Geophysics vs. Physics Path to P. Eng.

This review attempts to estimate the relative proximity of both a Bachelor's of Science in Geophysics and Physics to the course by course standard set by the CEQB.

The procedure was to plan a potential course selection optimized for the standard CEQB syllabus within the constraints of the University of Calgary Science Department requirements for these Majors. This way the potential range of assigned technical examinations following a course by course review could be estimated. The EGBC self-assessment forms and the APEGA course equivalents were used to aid in the analysis. The geophysics major was assessed relative to the geological engineering syllabus and the physics major was assessed relative to the engineering physics syllabus as most "related" to their science education.

It was found that a Geophysics Major graduate would be assigned between 6 and 16 of 24 potential technical examinations depending on the options selected in the degree program.

It was also found that a Physics Major graduate would be assigned between 5 and 16 of 24 potential technical examinations.

Geophysics Major Ph		Physics Major		
Semester 1				
Chemistry 211	Foundations of Chemistry: Structure and Bonding	Chemistry 211	Foundations of Chemistry: Structure and Bonding	
Physics 221	Mechanics	Physics 221	Mechanics	
Mathematics 275	Calculus for Engineers and Scientists	Mathematics 275	Calculus for Engineers and Scientists	
Computer Science 217	Introduction to Computer Science for Multidisciplinary Studies	Computer Science 217	Introduction to Computer Science for Multidisciplinary Studies	
Geology 201	Principles of Geoscience	Mathematics 211	Linear Methods I	
Semester 2				
Physics 223	Introductory Electromagnetism, and Thermal Physics	Physics 223	Introductory Electromagnetism, and Thermal Physics	
Chemistry 213	Foundations of Chemistry: Change and Equilibrium	Chemistry 213	Foundations of Chemistry: Change and Equilibrium	
Mathematics 277	Multivariable Calculus for Engineers and Scientists	Mathematics 277	Multivariable Calculus for Engineers and Scientists	
*Engineering 212	Fundamentals of Fluid Behavior	*Engineering 212	Fundamentals of Fluid Behavior	
Geology 202	Applications of Geoscience	Physics 229	Modern Physics	
Semester 3				
Mathematics 211	Linear Methods I	Mathematics 367	University Calculus III	
Geology 381	Sedimentary Rocks and Processes	Mathematics 375	Differential Equations for Engineers and Scientists	
Geophysics 351	Introduction to Geophysics and Planetary Physics	Mathematics 311	Linear Methods II	
Geophysics 355	Exploration and Environmental Geophysics	Physics 341	Classical Mechanics I	
Physics 323	Optics and Electromagnetism	*Engineering 202	Engineering Statics	
Semester 4				
Physics 321	Harmonic Motion, Waves, and Rotation	Physics 343	Classical Mechanics II	
Geology 343	3D Geologic Structures and Methods	Physics 355	Electromagnetic Theory I	
Mathematics 367	University Calculus III	Physics 375	Introduction to Optics and Waves	
Mathematics 375	Differential Equations for Engineers and Scientists	Physics 381	Computational Physics I	
*Engineering 202	Engineering Statics	*Engineering 349	Dynamics	
Semester 5				
Geology 445	Structural Geology	Physics 397	Applied Physics Laboratory I	
Geophysics 419	Computational Methods for Geophysicists	Physics 435	Mathematical Methods in Physics	
Geophysics 420	Inversion and Parameter Estimation for Geophysicists	Physics 449	Statistical Mechanics I	
*Engineering 311	Engineering Thermodynamics	Physics 455	Electromagnetic Theory II	
*Engineering 317	Mechanics of Solids	*Engineering 317	Mechanics of Solids	
Semester 6		·		
Geophysics 457	Physical Properties of Minerals, Soils and Rocks	Physics 443	Quantum Mechanics I	
*Chemical Engineering 331	Process Fluid Dynamics	Physics 457	Electromagnetic Theory III	
*Geology 401	Physical Hydrogeology	Physics 497	Applied Physics Laboratory II	
*Geology 571	Engineering Geology	*Engineering 225	Fundamentals of Electrical Circuits and Machines	
*Geology 353	Surficial Systems	*Physics 481	Computational Physics II	
Semester 7		-		
Geophysics 549	Field School	Physics 501	Relativity	
Geophysics 517	Geophysical Signal Processing I	Physics 599	Senior Research Thesis	
Statistics 327	Statistics for the Physical and Environmental Sciences	*Statistics 327	Statistics for the Physical and Environmental Sciences	
*Civil Engineering 413	Introduction to Civil Engineering Materials	*Physics 507	Solid State Physics	
*Geology 441	Field Techniques in Hydrogeology	*Mechanical Engineering 421	Materials I	
Semester 8				
Geophysics 551	Seismic Theory with Hydrocarbon Applications	*Physics 561	Stable and Radioactive Isotope Studies, Fundamentals	
Geophysics 559	Imaging, Inversion, and Interpretation of Geophysical Data	*Mechanical Engineering 485	Mechanical Engineering Thermodynamics	
Geophysics 565	Environmental Applications of Geophysics	*Electrical Engineering 361	Electronic Devices and Materials	
*Geography 254	Society and Environment	*Geography 254	Society and Environment	
*Economics 209	Engineering Economics	*Economics 209	Engineering Economics	

