Equivalent Course Guide

Updated November 2017

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: http://timetables.caret.cam.ac.uk/live/web/index.html

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

Danish Technical University: http://www.dtu.dk/English/education/Course_Catalogue.aspx

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

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

University College London: http://www.ucl.ac.uk/prospective-students/study-abroad-guide/application-study/subjects/index_list

EQUIVALENT COURSE GUIDE

Astrophysics (see Physics, also)

Caltech Course	*Cambridge (M)*	*Cambridge (L)*	*L'Ecole Poly*	*Edinburgh*	*Copenhagen*	*Melbourne*	*UCL*	*DTU*
AY 20				PHYS 10102 Astrophysics				
Ay 117				PHYS10080 Astronomical Statistics and Measurement				
Ay 101			Stellar Astrophysics (PHY553)				PHYS 4318 Stellar Atmospheres & Stellar Winds	

BEM/Economics

Caltech Course	*Cambridge (M)*	*Cambridge (L)*	*L'Ecole Poly*	*Edinburgh*	*Copenhagen*	*Melbourne*	*UCL*	*DTU*
BEM 101	Accounting and Finance (4E6) *(Engineering IIb)*							
BEM 102	4E6 Account and Finance (Engineering IIb)							
BEM 103	Business Economics (3E1)*(Engineering IIa)*						ECON 7002 Economics of Finance , ECON 2003 Intermediate Microeconomics	
BEM 105	Stochastic Financial Models *(Math IID)*						MATH 3508 Financial Math	
Ec 118				ECSC 09002 Natural Resource Management				

Ec 122				ECNM 10052 Essentials of Economics	Econometrics 2: Statistic Analysis of Econometric Time Series (KU)		ECON 2008 Quantitative Economics and Econometrics 1	
Ec 123							ECON 3005 International Monetary Economics, SESS 2010 Applied Economics	
PS/EC 172							PHIL 2050 Decision/Game Theory	

Biology

Caltech Course	***Cambridge (M)***	***Cambridge (L)***	***L'Ecole Poly***	***Edinburgh***	***Copenhagen***	***Melbourne***	***UCL***	***DTU***
Bi/Ch 110				BILG 09015 Structures and Functions of Proteins 3, CHEM 10014 Biophysical Chemistry, BILG 09013 Molecular Microbiology 3 Level 9			CHEM 3203 Biological Chemistry, BIOC 1008 General Biochemistry, BIOC 2002 General Biochemistry, BIOC 2004 Protein Structure and Function, BIOC 2008 General Biochemistry of Health, BIOC 2003 Further Topics in Biochemistry	

Bi 111							BIOC 2003 Further Topics in Biochemistry (?)	
Bi/Ch 113	Module P9: Cell Assembly and Interactions *(Part II PDN or Zoology)*						BIOC 3050 Advanced Molecular Cell Biology, BIOL 3006/ANAT3050 Molecular Cell Biology Biology	
Bi 117		Module P6: Development: Cell Differentiation and Organogenesis *(Nat Sci II, PDN)*					ANAT 2051A Human Anatomy and Embryology	
Bi 122				BILG09004 Evolutionary and Ecological Genetics 3	Theoretical Molecular Genetics (KU)		BIOL 3011 Advanced Human Genetics, BIOL 3012 Sex, Genes And Evolution, BIOL 3013 Advanced Human Genetics: Single Gene Disorders, Introduction to Human Genetics BIOL 2006	
Bi 145a							PHOL 2002 Animal and Human Physiology – Maintenance and Regulatory Mechanisms	

Bi/CNS 150	N2: Molecular Neuroscience (*Nat Sci II, Neuroscience*), N4: Sensory Transduction *(Nat Sci II, Neuroscience),* N3: Control of Action *(Nat Sci II, Neuroscience)* AND N2: Moleceular Neuroscience (*Nat Sci II, Neuroscience*) taken together (as of 2009)				Neurobiology (KU)		ANAT 2010 Human Neuroanatomy, ANAT 3025 Advanced Neuroanatomy, PHOL 2005 Structure and Function of the Nervous System, NEUR 3025 Advanced Functional Anatomy	
Bi 156	N2: Molecular Neuroscience *(Nat Sci II, Neuroscience)*							
Bi 215							Biology of Aging (BIOL 3017)	
CNS/SS/Psy/Bi 102b							PSYC 3303 Topics in Neurobiology	
BE/Bi/MedE	Cellular and Molecular Biomechanics							
BE 141	3G5 Biomaterials (Engineering IIA)							
BE 153		Systems and Clinical Physiology						

