

## Course Requirements and Registration Priorities (PhD), Fall 2023

#	Abbr	Title	Cr(US)	Cr(ECTS)	PreRequisite	CoRequisite	AntiRequisite	1st priority registration	2nd priority registration	3rd priority registration	4th priority registration
<b>GSB</b>											
<b>GSB</b>											
1	GSBPHD 01	Foundations of Social Science Research	4	8				Business Administration PhD			
<b>GSPP</b>											
<b>PhD in Public Policy</b>											
2	DPE 628	Good Governance and Corruption	4	8				2 year GSPP PhD Public Policy	Biomedical Sciences, Business Administration PhD, Chemical Engineering, Chemistry, Civil Engineering, Computer Science , Education, Electrical Engineering, Eurasian Studies, Global Health, Life Sciences, Mathematics, Mechanical Engineering, Mining Engineering, Petroleum Engineering, Physics, Public Policy, Robotics Engineering, Science, Engineering and Technology		
3	DPE 646	Communications for Public Leadership	4	8				2 year GSPP PhD Public Policy	Biomedical Sciences, Business Administration PhD, Chemical Engineering, Chemistry, Civil Engineering, Computer Science , Education, Electrical Engineering, Eurasian Studies, Global Health, Life Sciences, Mathematics, Mechanical Engineering, Mining Engineering, Petroleum Engineering, Physics, Public Policy, Robotics Engineering, Science, Engineering and Technology		

4	DPE 671	Game Theory and Public Policy	4	8				2 year GSPP PhD Public Policy	Biomedical Sciences, Business Administration PhD, Chemical Engineering, Chemistry, Civil Engineering, Computer Science , Education, Electrical Engineering, Eurasian Studies, Global Health, Life Sciences, Mathematics, Mechanical Engineering, Mining Engineering, Petroleum Engineering, Physics, Public Policy, Robotics Engineering, Science, Engineering and Technology		
5	DPE 673	Development Assistance and Governance	4	8				2 year GSPP PhD Public Policy	Biomedical Sciences, Business Administration PhD, Chemical Engineering, Chemistry, Civil Engineering, Computer Science , Education, Electrical Engineering, Eurasian Studies, Global Health, Life Sciences, Mathematics, Mechanical Engineering, Mining Engineering, Petroleum Engineering, Physics, Public Policy, Robotics Engineering, Science, Engineering and Technology		
6	DPE 682	Sustainable Development and Environmental Governance	4	8				2 year GSPP PhD Public Policy	Biomedical Sciences, Business Administration PhD, Chemical Engineering, Chemistry, Civil Engineering, Computer Science , Education, Electrical Engineering, Eurasian Studies, Global Health, Life Sciences, Mathematics, Mechanical Engineering, Mining Engineering, Petroleum Engineering, Physics, Public Policy, Robotics Engineering, Science, Engineering and Technology		

7	DPE 683	Energy Systems and Climate Policy	4	8				2 year GSPP PhD Public Policy	Biomedical Sciences, Business Administration PhD, Chemical Engineering, Chemistry, Civil Engineering, Computer Science , Education, Electrical Engineering, Eurasian Studies, Global Health, Life Sciences, Mathematics, Mechanical Engineering, Mining Engineering, Petroleum Engineering, Physics, Public Policy, Robotics Engineering, Science, Engineering and Technology		
8	DPE 684	Global Energy Policy	4	8				2 year GSPP PhD Public Policy	Biomedical Sciences, Business Administration PhD, Chemical Engineering, Chemistry, Civil Engineering, Computer Science , Education, Electrical Engineering, Eurasian Studies, Global Health, Life Sciences, Mathematics, Mechanical Engineering, Mining Engineering, Petroleum Engineering, Physics, Public Policy, Robotics Engineering, Science, Engineering and Technology		
9	DPP 600	Developing Dissertation Research	0	0				Public Policy			
10	DPP 601	Microeconomics in the Public Sector	4	8				1 year GSPP PhD Public Policy			
11	DPP 603	Public Administration and Management	4	8				1 year GSPP PhD Public Policy			
12	DPP 611	Statistics in Public Policy	4	8				1 year GSPP PhD Public Policy			
13	DPP 614	Advanced Quantitative Methods	4	8				2 year GSPP PhD Public Policy			
14	DPP 616	Advanced Qualitative Methods	4	8				2 year GSPP PhD Public Policy			
15	DPP 621	Public Policy and Analysis	4	8				1 year GSPP PhD Public Policy			
16	DPP 690-0	Thesis Preparation and Writing	0	0				3 year GSPP PhD Public Policy, 4 year GSPP PhD Public Policy			

