Title (Units): **COMP7290 Algorithmic Trading (3,2,1)**

Course Aims: To introduce financial markets mechanics and Direct Market Access; to study financial asset classes and algorithmic trading; to discuss risk management and trading psychology; to examine various aspects of technical analysis such as price trends, position sizing, and latency; to discuss operational concerns on trading; to gain hands-on computer experience in trade execution.

Prerequisite: Postgraduate student standing and basic knowledge in statistics

Course Intended Learning Outcomes (CILOs):
Upon successful completion of this course, students should be able to:

No.	Course Intended Learning Outcomes (CILOs)
	Knowledge
1	Understand financial markets mechanics and Direct Market Access
2	Explain financial asset classes and trading algorithms
3	Describe risk management, trading psychology, and operational concerns
4	Perform technical analysis on financial assets
	Professional Skill
5	Perform trading based on algorithms and technical analysis
6	Execute orders via trading software

Calendar Description: This course is to introduce financial markets mechanics and Direct Market Access. Financial asset classes and algorithmic trading will be studied. Risk management and trading psychology will be discussed. In addition, technical analysis such as price trends, position sizing, and latency will be covered. Basic operational concerns on trading will be examined. Hands-on computer experience in trade execution will be given.

Teaching and Learning Activities (TLAs):

CILOs	Type of TLA
1-6	Students will learn concepts and skills in financial markets mechanics, DMA, financial asset classes, algorithmic trading, risk management, trading psychology, technical analysis, and operational concerns in lectures and tutorials.
2-6	Students will work on assignments, tests, and examination to enhance their understanding of algorithmic trading and technical analysis.

Assessment:

No.	Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
1	Continuous Assessment	50%	1-6	Continuous assessments are designed to measure how well students have learned the basic concepts and skills of algorithmic trading and technical analysis. Tests, written assignments and software tools will be given to access CILOs 1-6.
2	Examination	50%	1-6	Final examination questions are designed to evaluate how far students have achieved their intended learning outcomes. Questions will primarily be analysis and skills based to assess the student's ability in the understanding and application of financial markets, trading algorithms, and technical analysis.

Assessment Rubrics:

Excellent (A)	• Achieve all CILOs, demonstrating a good mastery of both the theoretical and practical aspects of the knowledge and skills associated with financial markets, algorithmic trading, and risk management. • Able to develop correct solutions to a lot of problems in technical analysis and operational concerns. • Able to apply a variety of software skills to solve problems in financial trading.
Good (B)	• Achieve most of the six CILOs, demonstrating a good understanding of the knowledge and skills associated with financial markets, algorithmic trading, and risk management. • Able to develop correct solutions to problems in technical analysis and operational concerns. • Able to apply selected software skills to solve problems in financial trading.
Satisfactory (C)	• Achieve some of the six CILOs, demonstrating a basic level of understanding of the knowledge and skills associated with financial markets, algorithmic trading, and risk management. • Able to provide acceptable solutions to some problems in technical analysis and operational concerns. • Able to apply some software skills to solve problems in financial trading.
Fail (F)	• Achieve none of the six CILOs, with little understanding of the associated financial markets, algorithmic trading, and risk management. • Unable to provide solutions to simple problems in technical analysis and operational concerns. • Unable to apply any software skills to solve problems in financial trading.

Course Content and CILOs Mapping:

Content		**CILO No.**
I	Introduction to Financial Markets and Algorithmic Trading	1-2,5
II	Risk and Account Management	3
III	Technical Analysis	4-5
IV	Operational Concerns	3
V	Software Trading Tools	5-6

References:

- Robert Kissell, Algorithmic Trading Methods: Applications Using Advanced Statistics, Optimization, and Machine Learning Techniques, 2nd Edition, Academic Press, 2020.
- Stefan Jansen, Machine Learning for Algorithmic Trading: Predictive Models to Extract Signals from Market and Alternative Data for Systematic Trading Strategies with Python, 2nd Edition, Packt Publishing, 2020.
- Zeyu Zheng, Algorithmic Trading: Concepts, Perspectives, and Technical Notes, CreateSpace Independent Publishing Platform, 2017.
- Kevin J. Davey, Introduction to Algo Trading: How Retail Traders can Successfully Compete with Professional Traders, Independently published, 2018.
- Alvaro Cartea, Algorithmic and High-Frequency Trading (Mathematics, Finance and Risk), 1st Edition, Cambridge University Press, 2015.
- Kevin Davey, Building Winning Algorithmic Trading Systems, + Website: A Trader's Journey From Data Mining to Monte Carlo Simulation to Live Trading (Wiley Trading), Wiley, 2014.
- Howard B Bandy, Quantitative Technical Analysis: An integrated approach to trading system development and trading management, Blue Owl Press, Incorporated; 1st Edition, 2015.
- Andrew Aziz, How to Day Trade for a Living: Tools, Tactics, Money Management, Discipline and Trading Psychology, AMS Publishing Group, 4th Edition, 2015.
- Fred McAllen, Charting and Technical Analysis, Amazon Digital Services LLC, 2012.
- Charles G. Koonitz, Technical Analysis for Beginners Part Two: Riding the Stock Market Cycle, Tripod Solutions, 2017

Course Content:

Topic

I. Introduction to Financial Markets and Algorithmic Trading

II. Risk and Account Management
   A. Three-Step Risk Management
   B. Trading Psychology

III. Technical Analysis
   A. Trade on Price Trends, e.g., Candlesticks
   B. Trade on Position Sizing, e.g., VWAP
   C. Trade on News
   D. Trade on Latency

IV. Operational Concerns
   A. Building the System
   B. Sourcing Trade Idea
   C. Evaluating Trading Performance

V. Software Trading Tools