NUS School of Computing
Master of Computing (General Track) - Essential and Industry Readiness Courses
AY2025/2026, Semester 1

Course Code and Title	Lecture Day/Period	Time	Venue	Remarks	Exam
IT5001 Software Development Fundamentals *Lecturer: Alan Cheng*	Wednesday [13 Aug 2025 - 12 Nov 2025]	7.30pm - 9.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures.	Monday, 24 Nov 2025, 5pm - 7pm For exam details, please check with your lecturer and Canvas for announcements.
	Wednesday [27 Aug 2025 - 12 Nov 2025]	9am - 10am	**LAB** (Face-to-face)	Full-time students will attend either lab session.	
		10am - 11am	**LAB** (Face-to-face)		
		6.30pm - 7.30pm	**LAB** (Face-to-face)	Part-time students will attend this lab session.	
IT5002 Computer Systems and Applications *Lecturer: Colin Tan*	Tuesday [12 Aug 2025 - 11 Nov 2025]	6.30pm - 9.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures and labs.	Tuesday, 25 Nov 2025, 5pm - 7pm For exam details, please check with your lecturer and Canvas for announcements.
	Friday [29 Aug 2025 - 14 Nov 2025]	6.30pm - 8.30pm	**LAB** (Face-to-face)		
IT5003 Data Structures and Algorithms *Lecturer: Steven Halim*	Wednesday [13 Aug 2025 - 5 Nov 2025]	6.30pm - 8.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures.	Wednesday, 26 Nov 2025, 5pm - 7pm For exam details, please check with your lecturer and Canvas for announcements.
	Monday [25 Aug 2025 - 3 Nov 2025]	4pm - 6pm	**LAB** (Face-to-face)	Full-time students will attend this lab session.	
	Saturday [30 Aug 2025 - 8 Nov 2025]	10am - 12pm	**LAB** (Face-to-face)	Part-time students will attend this lab session.	
IT5004 Enterprise Systems Architecture Fundamentals *Lecturer: Lek Hsiang Hui*	Monday [11 Aug 2025 - 10 Nov 2025]	9am - 12pm	**LECTURE** (Face-to-face)	Students are to attend all lectures.	There will be no exam for IT5004.
IT5005 Artificial Intelligence *Lecturer: Rajendra Prasad Sirigina*	Tuesday [12 Aug 2025 - 11 Nov 2025]	2pm - 4pm	**LECTURE** (Face-to-face)	Students are to attend all lectures and tutorials.	Monday, 1 Dec 2025, 1pm - 3pm For exam details, please check with your lecturer and Canvas for announcements.
	Tuesday [26 Aug 2025 - 11 Nov 2025]	4pm - 5pm	**TUTORIAL** (Face-to-face)		
IT5006 Fundamentals of Data Analytics *Lecturer: Ashish Deepak Dandekar*	Thursday [14 Aug 2025 - 13 Nov 2025]	6.30pm - 8.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures and tutorials.	Thursday, 27 Nov 2025, 5pm - 7pm For exam details, please check with your lecturer and Canvas for announcements.
	Friday [29 Aug 2025 - 14 Nov 2025]	6.30pm - 7.30pm	**TUTORIAL** (E-Learn)		

IT5007 Software Engineering on Application Architecture *Lecturer: Prasanna Karthik Vairam*	Thursday [14 Aug 2025 - 13 Nov 2025]	2pm - 5pm	**LECTURE** (Face-to-face)	Students are to attend all lectures.	There will be no exam for IT5007.
IT5008 Database Design and Programming *Lecturer: Adi Prabawa*	Monday [11 Aug 2025 - 10 Nov 2025]	6.30pm - 8.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures and tutorials.	Friday, 28 Nov 2025, 9am - 11am For exam details, please check with your lecturer and Canvas for announcements.
	Monday [25 Aug 2025 - 10 Nov 2025]	8.30pm - 9.30pm	**TUTORIAL** (Face-to-face)		
IT5100A Industry Readiness: Typed Functional Programming *Lecturer: Foo Yong Qi*	Tuesday [12 Aug 2025 - 23 Sep 2025]	6.30pm - 8.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures.	There will be no exam for IT5100A.
IT5100B Industry Readiness: Stream Processing *Lecturer: Foo Yong Qi*	Tuesday [30 Sep 2025 - 11 Nov 2025]	6.30pm - 8.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures.	There will be no exam for IT5100B.
Students are required to attend all face-to-face classes, in-class assessments and in-person examinations (if applicable). Courses offered, descriptions and schedules may be subject to change.					

