

Master-list of CEG Technical Electives available in AY2018/19
(For CEG students of AY2016 intake and prior)

Modules highlighted in green are NOT part of CEG core; students have to take as UEM to meet pre-requisite

In green fonts: amendments (from previous Academic Year)

In red fonts: pending approval/revision

Module(s) added to the list (from previous Academic Year) are tagged with <NEW>

Technical Elective		Hours per week				CA	MCs	SEM	PRE/CO REQ
		LEC	TUT	LAB	PREP				
COMMUNICATIONS & NETWORKING									
Breadth	CS2010 Data Structures & Algorithms II Co-list under 'embedded computing', 'large-scale computing' & 'intelligent systems'	2	1	1	3 3		4	1&2	Pre: CS1020 or its equivalent Anti: CS2020, CS2030, CS2040/C
	CS2107 Introduction to Information Security Co-list under 'embedded computing' & 'large-scale computing'	2	1	0	3 4		4	1&2	Pre: CS1010 or its equivalence
	CS3103 Computer Networks Practice Module title change wef AY15/16 Co-list under 'embedded computing'	2	0	2	4 2		4	1	Pre: CS2105/EE3204
	CS3230 Design & Analysis of Algorithms Co-list under 'embedded computing' & 'large-scale computing'	2	1	0	3 3		4	1&2	Pre: (CS2010 or its equivalent) and (CS1231/MA1100)
	CS3235 Computer Security Co-list under 'embedded computing' & 'large-scale computing'	2	1	0	3 3		4	1&2	Pre: (CS2105/EE3204) and (CS2106/CG2271) and CS2107
	EE3131C Communication Systems	2	1	0.5	6.5	40%	4	1&2	Pre: EE2023 or equiv Anti: EE3103
Depth	CS4222 Wireless Networking Module title change wef AY15/16 Co-list under 'embedded computing'	2	0	2	4 2		4	2	Pre: (CS2105/EE3204) and (ST2334/ST2131)
	CS4226 Internet Architecture	2	1	0	4 3		4	1	Pre: (CS2105/EE3204) and (ST2334/ST2131)
	CS4236 Cryptography Theory & Practice Co-list under 'embedded computing'	2	1	0	3 4		4	1 [Evening]	Pre: CS2107 and (CS2010 or its equivalent) and CS1231
	CS4238 Computer Security Practice Co-list under 'embedded computing'	2	1	0	3 4		4	1&2 [Evening]	Pre: CS3235
	EE4113 Digital Communications & Coding	2.5	0.5	0.5	6.5	40%	4	Not offered in AY17/18	Pre: (EE2012/ST2334) and EE3103/EE3131G Anti: EE4102/EE4103
	EE4114 Optical Communications	2.5	0.5	0.5	6.5	30%	4	Not offered in AY17/18	Pre: EE3131G
	EE4210 Computer Communications Networks + Network Protocols and Applications Module title change wef AY18/19 Co-list under 'embedded computing' & 'large-scale computing'	2.5	0.5	0	7.5	40%	4	2	Pre: EE3204 EE2012/ST2334
	EE5135 Digital Communications <NEW for AY16 RFP>						4	2	Registration subject to approval