**GSE**

**MSc Educational Leadership HE**

17	EDUC 590	Academic English Writing for Doctoral Students I	3	6				1 year GSE PhD Education		
18	EDUC 700	Developing PhD Student Strategies for Progressing the Thesis	9	18				Education		
19	EDUC 701	Education Research Methods	3	6				1 year GSE PhD Education		
20	EDUC 709	Introduction to Scholarship in Education	3	6				1 year GSE PhD Education		
21	EDUC 712	Educational Policy and Reform	3	6				1 year GSE PhD Education		
22	EDUC 727	Exploring the Research Topic 1	0	0				1 year GSE PhD Education		
23	EDUC 730	Preparation for Proposal Defence	0	0				2 year GSE PhD Education		
24	EDUC 733	Thesis Proposal Defense	12.5	25				4 year GSE PhD Education		
25	EDUC 740	Doctoral Seminar	3	6				3 year GSE PhD Education		
26	EDUC 751	Dissertation Research	0	0				3 year GSE PhD Education, 4 year GSE PhD Education		
27	EDUC 760	Teaching and Learning in the University Context: Curriculum, Pedagogy and Assessment	3	6				2 year GSE PhD Education, 3 year GSE PhD Education, 4 year GSE PhD Education		
28	EDUC 800	International Study	12	24				2 year GSE PhD Education		
<b>SoM</b>										
<b>PHD</b>										
29	PHDBS 701	Thesis Research	90	180						
30	PHDBS 701-0	Thesis Research	0	0				Biomedical Sciences, Global Health		
31	PHDBS 702	Molecular Basis of Health and Disease	4	8				SoM	Life Sciences	
32	PHDBS 703	Biomedical Research Analysis and Design of Experimentation	4	8				SoM	Life Sciences	
33	PHDBS 704-0	NUSOM seminar	0	0				SoM		
34	PHDBS 705	Biosafety, Animal Welfare and Ethics	4	8				SoM	Life Sciences	
35	PHDBS 706	Advanced Biomedical Research Analysis and Design of Experimentation	4	8				SoM		

36	PHDBS 707	Publication Analysis	4	8				SoM			
37	PHDBS 708	Writing for Biomedical Sciences	3	6				Biomedical Sciences, Global Health	Life Sciences		
38	PHDBS 710	Molecular Pathology of Cancer	3	6				SoM	Life Sciences		
39	PHDBS 711	Molecular Basis of Genetic Disease	3	6				SoM	Life Sciences		
40	PHDBS 721	Drug Discovery I	3	6				SoM	Life Sciences		
41	PHDGH 701	Thesis Research	90	180				Global Health			
42	PHDGH 701-0	Thesis Research	0	0							
43	PHDGH 702	Foundations of Global Health	4	8				Global Health			
44	PHDGH 703	Health Policy and Systems in Global Health	4	8				Global Health			
45	PHDGH 704-0	NUSOM Seminar in Global Health	0	0				Global Health			
46	PHDGH 708	Advanced Methods in Global Health Research	3	6				Global Health			