Psy/CNS 130							PSYC 3207 Human Learning and Memory	
ChE/BE 163	Introduction to molecular Bioengineering							
BE 159	Cellular & Molecular Biomechanics							
Bi 122							BIOL 2006 Introduction to Human Genetics	
Bi 1								Bio-molecular Chemistry (MSC)
Bi 202		Module N5: Neural Degeneration and Regeneration						
Bi 118		Pluripotency and Differentiation						
Bi 182		Development: Cell Differentiation and Organogenesis						
Bi 9							Cell Biology CELL 2006	

Chemistry/Chemical Engineering

Caltech Course	*Cambridge (M)*	*Cambridge (L)*	*L'Ecole Poly*	*Edinburgh*	*Copenhagen*	*Melbourne*	*UCL*	*DTU*
Ch 21a				PHYS 09051 Foundations of Quantum Mechanics			CHEM 2301 Physical Chemistry, CHEM 2304 Quantum Mechanics and Spectroscopy, PHAS 2222 Quantum Physics , CHEM 2404 Quantum Mechanics and Spectroscopy	Advanced Physical Chemistry (DTU, 26236), Quantum Chemistry (DTU, 26261)
Ch 24a				CHEM 11014: Biophysical Chemistry				Biomolecular Chemistry (DTU, 26422)
Ch 41a				CHEM10024 Synthetic Organic Chemistry			CHEM 2201 Organic Chemistry, CHEM 2202 Fundamentals of Organic Chemistry, CHEM 1062 Chemistry for Biology Students	Practical Organic Chemistry (DTU, 26407), Organic Chemistry 3 (DTU, 26433)

ChE 62				U03925 Separation Processes II or CHEE 08013				
Ch 80						CHEM 40008 Chemistry Research Project		
Bi/Ch 110				UO1124 Clinical Biochemistry and Endocrinology 3, BILG09015 Structures and Functions of Proteins 3, U03191 Biophysical Chemistry			CHEM 3203 Biological Chemistry, BIOC 1008 General Biochemistry, BIOC 2002 General Biochemistry, BIOC 2003 Further Topics in Biochemistry, BIOC 2004 Protein Structure and Function	Advanced Biochemistry (DTU, 27301)
Ch 125a					Mathematics & Introductory Quantum Mechanics (KU)		CHEM 3302 Topics in Quantum Mechanics	
ChE 101				CHEE09010 Chemical Engineering Kinteics and Catalysis 3				
ChE 103a								Transport Processes (DTU, 28530)
ChE/ESE 158				METE 10002 Atmospheric Physics				

Ch 143								NMR Spectroscopy (DTU, 26438)
Ch 145							CHEM 2601 Chemistry of Biologically Important Molecules	
Ch/ChE 147							CHEM 2001 Chemistry of Materials	
ChE 148								Polymer Technology (DTU, 28213)
ChE/BE 163								Metabolic Engineering and Functional Genomics (DTU, 27405, Systems Biology Dept.)
BMB/Bi/ Ch 170a							CHEM 2601 Chemistry of Biologically Important Molecules AND BIOC 3008 Cellular Regulation (taken together)	
ChE 118				CHEE 10005 Chemical Engineering and Economics 4			CHEM 2001 Chemistry of Materials	

Ch 120a							CHEM 2001 Chemistry of Materials	
Ch 242a							CHEM 3205 Principles and Methods of Organic Synthesis	
ESE/Ch171		Atmospheric Chem & Global Change						
ChE 118	Chemical Product Design							
MS 115 (ChemE Materials Track)				CHEM 10041 Chemistry of Functional Materials				
MS 133	Rheology and Processing (Chemical Eng. IIB)							
ChE/BE 163	Introduction to Molecular Bioengineering							
Intro ESE (101 series)				Environmental Chemistry Level 10 CHEM 10048				
LAB CREDIT				Materials Chemistry level 8 CHEM 08021				
GE 104				Land-Atmosphere Interactions Level 10 ECSC 10014				

ChE 155								Catalysis and Kinetics
ChE 148								Polymer Technology, 28213
EE 185								Micro-2: Micro-Electro-Mechanical Systems, 33355

Computer Science

Caltech Course	***Cambridge (M)***	***Cambridge (L)***	***L'Ecole Poly***	***Edinburgh***	***Copenhagen***	***Melbourne***	***UCL***	***DTU***
Ma/CS 6a					Discrete Mathematical Structures (KU)		MATH 3502 Combinatorial Optimization	
Ma/CS 6b	Graph Theory *(Math IID)*							
Ma 121a	Graph Theory *(Math II)*							
CS2							COMP 2007 Concurrent Programming	
CS 143							COMP 3035 Networked Systems	Computer Networks and the Internet (62472, DTU)
CS 171							COMP 3080 Computer Graphics	

