

**Bachelor of 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 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 Flexible Grading Option (FGO) option have been exercised will not be counted towards the award of a Specialisation.
5. Courses taken during exchange: Only TWO Pass/Fail graded MPEs (including equivalent and generic MPEs) can be counted by specialisation. Students can take at most TWO generic MPEs. Among the two generic MPEs, only ONE generic MPE can count towards at most one specialisation. No double counting of MPEs is allowed across specialisations.
6. Students can be awarded up to TWO Specialisations. No double counting of MPEs is allowed across specialisations.
7. The “Specialisation” attained will be reflected in the result transcript, e.g., Specialisation in Security.
8. 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.
9. 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

Areas of Specialisation: ARTIFICIAL INTELLIGENCE	Semester Offered		AU	Pre-requisite*
	S1	S2		
SC3000 Artificial Intelligence	√	√	3	SC1007 & SC2000 or SC1007 & MH2500
SC4000 Machine Learning	√	√	3	SC1004 & SC1007 & SC2000 or SC1007 & MH2500
SC4001 Neural Networks & Deep Learning	√		3	SC1004 & SC1007 or MH2802 & SC1007
SC4002 Natural Language Processing	√		3	SC2001 or MH1403 Year 3 Standing
SC4003 Intelligent Agents		√	3	SC1007 & SC2000 or SC1007 & MH2500
SC4061 Computer Vision	√		3	Year 3 Standing
SC4062 Generative Artificial Intelligence – Advanced Topics	√		3	SC4001 & SC4002



Areas of Specialisation: SECURITY	Semester Offered		AU	Pre-requisite*
	S1	S2		
SC3010 Computer Security	√	√	3	SC2005
SC4010 Applied Cryptography	√		3	SC2000 or MH2500 Year 3 Standing
SC4011 Security Management	TBC			
SC4012 Software Security		√	3	SC2002 & SC2005
SC4014 Concepts and Techniques for Malware Analysis	TBC			
SC4015 Cyber Physical System Security		√	3	SC1006
SC4016 Cyber Threat Intelligence	√		3	Year 3 Standing
SC4063 Network Security		√	3	SC2005 & SC2008
Areas of Specialisation: DATA SCIENCE	Semester Offered		AU	Pre-requisite*
	S1	S2		
SC3020 Database System Principles	√	√	3	SC2207
SC4000 Machine Learning	√	√	3	SC1004 & SC1007 & SC2000
SC4002 Natural Language Processing	√		3	SC2001 or MH1403
SC4020 Data Analytics and Mining	√		3	SC2001 or MH1403
SC4021 Information Retrieval		√	3	SC2001 or MH1403
SC4022 Network Science	TBC			
SC4023 Big Data Management		√	3	SC2207 Year 3 Standing
SC4024 Data Visualisation	√		3	SC1003 & MH2500 or SC1003 & SC2000 Year 3 Standing



NO SPECIALISATION: Other MPES	Semester Offered		AU	Pre-requisite*
	S1	S2		
SC3021 Data Science Fundamental		√	3	SC1005
SC3270 Reasoning About Programs	√		3	SC2001 or SC2301 or MH1812 & MH1403
SC3030 Advanced Computer Networks	√		3	SC2008
SC3040 Advanced Software Engineering	√		3	SC2006
SC3050 Advanced Computer Architecture	√		3	SC1006
SC3060 Computer Graphics and Visualization	√		3	Year 3 Standing
SC3061 Human-Computer Interaction	√		3	Year 3 Standing
SC4025 Developing Data Products	TBC			
SC4030 Wireless and Mobile Network	√		3	SC2008
SC4031 Internet of Things: Communications and Networking		√	3	SC2008
SC4040 Advanced Topics in Algorithms	√		3	SC2001
SC4050 Parallel Computing	√		3	SC2001 & SC3050
SC4051 Distributed Systems		√	3	SC2005 & SC2008
SC4052 Cloud Computing		√	3	SC1004 or MH2802
SC4053 Blockchain Technology	√		3	SC1007&SC2001 & MH1812
SC4054 Simulation and Modelling	TBC			
SC4060 Virtual and Augmented Reality	TBC			
SC4242 Compiler Techniques	√		3	SC2001&SC2006
SC4064 GPU Programming		√	3	SC2001, SC2005, SC2008
SC4172 Internet of Things: Tiny Machine Learning		√	3	SC2107
SC4013 Application Security	TBC			
SC4054 Simulation and Modelling	TBC			

***In addition to the prerequisites shown here, students also need to be of at least Study Year 3 standing.**