

Equivalent Course Guide

Updated November 2018

This list does not include core classes, nor does it include option equivalents that are typically taken freshman and/or sophomore year, as such classes should be taken *before* study abroad commences. Course equivalence is based on similarities in course content and what Caltech Study Abroad students have received credit for in the past – it is by no means guaranteed.

Note that this list does not define all equivalent classes. Just because it is not listed does not mean an equivalent does not exist. It is best, therefore, to also go to the catalog and course lists for each program to determine if an equivalent class is available.

Note that students studying abroad can take classes not taught at Caltech for option elective or general credit. In fact, students are encouraged to do so to explore new subjects in their option or in other fields.

Please keep in mind that courses, schedules and professors can change. It is possible that some of these classes are no longer being taught, have been renamed, revised, or are taught in a different term or semester. Simply because a class is listed here does not guarantee that you will receive the credit you are seeking. **You MUST still have your professors at Caltech review the current syllabus and course description of each class. The professor who teaches a comparable class at Caltech will decide whether or not you can receive credit equivalent to a required CIT course.** Note that you are not required to check equivalence with Caltech instructors/professors until you are selected for a particular program. However, it is advised that you do so in the case of a required class.

Course catalog links for each study abroad program are below:

Cambridge: <https://2018-19.timetable.cam.ac.uk/>

Copenhagen: <http://studies.ku.dk/studies/>

List of departments: <http://introduction.ku.dk/organisation/departments/> - useful for determining classes by department

Danish Technical University: <https://www.dtu.dk/english/Education/Course-base>

Edinburgh University: <http://www.drps.ed.ac.uk/>

Melbourne: <https://handbook.unimelb.edu.au/faces/htdocs/user/search/SimpleSearch.jsp>

University College London: <https://www.ucl.ac.uk/prospective-students/study-abroad-ucl/study-abroad-guide/subjects>

EQUIVALENT COURSE GUIDE

Aerospace Engineering

Caltech Course	Cambridge (M)	Cambridge (L)	L'Ecole Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
Ae/APh/CE/ME 101a								Turbulence Theory (41129)
Ae 105a								Intro to Spacecraft Systems & Design (30300)

Astrophysics (see Physics, also)

Caltech Course	Cambridge (M)	Cambridge (L)	L'Ecole Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
Ay 20				Astrophysics (PHYS10102)				
Ay 21	Cosmology (Ma PT IIC)							
Ay 101			Stellar Astrophysics (PHY553)				Stellar Atmospheres & Stellar Winds (PHYS4318)	
Ge/Ay 117				Astronomical Statistics & Measurement (PHYS10080)				

Ay 190				Computational Astrophysics L11 (PHYS11037)				
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BEM/Economics

Caltech Course	Cambridge (M)	Cambridge (L)	L'Ecole Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
BEM 103					Introduction to Financial Engineering (42104)			
BEM 105	Stochastic Financial Models (Ma IID)	Stochastic Financial Models (Ma IID) ^a					Financial Math (MATH3508)	
Ec 122				Essentials of Economics (ECNM10052)	Econometrics 2: Statistic Analysis of Econometric Time Series			
PS/Ec 172								

Bioengineering

Caltech Course	Cambridge (M)	Cambridge (L)	L'Ecole Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
BE/Bi 103		Medical Physics (Engineering IIB)						

Bi/BE 129	Pathophysiology of Cancer (P7 PDN II)							
BE 153		Systems and Clinical Physiology (P8 PDN II) Mathematical Physiology (3G2)						
BE 159						Cell Signaling & Neurochemistry (BCMB30004)		
APh/BE 161								
ChE/BE 163	Introduction to Molecular Bioengineering (3G1)							Metabolic Engineering & Functional Genomics (27405)
Bi/BE 182		Development: Cell Differentiation & Organogenesis						
EE/BE/MedE 185					Introduction to Micro-Mechanical Systems Design &			Micro-2: Micro-Electro-Mechanical Systems (33355)

					Manufacture (41742)			
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Biology

Caltech Course	Cambridge (M)	Cambridge (L)	L'École Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
Bi 1					Biomolecular Chemistry (26422)			Biomolecular Chemistry (26422)
BE/Bi 103		Medical Physics (Engineering IIB)						
Bi/Ch 110				Biomacromolecules (CHEM10051) Structures & Functions of Proteins (BILG09015) Biophysical Chemistry (CHEM10014) Molecular Microbiology			Biological Chemistry (CHEM3202) General Biochemistry (BIOC1008)	

