Bachelor of Engineering (Computer Science) Curriculum Major Prescribed Electives for Specialisation (For AY21/22 and later Cohort)

- 1. Students must take at least 5 Major Prescribed Elective (MPE) courses and a minimum of 15 AUs in each Specialisation area to qualify for the Specialisation as shown in the list below.
- 2. If a student has read at least 5 courses from one Specialisation and a minimum of 15 AUs regardless of whether the courses are read as MPE or Broadening & Deepening Elective (BDE), the student will be deemed to have attained that particular Specialisation. (Note: Students can only take MPE as BDE after fulfilling the MPE requirements.)
- 3. The same course cannot count towards more than one specialisation for a student.
- 4. Courses where Satisfactory/Unsatisfactory (S/U) option has been exercised <u>will not</u> be counted towards the award of a Specialisation.
- 5. Only <u>TWO</u> Pass/Fail graded MPEs (including equivalent and generic MPEs) can be counted per specialisation. <u>No double counting</u> of MPEs is allowed across specialisations.
- 6. Students can take at most <u>TWO</u> generic MPEs. Among the two generic MPEs, only <u>ONE</u> generic MPE can count towards at most one specialisation.
- 7. Students can be awarded up to TWO Specialisations.
- 8. The "Specialisation" attained will be reflected in the result transcript, e.g., Specialisation in Security.
- 9. Topics to be offered can vary depending on factors such as availability of faculty; availability of visiting staff with certain expertise; new technological trends, etc. Special Topics may also replace the listed specialisation courses. Note that this list is subjected to changes.
- 10. To get the most updated list of courses available in Sem 1 or Sem 2, students may check the course code via this link https://wis.ntu.edu.sg/webexe/owa/aus_schedule.main

Semester Offered			
S1	S2	AU	Pre-requisite*
			SC1007 & SC1015
٧	٧	3	& SC2000
			SC1004 & SC1007
٧	٧	3	& SC2000
			SC1004 & SC1007 or
V	V	3	MH2802 & SC1007
V		3	SC2001
			SC1007 & SC2000 or
	V	3	SC1007 & MH2500
V		3	Nil
Semester Offered		011	Duo vosvisito*
S1	S2	AU	Pre-requisite*
			CC200F
٧	٧	3	SC2005
			\$62000
٧		3	SC2000
			cc2006
٧		3	SC2006
	\$1	S1 S2 V	S1 S2 V V V V V V V S1 V S1 S2 AU V S1 V V<