Technical Elective		Hours per week				CA	MCs	SEM	PRE/CO REQ
		LEC	TUT	LAB	PREP				
EMBEDDED COMPUTING									
Breadth	CS2010 Data Structures & Algorithms II Co-list under 'comms & networking', 'large-scale computing' & 'intelligent systems'	2	1	1	3 3		4	1&2	Pre: CS1020 or its equivalent Anti: CS2020, CS2030, CS2040/C
	CS2104 Programming Language Concepts Co-list under 'large-scale computing'	2	1	0	3 3		4	1	Pre: CS1020 or its equivalent
	CS2107 Introduction to Information Security Co-list under 'comms & networking' & 'large-scale computing'	2	1	0	3 4		4	1&2	Pre: CS1010 or its equivalence
	CS2108 Introduction to Media Computing Co-list under 'interactive digital media'	2	1	0	3 4		4	1	Pre: CS1020/E or CS2020 Anti: CS3246
	CS3103 Computer Networks Practice Module title change wef AY15/16 Co-list under 'comms & networking'	2	0	2	4 2		4	1	Pre: CS2105/EE3204
	CS3211 Parallel and Concurrent Programming <NEW> Co-list under 'large-scale computing'	2	1	0	3 3		4	2	Pre: CS2106/CG2271
	CS3218 Multimodal Processing in Mobile Platforms	2	1	1	2 4		4	2	Pre: MA1505, MA1506 and (CS2108/EE3206)
	CS3230 Design & Analysis of Algorithms Co-list under 'comms & networking' & 'large-scale computing'	2	1	0	3 3		4	1&2	Pre: (CS2010 or its equivalent) and (CS1231/MA1100)
	CS3235 Computer Security Co-list under 'comms & networking' & 'large-scale computing'	2	1	0	3 3		4	1&2	Pre: (CS2105/EE3204) and (CS2106/CG2271) and CS2107
EE3206 Introduction to Computer Vision and Image Processing Co-list under 'intelligent systems' & 'interactive digital media'	2.5	1.0	0.5	6	20%	4	1	Pre: EE2023 or equiv Anti: CS4243	
Depth	CS4212 Compiler Design Co-list under 'large-scale computing'	2	1	0	3 3		4	1	Pre: CS2104
	CS4222 Wireless Networking Module title change wef AY15/16 Co-list under 'comms & networking'	2	0	2	4 2		4	2	Pre: (CS2105/EE3204) and (ST2334/ST2131)
	CS4223 Multi-core Architectures <NEW> Co-list under 'large-scale computing' & 'system-on-a-chip design'	2	1	0	3 4		4	1	(CS2106/CG2271) and (CS3210/CS3220/CG3207)
	CS4236 Cryptography Theory & Practice Co-list under 'comms & networking'	2	1	0	3 4		4	1 [Evening]	Pre: CS2107 and (CS2010 or its equivalent) and CS1231
	CS4238 Computer Security Practice Co-list under 'comms & networking'	2	1	0	3 4		4	1&2 [Evening]	Pre: CS3235
	EE4210 Computer Communications Networks II Network Protocols and Applications Module title change wef AY18/19 Co-list under 'comms & networking' & 'large-scale computing'	2.5	0.5	0	7.5	40%	4	2	Pre: EE3204 EE2012/ST2334
	EE4214 Real-time Embedded Systems Co-list under 'system-on-a-chip design'	2	0.5	0.5	6	50%	4	Not offered in AY17/18	Pre: EE2024
	EE4218 Embedded Hardware System Design Co-list under 'large-scale computing' & 'system-on-a-chip design'	2	0.5	1	6.5	60%	4	1 [Evening]	Pre: EE2020 EE2024/EE2028/CG2028
EE4415 Integrated Digital Design Co-list under 'system-on-a-chip design'	2	0.5	0.5	7	40%	4	2	Pre: EE2020/EE2026	

CEG AY2016 intake and prior; as of June 2018

	EE4704 Introduction to Computer Vision and Image Processing <NEW> Module code change wef AY18/19 Co-list under 'intelligent systems' & 'interactive digital media'	2.5	1.0	0.5	6	25%	4	1	Pre: EE2023 or equiv Anti: CS4243, EE3206
	EE5903 Real-time Systems <NEW for AY16 RfP> Co-list under 'system-on-a-chip design'						4	2	Registration subject to approval