NUS School of Computing
Master of Computing (General Track) - Essential and Industry Readiness Courses
AY2025/2026, Semester 2

Course Code and Title	Lecture Day/Period	Time	Venue	Remarks	Exam
IT5001 Software Development Fundamentals *Lecturer: Alan Cheng*	Wednesday [14 Jan 2026 - 15 Apr 2026]	7.30pm - 9.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures.	Thursday, 30 Apr 2026, 5pm - 7pm For exam details, please check with your lecturer and Canvas for announcements.
	Wednesday [28 Jan 2026 - 15 Apr 2026]	10am - 11am	**LAB** (Face-to-face)	Full-time students will attend either lab session.	
		11am - 12pm	**LAB** (Face-to-face)		
		6.30pm - 7.30pm	**LAB** (Face-to-face)	Part-time students will attend this lab session.	
IT5002 Computer Systems and Applications *Lecturer: Colin Tan*	Tuesday [13 Jan 2026 - 14 Apr 2026]	6.30pm - 9.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures and labs.	Tuesday, 28 Apr 2026, 1pm - 3pm For exam details, please check with your lecturer and Canvas for announcements.
	Friday [30 Jan 2026 - 17 Apr 2026]	6.30pm - 8.30pm	**LAB** (Face-to-face)		
IT5003 Data Structures and Algorithms *Lecturer: Steven Halim*	Wednesday [14 Jan 2026 - 8 Apr 2026]	6.30pm - 8.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures.	Tuesday, 28 Apr 2026, 5pm - 7pm For exam details, please check with your lecturer and Canvas for announcements.
	Monday [26 Jan 2026 - 6 Apr 2026]	2pm - 4pm	**LAB** (Face-to-face)	Full-time students will attend either lab session.	
		4pm - 6pm	**LAB** (Face-to-face)		
	Saturday [31 Jan 2026 - 11 Apr 2026]	10am - 12pm	**LAB** (Face-to-face)	Part-time students will attend this lab session.	
IT5004 Enterprise Systems Architecture Fundamentals *Lecturer: Lek Hsiang Hui*	Thursday [15 Jan 2026 - 16 Apr 2026]	6.30pm - 9.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures.	There will be no exam for IT5004.
IT5005 Artificial Intelligence *Lecturer: Rajendra Prasad Sirigina*	Monday [12 Jan 2026 - 13 Apr 2026]	6.30pm - 8.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures and tutorials.	Monday, 4 May 2026, 9am - 11am For exam details, please check with your lecturer and Canvas for announcements.
	Monday [26 Jan 2026 - 13 Apr 2026]	8.30pm - 9.30pm	**TUTORIAL** (Face-to-face)		
IT5006 Fundamentals of Data Analytics *Lecturer: Ashish Deepak Dandekar*	Thursday [15 Jan 2026 - 16 Apr 2026]	9am - 11am	**LECTURE** (Face-to-face)	Students are to attend all lectures and tutorials.	Monday, 27 Apr 2026, 9am - 11am For exam details, please check with your lecturer and Canvas for announcements.
	Friday [30 Jan 2026 - 17 Apr 2026]	9am - 10am	**TUTORIAL** (E-Learn)		

IT5007 Software Engineering on Application Architecture *Lecturer: Prasanna Karthik Vairam*	Tuesday [13 Jan 2026 - 14 Apr 2026]	6.30pm - 9.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures.	There will be no exam for IT5007.
IT5008 Database Design and Programming *Lecturer: Adi Prabawa*	Monday [12 Jan 2026 - 13 Apr 2026]	9am - 11am	**LECTURE** (Face-to-face)	Students are to attend all lectures and tutorials.	Monday, 4 May 2026, 1pm - 3pm For exam details, please check with your lecturer and Canvas for announcements.
	Monday [26 Jan 2026 - 13 Apr 2026]	11am - 12pm	**TUTORIAL** (Face-to-face)		
IT5100B Industry Readiness: Stream Processing *Lecturer: Foo Yong Qi*	Thursday [15 Jan 2026 - 26 Feb 2026]	6.30pm - 8.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures.	There will be no exam for IT5100B.
IT5100D Industry Readiness: Networking Concepts for Developers *Lecturer: Vivy Suhendra*	Monday [2 Mar 2026 - 13 Apr 2026]	6.30pm - 8.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures.	There will be no exam for IT5100D.
IT5100E Industry Readiness: Security Best Practices *Lecturer: Foo Yong Qi*	Thursday [5 Mar 2026 - 16 Apr 2026]	6.30pm - 8.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures.	There will be no exam for IT5100E.
IT5100F Industry Readiness: Data Analytics and AI in Practice *Lecturer: Akshay Narayan*	Monday [12 Jan 2026 - 23 Feb 2026]	6.30pm - 8.30pm	**LECTURE** (Face-to-face)	Students are to attend all lectures.	There will be no exam for IT5100F.
Students are required to attend all face-to-face classes, in-class assessments and in-person examinations (if applicable). Courses offered, descriptions and schedules may be subject to change.					