				3 L9 (BILG09013) Clinical Biochemistry &Endocrinolo gy 5 (UO1124)				
Bi/Ch 113	Cell Assembly & Interactions (P9 PDN Pt II)						Advanced Molecular Cell Biology (BIOC3050) Molecular Cell Biology (BIOL3006/ANA T3050)	
Bi 117		Developm ent: Cell Differentia tion & Organoge nesis (P6 Nat Sci II, PDN)						
Bi 118		Pluripoten cy & Differentia tion						
Bi 122				Molecular Genetics 3 L9 (BILG09002)	Theoretic al			

				Evolutionary & Ecological Genetics 3 (BILG09004)	Molecular Genetics			
Bi/BE 129	Pathophysiology of Cancer (P7 PDN II)							
Bi 145a							Animal & Human Physiology-Maintenance & Regulatory Mechanisms (PHOL2002)	
Bi/CNS/NB/Psy 150	Molecular Neuroscience (N2, Nat Sci II) Sensory Transduction (N4, Nat Sci II) Control of Action (N3, Nat Sci II)	Introduction to Neuroscience (3G3)			Neurobiology (KU)		Advanced Neuroanatomy (ANAT3025) Advanced Functional Anatomy (NEUR3025)	
Bi 153		Systems and Clinical Physiology						

BMB/Bi/Ch 170							Chemistry of Biologically Important Molecules (CHEM2601)	
Bi/BE 182		Development: Cell Differentiation & Organogenesis						
CNS/Bi/EE/CS/NB 186	Computer Vision (4F12)							
CNS/Bi/NB 256		Central Mechanisms of Reward, Punishment, and Emotion (N6 PDN II)						

Chemical Engineering

Caltech Course	Cambridge (M)	Cambridge (L)	L'École Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
ChE 62				Separation Processes II (U03925/CHEE08013)				

ChE 101				Chemical Engineering Kinetics & Catalysis 3 (CHEE09010)			
ChE 118	Chemical Product Design			Chemical Engineering & Economics 4 (CHEE10005)			Chemistry of Materials (CHEM2001)
Ch/ChE 147	Introduction to Polymers (M0 Ch PT III)						Chemistry of Materials (CHEM2001)
Ch/ChE 148							Polymer Technology (28213)
ESE/ChE 158				Atmospheric Physics (METE10002)			
ChE/Ch 155							Catalysis & Kinetics (26510)
ChE/BE 163	Introduction to Molecular Bioengineering (3G1)						Metabolic Engineering & Functional Genomics (27405)

Chemistry

Caltech Course	Cambridge (M)	Cambridge (L)	L'Ecole Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
Ch 21a				Foundations of Quantum Mechanics (PHYS09051)			Quantum Mechanics & Spectroscopy (CHEM2304) Physical Chemistry (CHEM2301)	Advanced Physical Chemistry (26236) Quantum Chemistry (26261)
Ch 25				Biophysical Chemistry (CHEM11016)				Biomolecular Chemistry (26422)
Ch 41a				Synthetic Organic Chemistry (CHEM10024)			Organic Chemistry (CHEM2201) Fundamentals of Organic Chemistry (CHEM2202) Chemistry for Biology Students (CHEM1062)	Practical Organic Chemistry (26407) Organic Chemistry 3 (26433)
Ch 80						Chemistry Research Project		

						(CHEM400 08)		
Bi/Ch 110				Biomacromolecules (CHEM10051) Structures & Functions of Proteins (BILG09015) Biophysical Chemistry (CHEM10014) Molecular Microbiology 3 L9 (BILG09013) Clinical Biochemistry & Endocrinology 5 (UO1124)			Biological Chemistry (CHEM3202) General Biochemistry (BIOC1008)	
Bi/Ch 113	Cell Assembly & Interactions (P9 PDN Pt II)						Advanced Molecular Cell Biology (BIOC3050) Molecular Cell Biology	

							(BIOL3006/ANAT 3050)	
Ch 120a		Energy Landscapes and Soft Materials (M4 Ch PT III)					Chemistry of Materials (CHEM2001)	
Ch 121a	Computer Simulation Methods in Chemistry & Physics (M6)							
Ch 125a					Mathematics & Introductory Quantum Mechanics		Topics in Quantum Mechanics (CHEM3302)	
Ch 143								NMR Spectroscopy (26438)
Ch 144a	Organic Solids (M10 Ch PT III)							
Ch 145							Chemistry of Biologically Important	

							Molecules (CHEM2601)	
Ch/ChE 147	Introduction to Polymers (M0 Ch PT III)						Chemistry of Materials (CHEM2001)	
Ch/ChE 148								Polymer Technology (28213)
Ch 154a	Main Group Organometallics (M8 Ch PT III)							
ChE/Ch 155								Catalysis & Kinetics
BMB/Bi/ Ch 170							Chemistry of Biologically Important Molecules (CHEM2601)	
ESE/Ge/ Ch 171		Atmospheric Chemistry & Global Change						
ESE/Ch 175				Environmental Chemistry (CHEM10048)				

