NUS School of Computing
Master of Science in Digital Financial Technology (MSc DFinTech)

(Applicable to August 2026 Intake onwards)
(Students admitted in the August 2025 intake and earlier, please refer to this Annex instead.)

Core Courses (28 units)

Complete any three (12 units) of the following courses:

FT5001 Fintech Innovations: A Strategic Landscape
FT5002 Digital and AI Transformation in Finance
FT5003 Blockchain Innovations
FT5004 Programming for Blockchain Applications
FT5005 Machine Learning for Finance
FT5009 Contemporary Topics in Financial Data Analytics
FT5010 Algorithmic Trading Systems Design and Deployment
FT5011 Deep Learning for Finance
FT5012 Digital Trust in Banking and Finance
FT5013 Digital Asset Innovations in Finance
FT5014 AI Risk in the Financial Sector

Complete all (16 units) of the following courses:

BMD5301 Introduction to Finance for FinTech Professionals
BMD5302 Financial Modelling for FinTech Professionals
IT5001X Software Development Fundamentals
IT5006 Fundamentals of Data Analytics

Students who have taken courses similar to BMD5301 and IT5001X can replace* these courses by taking the following replacement courses or FT50xx courses:

IT5003 Data Structures and Algorithms
IT5004 Enterprise Systems Architecture Fundamentals
IT5005 Artificial Intelligence
IT5008 Database Design and Programming

***Note**: Students who wish to take replacement courses are required to submit their requests to the School of Computing for prior approval. However, for IT5001X, students are required to take an in-person proficiency test (non-refundable administrative fee applies) to assess their eligibility. All other core courses are required for all students.

Important:
1. *Please refer to course code as course titles, descriptions and schedules are subject to change without prior notice.*
2. *Please note that not all courses are offered every semester. Students are advised to refer to the course schedule and plan their studies accordingly.*

Capstone Project (12 units)

Complete one of the following options:

1. FT5007 FinTech Capstone Project** (12 units); or
2. Three elective courses (3 × 4 units) from the prescribed elective list.

****Note**: Students are required to fulfil all pre-requisites/co-requisites and minimum unit requirements before embarking on the Capstone Project.

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Elective Courses (12 units)

Students may take up to three (for the Capstone Project option) or six (for the non-Capstone option) level 4000/5000 elective courses from the prescribed elective list. A maximum of two level 4000 courses may be taken, with the remaining course(s) at level 5000. Level 6000 courses do not count towards the programme requirements.

Students who have completed FT50xx courses in excess of the programme's core requirements may use these FT50xx courses to fulfil the elective requirement.

The prescribed elective courses are listed under the three vertical tracks below. Students are strongly encouraged to take the elective courses within one vertical track but are not restricted to do so.

Preclusions:

- A course may specify certain preclusions. These are courses that have similar emphases and may not be taken together with that particular course.
- Please note that the following courses are precluded from each other:

Course	Precluded Course
CS5246 Text Mining	**CS4248** Introduction to Large Language Models
CS5421 Database Applications Design and Tuning	**CS4221** Database Applications Design and Tuning
CS5425 Big Data System for Data Science	**BT4221** Advanced Analytics with Big Data Technologies **CS4225** Big Data Systems for Data Science
CS5439 Software Security	**CS4239** Software Security
CS5446 Reinforcement Learning and Sequential Decision Making	**CS4246** Reinforcement Learning and Sequential Decision Making
IS5009 Topics in Financial Technology Solutions	**BT4013** Analytics for Capital Market Trading and Investment
IS5010 AI Ethics and Governance	**IS4246** Smart Systems and AI Governance
IS5116 Digital Entrepreneurship	**IS3251** Principles of Technology Entrepreneurship

Vertical #1. Computing Technologies

- CS5223 Distributed Systems
- CS5224 Cloud Computing
- CS5231 Systems Security
- CS5239 Performance Analysis of Computer Systems
- CS5321 Network Security
- CS5331 Web Security
- **CS5421** Database Applications Design and Tuning
- **CS5439** Software Security
- IS4261 Designing AI-driven Business Innovations
- IS4262 Digital Product Management
- IS4301 Agile IT with DevOps
- IS5008 Technology Risk and Cyber Resilience
- **IS5009** Topics in Financial Technology Solutions
- IT5003 Data Structures and Algorithms
- IT5004 Enterprise Systems Architecture Fundamentals
- IT5008 Database Design and Programming

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Vertical #2. Financial Data Analytics and Intelligence

