Coursework List - Dyne Kim

Subject	GPA (/4.3 , /4.0)		Branch	GPA		Course name	Level / Code		Semester	Grade	Credit
Math	3.983	3.852	Topology	3.981	3.925	(SSHS) Special Lecture - Topology	Highschool		highschool	Pass	0
						Topology	Junior	331	21 spring	A-	4
						Combinatorial Topology	Senior	430	22 fall	A+	3
						Algebraic Topology I	Graduate	531	23 spring	A0	3
						Algebraic Topology II	Graduate	532	23 fall	A0	3
						Geometric Topology	Graduate	630	24 spring	A0	3
			Differential Geometry	4.200	4.000	Differential Geometry	Graduate	520	23 fall	A+	3
						Riemannian Geometry	Graduate	621	24 spring	A+	3
						Topics in Mathematics - Curve Shortening Flow	Graduate	583	23 fall	A0	3
						Complex Geometry	Graduate	623	24 fall (now)		
			Algebra	4.171	3.968	(SSHS) Special Lecture - Modern Algebra	Highschool		highschool	Pass	0
						Linear Algebra	Sophomore	212	21 fall	A+	3
						Modern Algebra I	Junior	311	22 spring	A+	4
						Modern Algebra II	Junior	312	21 fall	A-	3
						Introduction to Commutative Algebra	Senior	412	23 spring	A+	3
						Introduction to Algebraic Geometry	Senior	411	22 fall	A+	3
						Individual Study - Castelnuovo Genus Bound of Projective Curves	Research	495	23 fall	Pass	1
						Number Theory	Graduate	510	23 fall	A0	3
						Algebra I	Graduate	511	23 spring	A0	3
						Algebra II	Graduate	512	Audited		
						Homological Algebra	Graduate	513	24 spring	A+	3
						Topics in Mathematics - Linear Algebraic Groups	Graduate	583	22 fall	A+	3
			Analysis	3.844	3.724	Analysis I	Sophomore	241	22 spring	Pass	4
						Analysis II	Sophomore	242	21 fall	A+	4
						Complex Variables	Junior	341	21 spring	A-	3
						Lebesgue Integral Theory	Senior	441	21 fall	B0	3
						Individual Study - Strichartz Estimate of Schrödinger Equation	Research	495	22 fall	Pass	1
						Real Analysis	Graduate	540	23 spring	A+	3
						Complex Function Theory	Graduate	541	22 fall	A-	3
						Functional Analysis	Graduate	641	23 fall	B+	3
						Theory of Partial Differential Equations	Graduate	645	24 spring	A0	3
						Nonlinear Differential Equations	Graduate	646	23 fall	A+	3
			Etc. Math	3.567	3.567	Logic and Set Theory	Sophomore	270	22 fall	A-	3
						Topics in Mathematics - Topological Methods in Combinatorics	Senior	480	23 fall	A0	3
						Probability Theory	Graduate	550	23 fall	B0	3
						Topics in Mathematics - Analysis of Random Conformal Fields	Graduate	583	Audited		

Instructor	Textbook
	박대희(Dae-heui Park) - 위상수학(Topology); Similar to Munkres, but written in Korean language
Hyungryul Baik	Munkres - Topology (First half)
Suhyoung Choi	Munkres - Topology (Second half) + Hatcher - Algebraic Topology (Ch.1)
Suhyoung Choi	Hatcher - Algebraic Topology (Ch. 1,2) + Bredon - Topology and Geometry (Ch. 4)
Suhyoung Choi	Bredon - Topology and Geometry (Ch. 5,6) + Massey - Singular Homology Theory + Spanier - Algebraic Topology
Suhyoung Choi	Suhyoung Choi - Real Projective Orbifolds with Ends and their Deformation Theory
Jiewon Park	Lee - Introduction to Smooth Manifolds
Jiewon Park	Lee - Introduction to Riemannian Manifolds
Kyeongsu Choi	(Lecture Note; Main Reference: Zhu - Lectures on Mean Curvature Flow)
Nguyen Ngoc Cuong	(Lecture Note; Main Reference: Huybrechts - Complex Geometry, Hörmander - An Introduction to Complex Analysis in Several Variables)
	Fraleigh - A First Course in Abstract Algebra
Sanghoon Baek	Hoffman, Kunze - Linear Algebra
Wansu Kim	Dummit, Foote - Abstract Algebra (First half)
Sijong Kwak	Dummit, Foote - Abstract Algebra (Second half)
Jinhyung Park	(Lecture Note; Main Reference: Atiyah, MacDonald - Introduction to Commutative Algebra)
Sijong Kwak	Hartshorne - Algebraic Geometry (Ch. I)
Jinhyung Park	Hartshorne - Algebraic Geometry (Ch. IV) + Arbarello, Cornalba, Griffiths, Harris - Geometry of Algebraic Curves Vol. I (Ch. III)
Bo-hae Im	Marcus - Number Fields + Serre - Local Fields
Wansu Kim	(Lecture Note; Main Reference: Lang - Algebra)
Jinhyun Park	(Lecture Note)
Sanghoon Baek	Weibel - Homological Algebra
Yongnam Lee	Humphreys - Linear Algebraic Groups
Mikyoung Lim	Douglass - Introduction to Mathematical Analysis (First half)
Yongjung Kim	Douglass - Introduction to Mathematical Analysis (Second half)
Soonsik Kwon	Ponnusamy, Silverman - Complex Variables with Applications
Moon-jin Kang	Stein, Shakarchi - PLA #3 Real Analysis
Soonsik Kwon	Stein, Shakarchi - PLA #4 Functional Analysis + Tao - Nonlinear Dispersive Equations
Ji Oon Lee	Stein, Shakarchi - PLA #3 Real Analysis + (Lecture Note on basic functional analysis)
Soonsik Kwon	Stein, Shakarchi - PLA #2 Complex Analysis + Ponnusamy, Silverman - Complex Variables with Applications
Ji Oon Lee	(Lecture Note; Main Reference: Rudin - Functional Analysis)
Myoungjean Bae	Evans - Partial Differential Equations (First half)
Moon-jin Kang	Evans - Partial Differential Equations (Second half)
Suhyoung Choi	(Lecture Note; Main Reference: Halmos - Naive Set Theory)
Andreas Holmsen	Matousek - Using the Borsuk-Ulam Theorem
Kyeongsik Nam	Durrett - Probability (First half)
Nam-gyu Kang	Kang, Makarov - Gaussian Free Field and Conformal Field Theory