ESE/CH 176				Environmental Chemistry (CHEM10048)				
Ch 242a	Stereocontrolled Organic Synthesis (M5 Ch PT III)						Principles & Methods of Organic Synthesis (CHEM3205)	

Computation and Neural Systems (CNS)

Caltech Course	Cambridge (M)	Cambridge (L)	L'École Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
Bi/CNS/NB/Psy 150	Molecular Neuroscience (N2, Nat Sci II) Sensory Transduction (N4, Nat Sci II) Control of Action (N3, Nat Sci II)	Introduction to Neuroscience (3G3)			Neurobiology (KU)		Advanced Neuroanatomy (ANAT3025) Advanced Functional Anatomy (NEUR3025)	

CS/CNS/EE 156a				Introductory Applied Machine Learning (INFR10069)				
CS/CNS 171	Computer Graphics and Image Processing (CS PT II)						Computer Graphics (COMP0027)	
CNS/Bi/EE/CS/NB 186	Computer Vision (4F12)							
CNS/Bi/NB 256		Central Mechanisms of Reward, Punishment, and Emotion (N6 PDN II)						

Computer Science

Caltech Course	Cambridge (M)	Cambridge (L)	L'École Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
CS 1				Programming & Data Analysis (PHYS08049)				

CS 2							Concurrent Programming (COMP2007)	
CS 3				Informatics 2C- Introduction to Software Engineering (INFR08019)				
Ma/CS 6/106a	Graph Theory (Ma PT IID) Number Theory (Ma PT IIC)			Discrete Mathematics & Mathematical Reasoning (INFR08023)	Discrete Mathematical Structures			
EE/CS/EST 135					Electric Power Engineering (31730)			
CS/EE/IDS 143							Networked Systems (COMP3035)	Computer Networks & the Internet (62472)

CS/CNS/EE 156a				Introductory Applied Machine Learning (INFR10069)				
ACM/CS/IDS 157		Statistical Modelling (Ma IIC)						
CS/CNS 171	Computer Graphics and Image Processing (CS PT II)					Computer Graphics (COMP0027)		
CNS/Bi/EE/CS/NB 186	Computer Vision (4F12)							

Electrical Engineering

Caltech Course	Cambridge (M)	Cambridge (L)	L'École Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
APh/EE 9				Group Design Project (Design of Microsystems) (SCEE11004)				
ACM/EE 106a	Numerical Analysis			Numerical Linear				

	(Ma Pt IID)			Algebra & Applications (MATH11196)				
ACM/EE 106b		Fluid Dynamics (Ma PT IB)						
ME/EE/EST 109				Sustainable Energy Technologies 4 (MECE10011)				
EE 111	Signals & Systems (3F1)			Signals & Linear Systems in Discrete Time (31606)				
ACM/EE/IDS 116					Stochastic Processes (02407)			
EE/CS/EST 135					Electric Power Engineering (31730)			
CS/EE/IDS 143							Networked Systems (COMP3035)	Computer Networks & the Internet (62472)

CS/CNS/EE 156a				Introductory Applied Machine Learning (INFR10069)				
EE/BE/MedE 185					Introduction to Micro-Mechanical Systems Design & Manufacture (41742)			Micro-2: Micro-Electro-Mechanical Systems (33355)
CNS/Bi/EE/CS/ NB 186	Computer Vision (4F12)							

Environmental Science and Engineering

Caltech Course	Cambridge (M)	Cambridge (L)	L'Ecole Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
ESE/ChE 158				Atmospheric Physics (METE10002)				
ESE/Ge/Ch 171		Atmospheric Chemistry & Global Change						

Geological and Planetary Science

Caltech Course	Cambridge (M)	Cambridge (L)	L'École Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
GE 11a							The Earth (GEOL1003)	
GE 104				Land-Atmosphere Interactions Level 10 (ECSC10014)				
GE 112	Sedimentology & Paleontology Core (Nat Sci II, Geological Sciences)	Sedimentary Systems (Nat Sci II, Geological Sciences)		Paleontology & Sedimentology L10 (EASC10106) Dynamic Stratigraphy (EASC10097)	Sedimentary Basins-Modelling, Stratigraphy & Resources	Sedimentary Geology (GEOL30003)		
GE 114a	Mineralogy Core-Dynamics of Atoms in Minerals (Nat Sci II, Geological Sciences)							
GE 114b		Mineralogy of the Deep Earth (Nat						

		Sci II, Geological Sciences)						
Ge/Ay 117				Astronomical Statistics & Measurement (PHYS10080)				
ESE/Ge/C h 171		Atmospheri c Chemistry & Global Change						