Engineering

Caltech Course	*Cambridge (M)*	*Cambridge (L)*	*L'Ecole Poly*	*Edinburgh*	*Copenhagen*	*Melbourne*	*UCL*	*DTU*
Ae/APh/CE/ ME 101a								Turbulence Theory (DTU, 41129)
Ae 105a								Intro to Spacecraft Systems and Design (DTU, 30300)
BE 103		Medical Physics (Engineering IIB)						
BE 141		Biomaterials (Engineering IIA)						
BE/EE 189a		Biosensors (Engineering IIB)						
EE 111	3E1 Signal and Systems *(Engineering IIA),* Digital Communication II			31606 Signals and Linear Systems in Discrete Time				
EE 185								Micro-2: MicroElectroMechanical Systems (MEMS) (DTU, 33355)
ME 18a Replaced by similar course, ME11abc. Check course descriptions for	3A5 Thermodynamics and Power Generation *(Engineering IIa)*			MECE 09010 Thermodynamics and Statistical Mechanics, Thermodynamics 3				

equivalency.								
ME 19a Replaced by similar course, ME11abc and ME12abc. Check course descriptions for equivalency.	3A1/3 Fluid Mechanics I/II *(Engineering IIa)*			U01631 Motion & Flow, MECE 10004 Fluid Mechanics 4, MECE 09011 Fluid Mechanics (Civil) 3, Fluid Mechanics (ME Year 4), SCEE 08003 Fluid Mechanics 2, SCEE08003 Fluid Mechanics 2			MECHE 470 Mechanics of Fluids	Basic Fluid Mechanics (DTU, 41312), Fundamental Problems in Fluid Dynamics (DTU, 10336)
ME 19b Replaced by similar course, ME11abc and ME12abc. Check course descriptions for equivalency.		3A1/3 Fluid Mechanics I/II *(Engineering IIa),* Waves in Fluids *(Math IIC),* Fluid Dynamics (*Math IB)*						
ME 35a Replaced by similar course, ME12abc. Check course descriptions for equivalency.	3C5 Dynamics *(Engineering IIa)*			MECE 10002 Dynamics 4				

ME 65 Replaced by similar course, Ae/AM/CE/ ME102a. Check course descriptions for equivalency.	3C7 Mechanics of Solids *(Engineering IIa)*			UO1206 Solid Mechanics 4, MECE09009 Solid Mechanics 3			MECH 3004 Applied Mechanics	Non-Linear Modeling and Analysis of Structures and Solids (DTU, 41291)
ME 71 Replaced by similar course, ME14. Check course descriptions for equivalency.				MECE 09018 Mechanical Design Principles 3				
ME 72a				MECE 09020 Mechanical Design Project				
ME 73	3C8 Machine Design *(Engineering IIa)*							
EST/EE/ME 109a				MECE 10011 Sustainable Energy Technologies 4				
CDS 110a	Optimization and Control *(Math II),* Systems and Control *(Engineering IIa)*						MECHE 467 Automatic Control	Linear Control Design 2 (DTU, 31310)
ME 131				INFR10005 Intelligent Autonomous				

				Robotics				
ME 171				MECE 09029 Computer Aided Engineering				
GE 120A				Structural Geology EASC 09002				
ACM 95A	Complex Analysis and Optimization (4M13) *(Engineering IIa)*			U01611 Complex Variable & Differential Equations				Multivariate Statistics, 02409
Ae 105A Space Engineering								Introduction to Spacecraft Systems and Designs, 30300
Ae/ME 232A			Computation Fluid Dynamics					

Geology

Caltech Course	***Cambridge (M)***	***Cambridge (L)***	***L'Ecole Poly***	***Edinburgh***	***Copenhagen***	***Melbourne***	***UCL***	***DTU***
Ge 11a							GEOL 1003 The Earth	
Ge 11c							GEOL 1015 Geology of Planetary Bodies	
Ge 112	C3 Sedimentology and Palaeontology Core *(Nat Sci II, Geological*	G2 Sedimentary Systems *(Nat Sci II, Geological Sciences)*		EASC 10097 Dynamic Stratigraphy	Sedimentary Basins - Modelling, Stratigraphy and Resources (KU)			

	Sciences)							
Ge 114a	C4 Mineralogy Core, M3 Dynamics of Atoms in Minerals *(Nat Sci II, Geological Sciences)*							
Ge 114b		M1 Mineralogy of the Deep Earth *(Nat Sci II, Geological Sciences)*						
Ge 115a							GEOL 1002 From Petrology to Petrogenesis	
Ge 121a							GEOL 3030 Field Methods in Active Tectonics	
Ge 115AB				Igneous Petrology & Metamorphic Petrology (???)				
Ge 190, Occasional Paleont.				Paleontology EASC 09006			GEOL 2008: Vertebrae Paleontology and Evlolution	
Ge 114A							Earth Materials GEOL 1001	