"*" = Option Course

"BOLD" = APEGA Engineering Course Equivalent

"<u>UNDERLINE</u>" = Common to Physics and Geophysics

ENGINEERS AND GEOSCIENTISTS BRITISH COLUMBIA 2018 GEOLOGICAL ENGINEERING SYLLABUS For Self-Evaluation

Name: _____<u>George Rockbetter</u> ______ User ID: ______

For directions, refer to the <u>Instructions for Completing Syllabus and Course Descriptions</u>. Please save as a PDF document and upload via your applicant portal.

Exam Number	Exam Name	Applicant's Self-Evaluation – Course Equivalent Code	Page Number Reference	For Office Use Only Notes
		Basic Studies (6 Rec	quired)	
04-BS-1	Mathematics	Mathematics 211 Mathematics 277 Mathematics 375		Full-Credit- No Credit Comments Mismatch with APEGA course equivalents list. Need vector math which is included in 277 but this is only referenced in 177 course description. You might get this one but it could take an appeal.
04-BS-2	Probability and Statistics	Statistics 327		Full Credit No Credit Comments On APEGA course equivalents list.
04-BS-3	Statics and Dynamics	Engineering 202 Engineering 349	Option	Full Credit No Credit Comments Good on statics (APEGA course equivalent). You could take Engineering 349 instead of another option to get this.

04-BS-6	Mechanics of Materials	Engineering 317	Option	Full Credit	No Credit
				Comments	
				On APEGA course equivale	ents list.
04-BS-7	Mechanics of Fluids	Chemical Engineering 331	Option	Full Credit	No Credit
04 00 7			option		
				Comments	
				On APEGA course equivale	ents list.
04-BS-14	Geology	Geology 201		Full Credit	No Credit
		Geology 202			
				Comments	
				Geology 471 is on course en	quivalents list which
				interchangeable for Geology	y 201.
		Basic Studies (2 Rec	quired)		
04-BS-5	Advanced			Full Credit	No Credit
	Mathematics			Comments	
				No clear course equivalent.	
04-BS-10	Thermodynamics	Engineering 311	Option	Full Credit	No Credit
				Comments	
				On APEGA course equivale	ents list.
04-BS-11	Properties of Materials	Civil Engineering 413	Option	Full Credit	No Credit
				Comments	
				On APEGA course equivale	ents list.
04-BS-12	Organic Chemistry	Chemistry 357		Full Credit	No Credit
		······································		Comments	
				On APEGA course equivale take Chemistry 357 instead this.	ents list. You could of another to get
04-BS-15	Engineering Graphics			Full Credit	No Credit
	and Design Process			Comments	
				The course equivalent Mech prerequisite you don't need.	hanical 339 has a . Not worth it.