**SMG**

**Mining Engineering**

47	MINE 701	Advanced Mine Geomechanics	4	8				1 year PhD SMG Mining Engineering	Chemical Engineering, Civil Engineering, Computer Science , Electrical Engineering, Mechanical Engineering, Robotics Engineering, Science, Engineering and Technology		
48	MINE 801	Advanced Mechanized Excavation and Tunneling	4	8				1 year PhD SMG Mining Engineering	1 year PhD SEDS Chemical Engineering, 1 year PhD SEDS Civil Engineering, 1 year PhD SEDS Computer Science, 1 year PhD SEDS Electrical Engineering, 1 year PhD SEDS Mechanical Engineering, 1 year PhD SEDS Robotics Engineering, 1 year PhD SEDS Science, Engineering and Technology		

49	MINE 803	Advanced Geometallurgy	4	8				1 year PhD SMG Mining Engineering	1 year PhD SEDS Chemical Engineering, 1 year PhD SEDS Civil Engineering, 1 year PhD SEDS Computer Science, 1 year PhD SEDS Electrical Engineering, 1 year PhD SEDS Mechanical Engineering, 1 year PhD SEDS Robotics Engineering, 1 year PhD SEDS Science, Engineering and Technology		
50	MINE 890-0	Thesis Research	0	0				4 year Gr SMG (pending graduation), Mining Engineering			
<b>Petroleum Engineering</b>											
51	PETE 802	Fluid Flow Through Porous Media	4	8				1 year PhD SMG Petroleum Engineering	1 year PhD SEDS Chemical Engineering, 1 year PhD SEDS Civil Engineering, 1 year PhD SEDS Computer Science, 1 year PhD SEDS Electrical Engineering, 1 year PhD SEDS Mechanical Engineering, 1 year PhD SEDS Robotics Engineering, 1 year PhD SEDS Science, Engineering and Technology		
52	PETE 805	Special Topics in Petroleum Engineering: Data Analytics	4	8				1 year PhD SMG Petroleum Engineering	1 year PhD SEDS Chemical Engineering, 1 year PhD SEDS Civil Engineering, 1 year PhD SEDS Computer Science, 1 year PhD SEDS Electrical Engineering, 1 year PhD SEDS Mechanical Engineering, 1 year PhD SEDS Robotics Engineering, 1 year PhD SEDS Science, Engineering and Technology		
53	PETE 890	Thesis Research	0	0				1 year PhD SMG Petroleum Engineering, 2 year PhD SMG Petroleum Engineering, 3 year PhD SMG Petroleum Engineering, 4 year Gr SMG (pending graduation), 4 year PhD SMG Petroleum Engineering			
<b>School of Mining and Geosciences</b>											

54	SMG 710	Research Methods and Statistics	3	6				1 year PhD SMG Mining Engineering, 1 year PhD SMG Petroleum Engineering	1 year PhD SEDS Chemical Engineering, 1 year PhD SEDS Civil Engineering, 1 year PhD SEDS Computer Science, 1 year PhD SEDS Electrical Engineering, 1 year PhD SEDS Mechanical Engineering, 1 year PhD SEDS Robotics Engineering, 1 year PhD SEDS Science, Engineering and Technology, 1 year PhD SSH Eurasian Studies, 1 year PhD SSH Life Sciences, 1 year PhD SSH Mathematics, 1 year PhD SSH Physics		
<b>SSH</b>											
<b>Area Studies</b>											
55	EAS 700	Introduction to Eurasia	4	8				Eurasian Studies	GSB, GSE, GSPP, SEDS, SMG, SSH, SoM		
56	EAS 701	Critical Issues in Eurasian Studies	2	4				Eurasian Studies	GSB, GSE, GSPP, SEDS, SMG, SSH, SoM		
57	EAS 702	Elective in Eurasian Humanities	4	8				Instructor's Permission Required. Registration through Add Course form only!			
58	EAS 703	Elective in Eurasian Social Sciences	4	8				Instructor's Permission Required. Registration through Add Course form only!			
59	EAS 704	Elective 2 in Eurasian Humanities	4	8				Instructor's Permission Required. Registration through Add Course form only!			
60	EAS 705	Elective 2 in Social Sciences	4	8				Instructor's Permission Required. Registration through Add Course form only!			
61	EAS 709	Proseminar in Eurasian Social Sciences	4	8				Instructor's Permission Required. Registration through Add Course form only!			
62	EAS 710	Independent Study in Eurasian Studies	4	8				Instructor's Permission Required. Registration through Add Course form only!			
63	EAS 711	Doctoral Seminar in Eurasian Studies I	4	8				Eurasian Studies	GSB, GSE, GSPP, SEDS, SMG, SSH, SoM		
64	EAS 800-0	Dissertation Research in Eurasian Studies	0	0				Eurasian Studies	GSB, GSE, GSPP, SEDS, SMG, SSH, SoM		