SCSE Page 1 of 3

School of Computer Science and Engineering

Software Security	SC4012				
SC4013			٧	3	SC2002 & SC2005
Application Security Not offered 3 SC2005 SC20014 SC4014	•				
SC4014		Not offered	Not offered	3	SC2005 & SC2008
Analysis SC4015 Cyber Physical System Security V 3 SC1006 SC4016 Cyber Physical System Security V 3 Nil SC4016 Cyber Physical System Security V 3 Nil SC4016 Cyber Threat Intelligence V 3 Nil Semester Offered S1 S2 AU Pre-requisite* SC3020 Database System Principles V V 3 SC2007 SC4000 Machine Learning V V 3 SC2000 Machine Learning V V 3 SC2000 Machine Learning V V 3 SC2000 SC4002 Natural Language Processing V 3 SC2001 SC4020 Natural Language Processing V 3 SC2001 SC4021 Information Retrieval SC4022 Network Science V 3 SC2001 SC4023 Big Data Management V 3 SC2001 SC4024 Data Visualisation V 3 SC2007 SC4024 Data Visualisation V 3 SC2008 SC3030 Advanced Computer Networks V 3 SC2008 SC3030 Advanced Computer Networks SC30301 Advanced Computer Architecture V V 3 SC2006 SC3050 Advanced Computer Interaction SC3060 Computer Graphics and Visualization V 3 SC2008 SC40401 Internet of Things: Communications and Networking SC4050 Microbes and Mobile Networks V 3 SC2008 SC2001 SC2005 SC2008 SC4050 Distributed Systems V 3 SC2008 SC2000 SC4055 V 3 SC2008 SC2008 SC4055	SC4014				
Analysis SC4015 Cyber Physical System Security V 3 SC1006 SC4016 Cyber Physical System Security V 3 Nil SC4016 Cyber Physical System Security V 3 Nil SC4016 Cyber Threat Intelligence V 3 Nil Semester Offered S1 S2 AU Pre-requisite* SC3020 Database System Principles V V 3 SC2007 SC4000 Machine Learning V V 3 SC2000 Machine Learning V V 3 SC2000 Machine Learning V V 3 SC2000 SC4002 Natural Language Processing V 3 SC2001 SC4020 Natural Language Processing V 3 SC2001 SC4021 Information Retrieval SC4022 Network Science V 3 SC2001 SC4023 Big Data Management V 3 SC2001 SC4024 Data Visualisation V 3 SC2007 SC4024 Data Visualisation V 3 SC2008 SC3030 Advanced Computer Networks V 3 SC2008 SC3030 Advanced Computer Networks SC30301 Advanced Computer Architecture V V 3 SC2006 SC3050 Advanced Computer Interaction SC3060 Computer Graphics and Visualization V 3 SC2008 SC40401 Internet of Things: Communications and Networking SC4050 Microbes and Mobile Networks V 3 SC2008 SC2001 SC2005 SC2008 SC4050 Distributed Systems V 3 SC2008 SC2000 SC4055 V 3 SC2008 SC2008 SC4055	Concepts and Techniques for Malware		V	3	SC1006 & SC2005
SC4015			•	3	
Cyber Physical System Security V 3 SC1006	SC4015				201000
SC4016			٧	3	SC1006
Cyber Threat Intelligence V 3 Nil DATA SCIENCE Semester Offered SC3020 AU Pre-requisite* SC3020 V V 3 SC2207 SC4000 V V 3 SC21004 & SC1007 & SC2000 SC4000 V V 3 SC2000 SC4000 SC2001 SC2002 SC2002 SC2008 SC2008					
Semester Offered S1 S2 AU		V		3	Nil
S1 S2		Semester Offered			
Database System Principles V	DATA SCIENCE	S1	S2	AU	Pre-requisite*
Database System Principles V V 3 SC1004 & SC1007 SC4000 Machine Learning V V 3 SC1004 & SC1007 SC4002 SC4020 3 SC2001 SC2001 SC4020 V 3 SC2001 SC2001 SC4021 V 3 SC2001 SC2001 Information Retrieval V 3 SC2001 SC2001 SC4022 V 3 SC2001 SC2001 Network Science V 3 SC2207 SC2001 SC4023 V 3 SC2001 SC2007 SC4024 V 3 SC1003 & SC2000 Other MPEs S1 S2 AU Pre-requisite* SC3030 Advanced Computer Networks V 3 SC2008 SC3040 V 3 SC2008 SC3050 V 3 SC1006 SC3060 V 3 SC1006 SC4030 V 3	SC3020	,	,	2	SC2207
Machine Learning	Database System Principles	V	V	3	302207
SC4002	SC4000				SC1004 & SC1007
Natural Language Processing V 3 SC2001	Machine Learning	V	V	3	& SC2000
Natural Language Processing	SC4002				000004
SC4020	Natural Language Processing	٧		3	SC2001
Data Analytics and Mining V 3 SC2001	SC4020				000001
