

GEOPHYSICS COURSE EQUIVALENTS (2020 Geophysics syllabus)

University of Calgary (Updated July 2020)

Each course can be counted only once, even though it may appear in several sections below.

For detailed descriptions of the subject areas listed below, refer to the GKE document, at: : [GC-Knowledge-Requ-BKLT--REV--EN--web--final-.pdf \(geoscientistscanada.ca\)](https://www.geoscientistscanada.ca/geoscientistscanada/Assets/GeoscientistsCanada/Geophysics/Geophysics%20GKE%20-%20REV%20-%20EN%20-%20web%20-%20final%20-%202020.pdf)

Group 1A Compulsory Foundation Science

1A.1 Chemistry

CHEM 201 General Chemistry: Structure & Bonding	(1A.1c)
CHEM 203 General Chemistry: Change & Equilibrium	(1A.1d)
CHEM 211 Foundations of Chemistry: Structure & Bonding	(1A.1a)
CHEM 213 Foundations of Chemistry: Change & Equilibrium	(1A.1b)

1A.2 Mathematics

MATH 249 Introductory Calculus	(1A.2a,b,c)
MATH 265 University Calculus I	(1A.2a,b,c)
MATH 275 Calculus for Engineers and Scientists	(1A.2a,b,c)

1A.3 Physics

PHYS 211 Mechanics	(1A.3a,c)
PHYS 221 Mechanics	(1A.3a,c)
PHYS 227 Classical Physics	(1A.3a,c)
PHYS 223 Introductory Electromagnetism and Thermal Physics	(1A.3b,d)
PHYS 259 Electricity and Magnetism (for students in Engineering)	(1A.3b,d)
PHYS 323 Optics & Electromagnetism	(1A.3b,d)

Group 1B Additional Foundation Science

1B.1 Biology

BIOL 205 The Organization and Diversity of Life	(1B.1a)
or	
Higher-level course for a degree in science or engineering with a bioscience prerequisite - e.g. vertebrate zoology, invertebrate zoology, microbiology. See the University of Calgary calendar.	(1B.1b)

1B.2 Chemistry

CHEM 201 General Chemistry: Structure & Bonding	(1B.2a, same as 1A.1c)
CHEM 203 General Chemistry: Change & Equilibrium	(1B.2a, same as 1A.1d)
CHEM 211 Foundations of Chemistry: Structure & Bonding	(1B.2a, same as 1A.1a)
CHEM 213 Foundations of Chemistry: Change & Equilibrium	(1B.2a, same as 1A.1b)
CHEM 321 Environmental Chemistry	(1B.2e)
CHEM 351 Organic Chemistry I	(1B.2c)
CHEM 353 Organic Chemistry II	(1B.2c)
CHEM 355 Organic Chemistry II (for Chemists)	(1B.2c)
CHEM 357 Industrial Organic Chemistry for Engineers	(1B.2c)
CHEM 371 Physical Chemistry: Thermodynamics Chemistry	(1B.2b)
CHEM 373 Physical Chemistry: Quantum Chemistry	(1B.2e)
or	
Higher-level chemistry courses for a degree in science or engineering that require one or more of the above courses as prerequisites. See the University of Calgary calendar.	(1B.2e)

1B.3 Computer Programming

CPSC 217 Introduction to Computer Science for Multi-disciplinary Studies I	(1B.3a)
CPSC 231 Introduction to Computer Science for Computer Science Majors I	(1B.3a)
CPSC 235 Advanced Introduction to Computer Science	(1B.3a)
PHYS 381 Computational Physics I	(1B.3b)
PHYS 481 Computational Physics II	(1B.3b)

1B.4 Mathematics

MATH 211 Linear Methods I	(1B.4c)
MATH 213 Honours Linear Algebra I	(1B.4c)
MATH 267 University Calculus II	(1B.4a)
MATH 277 Multivariable Calculus for Engineers and Scientists	(1B.4a)
MATH 331 Multivariate Calculus	(1B.4d)
MATH 375 Differential Equations for Engineers and Scientists	(1B.4b)
or	
Higher-level mathematics courses for science or engineering majors that require one or more of the above courses as prerequisites. See the University of Calgary calendar.	(1B.4e)