Technical Elective		Hours per week				CA	MCs	SEM	PRE/CO REQ
		LEC	TUT	LAB	PREP				
LARGE-SCALE COMPUTING									
Breadth	CS2010 Data Structures & Algorithms II Co-list under 'comms & networking', 'embedded computing' & 'intelligent systems'	2	1	1	3 3		4	1&2	Pre: CS1020 or its equivalent Anti: CS2020, CS2030, CS2040/C
	CS2102 Database Systems	2	1.5	0.5	3 3		4	1&2	Pre: (CS1020 or its equivalent) and (CS1231/MA1100) Anti: CS2102S, IT2002
	CS2104 Programming Language Concepts Co-list under 'embedded computing'	2	1	0	3 3		4	1	Pre: CS1020 or its equivalent
	CS2107 Introduction to Information Security Co-list under 'comms & networking' & 'embedded computing'	2	1	0	3 4		4	1&2	Pre: CS1010 or its equivalence
	CS3210 Parallel Computing	2	1	0	3 4		4	1	Pre: CS2100/EE2024
	CS3211 Parallel and Concurrent Programming Co-list under 'embedded computing'	2	1	0	3 3		4	2	Pre: CS2106/CG2271
	CS3230 Design & Analysis of Algorithms Co-list under 'comms & networking' & 'embedded computing'	2	1	0	3 3		4	1&2	Pre: (CS2010 or its equivalent) and (CS1231/MA1100)
	CS3235 Computer Security Co-list under 'comms & networking' & 'embedded computing'	2	1	0	3 3		4	1&2	Pre: (CS2105/EE3204) and (CS2106/CG2271) and CS2107
Depth	CS3223 Database Systems Implementation	2	1	0	3 3		4	2	Pre: (CS2010 or its equivalent) and CS2102/ CS2102S
	CS4211 Formal Methods for Software Engineering	2	1	0	3 4		4	1	Pre: CS2103
	CS4212 Compiler Design Co-list under 'embedded computing'	2	1	0	3 3		4	1	Pre: CS2104
	CS4221 Database Applications Design and Tuning Module title change wef AY15/16	2	1	0	3 4		4	2 [Evening]	Pre: CS3223
	CS4223 Multi-core Architectures Co-list under 'embedded computing' & 'system-on-a-chip design'	2	1	0	3 4		4	1	(CS2106/CG2271) and (CS3210/CS3220/CG3207)
	CS4224 Distributed Databases	2	1	0	3 4		4	1 [Evening]	Pre: CS3223
	CS4231 Parallel & Distributed Algorithms	3	0	0	3 4		4	2 [Evening]	Pre: CS3230/CS3210
	CS4345 General Purpose Computation on GPU	2	0	0	4 4		4	Not offered in AY17/18	Pre: CS3241
	EE4210 Computer Communications Networks II Network Protocols and Applications Module title change wef AY18/19 Co-list under 'comms & networking' & 'embedded computing'	2.5	0.5	0	7.5	40%	4	2	Pre: EE3204 EE2012/ST2334
	EE4218 Embedded Hardware System Design <NEW> Co-list under 'embedded computing' & 'systems-on-a-chip design'	2	0.5	1	6.5	60%	4	1 [Evening]	Pre: EE2024/EE2028/CG2028

Technical Elective		Hours per week				CA	MCs	SEM	PRE/CO REQ
		LEC	TUT	LAB	PREP				
INTELLIGENT SYSTEMS									
Breadth	CS2010 Data Structures & Algorithms II Co-list under 'comms & networking', 'embedded computing' & 'large-scale computing'	2	1	1	3 3		4	1&2	Pre: CS1020 or its equivalent Anti: CS2020, CS2030, CS2040/C
	CS3240 Interaction Design Co-list under 'interactive digital media'	2	1	1	3 3		4	1&2	Pre: CS1020 or its equivalent) or NM2217
	CS3243 Introduction to Artificial Intelligence	2	1	0	3 4		4	2	Pre: (CS2010 or its equivalent) and (CS1231/MA1100)
	CS3244 Machine Learning	2	1	0	3 3		4	1&2	Pre: (CS2010 or its equivalent), ST2334, MA1505 and MA1506
	EE3331C Feedback Control Systems Co-list under 'interactive digital media'	3	1	0.5	5.5	40%	4	1&2	Pre: EE2023 Anti: EE2010
	EE3731C Signal Processing Methods Co-list under 'interactive digital media'	2	1	0	7	40%	4	1 [Evening]	Pre: EE2012/ST2334 and EE2023 or equiv
	EE3206 Introduction to Computer Vision and Image Processing Co-list under 'intelligent systems' & 'interactive digital media'	2.5	1.0	0.5	6	20%	4	1	Pre: EE2023 or equiv Anti: CS4243
Depth	CS4243 Computer Vision and Pattern Recognition <NEW> Co-list under 'interactive digital media'	3	0	0	3 4		4	1 [Evening]	Pre: (CS1020 or its equivalent), MA1505, MA1506 and ST2334 Anti: EE4212
	CS4244 Knowledge-based systems	3	0	0	3 4		4	2	Pre: CS3243
	CS4246 AI Planning and Decision Making	2	1	0	4 3		4	1 [Evening]	Pre:(ST2334/ST2131/MA2216) and CS3243
	CS4248 Natural Language Processing	3	0	0	3 4		4	1	Pre: (CS3243/CS3245) and (ST1232/ ST2131/ST2334)
	EE4212 Computer Vision Co-list under 'interactive digital media'	2.5	0.5	0	7	40%	4	2 [Evening]	Pre: EE3206/EE3731C Anti: CS4243
	EE4213 Image & Video Processing Co-list under 'interactive digital media'	2	0.5	0	7.5	45%	4	Not offered in AY17/18	Pre: EE3206 Anti: CS4243
	EE4305 Introduction to Fuzzy/Neural Systems	2.5	0.5	0.5	6.5	30%	4	1	Pre: EE2023 or equiv
	EE4307 Control Systems Design and Simulation	1.5	0	0	5 proj 3.5prep	100%	4	2	Pre: EE3331C
	EE4308 Advances in Intelligent Systems and Robotics	2.5	0.5	0.5	2.5 proj 4 prep	100%	4	2	Pre: EE3331C Ant: EE4306
	EE4704 Introduction to Computer Vision and Image Processing <NEW> Module code change wef AY18/19 Co-list under 'embedded systems' & 'interactive digital media'	2.5	1.0	0.5	6	25%	4	1	Pre: EE2023 or equiv Anti: CS4243, EE3206
	EE5101 Linear Systems <NEW for AY16 RfP>						4	2	Registration subject to approval
EE5907 Pattern Recognition <NEW for AY16 RfP> Co-list under 'interactive digital media'						4	2	Registration subject to approval	

