AY2023 AND LATER COHORTS CURRICULUM FOR COMPUTER SCIENCE (With Poly Exemption)

a) Doing PI

SUMMARY OF ACADEMIC UNIT REQUIREMENT						
			Known as GER for intakes before S1 AY21-22			
Year of Study	**Core**	**MPE**	**C-Core**	**F-Core**	**BDE**	**Total AU**
1	25	0	9	3	0	**37**
2	28	0	8	0	0	**39**
3	4	12	0	12	0	**25**
4	4	9	0	0	0	**13**
Total	**61**	**21**	**17**	**15**	**0**	**114**

Suggested Course Schedules

YEAR 1 SEMESTER 1				
Course Code	**Course Title**	**Type**	**AU**	**Pre-Requisite**
SC1003	Introduction to Computational Thinking & Programming	C	3	Nil
SC1005	Digital Logic	C	3	Nil
SC1013	Physics for Computing	C	2	Nil
MH1810	Mathematics I	C	3	Nil
MH1812	Discrete Mathematics	C	3	Nil
CC0003	Ethics & Civics in a Multi-Cultural World	C-Core	2	Nil
CC0005	Healthy Living & Mental Wellbeing	C-Core	3	Nil
HW0001	Introduction to Academic Communication	-	0	For student who failed QET
			19	

YEAR 1 SEMESTER 2				
Course Code	**Course Title**	**Type**	**AU**	**Pre-Requisite**
SC1004	Linear Algebra for Computing	C	3	MH1810, SC1003
SC1006	Computer Organisation & Architecture	C	3	SC1005
SC1007	Data Structures & Algorithms	C	3	SC1003
EG1001	Engineers in Society	C	2	Nil
SC1015	Introduction to Data Science & AI	F-Core	3	SC1003
CC0001	Inquiry and Communication in an Interdisciplinary World	C-Core	2	Nil
CC0002	Navigating the Digital World	C-Core	2	Nil
			18	

YEAR 2 SEMESTER 1				
Course Code	**Course Title**	**Type**	**AU**	**Pre-Requisite**
SC2000	Probability and Statistics for Computing	C	3	MH1810
SC2001	Algorithm Design and Analysis	C	3	SC1007, MH1812
SC2002	Object Oriented Design and Programming	C	3	SC1003
SC2005	Operating Systems	C	3	SC1006, SC1007
SC2006	Software Engineering	C	3	SC2002 (Co-requisite)
CC0007	Science & Technology for Humanity	C-Core	3	Nil
			18	

YEAR 2 SEMESTER 2				
Course Code	**Course Title**	**Type**	**AU**	**Pre-Requisite**
SC2207	Introduction to Database	C	3	SC2001
SC2008	Computer Networks	C	3	SC1004, SC2000
SC2079	Multidisciplinary Design Project	C	4	Year 3 standing
CC0006	Sustainability: Society, Economy & Environment	C-Core	3	Nil
ML0004	Career & Entrepreneurial Development for the Future World	C-Core	2	Nil
SC3000	Artificial Intelligence (Compulsory MPE-1)	MPE-1	3	SC1007, SC1015, SC2000
SC3010	Computer Security (Compulsory MPE-1)	MPE-1	3	SC2005
			21	

YEAR 3 SEMESTER 1				
Course Code	**Course Title**	**Type**	**AU**	**Pre-Requisite**
SC3079	Professional Internship	F-Core	10	Year 3 standing
			10	

YEAR 3 SEMESTER 2				
Course Code	**Course Title**	**Type**	**AU**	**Pre-Requisite**
SC4079	Final Year Project	C	4	Year 4 standing
HW0288	Engineering Communication	F-Core	2	CC0001, Year 3 standing
SC30xx	Major Prescribe Elective	MPE-1	3	Year 3 standing
SC30xx	Major Prescribe Elective	MPE-1	3	Year 3 standing
SC4xxx	Major Prescribe Elective	MPE-2	3	Year 3 standing
			15	