1B.5 Physics

ENGG 201 Behaviour of Gases, Liquids and Solids	(1B.5b)
ENGG 311 Engineering Thermodynamics	(1B.5b)
PHYS 211 Mechanics	(1B.5a, same as 1A.3a,c)
PHYS 221 Mechanics	(1B.5a, same as 1A.3a,c)
PHYS 223 Introductory Electromagnetism and Thermal Physics	(1B.5a, same as 1A.3b,d)
PHYS 227 Classical Physics	(1B.5a, same as 1A.3a,c)
PHYS 259 Electricity and Magnetism (for students in Engineering)	(1B.5a, same as 1A.3b,d)
PHYS 321 Harmonic Motion, Waves & Rotation	(1B.5c)
PHYS 323 Optics & Electromagnetism	(1B.5a,c, same as 1A.3b,d)

PHYS 369 Acoustics, Optics and Radiation (for students in Engineering) (1B.5c)
PHYS 375 Introduction to Optics and Waves (1B.5c)
PHYS 449 Statistical Mechanics I (1B.5e)

or

Higher level physics courses for science or engineering majors that require one or more of the above courses as prerequisites. See the University of Calgary calendar. (1B.5e)

1B.6 Statistics

STAT 213 & 217 Introduction to Statistics I & II
STAT 323 Introduction to Theoretical Statistics
STAT 327 Statistics for the Physical and Environmental Sciences

Group 2A Compulsory Foundation Geoscience

2A.1 Field Techniques

GLGY 337 Introduction to Geologic Field Methods (2A.1b)
GOPH 549 Field School (2A.1a)

2A.2 Mineralogy and Petrology

GLGY 201 Principles of Geoscience
GLGY 313 Mineralogy

2A.3 Sedimentation and Stratigraphy

GLGY 381 Sedimentary Rocks & Processes

2A.4 Structural Geology

GLGY 343 3D Geologic Structures and Methods
GLGY 445 Structural Geology

Group 2B Additional Foundation Geoscience

2B.1 Digital Signal Processing

GOPH 517 Geophysical Signal Processing I
GOPH 557 Geophysical Signal Processing II

2B.2 Global Geophysics / Physics of the Earth

GOPH 351 Introduction to Geophysics (2B.2a,b)

2B.3 Seismology / Seismic Methods

GOPH 355 Exploration Geophysics	(2B.3b)
GOPH 551 Seismic Theory & Methods	(2B.3a)
GOPH 665 Theoretical Seismology	(2B.3a)

2B.4 Exploration Geophysics

GOPH 355 Exploration Geophysics

2B.5 Radiometrics / Gravity & Magnetism

GOPH 547 Global & Mineral Exploration Applications	(2B.5b)
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2B.6 Electrical & Electromagnetic Methods

GOPH 565 Environmental Applications of Geophysics

Group 2C Other Geoscience/Science

These lists are not meant to be exhaustive.

These courses are at the second level or higher.

2C.1 Applied Math / Physics

ENGG 317 Mechanics of Solids	(2C.1d)
ENME 341 Fundamentals of Fluid Mechanics	(2C.1h)
GLGY 597 Geostatistics	(2C.1j)
MATH 331 Multivariate Calculus	(2C.1r)
MATH 367 University Calculus III	(2C.1r)
MATH 375 Differential Equations for Engineers and Scientists (same as 1B.4b)	
PHYS 375 Introduction to Optics & Waves	(2C.1o, same as 1B.5c)
PHYS 381 Computational Physics I	(2C.1n, same as 1B.3b)
PHYS 397 Applied Physics Laboratory I	
PHYS 455 Electromagnetic Theory II	(2C.1f)
PHYS 481 Computational Physics II	(2C.1n, same as 1B.3b)
PHYS 507 Solid State Physics	(2C.1c)

2C.2 Communication

COMS 363 Professional and Technical Communication	(2C.2b)
GLGY 510 Senior Thesis	(2C.2a)
GOPH 509 Independent Study (Senior B.Sc. Thesis)	(2C.2a)
M.Sc. or Ph.D. Thesis	(2C.2a)
SCIE 311 Writing and Reviewing Scientific Reports	(2C.2b)