		Group A (7 requir	ed)		
18-Geol-A1	Mineralogy & Petrology	Geology 313 Geology 333		Full Credit	No Credit
				Comments	
				On APEGA course equival	ents list.
18-Geol-A2	Hydrogeology	Geology 401	Option	Full Credit	No Credit
				Comments	
				On APEGA course equival	ents list.
18-Geol-A3	Sedimentation & Stratigraphy	Geology 381		Full Credit	No Credit
				Comments	
				On APEGA course equival	ents list.
18-Geol-A4	Structural Geology	Geology 343		Full Credit	No Credit
		Geology 445			
				Comments	
				On APEGA course equival needed one but applicant h	ents list. Just nas both
18-Geol-A5	Rock Mechanics	Geology 571	Option	Full Credit	No Credit
				Comments	
				On APEGA course equival	ents list.
18-Geol-A6	Soil Mechanics	Civil Engineering 423		Full Credit	<u>No Credit</u>
				Comments	
				APEGA course equivalent 423. You may be able to ge the prerequisite is Geology equivalent to Geology 201.	is Civil Engineering et into this course as 376 which is
	Applied Geophysics	Geophysics 351		Full Credit	No Credit
10-0e0i-A7					
				Comments	
				On APEGA course equival	ents list.

		Group B (3 Requir	red)		
18-Geol-B1	Contaminant Hydrogeology	Geology 505		Full Credit Comments On APEGA course equivale Geology 401 & 403 as pre-p need to have this as one of B so you can change up sor electives if you want to.	No Credit nts list. You need prequisite. You don't your three in Group me of your geology
18-Geol-B2	Terrain Analysis			Full Credit Comments The course equivalents are Since you have extra Group options for it.	No Credit geography classes. B, not worth using
18-Geol-B3	Site Investigation	Geology 441	Option	Full Credit Comments On APEGA course equivale	No Credit nts list.
18-Geol-B4	Geomorphology & Pleistocene Geology	Geology 353	Option	Full Credit Comments On APEGA course equivale	No Credit nts list.
18-Geol-B5	Environmental Geology			Full Credit Comments No clear course equivalent.	No Credit

40.0 1.00			Full Credit	No Crodit
18-Geol-B6	Resource Geology		<u>r un creun</u>	No orcan
	ONE of			
	18-Geol-B6-1 –		Comments	
	Petroleum Deposits		Too many pre-requisites.	
	or			
	18-Geol-B6-2 – Coal			
	Deposits			
	or			
	18 Cool R6 2			
	Notallia & Industrial			
	Mineral Deposits			
	Milleral Deposits			
18-Geol-B7	Petroleum		Full Credit	No Credit
	Development			
	201000		Commonto	
			The course equivalent has the	wo 600 level pre-
18-Geol-B8	Resource Economics		Full Credit	No Credit
	& Valuation			
			Comments	
			600 level option. Not worth it	
			Full Credit	No Cradit
18-Geol-B9	Exploration & Mining		Fuil Credit	No Credit
	Geology			
			Comments	
			No clear course equivalent.	

18-Geol-10	Geophysical Exploration Methods <u>ONE</u> of 18-Geol-B10-1 – Gravity & Magnetic Fields or 18-Geol-B10-2 – Electrical Methods or 18-Geol-B10-3 – Exploration Seismology	Geophysics 565	Option	Full Credit No Credit Comments On APEGA course equivalents list
		Complementary Studies (A	All Required)	
11-CS-1 11-CS-2	Engineering Economics Engineering in	Economics 209	Option	Full CreditNo CreditCommentsOn APEGA course equivalents list but you will need to arrange permission to take it. Take Econ 209 so you can use it as one of your Arts credits.Full CreditNo Credit
	Society – Health and Safety			Comments
11-CS-3	Sustainability, Engineering and the Environment	Geography 254	Option	Full Credit No Credit Comments Geography 254 covers much of the same ground. Maybe you get credit. This is your other arts credit.
11-CS-4	Engineering Management			Full Credit No Credit Comments

Name: Olivia Newton-Electron

User ID:

For directions, refer to the <u>Instructions for Completing Syllabus and Course Descriptions</u>.