SC4021	Data Analytics and Mining	٧		3	SC2001
Information Retrieval V 3 SC2001 SC4022 V 3 SC2001 Network Science V 3 SC2001 SC4023 V 3 SC2207 SC4024 V 3 SC2207 SC4024 Data Visualisation V 3 SC1003 & SC2000 Other MPES S1 S2 SC2008 SC3030 Advanced Computer Networks V 3 SC2008 SC3040 Advanced Software Engineering V 3 SC2006 SC3050 Advanced Computer Architecture V V 3 SC1006 SC3050 Advanced Computer Foraphics and Visualization V 3 SC1006 SC3060 Nil SC4030 V 3 SC2008 Wireless and Mobile Networks V 3 SC2008 SC4031 Internet of Things: Communications and Networking SC4030 Advanced Topics in Algorithms V 3 SC2008 SC40401 Advanced Topics in Algorithms V 3 SC2001 SC4050 Advanced Topics in Algorithms V 3 SC2005 SC4051 Distributed Systems V 3 SC2005 SC4050 SC2008 SC2008 SC4050 SC4050 SC4050 V 3 SC2005 SC4050 SC4050 SC2008 SC4050 SC4050 SC4050 SC2008 SC4050 SC4050 SC4050 SC4050 SC4050 SC4050 SC4050 SC4050 SC4050 SC4050 SC4050 SC4050	SC4021				20004
SC4022 Network Science V 3 SC2001			٧	3	SC2001
Network Science V 3 SC2207					SC2001
SC4023 Big Data Management			٧	3	
Big Data Management					
SC4024			٧	3	SC2207
Semester Offered Semester Offered State Semester Offered S					
Semester Offered S1 S2 SC2008		V		3	SC1003 & SC2000
Scale	Data Visualisation	Semeste	Semester Offered		
SC3030	Other MPEs	C1	AU		Pre-requisite*
Advanced Computer Networks SC3040 Advanced Software Engineering SC3050 Advanced Computer Architecture SC3060 Computer Graphics and Visualization SC3061 Human-Computer Interaction SC4030 Wireless and Mobile Networks SC4031 Internet of Things: Communications and Networking SC4040 Advanced Topics in Algorithms SC4050 Parallel Computing SC4052 V 3 SC2008 SC2001 SC2008		21	32		
Advanced Computer Networks SC3040 Advanced Software Engineering SC3050 Advanced Computer Architecture V V V SC1006 SC3060 Computer Graphics and Visualization V SC3061 Human-Computer Interaction V SC4030 Wireless and Mobile Networks SC4031 Internet of Things: Communications and Networking SC4040 Advanced Topics in Algorithms SC4050 Parallel Computing SC4051 Distributed Systems SC4052 V SC2008 SC2008 SC2008 SC2008 SC2008 SC2001 SC2008 SC2001 SC2008 SC2008				2	SC2008
Advanced Software Engineering SC3050 Advanced Computer Architecture V V V S SC1006 SC3060 Computer Graphics and Visualization V SC3061 Human-Computer Interaction V SC4030 Wireless and Mobile Networks SC4031 Internet of Things: Communications and Networking SC4040 Advanced Topics in Algorithms SC4050 Parallel Computing SC4051 Distributed Systems SC4052 V SC1006 SC2006 SC1006 SC1006	•	V		<u> </u>	
Advanced Software Engineering SC3050 Advanced Computer Architecture V V V 3 SC1006 SC3060 Computer Graphics and Visualization V SC3061 Human-Computer Interaction V SC4030 Wireless and Mobile Networks SC4031 Internet of Things: Communications and Networking SC4040 Advanced Topics in Algorithms SC4050 Parallel Computing SC4051 Distributed Systems SC4052 V V SC1006 SC1006 V V V SC1006 SC1006 V V SC2008 SC2008 SC2008 SC2008 SC2001 SC2001 SC2001 SC2008 SC2001 SC2001 SC2008		.,		2	SC2006
Advanced Computer Architecture SC3060 Computer Graphics and Visualization V 3 Nil SC3061 Human-Computer Interaction SC4030 Wireless and Mobile Networks SC4031 Internet of Things: Communications and Networking SC4040 Advanced Topics in Algorithms SC4050 Parallel Computing SC4051 Distributed Systems SC4052 V V 3 SC1006 Nil 3 Nil SC2008 SC2008 SC2008 SC2008 SC2008 SC2001 SC2001 SC2001 SC2001 SC2001 SC2008 SC2001 SC2001 SC2001 SC2008 SC2001 SC2008 SC2001 SC2008 SC2001 SC2008		V		<u> </u>	002000