**Biological Science**

65	BIOL 800-0	Thesis Research	0	0				Biomedical Sciences, Life Sciences	GSB, GSE, GSPP, SEDS, SMG, SoM		
66	BIOL 820	Statistical Methods in Life Sciences	3	6				Biomedical Sciences, Life Sciences	GSB, GSE, GSPP, SEDS, SMG, SoM		
67	BIOL 831	Synthetic Biology	4	8				Biomedical Sciences, Life Sciences	GSB, GSE, GSPP, SEDS, SMG, SoM		
68	BIOL 832	Drug Discovery and Design	4	8				Biomedical Sciences, Life Sciences	GSB, GSE, GSPP, SEDS, SMG, SoM		
69	BIOL 834	Advanced Cancer Biology	4	8				Biomedical Sciences, Life Sciences	GSB, GSE, GSPP, SEDS, SMG, SoM		
70	BIOL 850	Structural and Molecular Biology in Health and Disease	4	8				Biomedical Sciences, Life Sciences	GSB, GSE, GSPP, SEDS, SMG, SoM		
71	BIOL 860	Molecular Biology of Prokaryotic Cells	4	8				Biomedical Sciences, Life Sciences	GSB, GSE, GSPP, SEDS, SMG, SoM		
72	BIOL 875	Gene Therapy	4	8				Biomedical Sciences, Life Sciences	SSH	GSB, GSE, GSPP, SEDS, SMG, SoM	

**Chemistry**

73	CHEM 700	Hot Topics in Chemistry	4	8				Chemistry	SSH	SEDS, SMG, SoM	
74	CHEM 711	Polymer Chemistry	4	8				Chemistry	SSH	SEDS, SMG, SoM	
75	CHEM 720	Spectrochemical Methods of analysis	4	8				Chemistry	SSH	SEDS, SMG, SoM	
76	CHEM 722	Advanced Environmental Chemistry	4	8				Chemistry	SSH	SEDS, SMG, SoM	
77	CHEM 730	Chemical Thermodynamics and Kinetics	4	8				Chemistry	SSH	SEDS, SMG, SoM	
78	CHEM 750	Modern Inorganic Chemistry	4	8				Chemistry	SSH	SEDS, SMG, SoM	
79	CHEM 798-0	Thesis Research	0	0				Chemistry	SSH	SEDS, SMG, SoM	

**Communication and Composition**

80	WCS 730	From Genre to Style and Back: Writing for PhD Students	4	8				SSH			
----	---------	--	---	---	--	--	--	-----	--	--	--

**Mathematics**

81	MATH 700-0	Thesis Research	0	0				Mathematics	SEDS, SMG, SSH, SoM		
82	MATH 701	Real Analysis	4	8				Mathematics			
83	MATH 721	Nonlinear Differential Equations with Applications	4	8				Mathematics			