Please save as a PDF document and upload via your applicant portal.

Exam Number	Exam Name	Applicant's Self-Evaluation – Course Equivalent Code	Page Number Reference to Course Equivalent	For Office Use Only
Basic Studies (6 R	equired)			
04-BS-1	Mathematics	Mathematics 211 Mathematics 311 Mathematics 275 Mathematics 277 Mathematics 367 Mathematics 375		Full Credit No Credit This one could not be denied to our applicant.
04-BS-2	Probability and Statistics	Statistics 327	Option	Full CreditNo CreditListed as APEGA courseequivalent.
04-BS-3	Statics and Dynamics	Engineering 202 Engineering 349	Options	Full CreditNo CreditListed as APEGA courseequivalent.
04-BS-4	Electric Circuits and Power	Engineering 225	Options	Full CreditNo CreditListed as APEGA courseequivalent.
04-BS-5	Advanced Mathematics	Physics 381 Physics 481	481 is an option	Full CreditNo CreditThese two physics coursescover all aspects of 04-BS-5syllabus.

04-BS-9	Basic Electromagnetics	Physics 355	Full Credit	No Credit
		Physics 455	Electromagnetics I, II	I, & III.
		Physics 457	BS-9 syllabus covered	d and then
			some.	

Basic Studies (2 r	equired)			
04-BS-6	Mechanics of Materials	Engineering 317	Option	Full Credit No Credit
				On APEGA course equivalents list.
04-BS-7	Mechanics of Fluids	Mechanical Engineering 341	Option	Full CreditNo CreditOn APEGA course equivalents list. Could take this one instead of one of the others.
04-BS-8	Digital Logic Circuits	Electrical Engineering 353		Full CreditNo CreditNot worth it as needs twoprerequisites.
04-BS-10	Thermodynamics	Engineering 311	Option	Full Credit No Credit On APEGA course equivalents list. Could take this one instead of one of the others.
04-BS-11	Properties of Materials	Mechanical Engineering 421	Option	Full CreditNo CreditOn APEGA course equivalentslist.
04-BS-12	Organic Chemistry	Chemistry 357	Option	Full CreditNo CreditOn APEGA course equivalents list. Couldtake this one instead of one of the others.

Group A (7 requir	red)				
17-Phys-A1	Classical Mechanics	Physics 343		Full Credit Listed as APEGA cours equivalent.	No Credit se
17-Phys-A2	Statistical Physics	Physics 449		Full CreditNoListed as APEGA coursequivalent.	Credit se
17-Phys-A3	Electromagnetics	Physics 457		Full Credit The APEGA course equire a prerequisite open. PHYS 457 cover material. May be subj appeal.	No Credit uivalents not rs the ject to
17-Phys-A4	Quantum Mechanics	Physics 443		Full Credit Listed as APEGA cours equivalent.	No Credit se
17-Phys-A5-A	Electronic Materials and Devices	Electrical Engineering 361	Option	Full Credit APEGA course equival longer available. This on electronic material devices seems to repl covers syllabus. May b to appeal.	No Credit lent no course is ls and ace it and be subject
17-Phys-A5-B	Analog and Digital Electronic Circuits			Full Credit No clear course equiv	No Credit alent.