YEAR 4 SEMESTER 1				
Course Code	**Course Title**	**Type**	**AU**	**Pre-Requisite**
SC4079	Final Year Project	C	4	Year 4 standing
SC4xxx	Major Prescribe Elective	MPE-2	3	Year 3 standing
SC4xxx	Major Prescribe Elective	MPE-2	3	Year 3 standing
SC4xxx	Major Prescribe Elective	MPE-2	3	Year 3 standing
			13	
		Total AU for Graduation :	114	

b) Doing PA

SUMMARY OF ACADEMIC UNIT REQUIREMENT						
			ICC			
Year of Study	**Core**	**MPE**	**C-Core**	**F-Core**	**BDE**	**Total AU**
1	25	0	9	3	0	**37**
2	25	6	8	5	0	**44**
3	8	18	0	2	5	**33**
Total	**58**	**24**	**17**	**10**	**5**	**114**

Suggested Course Schedules

YEAR 1 SEMESTER 1				
Course Code	**Course Title**	**Type**	**AU**	**Pre-Requisite**
SC1003	Introduction to Computational Thinking & Programming	C	3	Nil
SC1005	Digital Logic	C	3	Nil
SC1013	Physics for Computing	C	2	Nil
MH1810	Mathematics I	C	3	Nil
MH1812	Discrete Mathematics	C	2	Nil
CC0003	Ethics & Civics in a Multi-Cultural World	C-Core	2	Nil
CC0005	Healthy Living & Mental Wellbeing	C-Core	3	Nil
HW0001	Introduction to Academic Communication	-	0	For student who
			18	

YEAR 1 SEMESTER 2				
Course Code	**Course Title**	**Type**	**AU**	**Pre-Requisite**
SC1004	Linear Algebra for Computing	C	3	MH1810, SC1003
SC1006	Computer Organisation & Architecture	C	3	SC1005
SC1007	Data Structures & Algorithms	C	3	SC1003
EG1001	Engineers in Society	C	3	Nil
SC1015	Introduction to Data Science & AI	F-Core	3	SC1003
CC0001	Inquiry and Communication in an Interdisciplinary World	C-Core	2	Nil
CC0002	Navigating the Digital World	C-Core	2	Nil
			19	

YEAR 2 SEMESTER 1				
Course Code	**Course Title**	**Type**	**AU**	**Pre-Requisite**
SC2000	Probability and Statistics for Computing	C	3	MH1810
SC2001	Algorithm Design and Analysis	C	3	SC1007, MH1812
SC2002	Object Oriented Design and Programming	C	3	SC1003
SC2005	Operating Systems	C	3	SC1006, SC1007
SC2006	Software Engineering	C	3	SC2002 (Co-requisite)
CC0007	Science & Technology for Humanity	C-Core	3	Nil
			18	

YEAR 2 SEMESTER 2				
Course Code	**Course Title**	**Type**	**AU**	**Pre-Requisite**
SC2079	Multidisciplinary Design Project	C	4	Year 3 standing
SC2207	Introduction to Database	C	3	SC2001
SC2008	Computer Networks	C	3	SC1004, SC2000
SC3000	Artificial Intelligence (Compulsory MPE-1)	MPE-1	3	SC1007, SC1015, SC2000
SC3010	Computer Security (Compulsory MPE-1)	MPE-1	3	SC2005
CC0006	Sustainability: Society, Economy & Environment	C-Core	3	Nil
ML0004	Career & Entrepreneurial Development for the Future World	C-Core	2	Nil
			21	

YEAR 2 SPECIAL SEMESTER				
Course Code	**Course Title**	**Type**	**AU**	**Pre-Requisite**
SC3126	Professional Attachment	F-Core	5	Year 3 standing
			5	

YEAR 3 SEMESTER 1				
Course Code	**Course Title**	**Type**	**AU**	**Pre-Requisite**
SC4079	Final Year Project (Continue in next semester)	C	4	Year 4 standing
HW0288	Engineering Communication	F-Core	2	CC0001, Year 3 standing
SC30xx	Major Prescribe Elective	MPE-1	3	Year 3 standing
SC30xx	Major Prescribe Elective	MPE-1	3	Year 3 standing
SC4xxx	Major Prescribe Elective	MPE-2	3	Year 3 standing
	Broadening & Deepening Elective	BDE	2	
			17	