Technical Elective		Hours per week				CA	MCs	SEM	PRE/CO REQ
		LEC	TUT	LAB	PREP				
INTERACTIVE DIGITAL MEDIA									
Breadth	CS2108 Introduction to Media Computing Co-list under 'embedded computing'	2	1	0	3 4		4	1	Pre: CS1020/E or CS2020 Anti: CS3246
	CS3240 Interaction Design Co-list under 'intelligent systems'	2	1	1	3 3		4	1&2	Pre: CS1020 or its equivalent) or NM2217
	CS3241 Computer Graphics	2	1	0	3 3		4	1&2	Pre: CS1020 or its equivalent
	CS3242 3D Modeling and Animation	2	1	1	3 3		4	2	Pre: CS3241 and (PC1221/H2 Physics or equiv) and MA1505 and MA1506 Anti: CS4342
	CS3247 Game Development	2	1	1	3 3		4	2	Pre: CS3241 and (PC1221/H2 Physics or equiv) Anti: CS4213
	CS3249 User Interface Development	2	1	1	3 3		4	Not offered in AY17/18	Pre: CS2103/T
	EE3331C Feedback Control Systems Co-list under 'intelligent systems'	3	1	0.5	5.5	50%	4	1&2	Pre: EE2023 Anti: EE2010
	EE3731C Signal Processing Methods Co-list under 'intelligent systems'	2	1	0	7	40%	4	1 [Evening]	Pre: EE2012/ST2334 and EE2023
	EE3701 Digital Media Technologies	2	1	0	7	100 %	4	Not offered in AY17/18	Pre: CS1010 or equiv
	EE3206 Introduction to Computer Vision and Image Processing Co-list under 'intelligent systems' & interactive digital media	2.5	1.0	0.5	6	20%	4	1	Pre: EE2023 or equiv Anti: CS4243
Depth	CS4240 Interaction Design for Virtual and Augmented Reality	2	0	2	4 2		4	2	Pre: CS3240 and MA1301/H2 Math
	CS4243 Computer Vision and Pattern Recognition Co-list under 'intelligent systems'	3	0	0	3 4		4	1 [Evening]	Pre: (CS1020 or its equivalent), MA1505, MA1506 and ST2334 Anti: EE4212
	CS4247 Graphics Rendering Techniques	3	0	0	3 4		4	2	Pre: CS3241
	CS4249 Phenomena and Theories of Human-Computer Interaction	2	0	0	4 4		4	1 [Evening]	Pre: CS3240/NM2213/NM2216
	CS4347 Sound and Music Computing	2	0.5	0.5	4 3		4	2	Pre: (MA1505/MA1521) and (MA1506/MA1101R) and CS2108
	CS4351 Real-Time Graphics	2	1	0	4 3		4	1	Pre: CS3241
	EE4212 Computer Vision Co-list under 'intelligent systems'	2.5	0.5	0	7	40%	4	2 [Evening]	Pre: EE3206/EE3731C or equiv Anti: CS4243
	EE4213 Image & Video Processing Co-list under 'intelligent systems'	2	0.5	0	7.5	45%	4	Not offered in AY17/18	Pre: EE3206 Anti: CS4243
	EE4604 Biological Perception in Digital Media	2	1	0	7	100 %	4	Not offered in AY17/18	Pre: EE3206/EE3731C
	EE4704 Introduction to Computer Vision and Image Processing <NEW> Module code change wef AY18/19 Co-list under 'embedded systems' & intelligent systems'	2.5	1.0	0.5	6	25%	4	1	Pre: EE2023 or equiv Anti: CS4243, EE3206
	ME4245 Robot Kinematics, Dynamics and Control	3	0.5	0	2 4.5	30%	4	1	Pre: EE3331C
	EE5907 Pattern Recognition <NEW for AY16 RfP> Co-list under 'intelligent systems'						4	2	Registration subject to approval