17-Phys-A6	Solid State Physics	Physics 507	Option	Full Credit	No Credit
				Listed as APEGA cou	irse
				equivalent.	
17-Phys-A7	Optics			Full Credit	No Credit
				No clear course equi	ivalent.
Group B (3 Requi	red)				
17-Phys-B1	Radiation Physics	Physics 561	Option	Full Credit	No Credit
				Listed as APEGA cou	irse
				equivalent.	
17 Dhua D2	Flastra Ontical			Full Cue dit	No Crodit
17-Phys-B2	Electro-Optical Engineering			Full Credit	No Credit
	Lingineering				
17-Phys-B3	Digital Systems and			Full Credit	No Credit
	Computers				
17-Phys-B4	Signals and			Full Credit	No Credit
	Communications				
17-Phys-B5	Systems and Control			Full Credit	No Credit
17-Phys-B6	Applied Thermodynamics	Mechanical Engineering 485	Option	Full Credit	No Credit
	and Heat Transfer				
				LISLEU AS APEGA COU	irse
				equivalent.	
17-Phys-B7	Structure of Materials	Mechanical Engineering 421	Option	Full Credit	No Credit
				Listed as APEGA cou	irse
				equivalent.	
				- quivalenti	

Complementary Studies (All Required)					
11-CS-1	Engineering Economics	Economics 209	Option	Full Credit	No Credit
				Comments	
				On APEGA course equivalents	
				list but you will need	d to
				arrange permission to take	
				it.Take Econ 209 so	you can use
				it as one of your Art	s credits.
11-CS-2	Engineering in Society –			Full Credit	No Credit
	Health and Safety			Comments	
11-CS-3	Sustainability, Engineering and the Environment	Geography 254		Full Credit	No Credit
				Comments	
				Geography 254 covers much of the same ground. Maybe you get credit. This is your other arts credit.	
11-CS-4	Engineering Management			Full Credit	No Credit
				Comments	

B.Sc. Geophysics

University of Calgary

Electives optimized for Geological Engineering Syllabus

First Semester

Required Courses

Geology 201 Principles of Geoscience

Chemistry 211 Foundations of Chemistry: Structure and Bonding

Physics 221 Mechanics

Mathematics 275 Calculus for Engineers and Scientists

Computer Science 217 Introduction to Computer Science for Multidisciplinary Studies

Second Semester

Required Courses

- Geology 202 Applications of Geoscience
- Prerequisite(s): Geology 201

Physics 223 Introductory Electromagnetism, and Thermal Physics

Prerequisite(s): Physics 221

Chemistry 213 Foundations of Chemistry: Change and Equilibrium

Prerequisite(s): Chemistry 211

Mathematics 277 Multivariable Calculus for Engineers and Scientists

Prerequisite(s): Mathematics 275

Option Courses

Engineering 212 Fundamentals of Fluid Behaviour

Needed for Engineering 311 & Chemical Engineering 331

Third Semester

Required Courses

Geology 381 Sedimentary Rocks and Processes

Prerequisite(s): Geology 202, Chemistry 213, and Physics 221

Geophysics 351 Introduction to Geophysics and Planetary Physics

Prerequisite(s): Geology 201 and 202, Mathematics 277, and Physics 223

Geophysics 355 Exploration and Environmental Geophysics

Prerequisite(s): Geology 201 and 202, Mathematics 277, and Physics 223

Mathematics 211 Linear Methods I

Physics 323 Optics and Electromagnetism

Prerequisite(s): Physics 223 and 3 units from Physics 221; and 3 units from Mathematics 275.

Fourth Semester

Required Courses

Physics 321 Harmonic Motion, Waves, and Rotation

Prerequisite(s): 3 units from Physics 221; and Mathematics 211; and Mathematics 277.

Geology 343 3D Geologic Structures and Methods

Prerequisite(s): Geology 381

Mathematics 367 University Calculus III

Prerequisite(s): Mathematics 277; and Mathematics 211.

Mathematics 375 Differential Equations for Engineers and Scientists

Prerequisite(s): Mathematics 277

Needed for Chemical Engineering 331

Option Courses

Engineering 202 Engineering Statics

Needed for Engineering 317, Chemical Engineering 331

Fifth Semester

Required Courses

Geology 445 Structural Geology

Prerequisite(s): Geology 343

Geophysics 419 Computational Methods for Geophysicists

Prerequisite(s): Mathematics 211; and Mathematics 267; and Geophysics 351 or 355; and 3 units from Computer Science 217.