2C.3 Earth & Planetary Geoscience

GLGY 555 Global Tectonics	(2C.3b)
GOPH 351 Introduction to Geophysics	(2C.3c, same as 2B.2a,b)

2C.4 Field Techniques

GLGY 337 Introduction to Geologic Field Methods	(2C.4b, same as 2A.1b)
GLGY 435 Field Methods	(2C.4b, same as 2A.1b)
GLGY 441 Field Techniques in Hydrogeology	
GLGY 537 Advanced Field Methods	
GLGY 545 Petroleum Geology Field School	
GOPH 549 Field School	(2C.4a, same as 2A.1a)

2C.5 Fundamental Math / Physics

ENGG 311 Engineering Thermodynamics (2C.5e, same as 1B.5b)
PHYS 321 Harmonic Motion, Waves & Rotation
PHYS 323 Optics & Electromagnetism
PHYS 369 Acoustics, Optics and Radiation (for students in Engineering)
PHYS 375 Introduction to Optics and Waves (2C.5f, same as 1B.5c)
PHYS 449 Statistical Mechanics I

2C.6 Geology

GLGY 323 Geochemical Processes (2C.6a)
GLGY 333 Igneous, Metamorphic & Ore Rocks and Processes
GLGY 403 Aqueous Geochemistry
GLGY 431 Igneous Petrology (2C.6b)
GLGY 433 Metamorphic Petrology (2C.6c)
GLGY 463 Siliciclastic Sedimentology
GLGY 483 Carbonate Sedimentology
GLGY 535 Early Earth Evolution
GLGY 541 Advanced Structural Geology (2C.6e)
GLGY 555 Global Tectonics (2C.6f)
GLGY 561 Sequence Stratigraphy
GLGY 579 Basin Analysis
GLGY 583 Advanced Carbonate Sedimentology
GLGY 587 Invertebrate Paleobiology
GLGY 641 Advanced Structural Methods (2C.6e)

2C.7 Geophysical Methods & Interpretation

GLGY 623 Modern Diffraction and Scattering Techniques (2C.7b)
GOPH 351 Introduction to Geophysics (2B.2a,b)
GOPH 355 Exploration Geophysics (2B.3b)

GOPH 419 Computational Methods for Geophysicists
GOPH 420 Inversion & Parameter Estimation for Geophysicists
GOPH 457 Physical Properties of Rocks (2C.7h)
GOPH 517 Time Series Analysis and 1D Data Processing
GOPH 547 Gravity and Magnetism (2C.7e, same as 2B.5)
GOPH 551 Seismic Theory & Methods (2C.7f, same as 2B.3a)
GOPH 557 Multidimensional Data Analysis and Processing
GOPH 559 Geophysical Interpretation (2C.7i)
GOPH 657 Seismic Signal Analysis
GOPH 665 Theoretical Seismology
GOPH 667 Introduction to Microseismic Methods
GOPH 671 Inverse Theory and Applications I
GOPH 673 Inverse Theory and Applications II

2C.8 Modern Physics

PHYS 443 Quantum Mechanics I (2C.8b)
PHYS 449 Statistical Mechanics I (2C.8c)

2C.9 Near Surface Geoscience

GEOG 484 Remote Sensing Essentials (2C.9g)
GLGY 353 Surficial Systems
GOPH 355 Exploration Geophysics
GOPH 565 Environmental Applications of Geophysics (2C.9a, same as 2B.6)

2C.10 Regional Geology

2C.11 Resource Geoscience

ENPE 507 Well Logging and Formation Evaluation (2C.11g)
ENPE 523 Introduction to Reservoir Engineering (2C.11f)
GLGY 401 Physical Hydrogeology (2C.11b)
GLGY 505 Contaminant Hydrogeology
GLGY 527 Ore Deposits (2C.11d)
GLGY 571 Engineering Geology
GLGY 577 Introduction to Petroleum Geology (2C.11e)
GLGY 579 Basin Analysis
GLGY 581 Advanced Petroleum Geology (2C.11e)
GLGY 601 Advanced Physical Hydrology (2C.11c)