NUS School of Computing

Essential and Industry Readiness Course Descriptions

Course Code and Title	Pre-Requisites[1]	Co-Requisites[2]	Preclusions[3]	Description
Essential Courses				
IT5001 Software Development Fundamentals				This course aims to introduce non-computing students to the principles and concepts of software development at an accelerated pace. Students will be introduced to the basics of programming (control flow, code and data abstraction, recursion, types, OO), development methodology (ensuring correctness, testing, debugging), simple data structures and algorithms (lists, maps, sorting), and software engineering principles. Through hands on assignments and projects, students will learn good software development practices (documentation, style) and experience a typical software engineering cycle.
IT5002 Computer Systems and Applications		IT5001 Software Development Fundamentals		This course aims to introduce non-computing students to (a) the common principles and concepts in computer systems: abstraction, layering, indirection, caching, hierarchical naming, prefetching, pipelining, locking, concurrency; (b) the inner workings of a computing device, including hardware (CPU, memory, disks), operating systems (kernels, processes and threads, virtual memory, files), and applications (Web, databases).
IT5003 Data Structures and Algorithms	IT5001 Software Development Fundamentals			This course introduces non-computing students to efficient computational problem solving in an accelerated pace. Students will learn to formulate a computational problem, identify the data required and come up with appropriate data structures to represent them, and apply known strategies to design an algorithm to solve the problem. Students will also learn to quantify the space and time complexity of an algorithm, prove the correctness of an algorithm, and the limits of computation. Topics include common data structures and their algorithms (lists, hash tables, heap, trees, graphs), algorithmic problem solving paradigms (greedy, divide and conquer, dynamic programming), and NP-completeness.
IT5004 Enterprise Systems Architecture Fundamentals		IT5001 Software Development Fundamentals		This course aims to equip non-computing students with fundamental knowledge in architecting and designing modern Enterprise Systems in organisations that can be reasonably complex, scalable, distributed, component-based and mission critical. Students will develop an understanding of high-level concepts such as enterprise architecture and software architecture. They will then move on to acquire fundamental systems analysis and design techniques such as object-oriented requirements analysis and design using the Unified Modelling Language.
IT5005 Artificial Intelligence*				The study of artificial intelligence, or AI, aims to make machines achieve human-level intelligence. This course provides a comprehensive introduction to the fundamental components of AI, including how problem-solving, knowledge representation and reasoning, planning and decision making, and learning. The course prepares students without any AI background to pursue advanced courses in AI.

[1] Pre-Requisites indicate the base of knowledge on which the subject matter of a particular course will be built. Before taking a course, a student should complete any pre-requisite course(s) listed for that particular course.
[2] Co-requisites are courses that are to be taken concurrently.
[3] A course may specify certain preclusions. These are courses that have similar emphases and may not be taken together with that particular course.