- CS5242 Neural Networks and Deep Learning
- **CS5246** Text Mining
- CS5260 Neural Networks and Deep Learning II
- CS5339 Theory and Algorithms for Machine Learning
- CS5340 Uncertainty Modelling in AI
- CS5344 Big-Data Analytics Technology
- **CS5425** Big Data Systems for Data Science
- **CS5446** Reinforcement Learning and Sequential Decision Making
- CS5562 Trustworthy Machine Learning
- IS5006 Human-Centred Intelligent Systems
- **IS5010** AI Ethics and Governance
- IS5152 Data-Driven Decision Making
- IT5005 Artificial Intelligence

Vertical #3. Digital Financial Transactions and Risk Management

- BMF5342 Financial Technology, Analytics and AI
- BMF5346 Venture Capital and Private Equity
- BMF5353 Applied Investment Strategies
- BMF5354 Financial Regulation in a Digital Age
- BMF5355 Financial Systems and Technologies
- BMF5358 Fintech Venture Creation
- BT4013 Analytics for Capital Market Trading and Investment
- BT4016 Risk Analytics for Financial Services
- CS5233 Simulation and Modelling Techniques
- FE5103 Equity Products and Exotics
- FE5108 Portfolio Theory and Investments
- FE5222 Advanced Derivatives Pricing
- **IS5116** Digital Entrepreneurship

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Course Descriptions (Core Courses)

Course Code and Title	Pre-Requisites [1]	Co-Requisites [2]	Preclusions [3]	Description
FT5001 Fintech Innovations: A Strategic Landscape (4 units)				The objective of this course is to provide a technological overview of the eco-system of FinTech innovations for consumers. Particularly, this course will cover important business models and innovations in payment solutions, crowd-funding platforms, investment and robo-advisors, and other important FinTech innovations that affect the personal finance of individual consumers.
FT5002 Digital and AI Transformation in Finance (4 units)				This course equips students to lead digital and AI transformation in banking and finance enterprises by providing an end-to-end framework for staging and executing digital and AI transformation programs. It covers change management and strategic transformation, the modernisation of legacy core banking and financial systems, and building "digital-to-the-core" capabilities through culture, operating model, architecture and human capital. Students will learn how to transition financial institutions into a data- and AI-driven operating environment, including platform and infrastructure considerations, governance, and regulatory considerations.
FT5003 Blockchain Innovations (4 units)				Blockchain technologies could be the most disruptive FinTech technologies. This course covers the important topics of blockchain innovations. Students will learn the architecture of blockchain, the history and evolution of blockchain applications, and the case studies of state-of-art blockchain applications in the industry.
FT5004 Programming for Blockchain Applications (4 units)				This course provides an overview of the essential concepts for blockchain application development. Students will be able to understand how blockchain applications function and the differences compared to traditional applications. Additionally, they will gain knowledge of the standards, key libraries, and services required for blockchain application development and be able to utilize them effectively.
FT5005 Machine Learning for Finance (4 units)				This course covers foundation knowledge in machine learning and data mining for solving practical analytics problems or building AI applications at FinTech firms. Some topics covered including supervised learning models, time series forecasting methods, basics of natural language processing, and unsupervised learning.

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[2] Co-requisites are courses that are to be taken concurrently.
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Course Code and Title	Pre-Requisites [1]	Co-Requisites [2]	Preclusions [3]	Description
FT5007 FinTech Capstone Project (12 units)	**IT5001/IT5001X** Software Development Fundamentals	**IT5006** Fundamentals of Data Analytics		Capstone project course spans over two semesters and is organised into two components. The first semester will comprise of a series of seminar-lectures that would help prepare students for conducting a literature review, working on pilot projects, and facilitating industry attachment for a summer internship. Starting in the first semester, students are required to work on a FinTech project. The project could be academic research, translational research, or software development. Part-time students are strongly encouraged to opt for the electives option as the Capstone Project is highly intensive and requires substantial time commitment.
FT5009 Contemporary Topics in Financial Data Analytics (4 units)				The objective of this course is to provide students with an overview of recent advances in financial data analytics. In addition, the lecturer may provide an in-depth discussion of selected important topics in financial data analytics that is the focus of industry-oriented research at financial institutions or start-ups. From this course, students will learn advanced data mining algorithms, financial statistical models, fintech programming knowledge, and business cases or academic papers on modern financial applications.
FT5010 Algorithmic Trading Systems Design and Deployment (4 units)	**IT5001/IT5001X** Software Development Fundamentals		**IS4226** Systematic Trading Strategies and Systems	The course teaches students financial market fundamentals and best practices in systematic trading, covering the distinction between discretionary and systematic methods. It emphasizes designing and developing rule-based trading strategies and systems, utilizing financial trading and app development concepts. It focuses on best practices for backtesting and hypothesis testing for different trading strategies derived from technical analysis, fundamental analysis, and machine learning. The course also addresses investor biases and ways to overcome them through data-driven decision-making and risk management.