Advanced Computer Architecture SC3060 Computer Graphics and Visualization SC3061 Human-Computer Interaction SC4030 Wireless and Mobile Networks SC4031 Internet of Things: Communications and Networking SC4040A Advanced Topics in Algorithms SC4050 Parallel Computing SC4051 Distributed Systems SC4052 Nil SC2008 Nil SC2008 SC2008 SC2008 SC2001 SC2001 SC2001 SC2001 SC2001 SC2001 SC2008 SC2001 SC2001 SC2008 SC2001 SC2001 SC2008 SC2001 SC2008 SC2001 SC2008 SC2008 SC2008 SC2008 SC2008 SC2008				2	SC1006
Computer Graphics and Visualization SC3061 Human-Computer Interaction SC4030 Wireless and Mobile Networks SC4031 Internet of Things: Communications and Networking SC4040 Advanced Topics in Algorithms SC4051 Distributed Systems SC4052 Nil SC2008 Nil SC2008 SC2008 SC2008 SC2008 SC2008 SC2008 SC2001 SC2001 SC2001 SC2001 SC2005 & SC2008 SC1004		V	V	3	361000
Computer Graphics and Visualization SC3061 Human-Computer Interaction SC4030 Wireless and Mobile Networks SC4031 Internet of Things: Communications and Networking SC4040 Advanced Topics in Algorithms SC4050 Parallel Computing SC4051 Distributed Systems SC4052 Nil SC2008 SC2008 SC2008 SC2008 SC2008 SC2001 SC2001 SC2001 SC2001 SC2001 SC2008 SC2001 SC2001 SC2008 SC2001 SC2008	SC3060	,		•	Nil
Human-Computer Interaction	Computer Graphics and Visualization	V		3	IVII
Human-Computer Interaction SC4030 Wireless and Mobile Networks SC4031 Internet of Things: Communications and Networking SC4040 Advanced Topics in Algorithms SC4050 Parallel Computing SC4051 Distributed Systems SC4052 SC2008 SC2008 SC2008 SC2001 SC2001 SC2001 SC2001 SC2001 SC2008 SC2001 SC2001 SC2001 SC2008 SC2008 SC2008 SC2008 SC2008	SC3061			_	Nil
Wireless and Mobile Networks V 3 SC2008 SC4031 Internet of Things: Communications and Networking V 3 SC2008 SC4040 V 3 SC2001 Advanced Topics in Algorithms V 3 SC2001 SC4050 V 3 SC2001 & SC3050 SC4051 V 3 SC2005 & SC2008 SC4052 V 3 SC2006 & SC2008	Human-Computer Interaction	V		3	IVII
Wireless and Mobile Networks V 3 SC4031 Internet of Things: Communications and Networking V 3 SC2008 SC4040 V 3 SC2001 Advanced Topics in Algorithms V 3 SC2001 SC4050 V 3 SC2001 & SC3050 SC4051 V 3 SC2005 & SC2008 SC4052 V 3 SC2007 & SC2008	SC4030			_	\$C2009
Internet of Things: Communications and Networking V 3 SC2008	Wireless and Mobile Networks	٧		3	3C2006
Networking SC4040 Advanced Topics in Algorithms V 3 SC2001	SC4031				
Networking SC4040 SC4050 V 3 SC2001 Parallel Computing V 3 SC2001 & SC3050 SC4051 V 3 SC2005 & SC2008 Distributed Systems V 3 SC2005 & SC2008	Internet of Things: Communications and		V	3	SC2008
Advanced Topics in Algorithms SC4050 Parallel Computing SC4051 Distributed Systems SC4052 V 3 SC2001 & SC3050 SC2005 & SC2008 SC2005 & SC2008	Networking				
Advanced Topics in Algorithms SC4050 Parallel Computing SC4051 Distributed Systems SC4052 SC1004	SC4040				CC2001
SC4050 V 3 SC2001 & SC3050 Parallel Computing V 3 SC2005 & SC2008 SC4051 V 3 SC2005 & SC2008 SC4052 V 3 SC1004	Advanced Topics in Algorithms	V		3	3CZUU1
Parallel Computing	SC4050				CC2004 0 CC2050
SC4051 Distributed Systems SC4052 V 3 SC2005 & SC2008 SC4052		V		3	SC2001 & SC3050
Distributed Systems V 3 SC2005 & SC2008 SC2008 SC2008 SC2008 SC2008	SC4051				002005 0 002022
SC4052 , SC1004			√	3	SC2005 & SC2008
	•				22.22
	Cloud Computing		V	3	SC1004

SCSE Page 2 of 3



School of Computer Science and Engineering

SC4053	-1		2	SC2001 & MH1812
Blockchain Technology	٧		3	362661 & 11112612
SC4054		_	_	SC1007 & SC2000
Simulation and Modelling		٧	3	3C1007 & 3C2000
SC4060				NI:I
Virtual and Augmented Reality		V	3	Nil
SC4242				SC2107
Compiler Techniques	V		3	3C2107

^{*}In addition to the Pre-requisite shown here, student also needs to be of at least Study Year 3 standing.

SCSE Page 3 of 3