price dynamics: simulation and inference	3
3.	Monte carlo methods for derivative pricing	Pricing European options, pricing path independent and path dependent exotic options, sensitivity, calibration, variance reduction techniques, output analysis	6
4.	Monte carlo methods in Insurance	Coherent risk measure, premium principle, mortality models in life insurance, ruin probabilities in non-life insurance	3

C) **Pre-requisites, if any:** MBA651, MBA772

7. **References**:

1. Glasserman, P. (2003). *Monte Carlo Methods in Financial Engineering*. Springer.
2. Korn, R., Korn E., and Kroisandt, G. (2010). *Monte Carlo Methods and Models in Finance and Insurance*. Routledge.
3. Hirsa, A. (2024). *Computational Methods in Finance*. CRC press.
4. Oosterless, C.W. and Grzelak, L.A. (2019). *Mathematical Modeling and Computation in Finance*. World Scientific.

Dated: 20 January 2025 **Proposer**: Sourav Majumdar

Dated:_______________ **DUGC/DPGC Convener**:___________________

The course is approved / not approved

Chairman, SUGC/SPGC Sudhe

Dated:______________________________ 27/03/25

PGDesk-IITK-DOAA

From: DPGC DoMS <dpgc_doms@iitk.ac.in>
Sent: 11 February 2025 15:17
To: Pgdesk
Cc: Souravm
Subject: Fwd: Proposal for two new courses (DoMS)

Categories: Blue Category

Dear Ravi ji,

The following courses completed 21 days of the review process yesterday. The proposer of the course or the DPGC have not received any comments on the course outlines. Therefore, the outlines present in the links can be considered as final, and may be considered for approval in the upcoming SPGC meeting.

I propose the following course codes:

a) **"DMS613"** (9 credit): Introduction to Mathematical Finance

b) **"MBA788"** (5 credit): Monte Carlo Methods in Finance

Best regards,

Subhankar Mukherjee
DPGC Convenor
Department of Management Sciences
IIT Kanpur

-------- Original Message --------

Subject: Proposal for two new courses (DoMS)
Date:2025-01-20 17:43
From:DPGC DoMS <dpgc_doms@iitk.ac.in>
To:acadstaff@lists.iitk.ac.in

Dear all,

Please find the link for the proposals for two new courses by Dr. Sourav Majumdar at the Department of Management Sciences:

1. Introduction to Mathematical Finance: https://iitk.ac.in/doaa/data/NewCourses/Course-proposal-DMSXXX-Introduction-to-Mathematical-Finance.pdf

2. Monte Carlo Methods in Finance: https://iitk.ac.in/doaa/data/NewCourses/Course-proposal-MBAXXX-Monte-Carlo-Methods-in-Finance.pdf

Please share your feedback/comments, if any, by 10 February 2025 to Dr. Sourav Majumdar (souravm@iitk.ac.in) with a copy to the DPGC Convenor (dpgc_doms@iitk.ac.in).

Best regards,

Subhankar Mukherjee
DPGC Convenor
Department of Management Sciences
IIT Kanpur

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INDIAN INSTITUTE OF TECHNOLOGY KANPUR
POSTGRADUATE OFFICE

No. A(P)/IITK/course approval/
March 25, 2025

The Convener, DPGC
Departments of **DOMS/MTH/SEE**
IIT Kanpur

I am directed to communicate the concurrence of the SPGC (2024-25) in its 6th meeting held on 27/02/2025 for the approval of new/modification PG course proposal. After detailed discussion the following courses were approved.