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Course Code and Title	Pre-Requisites [1]	Co-Requisites [2]	Preclusions [3]	Description
FT5011 Deep Learning for Finance (4 units)	**FT5005** Machine Learning for Finance			This course will introduce the foundational concepts and applications of major deep learning algorithms. This course aims to bridge the gap between the rapidly evolving world of deep learning technologies and the unique challenges presented by the financial industry. Through a combination of theoretical lessons, practical case studies, hands-on exercises, and discussions, students will explore the potential, limitations, and implications of employing deep learning solutions in various financial scenarios. By the end of this course, participants will have hands-on experience in designing, training, and implementing deep learning models for financial applications.
FT5012 Digital Trust in Banking and Finance (4 units)			**AI5205** Ethics, Governance, and Compliance in AI and Emerging Technologies and **IS4234** Governance, Regulation, and Compliance Technology	Globally, the banking and finance sector has witnessed many rapid changes in recent years. These include advancements in digital technologies, evolving practices in delivering digital financial services, shifts in the security threat and risk landscape, heightened connectivity with ecosystem partners, and increasing expectations from government and financial regulators. Consequently, it is of utmost importance that financial institutions and other critical sectors of the economy implement robust enterprise-level risk governance and strong risk management practices, safeguarding critical services against cybercriminals and digital fraud. Such a multipronged strategy will ensure that digital financial services remain resilient and provide adequate protection for personal information and privacy. This course will prepare students to tackle these global challenges effectively.
FT5013 Digital Asset Innovations in Finance (4 units)				This course offers an in-depth exploration of the technological innovations driving the emergence and growth of digital assets in finance. Students will delve into the foundational concepts of digital assets, understand the mechanics of decentralized finance (DeFi), and examine the cutting-edge technologies shaping the future of the financial industry. The course is structured to build knowledge progressively, starting from basic principles and advancing to complex applications and future trends.

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FT5014 AI Risk in the Financial Sector (4 units)				Financial institutions worldwide increasingly deploy AI, agentic and generative AI to drive innovation in areas like fraud detection, customer personalisation, and automated trading, yet these technologies introduce unprecedented risks such as model biases, adversarial attacks, and supply chain vulnerabilities that have led to multimillion-dollar incidents. This course equips students with essential skills to navigate this high-stakes landscape, transforming potential threats into opportunities for resilient, trustworthy AI adoption that aligns with regulatory demands from bodies like Singapore MAS, US FFIEC, and the European Union AI Act. For students, it offers a competitive edge in fintech careers by blending practical risk analysis with real-world case studies, latest institutional and regulatory developments in the high-stake accelerated adoption of AI in the global financial sector, addressing the urgent industry need for professionals who can balance innovation with trust.
BMD5301 Introduction to Finance for FinTech Professionals (4 units)				This course aims to provide students with the foundation to understand the key concepts and tools used in Finance, which are necessary for managers and analysts to make sound financial decisions. Topics covered include discounted cash flow models, risk and return, capital budgeting, valuation of stocks and other financial securities, as well as an overview of financial markets and financial institutions.
BMD5302 Financial Modelling for FinTech Professionals (4 units)				This course introduces Finance models used in corporate finance, portfolio management, derivatives and bonds. It takes an applied approach by implementing through Excel, VBA and Python.
IT5001X Software Development Fundamentals (4 units)			**IT5001** Software Development Fundamentals	This course aims to introduce non-computing students to programming principles and their application in software development. Students will be introduced to the basics of programming (control flow, data and function abstraction, types, OO), simple data structures and algorithms (lists, maps, sorting), and development methodology (testing, debugging). Through hands on assignments, students will learn good software development practices (documentation, style) and experience building practical applications. This course is appropriate for students in programmes with non-CS focus.

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Course Code and Title	Pre-Requisites [1]	Co-Requisites [2]	Preclusions [3]	Description
IT5006 Fundamentals of Data Analytics (4 units)	**IT5001/IT5001X** Software Development Fundamentals		**BT5126** Handson with Business Analytics, **IS5126** Handson with Applied Analytics and **CS5228** Knowledge Discovery and Data Mining	This graduate-level course provides a comprehensive foundation to the fundamentals of data analytics; namely exploratory data analysis, predictive modeling, and result interpretation. The syllabus emphasizes the translation of real-world scenarios into tractable analytical problems. Students are equipped with a robust toolkit of statistical methods for exploratory analysis. They will delve into the frameworks of both classical and Bayesian learning to tackle analytical challenges. Additionally, the course provides hands-on experience building end-to-end data analytics pipelines using Python. This well-balanced approach integrates technical expertise with business-oriented applications, establishing a strong foundation for pursuing advanced studies in machine learning or business analytics.

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