Geophysics 420 Inversion and Parameter Estimation for Geophysicists

Prerequisite(s): Mathematics 211; and Mathematics 267; and Geophysics 351 or 355; and 3 units from Computer Science 217.

Selected Courses

Option Courses

Engineering 311 Engineering Thermodynamics

Prerequisite(s): Engineering 212 and Mathematics 275

Needed for Petroleum 523 and APEGA 04-BS-10

Engineering 317 Mechanics of Solids

Prerequisite: Engineering 202 & Mathematics 275

Needed for APEGA 04-BS-6

Sixth Semester

Required Courses

Geophysics 457 Physical Properties of Minerals, Soils and Rocks

Prerequisite(s): Geophysics 351 or 355; and Mathematics 211; and Mathematics 267.

Option Courses

Chemical Engineering 331 Process Fluid Dynamics

Prerequisite(s): Engineering 212, Engineering 202, and Mathematics 375

Needed for Petroleum Engineering 523 and APEGA 04-BS-7

Geology 401 Physical Hydrogeology

Prerequisite(s): Geology 202, Mathematics 277, and Physics 221

Needed for Geology 441 and APEGA 18-GEOL-A2

Geology 571 Engineering Geology

Prerequisite(s): Geology 343, Physics 221, and Mathematics 277

Needed for APEGA 18-GEOL-A5

Geology 353 Surficial Systems

Prerequisite(s): Geology 202; and Chemistry 203 or 213; and Physics 223; and Physics 211 or 221; and Mathematics 267 or 277.

Needed for APEGA 18-GEOL-B4

Seventh Semester

Required Courses

Geophysics 549 Field School

Prerequisite(s): Geophysics 355, 419, and 457.

Geophysics 517 Geophysical Signal Processing I

Prerequisite(s): Geophysics 355 and 419; and Mathematics 211; and Mathematics 267.

Selected Courses

Statistics 327 Statistics for the Physical and Environmental Sciences

Prerequisite(s): Mathematics 275

Needed for APEGA 04-BS-2

Option Courses

Civil Engineering 413 Introduction to Civil Engineering Materials

Prerequisite(s): Engineering 201 or 212; and Engineering 317 or Civil Engineering 317

Needed for APEGA 04-BS-11

Geology 441 Field Techniques in Hydrogeology

Prerequisite: Geology 401

Needed for APEGA 18-GEOL-B3

Eighth Semester

Required Courses

Geophysics 551 Seismic Theory with Hydrocarbon Applications

Prerequisite(s): Geophysics 355, 419 and 517; Physics 321, 323; Mathematics 211; and Mathematics 367

Geophysics 559 Imaging, Inversion, and Interpretation of Geophysical Data

Prerequisite(s): Geophysics 351 and 355; and Mathematics 211; and Mathematics 267

Selected Courses

Geophysics 565 Environmental Applications of Geophysics

Prerequisite(s): Geophysics 457; and Mathematics 211; and Mathematics 267

Option Courses

Geography 254 Society and Environment

Economics 209 Engineering Economics

Need permission from Economics Department. Do not take Engineering 229 as you want to use this as an arts credit.

Needed for APEGA 11-CS-1

Students must successfully complete a minimum of 54 units, to a maximum of 66 units, in Courses Constituting the Field of Geology while fulfilling the following requirements:

27 units - Geophysics 351, 355, 419, 420, 457, 517, 549, 551, 559

3 units - Geophysics 547 or 565

15 units - Geology 201, 202, 343, 381, 445

- 6 units Chemistry 201 or 211, and 203 or 213
- 3 units Computer Science 217, 231 or Data Science 211
- 3 units Mathematics 249 or 265 or 275

