

Equivalent Course Guide

Updated November 2021

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://www.internationalstudents.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>

L'Ecole Poly <https://www.polytechnique.edu/en>

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)	
Ay/Ph 104	Relativistic Astrophysics & Cosmology							

	(Nat Sci III, Physics)							
Ge/Ay 117				Astronomical Statistics & Measurement (PHYS10080)				
Ay 190				Computational Astrophysics L11 (PHYS11037)				

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 & Manufacture (41742)			Micro-2: Micro-Electro-Mechanical Systems (33355)

Biology

Caltech Course	Cambridge (M)	Cambridge (L)	L'Ecole Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU	Chicago
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)			Biological Chemistry (CHEM3202) General Biochemistry (BIOC1008)		

				Biophysical Chemistry (CHEM10014) Molecular Microbiology 3 L9 (BILG09013) Clinical Biochemistry & Endocrinology 5 (UO1124)					
Bi/Ch 113	Cell Assembly & Interactions (P9 PDN Pt II)						Advanced Molecular Cell Biology (BIOC3050)		
Bi 117		Development: Cell Differentiation & Organogenesis (P6 Nat Sci II, PDN)					Molecular Cell Biology (BIOL3006/ANAT 3050)		

Bi 118		Pluripotency & Differentiation							
Bi 122				Molecular Genetics 3 L9 (BILG09002)	Theoretical Molecular Genetics				
				Evolutionary & Ecological Genetics 3 (BILG09004)					
Bi/BE 129	Pathophysiology of Cancer (P7 PDN II)								
Bi 145a							Animal & Human Physiology-Maintenance & Regulatory Mechanisms (PHOL2002)		Principles of Physiology (BIOS 20242)
Bi/CNS/NB/Psy 150	Molecular Neuroscience (N2, Nat Sci II) Sensory Transduction (N4, Nat Sci II)	Introduction to Neuroscience (3G3)			Neurobiology (KU)		Advanced Neuroanatomy (ANAT3025) Advanced Functional Anatomy (NEUR3025)		

	Control of Action (N3, Nat Sci II)								
Bi/CNS/EE 156a				Introductory Applied Machine Learning (INFR10069)					
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)							
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Chemical Engineering

Caltech Course	Cambridge (M)	Cambridge (L)	L'Ecole 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) Chemical Engineering Design 3A Level 10 (CHEE10010)			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	Chicago
Ch 21a				Foundations of Quantum Mechanics (PHYS09051)			Quantum Mechanics & Spectroscopy (CHEM2304) Physical Chemistry (CHEM2301)	Advanced Physical Chemistry (26236) Quantum Chemistry (26261)	
Ch 21b				Chemistry 3A (VS1) Level 9 (CHEM09008)					
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 (CHEM40008)			
Bi/Ch 110				Biomacromolecules (CHEM10051) Structures & Functions of Proteins (BILG09015) Biophysical Chemistry (CHEM10014) Molecular Microbiology 3		Biological Chemistry (CHEM3202) General Biochemistry (BIOC1008)		Introduction to Biochemistry (BIOS 20200)

				L9 (BILG09013) Clinical Biochemistry &Endocrinolog y 5 (UO1124)					
Bi/Ch 113	Cell Assembly & Interactions (P9 PDN Pt II)						Advanced Molecular Cell Biology (BIOC3050) Molecular Cell Biology (BIOL3006/ANAT 3050)		
Ch 120a		Energy Landscap es and Soft Materials (M4 Ch PT III)					Chemistry of Materials (CHEM2001)		
Ch 121a	Computer Simulation Methods in Chemistry & Physics (M6)								
Ch 125a					Mathema tics & Introduct ory		Topics in Quantum Mechanics (CHEM3302)		

					Quantum Mechanics				
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'Ecole Poly	Edinburgh	Copenhagen	Melbourne	UCL	DTU
Bi/CNS/NB/Psy 150	Molecular Neuroscience	Introduction to			Neurobiology (KU)		Advanced Neuroanatomy (ANAT3025)	

	(N2, Nat Sci II) Sensory Transduction (N4, Nat Sci II) Control of Action (N3, Nat Sci II)	Neuroscience (3G3)					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)				
CS011				Introduction to Java Programming Level 9 (INFR09021)				
CS 121	Databases (CS IA)							
Ma/CS 6/106a	Graph Theory (Ma PT IID) Number Theory (Ma PT IIC)			Discrete Mathematics & Mathematical Reasoning (INFR08023)	Discrete Mathematical Structures			

Ma/CS 6c	Automata and Formal Languages (Math IIC)							
EE/CS/EST 135					Electric Power Engineering (31730)			
CS/EE/IDS 143	Principles of Communications (CS II)						Networked Systems (COMP3035)	Computer Networks & the Internet (62472)
CS/EE/ME 134				Introduction to Vision and Robotics Level 9 (INFR09019)				
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/N B 186	Computer Vision (4F12)							
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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 (Ma Pt IID)			Numerical Linear 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)				

EE 112				Digital Signal Analysis 4 Level 10 (ELEE10010)				
EE 160	3F7 Information Theory and Coding (Eng IIB)							
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/N B 186	Computer Vision (4F12)							
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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'Ecole 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 166				Hydrogology 1: Applied Hydrogeology Level 10 (EASC 10082)				
Ge/Ay 117				Astronomical Statistics & Measurement (PHYS10080)				

ESE/Ge/Ch 171		Atmospheric Chemistry & Global Change						
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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)			Discrete Mathematics & Mathematical	Discrete Mathematical Structures			

	Number Theory (Ma PT IIC)			Reasoning (INFR08023)				
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)

Ma 144a	Graph Theory (IID)							
Ma/SS 142		Stochastic Financial Models (Math IID)						
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 105		Analysis of Functions (Math IID)						
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			Computation Fluid Dynamics					

Physics/ Applied Physics

Caltech Course	Cambridge (M)	Cambridge (L)	L'Ecole Poly	Edinburgh	Copenhagen	Melbourne	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)			Langrangian 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			Foundations of Quantum Mechanics (PHYS09051)			Atom & Photon Physics	Advanced Quantum Mechanics (10112)

	(Nat Sci II, Physics) Principles of Quantum Mechanics (Math IID)			Quantum Physics (PHYS10043) Quantum Mechanics (PHYS09053) Quantum Theory (PHYS11019)			(PHYS4421) Advanced Quantum Mechanics (PHYS4226)	
Ph 127a	Thermal & Statistical Physics (Nat Sci II, Physics)			Statistical Physics (PHYS11024)				Statistical Physics (10400)
Ph 129c			Symmetry Groups in Physics					
Ph 135			Physics of Elementary Particles (PHY554) Quantum Optics- Lasers (PHY551A)					
APh 156a								Plasma Physics (10400)

APh/BE 161								Intro to Biophysics (10347)
Ph 205a	Particle Physics (Nat Sci III, Physics)							
Ph/APh 223a	Quantum Condensed Matter Field Theory (Nat Sci III, Physics)							
Ph 236a	Relativity (Nat Sci II, Physics)							