

NUS School of Computing					
Master of Computing (General Track) – Essential Modules Semester 1, AY2021/2022					
Module Code & Title	Lecture Day/Period	Time	Venue	Remarks	Exam
<b>IT5001 Software Development Fundamentals</b> Lecturer: Alan Cheng and Jenny Lim	Wednesday [11 Aug 2021 - 3 Nov 2021]	4pm - 6pm	LECTURE (E-Learn)	All students are to attend both Wed 4pm-6pm and Fri 2pm-3pm lessons. Part-time students may attend the Wed 6.30pm-8.30pm and Sat 9am-10am lessons instead.	Saturday, 16 Oct 2021, 2pm - 4pm  For exam details, please check with your lecturer and LumiNUS for announcements
	Friday [13 Aug 2021 - 1 Oct 2021]	2pm - 3pm	LECTURE (E-Learn)		
	Monday [16 Aug 2021 - 4 Oct 2021]	2pm - 4pm	LAB (E-Learn)	Students attending the Wed 4pm-6pm and Fri 2pm-3pm lessons will attend either lab session.	
		4pm - 6pm	LAB (E-Learn)		
	Wednesday [11 Aug 2021 - 29 Sep 2021]	6.30pm - 8.30pm	LECTURE (E-Learn)	Part-time students may attend both Wed 6.30pm-8.30pm and Sat 9am-10am lessons.	
	Saturday [14 Aug 2021 - 2 Oct 2021]	9am - 10am	LECTURE (E-Learn)		
	Saturday [14 Aug 2021 - 2 Oct 2021]	10am - 12pm	LAB (E-Learn)	Part-time students attending Wed 6.30pm-8.30pm and Sat 9am-10am lessons will attend this lab session.	
<b>IT5002 Computer Systems and Applications</b> Lecturer: Colin Tan	Friday [13 Aug 2021 - 12 Nov 2021]	6.30pm - 8.30pm	LECTURE (E-Learn)	Students are to attend all lectures and labs.	Tuesday, 30 Nov 2021, 1pm - 3pm  For exam details, please check with your lecturer and LumiNUS for announcements
		8.30pm - 9.30pm	LAB (E-Learn)		
	Alternate Saturday [21 Aug 2021 - 6 Nov 2021]	2pm - 4pm	LAB (E-Learn)		
<b>IT5003 Data Structures and Algorithms</b> Lecturer: Jenny Lim and Steven Halim	Wednesday [6 Oct 2021 - 24 Nov 2021]	6.30pm - 8.30pm	LECTURE (E-Learn)	Students are to attend both Wed and Sat lectures.	Saturday, 4 Dec 2021, 9am - 11am  For exam details, please check with
	Saturday [9 Oct 2021 - 27 Nov 2021]	9am - 10am	LECTURE (E-Learn)		

	Saturday [9 Oct 2021 - 27 Nov 2021]	10am - 12pm	LAB (E-Learn)	Students may select one lab session to attend.	your lecturer and LumiNUS for announcements
	Monday [11 Oct 2021 - 29 Nov 2021]	2pm - 4pm	LAB (E-Learn)		
		4pm - 6pm	LAB (E-Learn)		
<b>IT5005 Artificial Intelligence</b> Lecturer: Rajendra	Monday [9 Aug 2021 - 8 Nov 2021] <i>*(Please note that 9 Aug 2021 is a public holiday so there will be no class)</i>	6.30pm - 8.30pm	LECTURE (E-Learn)	Students are to attend all lectures and labs.	Wednesday, 1 Dec 2021, 1pm - 3pm  For exam details, please check with your lecturer and LumiNUS for announcements
		8.30pm - 9.30pm	LAB (E-Learn)		
<b>IT5007 Software Engineering on Application Architecture</b> Lecturer: Prasanna	Thursday [12 Aug 2021 - 11 Nov 2021] <i>*(Please note that 4 Nov 2021 is a public holiday so there will be no class)</i>	4pm - 6pm	LECTURE (E-Learn)	Students are to attend all lectures and labs.	
		6pm - 7pm	LAB (E-Learn)		

**\* Modules offered, descriptions and schedules may be subject to change.**

\*Please refer to this link for lecture/lab venues: <https://www.comp.nus.edu.sg/maps/venues/>

#### Essential Modules:

##### IT5001 Software Development Fundamentals

This module 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 (waterfall and agile workflow). Students must pass IT5001 in order to continue with the other CF I modules.

##### IT5002 Computer Systems and Applications

This module 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

This module 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

This module 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 module 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 module prepares students without any AI background to pursue advanced modules in AI.

### **IT5006 Fundamentals of Data Analytics**

This module 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 module prepares students without any analytics background to pursue advanced modules in business and data analytics.

### **IT5007 Software Engineering on Application Architecture**

Pre-requisite: 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.