Material Science

Caltech Course	Cambridge (M)	Cambridge (L)	L'Ecole Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
MS 115				Chemistry of Functional Materials (CHEM10041)				
MS 133	Rheology & Processing (ChE IIB)							

Math/ACM

Caltech Course	Cambridge (M)	Cambridge (L)	L'Ecole Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
Ma 5/105a	Groups (Math IA)			Algebra (U01617)	Algebra 2 Modern Algebra			

Ma 5/105b		Group Rings & Modules (Math IB)						
Ma/CS 6/106a	Graph Theory (Ma PT IID) Number Theory (Ma PT IIC)			Discrete Mathematics & Mathematical Reasoning (INFR08023)	Discrete Mathematical Structures			
Ma 108a	Analysis II (Math IB)			Honours Analysis L10 (MATH10068) Metric Spaces (U01630) Pure & Applied Analysis (U01634)				
Ma 108b		Analysis of Function (Ma IID)						
Ma 109a		Geometry (Ma IIB)		Topology (MATH10077)	Topology			

Ma 109b		Differential Geometry (Math II) Geometry (Math IB)						
Ma 112a	Principles of Statistics (Ma PT IID)	Statistics (Ma IID)						Multivariate Statistics (02409)
ACM 95a	Complex Analysis & Optimization (4M13, Engineering IIA)			Complex Variable & Differential Equations (U01611)				Multivariate Statistics (02409)
ACM 95b		Complex Methods (Math IB)						
ACM/IDS 101ab				Advanced Methods of Applied Mathematics L10 (MATH10086) Differential Equations (Math 10066)				
ACM/EE 106a	Numerical Analysis (Ma Pt IID)							

ACM/EE 106b		Fluid Dynamics (Ma PT IB)						
ACM/CMS/IDS 113	Optimization and Control (Ma PT IID)			Non-Linear Optimization (U02703)				
ACM/EE/IDS 116					Stochastic Processes (02407)			
Ma 121a	Graph Theory (Ma PT IID)	Graph Theory (Ma IID)		Database Systems L10 (INFR10070)				
ACM/CS/IDS 157		Statistical Modelling (Ma IIC)						
ACM/IDS 216		Statistical Modelling (Ma PT IIC)						

Mechanical Engineering

Caltech Course	Cambridge (M)	Cambridge (L)	L'Ecole Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
ME 72a				Mechanical Design Project (MECE09018)				
Ae/APh/CE/ME 101a								Turbulence Theory (41129)

ME/EE/EST 109				Sustainable Energy Technologies 4 (MECE10011)				
Ae/ACM/Me 232a			Computatio n Fluid Dynamics					

Physics/ Applied Physics

Caltech Course	Cambrid ge (M)	Cambrid ge (L)	L'Ecole Poly	Edinburgh	Copenhag en	Melbour ne	UCL	DTU
Ph 5				Electronic Methods in the Physical Laboratory (U01361) Electronic Methods in the Physical Laboratory (PHYS09023)				
APh/EE 9				Group Design Project (Design Microsystems) (SCEE11004)				

Aph 17a				Thermodynamics & Statistical Mechanics, Thermodynamics 3 (U03272)				Statistical Physics (10122)
Ae/APh/CE/ME 101a								Turbulence Theory (41129)
Ph 101				Physics Skills (PHYS10042)				
Ph 106a	TP1 Theoretical Physics I (Nat Sci II, Physics) Classical Dynamics (Math II)			Lagrangian Dynamics L10 (PHYS10015)				
Ph 106b		Theoretical Physics (Nat Sci II, Physics)						
Aph 114a				Chemistry of Functional Materials (CHEM10041)				

				Condensed Matter Physics (PHYS10099)				
Ph 125a	Advanced Quantum Physics (Nat Sci II, Physics)			Foundations of Quantum Mechanics (PHYS09051) Quantum Physics (PHYS10043) Quantum Mechanics (PHYS09053) Quantum Theory (PHYS11019)			Atom & Photon Physics (PHYS4421) Advanced Quantum Mechanics (PHYS4226)	Advanced Quantum Mechanics (10112)
Ph 127a				Statistical Physics (PHYS11024)				Statistical Physics (10400)
Ph 129c			Symmetry Groups in Physics					
Ph 135			Physics of Elementary Particles (PHY554)					

			Quantum Optics- Lasers (PHY551 A)					
APh 156a								Plasma Physics (10400)
APh/BE 161								Intro to Biophysics (10347)
Ph/APh 223a	Quantum Condensed Matter Field Theory (Nat Sci III, Physics)							
Ph 236a	Relativity (Nat Sci II, Physics)							