84	MATH 742	Advanced statistical programming	4	8			Mathematics			
<b>Physics</b>										
85	PHYS 700-0	Thesis Research	0	0			Physics	SSH	SEDS, SMG, SoM	
86	PHYS 705	Classical Mechanics	4	8			Physics	SEDS, SMG, SSH, SoM		
87	PHYS 715	Classical Electrodynamics	4	8			Physics	SEDS, SMG, SSH, SoM		
88	PHYS 730	Solid State Physics	4	8			Physics	SEDS, SMG, SSH, SoM		
89	PHYS 750	Advanced Mathematical Physics	4	8			Physics	SEDS, SMG, SSH, SoM		
90	PHYS 763	General Relativity	4	8			Physics	SEDS, SMG, SSH, SoM		
91	PHYS 765	Advanced Physics Laboratory	3	6			Physics	SEDS, SMG, SSH, SoM		
92	PHYS 791	Research methods and ethics	3	6			Physics	SEDS, SMG, SSH, SoM		
<b>SEDS</b>										
<b>Chemical and Materials Engineering</b>										
93	DCHME 700-0	Thesis Research	0	0			Chemical Engineering	Science, Engineering and Technology		
94	DCHME 755	Integrated Computational Materials Engineering	4	8			Chemical Engineering	Science, Engineering and Technology		
95	DCHME 761	Advanced Chemical Reaction Engineering	4	8			Chemical Engineering	Science, Engineering and Technology		
96	DCHME 762	Advanced Materials Processing	4	8			Chemical Engineering	Science, Engineering and Technology		
<b>Civil and Environmental Engineering</b>										
97	DCEE 700-0	Thesis Research	0	0			Civil Engineering			
98	DCEE 750	Finite Element Methods	4	8			1 year PhD SEDS Civil Engineering	SEDS		
99	DCEE 757	Advanced Environmental Chemistry	4	8			1 year PhD SEDS Civil Engineering	SEDS		
100	DCEE 760	Advanced Foundation Engineering	4	8			Civil Engineering			
101	DCEE 761	Advanced Soil Mechanics	4	8			1 year PhD SEDS Civil Engineering	SEDS		
102	DCEE 772	Engineering Management and Engineering Economy	4	8			Civil Engineering			
<b>Computer Science</b>										
103	CSCI 700-0	Thesis Research	0	0			Computer Science			

104	CSCI 701	Advanced Software Principles and Practice	4	8				Computer Science	Robotics Engineering	SSH	
105	CSCI 711	Advanced Theory of Computation	4	8				Computer Science	Robotics Engineering	SSH	
106	CSCI 735	Advanced Wireless Communication and Networks	4	8				Computer Science	Robotics Engineering	SSH	
107	CSCI 785	Advanced Computer Vision	4	8				Computer Science	Robotics Engineering	SSH	
108	CSCI 794	Advanced Deep Learning	4	8				Computer Science	Robotics Engineering	SSH	
<b>Electrical and Computer Engineering</b>											
109	DELCE 700-0	Thesis Research	0	0				Electrical Engineering			
110	DELCE 753	Stochastic Processes	4	8				Electrical Engineering	Science, Engineering and Technology	SEDS	
111	DELCE 760	Advanced System Modelling and Control	4	8				Electrical Engineering	Science, Engineering and Technology		
112	DELCE 761	Advanced Data Structures and Algorithms	4	8				Electrical Engineering	Science, Engineering and Technology	SEDS	
<b>Mechanical and Aerospace Engineering</b>											
113	DMAE 700-0	Thesis Research	0	0				Mechanical Engineering			
114	DMAE 701	Advanced Applied Mathematics	4	8				Mechanical Engineering	SEDS		
115	DMAE 751	Modern Control Engineering	4	8				Mechanical Engineering	SEDS		
116	DMAE 763	Computational Fluid Structure Interaction	4	8				Mechanical Engineering	SEDS		
117	DMAE 765	Advanced Manufacturing Processes and Strategies	4	8				Mechanical Engineering			
<b>Robotics and Mechatronics</b>											
118	ROBT 700-0	Thesis Research	0	0				Robotics Engineering	Science, Engineering and Technology		
119	ROBT 701	Advanced Robot Manipulation and Mobility	4	8				Robotics Engineering	Science, Engineering and Technology		
120	ROBT 703	Advanced Optimal Control and Planning	4	8				Robotics Engineering	Science, Engineering and Technology		
121	ROBT 709	Advanced Robot Dynamics and Control	4	8				Robotics Engineering	Science, Engineering and Technology		
<b>School of Engineering</b>											
122	DENG 700-0	Thesis Research	0	0				Science, Engineering and Technology	SEDS		