12 units - Mathematics 211; and 267 or 277; and 367 or 377; and 375 or 376

12 units - Physics 211 or 221, 223, 321, 323

3 units - Statistics 321 or 327

6 units - Science or Engineering options from the following:

- Chemistry 321, 371, 373
- Computer Science 219 or 233
- Mathematics 307, 311, 361, <u>375</u>, 376, 411, 413, 421
- Petroleum Engineering 507, 513, 515, 523, 543
- Physics 229 or 325, 341, 343, 397, 455, 497
- Courses in the Field of Geophysics
- Courses in the Field of Geology

Geology 401

Geology 571

18 units - Breadth Requirement: Options from faculties other than the Faculty of Science, excluding courses in Table I.

Engineering 202

Engineering 212

Engineering 311

Chemical Engineering 331

Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

Geography 254

Economics 209 (Requires Permission of Economics Department)

6 units - Non-Major Field Requirement: Options outside of the Field of Geophysics

Engineering 413

Engineering 317

6 units - Options

Geology 353

Geology 441

B.Sc. Physics

University of Calgary

Electives optimized for 2017 National Engineering Physics Syllabus

First Semester

Required Courses

Chemistry 211 Foundations of Chemistry: Structure and Bonding

Physics 221 Mechanics

Mathematics 275 Calculus for Engineers and Scientists

Computer Science 217 Introduction to Computer Science for Multidisciplinary Studies

Mathematics 211 Linear Methods I

Second Semester

Required Courses

Physics 229 Modern Physics

Prerequisite(s): 3 units from Physics 211, **221**, 227 or Engineering 349; and 3 units from Mathematics 249, 265 or **275**.

Physics 223 Introductory Electromagnetism, and Thermal Physics

Prerequisite(s): Physics 221

Chemistry 213 Foundations of Chemistry: Change and Equilibrium

Prerequisite(s): Chemistry 211

Mathematics 277 Multivariable Calculus for Engineers and Scientists

Prerequisite(s): Mathematics 275

Option Courses

Engineering 212 Fundamentals of Fluid Behaviour

Needed for Engineering 311 & Mechanical Engineering 341

Third Semester

Required Courses

Physics 341 Classical Mechanics I

Prerequisite(s): 3 units from Physics 211, 221 or 227; and Mathematics 211 or 213; and Mathematics 267 or 277.

Mathematics 375 Differential Equations for Engineers and Scientists

Prerequisite(s): Mathematics 277

Mathematics 367 University Calculus III

Prerequisite(s): Mathematics 277; and Mathematics 211.

Mathematics 311 Linear Methods II

Prerequisite(s): Mathematics 211 or 213

Option Courses

Engineering 202 Engineering Statics

Needed for Engineering 317, Mechanical Engineering 341, APEGA 04-BS-3

Fourth Semester

Required Courses

Physics 343 Classical Mechanics II

Prerequisite(s): Physics 341.

Prerequisite(s): 3 units from Physics 211, 221 or 227; and Mathematics 375 or 376.

Physics 355 Electromagnetic Theory I

Prerequisite(s): 3 units from Physics 211, 221 or 227; and Mathematics 375 or 376.

Physics 375 Introduction to Optics and Waves

Prerequisite(s): 3 units from Physics 211, 221 or 227; and Mathematics 267 or 277.

Physics 381 Computational Physics I

Prerequisite(s): Physics 341; and 3 units from Computer Science 217, 231 or Data Science 211.

Option Courses

Engineering 349 Dynamics

Prerequisite(s): Engineering 202 or Energy Engineering 260; and Mathematics 277 or Mathematics 331.

Needed for APEGA 04-BS-3

Fifth Semester

Required Courses

Physics 397 Applied Physics Laboratory I

Prerequisite(s): Physics 229 or 325.

Physics 435 Mathematical Methods in Physics

Prerequisite(s): Physics 343 and Mathematics 367; and one Mathematics 375 or 376.

Physics 449 Statistical Mechanics I

Prerequisite(s): Physics 229 or 325; and Mathematics 375 or 376; and either Physics 343 and Mathematics 367; or Physics Engineering 383.