Course No	Title	Credits	Instructor	SPGC Decision
DMS613	Introduction to Mathematical Finance	3-0-0-0-[9]	Dr. Sourav Majumdar	Approved
MBA644	Cyber Security and Privacy for Managers	3-0-0-1-[10]	Dr. Sourya Joyee De	Approved
MBA788M	Monte Carlo Methods in Finance	3-0-0-1-[5]	Dr. Sourav Majumdar	Approved
MBA789M	Management Sciences	3-0-0-1-[5]	Dr. Harshal Rajan Mulay	Approved
MBA790M	Private Equity, Venture Capital and other Alternative Assets	3-0-0-1-[5]	Dr. Harshal Rajan Mulay	Approved
MTH619	Representation theory of quivers	3-0-0-0-[9]	Dr. Amit Kuber	Approved
SEE627	Electric Mobility [Modification]	3-0-0-2-[11]	Dr. Amarendra Edpuganti	Approved

Joint/Assistant Registrar
Academic Affairs

CC: OARS (DOAA Office) For necessary action

MINUTES

FOR THE 6th MEETING OF THE SENATE POSTGRADUATE COMMITTEE (2024-25) HELD ON February 27, 2025 (Thursday) AT 11:00 AM CONFERENCE ROOM (208), ACADEMIC AFFAIRS BUILDING

Members Present: Prof(s): D. Chaitanya Kumar Rao on behalf P M Mohite (AE), Suresh Kumar (BSBE), Basker Sundararaju (CHM), Ark Verma (CGS), Gourabananda Pahar (CE), Soumik Das on behalf of Dipin S Pillai (CHE), J Ramkumar (DES), Sukumar Vellakkal (ECO), Imon Mondal (EE), Animesh Mandal (ES), Rajarshi Sengupta (HSS), Subhankar Mukherjee (DoMS), Anikesh Pal (ME), Sudhanshu S Singh (MSE), Pritam Chakraborty (MSP), Sudhanshu Shekhar (MATH), Sagar Chakrabarty (PHY), Kunal P Mooley (SPASE), Prabodh Bajpai (SEE)

Members Absent: Prof(s), Piyush Rai (CSE), Pankaj Wahi (NET), Sapam Ranjita Chanu (PSE)

Senate Nominee : Prof. Abheejeet Mohapatra

Student representatives: Saurabh Sona Lahamate (231250121

(A) Ratification of minutes of 5th SPGC meeting held on January 24, 2025

No comments were received. Minutes is confirmed

(B) Item requiring SPGC Approval

a) New course approval

Course No	Title	Credits	Instructor	SPGC Decision
DMS613	Introduction to Mathematical Finance	3-0-0-0-[9]	Dr. Sourav Majumdar	Approved
MBA644	Cyber Security and Privacy for Managers	3-0-0-1-[10]	Dr. Sourya Joyee De	Approved
MBA788M	Monte Carlo Methods in Finance	3-0-0-1-[5]	Dr. Sourav Majumdar	Approved
MBA789M	Management Sciences	3-0-0-1-[5]	Dr. Harshal Rajan Mulay	Approved
MBA790M	Private Equity, Venture Capital and other Alternative Assets	3-0-0-1-[5]	Dr. Harshal Rajan Mulay	Approved
MTH619	Representation theory of quivers	3-0-0-0-[9]	Dr. Amit Kuber	Approved
SEE627	Electric Mobility [Modification]	3-0-0-2-[11]	Dr. Amarendra Edpuganti	Approved

b) Termination under 5.7

S. No	Roll No	Name	Dept.	Prog.	Supervisor & DPGC Recommendation	SPGC Decision
1.	241250026	Jatin Chaudhary	DOMS	MBA	Recommended	Approved to be reported to Senate
2.	241010003	Adhikari Thakur Prasad Das	AE	MTech	Recommended	Approved to be reported to Senate

c) Full Time to Part-Time

S. No	Roll No	Name	Dept	Prog	Supervisor and DPGC Recommendation	Remark	SPGC Decision
1.	231040115	Swati Gupta	EE	MTech	Recommended	CU=78 TU=54 CPI=9.38 NOC - attached	Approved
2.	231040036	Bingi Poojari Venkatesh	EE	MTech	Recommended	CU=78 TU=54 CPI=9.38 NOC - attached	Approved

Sudhe