Technical Elective		Hours per week				CA	MCs	SEM	PRE/CO REQ
		LEC	TUT	LAB	PREP				
SYSTEM-ON-A-CHIP DESIGN									
Breadth	EE3408C Integrated Analog Design	2-5 3	0-5 1	0-5 0	6-5 6	40%	4	1	Pre: E2021/CG2027/EE2027 Anti: EE3408
	EE3407 Analog Electronics	2-5	0-5	0-5	6-5	20%	4	2	Pre: E2021
Depth	CS4223 Multi-core Architectures Co-list under 'embedded computing' & 'large-scale computing'	2	1	0	3 4		4	1	(CS2106/CG2271) and (CS3210/CS3220/CG3207)
	EE4214 Real-time Embedded Systems Co-list under 'embedded computing'	2	0-5	0-5	6	50%	4	Not offered in AY17/18	Pre: EE2024
	EE4218 Embedded Hardware System Design Co-list under 'embedded computing' & 'large-scale computing'	2	0.5	1	6.5	60%	4	1 [Evening]	Pre: EE2020 EE2024/EE2028/CG2028
	EE4407 Analog Electronics <NEW> Module change wef AY18/19	2	1	0.5	6.5	20%	4	2	Pre: E2021/CG2027/EE2027 Anti: EE3407
	EE4415 Integrated Digital Design Co-list under 'embedded computing'	2	0.5	0.5	7	40%	4	2	Pre: EE2020/EE2026
	EE4505 Power Semiconductor Devices & ICs Note: Scheduled to offer in alternative years i.e. AY18/19, AY20/21	2	0.5	0.5	7	100%	4	Not offered in AY17/18 ST1	Pre: EE2021 or equiv (AY16 intake & prior); Stage 3 Engrg students (AY17 intake & after)
	EE5903 Real-time Systems <NEW for AY16 RfP> Co-list under 'embedded computing'							4	2

Note:

- Other level 3000/4000 modules hosted by CS or ECE may be used as fulfilling CEG Technical Elective (TE) requirements (under no particular concentration). Generally, a level 3000 module will count as CEG TE Breadth, while a 4000 level module will count as CEG TE Depth.

- The following level 2000 modules may count as CEG TE Breadth (under no particular concentration):

~~CS2281 Programming in Unix~~

EE2011 Engineering Electromagnetics

~~EE2022 Electrical Energy Systems (re-coded to EE3505C effective AY2015)~~

EE2025 Power Electronics (re-coded from EE3501C effective AY2015; to be first offered)

IE2110 Operation Research I

IE2130 Quality Engineering I

- With effect from AY2018/19, some EE3xxx modules will be recoded to EE4xxx.

"CS1010 or its equivalent" - This prerequisite clause refers to "CS1010 or CS1010E or CS1101 or CS1101C or CS1101S or CG1101 or CS1010FC/X".

"CS1020 or its equivalent" - This prerequisite clause refers to "CS1020 or CS1020E or ~~CS2020 or CS1102 or CS1102C or CS1102S or CG1102 or CG1103~~".

"CS2010 or its equivalent" - This prerequisite clause means "CS2010 or CS2020 or CS2040 or CS2040C ~~CS1102 or CS1102C or CS1102S or CG1102~~".

For CS-coded modules, please refer to IVLE for the CA component.

Offer semester and pre-requisites may change; please refer to Bulletin

<http://www.nus.edu.sg/nusbulletin/search-modules/>.

The host department reserves the right to make final changes to any module on offer.