Physics 455 Electromagnetic Theory II

Prerequisite(s): 3 units from Physics 255, 355, 259 or 323; and Mathematics 375 or 376; and Mathematics 367.

Option Courses

Engineering 317 Mechanics of Solids

Prerequisite: Engineering 202 & Mathematics 275

Needed for APEGA 04-BS-6

Sixth Semester

Required Courses

Physics 443 Quantum Mechanics I

Prerequisite(s): Physics 343; and 229 or 325; and Mathematics 311 or 313; and Physics 435 or Mathematics 433

Physics 457 Electromagnetic Theory III

Prerequisite(s): Physics 455 or Electrical Engineering 475; and one of Physics 435, Mathematics 433 or Physics Engineering 435.

Physics 497 Applied Physics Laboratory II

Prerequisite(s): Physics 397; and Mathematics 433 or Physics 435.

Option Courses

Engineering 225 Fundamentals of Electrical Circuits and Machines

Needed for APEGA 04-BS-4

Physics 481 Computational Physics II

Prerequisite(s): Physics 381 or Computer Engineering 335; and Mathematics 375 or 376.

Seventh Semester

Required Courses

Physics 501 Relativity

Prerequisite(s): Physics 455 or Electrical Engineering 475.

Physics 599 Senior Research Thesis

Option Courses

Statistics 327 Statistics for the Physical and Environmental Sciences

Prerequisite(s): Mathematics 275

Needed for APEGA 04-BS-2

Physics 507 Solid State Physics

Prerequisite(s): Physics **443** and **449**; and Physics **455** or Electrical Engineering 475.

Needed for APEGA 11-PHYS-A6

Mechanical Engineering 421 Materials I

Prerequisite(s): 3 units from Engineering 311, Biomedical Engineering 322, or Physics **449**.

Needed for APEGA 17-PHYS-B7

Eighth Semester

Option Courses

Physics 561 Stable and Radioactive Isotope Studies, Fundamentals

Needed for APEGA 17-PHYS-B1

Mechanical Engineering 485 Mechanical Engineering Thermodynamics

Prerequisite(s): Engineering 311 or Physics 449.

Needed for APEGA 17-PHYS-B6

Geography 254 Society and Environment

Economics 209 Engineering Economics

Need permission from Economics Department. Do not take Engineering 229 as you want to use this as an arts credit.

Needed for APEGA 11-CS-1

Electrical Engineering 361 Electronic Devices and Materials

Prerequisite(s): Engineering 225 and Mathematics 277.

Needed for 17-PHYS-A5-A

3 units - Physics 211 or 221 or 227

3 units - Physics 229

3 units - Mathematics 211 or 213

3 units - Mathematics 249, 265 or 275

3 units - Mathematics 267 or 277

3 units - Computer Science 217 or Data Science 211

3 units - Chemistry 201 or 209 or 211 or Biology 241

3 units - Chemistry 203 or 213 or Biology 205 or Computer Science 219 or Astrophysics 305

39 units - Physics 341, 343, 355, 375, 381, 397, 443, 449, 455, 457, 497, 501, and 599 or 598

3 units - 400- or 500-level Physics option Physics 561

3 units - Mathematics **311** or 313

6 units - Mathematics 375 or 376, and Mathematics 367 or 377

3 units - Physics 435 or Mathematics 433

18 units - Breadth Requirement: Options from faculties other than the Faculty of Science, excluding courses in Table I. <u>Engineering 225</u>, <u>Mechanical Engineering 421</u>, <u>Mechanical Engineering 485</u>, <u>Electrical Engineering 361</u>

Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

Geography 254, Economics 209 (Requires Permission of Economics Department)

6 units - Science options

Physics 481, Physics 507

3 units - Non-Major Field Requirement: Options that are not in the Field of Physics

Statistics 327

15 units - Options

Engineering 202, Engineering 349, Engineering 317