Math/ACM

Caltech Course	***Cambridge (M)***	***Cambridge (L)***	***L'Ecole Poly***	***Edinburgh***	***Copenhagen***	***Melbourne***	***UCL***	***DTU***
ACM 95a	Complex Analysis and Optimization (4M13) *(Engineering IIa)*			U01611 Complex Variable & Differential Equations				Multivariate Statistics, 02409
ACM 95b		Complex Methods *(Math I B)*						
Ma 5a	Groups *(Math IA)*			U01617 Algebra	Algebra 2 (KU), Modern Algebra (KU)			
Ma 5b		Groups, Rings and Modules *(Math I B)*						
Ma/CS 6a	Graph Theory *(Math II)*				Discrete Mathematical Structures (KU)			
Ma/CS 6b	Graph Theory *(Math IID)*							
ACM 101				Math 10066 Differential Equations				
ACM 113				U02703 Non Linear Optimization				
BEM 105	Stochastic Financial Models *(Math IID)*							
ACM 106a	Numerical Analysis *(Math IID)*							

Ma 108a	Analysis II *(Math I B)*			U01630 Metric Spaces U01634 Pure & Applied Analysis				
Ma 109a				MATH 10077 Topology	Topology (KU)			
Ma 109b		Differential Geometry *(Math II)*, Geometry *(Math I B)*						
Ma 112a								Multivariate Statistics (DTU, 02409)
ACM/ESE 118		Statistical Modelling *(Math II)*		U01933 Distribution Free Statistical Methods				
Ma 121a	Graph Theory *(Math II)*							

Physics/Applied Physics

Caltech Course	***Cambridge (M)***	***Cambridge (L)***	***L'Ecole Poly***	***Edinburgh***	***Copenhagen***	***Melbourne***	***UCL***	***DTU***
Ph 5				U01361 Electronic Methods in the Physical Laboratory, PHYS09023 Electronic Methods in the Physical				

				Laboratory				
APh 17a	B6 Statistical Mechanics, 3A5 Thermodynamics and Power Generation *(Engineering IIa)*			U03272 Thermodynamics and Statistical Mechanics, Thermodynamics 3				Statistical Physics (DTU 10122)
AY 20				PHYS 10102 Astrophysics				
Ae/APh/CE/ME 101a								Turbulence Theory (DTU, 41129)
Ph 106a	TP1 Theoretical Physics I *(Nat Sci II, Physics)*, Classical Dynamics *(Math II)*			PHYS 10015 Lagrangian Dynamics				
Ph 106b		Theoretical Physics II *(Nat Sci II, Physics)*						
Ph 125a	Advanced Quantum Physics *(Nat Sci II, Physics)*, Principles of Quantum Mechanics *(Math II)*			U01422 Quantum Physics, PHYS 09017 Quantum Mechanics, PHYS10043 Quantum			PHYS 4421 Atom and Photon Physics, PHYS 3226 Quantum Mechanics, PHYS 4226	Advanced Quantum Mechanics (DTU,10112)

				Physics, PHYS 11019 Quantum Theory			Advanced Quantum Mechanics	
APh 125b		Quantum Condensed Matter Physics *(Nat Sci II, Physics),* Theoretical Physics II *(Nat Sci II, Physics)*						
Ph 127a				PHYS 11024 Statistical Physics				Statistical Physics (DTU, 10122)
Ph 135a	Particle Physics (*Nat Sci III, Physics*)							
APh 156a								Plasma Physics (DTU 10400)
Aph/BE 161								Intro to Biophysics (DTU 10347)
Ph 223a	Quantum Condensed Matter Field Theory *(Nat Sci III, Physics)*							
Ph 236a	Relativity *(Nat Sci II, Physics)*, General Relativity *(Math III)*							

EE/APh 9				SCEE 11004 Group Design Project (Design of Microsystems)				
APh 114A				CHEM 10041 Chemistry of Functional Materials, PHYS 10099 Condensed Matter Physics				
Ph 101				Physics Skills (PHYS 10042)				
Ph129C			Symmetry Groups in Physics					
Ay 101			Stellar Astrophysics (PHY553)					PHYS 4318 Stellar Atmospheres & Stellar Winds
Ph 108a				PHYS 10015 Langrangian Dynamics				
Ph 135A			Quantum Physics of Electrons in Solids (PHY552A)					
Ph 135B			Quantum Physics of electrons in Solids					
Ph135C			Elementary Particle Physics (PHY 554)					