YEAR 3 SEMESTER 2				
Course Code	**Course Title**	**Type**	**AU**	**Pre-Requisite**
SC4079	Final Year Project (Continue from previous semester)	C	4	Year 4 standing
SC4xxx	Major Prescribe Elective	MPE-2	3	Year 3 standing
SC4xxx	Major Prescribe Elective	MPE-2	3	Year 3 standing
SC4xxx	Major Prescribe Elective	MPE-2	3	Year 3 standing
	Broadening & Deepening Elective	BDE	3	
			16	
		Total AU for Graduation :	**114**	

2. CS Curriculum Overview

Components/Courses			Prerequisite	AUs	Subtotal
Common Core	**CC0001**	Effective Communication in an Interdisciplinary World	Nil	2	17
	CC0002	Navigating the Digital World	Nil	2	
	CC0003	Ethics & Civics in a Multicultural World	Nil	2	
	ML0004	Career & Entrepreneurial Development for the Future World	Nil	2	
	CC0005	Healthy Living & Mental Wellbeing	Nil	3	
	CC0006	Sustainability: Human, Social, Economic & Environment	Nil	3	
	CC0007	Science & Technology for Humanity	Nil	3	
Foundational Cores		Effective Communications 2	Nil	2	15
	SC1015	Introduction to Data Science and AI	Nil	3	
	SC3079	Professional Internship	Nil	10	
BD Electives (Exempted)		**Free choices by students**	**Nil**	**0**	**0**
Eng & Science Fundamentals	**EG0001**	Engineers in Society	Nil	2	4
	SC1013	Physics for Computing	Nil	2	
Computer Science (CS) CORE	**MH1810**	Mathematics 1	Nil	3	42
	MH1812	Discrete Mathematics	Nil	3	
	SC1004	Linear Algebra for Computing	MH1810, SC1003 (Co-requisite)	3	
	SC2000	Probability and Statistics for Computing	MH1810	3	
	SC1003	Introduction to Computational Thinking and Programming	Nil	3	
	SC1005	Digital Logic	Nil	3	
	SC1006	Computer Organisation and Architecture	SC1005 (Co-requisite)	3	
	SC1007	Data Structures and Algorithms	SC1003	3	
	SC2001	Algorithm Design and Analysis	MH1812. SC1007	3	
	SC2002	Object Oriented Design & Programming	SC1003	3	
	SC2005	Operating Systems	SC1006, SC1007	3	
	SC2007	Software Engineering	SC2002 (Co-requisite)	3	
	SC2207	Introduction to Database	SC2001 (Co-requisite)	3	
	SC2008	Computer Networks	SC1004, SC2000	3	
CS Major Prescribed Electives 1 (MPE-1)		*Take Four from the following MPE-1 courses*			12
	SC3000	Artificial Intelligence* (Compulsory)	SC1007, SC1015, SC2000 (Year 3 standing)	3	
	SC3010	Computer Security* (Compulsory)	SC1004, SC1007, SC2000 (Year 3 standing)	3	
	SC3020	Database System Principles	SC2207	6	
	SC3030	Advanced Computer Networks	SC2008		
	SC3040	Advanced Software Engineering	SC2006		
	SC3050	Advanced Computer Architecture	SC1006 (Year 3 standing)		
	SC3060	Computer Graphics and Visualisation	Year 2 Standing		
CS MPE-2 & Specialisations		*Take any Four MPE-2 courses offered at Level 4*[2] . Students can be specialised in a specific area by taking at least FIVE MPEs in a Specialisation[3]	*Year 3 standing, and see individual course*	12	12
Projects	**SC2079**	Multidisciplinary Design Project	Year 3 standing	4	12
	SC4079	Final Year Project	Year 4 standing	8	
				Total AU	**114**

1. There are seven MPE Groups consisting of SC3--- and SC4--- courses (refer to Section 3).

2. Courses with code SC4--- in Section 3.

3. There are three Specialisations (refer to Section 4): i) Artificial Intelligence, ii) Security; and iii) Data Science.