123	DENG 782	Research Methods and Ethics	3	6				<p>1 year PhD SEDS Chemical Engineering, 1 year PhD SEDS Civil Engineering, 1 year PhD SEDS Computer Science, 1 year PhD SEDS Electrical Engineering, 1 year PhD SEDS Mechanical Engineering, 1 year PhD SEDS Robotics Engineering, 1 year PhD SEDS Science, Engineering and Technology</p>	<p>2 year PhD SEDS Chemical Engineering, 2 year PhD SEDS Civil Engineering, 2 year PhD SEDS Computer Science, 2 year PhD SEDS Electrical Engineering, 2 year PhD SEDS Mechanical Engineering, 2 year PhD SEDS Robotics Engineering, 2 year PhD SEDS Science, Engineering and Technology</p>	<p>3 year PhD SEDS Chemical Engineering, 3 year PhD SEDS Civil Engineering, 3 year PhD SEDS Computer Science, 3 year PhD SEDS Electrical Engineering, 3 year PhD SEDS Mechanical Engineering, 3 year PhD SEDS Robotics Engineering, 3 year PhD SEDS Science, Engineering and Technology, 4 year PhD SEDS Chemical Engineering, 4 year PhD SEDS Civil Engineering, 4 year PhD SEDS Computer Science, 4 year PhD SEDS Electrical Engineering, 4 year PhD SEDS Mechanical Engineering, 4 year PhD SEDS Robotics Engineering, 4 year PhD SEDS Science, Engineering and Technology, 5 year PhD SEDS Science, Engineering and Technology, SMG</p>	
-----	-------------	--------------------------------	---	---	--	--	--	---	---	---	--

124	DENG 789	Doctoral Seminar I	3	6	DENG 785 PhD Proposal Oral Defence (2604) (P)			Science, Engineering and Technology			
125	DENG 790	Doctoral Seminar II	3	6	DENG 789 Doctoral Seminar I (4598) (P)			Science, Engineering and Technology			
126	DENG 791	Doctoral Seminar III	3	6	DENG 790 Doctoral Seminar II (4599) (P)			Science, Engineering and Technology			
127	DENG 792	Doctoral Seminar IV	3	6	DENG 791 Doctoral Seminar III (4600) (P)			Science, Engineering and Technology			
128	DENG 793	Doctoral Seminar V	3	6	DENG 792 Doctoral Seminar IV (4601) (P)			Science, Engineering and Technology			
129	DENG 794	Dissertation Research	12	24	DENG 785 PhD Proposal Oral Defence (2604) (P)			Science, Engineering and Technology			
130	DENG 795	Research at Host University	6	12	DENG 785 PhD Proposal Oral Defence (2604) (P)			Science, Engineering and Technology			
131	DENG 796	Thesis Completion	0	0				Science, Engineering and Technology			
132	DENG 797	Oral Defence of PhD Dissertation	0	0	DENG 785 PhD Proposal Oral Defence (2604) (P) AND DENG 789 Doctoral Seminar I (4598) (P) AND DENG 790 Doctoral Seminar II (4599) (P)			Science, Engineering and Technology			
133	DENG 798	Doctoral Seminar VI	3	6	DENG 793 Doctoral Seminar V (4602) (P)			Science, Engineering and Technology			
134	DENG 799	Doctoral Seminar VII	3	6	DENG 798 Doctoral Seminar VI (4607) (P)			Science, Engineering and Technology			