				*Students are strongly advised to complete IT5001 Software Development Fundamentals prior to enrolling in IT5005 Artificial Intelligence.
IT5006 Fundamentals of Data Analytics	IT5001 Software Development Fundamentals		BT5126 Hands-on with Business Analytics, IS5126 Hands-on with Applied Analytics and CS5228 Knowledge Discovery and Data Mining	This course introduces students to the fundamental concepts in business analytics. They can learn how to apply basic business analytics tools (such as R), and how to effectively use and interpret analytic models and results for making informed business decisions. The course prepares students without any analytics background to pursue advanced courses in business and data analytics.
IT5007 Software Engineering on Application Architecture	IT5001 Software Development Fundamentals	IT5003 Data Structures and Algorithms		To meet changing business needs, this course focuses on flexible and agile software development on modern application architecture. Students learn to design and develop modern applications that support multiple clients across different platforms such as desktop, mobile devices and cloud. The course covers designing (1) website-based front-end software and (2) mobile app front-end that interacts with a common cloud-based backend. The final part involves engineering software for higher-level objectives such as security and performance. Tools and techniques for writing modern software, such as, HTML5, CSS3, React.js, Node.js, MySQL/MongoDB, and Git will be taught.
IT5008 Database Design and Programming				The aim of this course is to introduce the fundamental concepts and techniques necessary for the understanding and practice of design and implementation of database applications and of the management of data with relational database management systems. The course covers practical and theoretical aspects of design with entity-relationship model, theory of functional dependencies and normalization by decomposition in third and Boyce-Codd normal forms. The course covers practical and theoretical aspects of programming with SQL data definition and manipulation sublanguages as well as relational algebra/calculus.
Industry Readiness Courses				
IT5100A Industry Readiness: Typed Functional Programming	IT5001 Software Development Fundamentals			Typed functional programming are becoming more widely adopted in industry, as can be seen in the success of a number of advanced programming languages, such as OCaml, Haskell and Scala 3. These advanced languages offer a range of expressive features to allow robust, reusable and high-performing software codes to be safely and rapidly developed. This course will cover key programming techniques of typed functional programming that are becoming widely adopted, such as strong typing, code composition and abstraction, effect handlers, and safe techniques for asynchronous and concurrent programming.
IT5100B Industry Readiness: Stream Processing	IT5001 Software Development Fundamentals			The global availability of data has reached a level where aggregating data into generic, general-purpose “stores” is no longer feasible. Having data collections statically available for querying by interested parties on demand is increasingly becoming the way of the past. Instead, a new paradigm, called Data Streaming, has emerged recently. In this paradigm, data is bundled into high-throughput “streams'' that are sharded efficiently across a large number of network nodes. Consumers, sometimes counted in hundreds of thousands, or millions, “subscribe” to data subsets and are notified when new data becomes available, being under the

				obligation to process it immediately, or lose it. Consequently, data storage is no longer centralized, but rather distributed into many smaller-sized abstract collections. This new approach to "Big Data" requires a new set of tools, platforms, and solution patterns. In this course we propose to explore several facets of this new paradigm: • The Stream paradigm introduced in Java 8. • Platforms that implement Data Streaming, such as Kafka, and the Java bindings in the library KafkaConnect. • Computing paradigms for stream processing, such as Reactive Programming, and the library RxJava. • High-performance stream computing platforms, such as Flink. The course will be using Java as the main vehicle for introducing concepts and showcasing examples.
IT5100D Industry Readiness: Networking Concepts for Developers	IT5001 Software Development Fundamentals			Appreciating the network communication mechanisms underlying many modern applications is important in producing good quality software. This course is designed to help students prepare for web development roles in the industry. It aims to provide a high-level understanding of networking principles that influence web development practices, including fundamental concepts of computer networks, internet protocol layers with focus on the upper layers, socket programming, and other pertinent concepts in modern networks. The course will focus on hands-on programming and set-up of web applications, utilizing widely used libraries or frameworks, and best practices in web-based software development.
IT5100E Industry Readiness: Security Best Practices	IT5001 Software Development Fundamentals			Malicious exploitation of vulnerable applications running on the web can have disastrous consequences. This course is designed to help students prepare for secure application development roles in the industry, with a focus on web applications. It aims to provide an understanding of important security considerations and emphasizes practical experience in secure coding practices. Topics covered include fundamental security concepts (e.g., encryption, authentication, authorization), secure coding practices (e.g., handling of cookies, passwords, errors), secure design and deployment principles (e.g., threat modelling, vulnerability scanning), along with industry standards (e.g., OWASP), tools, common threats and defense against them.
IT5100F Industry Readiness: Data Analytics and AI in Practice	IT5001 Software Development Fundamentals			Software development roles in the industry increasingly trend towards incorporating data analytics and artificial intelligence (AI) for various operational and business needs. This course aims to familiarise students with practical problem solving by applying appropriate techniques and tools of data analytics and AI. Students will learn via practical exercises in typical data analytics and AI use cases (e.g., predictive analysis, recommendation systems) and go through solution development steps from problem definition and data preparation to performance evaluation. A quick introduction to the key concepts will be included for the benefit of students without prior experience in the topics.

Pre-requisites, co-requisites and preclusions may be subject to changes.