3. CS Major Prescribed Electives

Group	Code	Title	Prerequisite
Artificial Intelligence	SC3000	Artificial Intelligence*	SC1007, SC1015, SC2000
	SC4000	Machine Learning	SC1004, SC1007, SC2000 (Year 3 standing)
	SC4001	Neural Networks and Deep Learning	SC1004, SC1007, SC2000 (Year 3 standing)
	SC4002	Natural Language Processing	SC2001 (Year 3 standing)
	SC4003	Intelligent Agents	SC1004, SC1007, SC2000 (Year 3 standing)
Security	SC3010	Computer Security*	SC2005
	SC4010	Applied Cryptography	MH1812 (Year 3 standing)
	SC4011	Security Management	SC2006 (Year 3 standing)
	SC4012	Software Security	SC2005, SC2006 (Year 3 standing)
	SC4013	Application Security	SC2005, SC2008 (Year 3 standing)
	SC4014	Concepts and Techniques for Malware Analysis	SC2005 (Year 3 standing)
	SC4015	Cyber Physical System Security	SC1006 (Year 3 Standing)
	SC4016	Cyber Threat Intelligence	(Year 3 Standing)
Data Management and Analytics	SC3020	Database System Principles	SC2207
	SC4020	Data Analytics and Mining	SC2001 (Year 3 standing)
	SC4021	Information Retrieval	SC2001(Year 3 standing)
	SC4022	Network Science	SC2001 (Year 3 standing)
	SC4023	Big Data Management	SC3020 (Year 3 standing)
	SC4024	Data Visualisation	SC1003, SC2000 (Year 3 standing)
Networking and Mobility	SC3030	Advanced Computer Networks	SC2008
	SC4030	Wireless and Mobile Communication	SC2008 (Year 3 standing)
	SC4031	IoT - Communications and Networking	SC2008 (Year 3 standing)
	SC4032	Information Theory	SC2008(Year 3 standing)
	SC4033	Network Security	SC2008(Year 3 standing)
Software Engineering and Programming	SC3040	Advanced Software Engineering	SC2006
	SC4040	Advanced Topics in Algorithms	SC2001 (Year 3 standing)
	SC4041	Programming Languages	SC1007, SC2002 (Year 3 standing)
	SC4242	Compiler Techniques	SC2001, SC2002
Systems and Architecture	SC3050	Advanced Computer Architecture	SC1006
	SC4050	Parallel Computing	SC1006, SC2001 (Year 3 standing)
	SC4051	Distributed Systems	SC2005, SC2008 (Year 3 standing)
	SC4052	Cloud Computing	SC2005, SC2008 (Year 3 standing)
	SC4053	Blockchain Technology	MH1812, SC1007, SC2008 (Year 3 standing)
	SC4054	Simulation and Modelling	SC1007, SC2000
Visual and Interactive Computing	SC3060	Computer Graphics and Visualisation	Year 2 standing
	SC3061	Human-Computer Interaction	NIL
	SC4060	Virtual and Augmented Reality	SC3060 (Year 3 standing)
	SC4061	Computer Vision	NIL (Year 3 standing)

4. CS Specialization Tracks (Minimum five within a group)

ARTIFICIAL INTELLIGENCE
SC3000 Artificial Intelligence (3 AU)
SC4000 Machine Learning (3 AU)
SC4001 Neural Networks and Deep Learning (3 AU)
SC4002 Natural Language Processing (3 AU)
SC4003 Intelligent Agents (3 AU)
SC4020 Data Analytics and Mining (3 AU)
SC4061 Computer Vision (3 AU)

SECURITY
SC3010 Computer Security (3 AU)
SC4010 Applied Cryptography (3 AU)
SC4011 Security Management (3 AU)
SC4012 Software Security (3 AU)
SC4013 Application Security (3 AU)
SC4014 Concepts and Techniques for Malware Analysis (3 AU)
SC4015 Cyber Physical System Security (3 AU)
SC4016 Cyber Threat Intelligence (3 AU)
SC4033 Network Security (3 AU)

DATA SCIENCE
SC3020 Database System Principles (3 AU)
SC4020 Data Analytics and Mining (3 AU)
SC4021 Information Retrieval (3 AU)
SC4000 Machine Learning (3 AU)
SC4002 Natural Language Processing (3 AU)
SC4022 Network Science (3 AU)
SC4023 Big Data Management (3 AU)
SC4024 Data Visualisation (3 AU)