Course Description
Introductory General Topology
General Topology (Definition, Separation Axioms, Compactness, Compactification, Metrizability)
Introductory Algebraic Topology & Combinatorial Topology (Fundamental Group, Topological Property of Graphs, Introductory Homology Theory)
Fundamental groups, Covering Spaces, Homology Theory
Cohomology Theory, Products in Homology and Cohomology, Poincare Duality
Orbifold Theory, Hyperbolic Geometry, Singularities of Orbifold
Smooth Manifold Theory (Smooth Manifolds, Rank Theorem, Whitney Embedding, Lie Groups and Algebras, Bundles, Riemannian Metrics, Orientation, Differential Forms)
Riemannian and pseudo-Riemannian manifolds, Connections, Geodesics, Curvature, Jacobi Fields, Comparison Theory
Curve Shortening Flow (CSF), Mean Curvature Flow, Maximal Principles of CSF, Well-posedness and convergence of CSF, Current Research Topics and Conjectures
Several Complex Variables, Domain of Holomorphy, Complex Manifolds, Sheaves and Cohomology, Kähler Geometry
Introductory Group Theory and Ring Theory
Advanced Linear Algebra (Rigorous Proofs for Theorems in Elementary Linear Algebra, Linear Algebra over PID, Jordan Decomposition and Canonical Form, Bilinear Forms)
Group Theory (Sylow Theory, Classification of Groups, Fundamental Theorem of Finitely Generated Abelian Groups), Ring Theory (PID, UFD, division rings)
Ring Theory (Ideals, Modules), Field Theory (Galois Theory, Transcendence)
Commutative Algebra (Module Theory, Integral Extension, Completion, Dimension Theory, Differential, Cohen-Macaulay Ring)
Classical Algebraic Geometry (Variety Theory): variety, variety morphism, affine ring, birational morphism, blowup, Hilbert polynomial, intersection, introduction to schemes
Riemann-Roch, Trisecant Lemma, embedding into projective space, Clifford's Theorem, Castelnuovo Genus Bound and its application
Number Fields and Rings, Prime Decomposition, Ramification, Ideal Class Group, p-adic Fields, Class Number Formula, Introductory Class Field Theory
Category Theory, Advanced Group and Ring Theory, Representation Theory
Category Theory (Especially Limits, in view of higher category), Witt vectors, Infinite Galois Theory, Homological Algebra
Abelian Categories, Derived Functors, Homology and Cohomology, Tor and Ext, Homological Dimensions, Group Cohomology
Affine Algebraic Groups, Lie Algebras, Jordan Decomposition, Solvable/Reductive Groups, Linear Representation
Undergraduate Analysis (Limits and Continuity, Differentiation, Function of Bounded Variation, Riemann Integral)
Undergraduate Analysis (Multivariable Functions, Multiple Integral, Fubini's Theorem, Vector Calculus, Generalized Stokes Theorem)
Undergraduate Complex Analysis (Holomorphic Functions, Cauchy's Theorem, Residue Theorem)
Lebesgue Integral Theory (Lebesgue Measure and Integration, Differentiation of Absolutely Continuous Functions)
Oscillatory Integral, Christ-Kiselev Lemma, Hardy-Littlewood-Sobolev Inequality, Dispersive PDE, Strichartz Estimate, Wellposedness of Semilinear Schrodinger Equations
Lebesgue Integral Theory (including Abstract Measure), Introductory Functional Analysis (Hilbert space, Banach Space, L^p space, Compact Operator)
Advanced Complex Analysis (Weierstrass and Hadamard Factorization, Schwartz Space, Holomorphic Fourier Transform, Riemann Zeta and Prime Number Theorem)
Topological Vector Spaces, Local Convexity, Distribution Theory, Fourier Theory for Distributions, Sobolev Space
Basic Three Types of PDE, BV Problem for Elliptic PDE, Mean Value Property, Maximum Principle, Initial&Boundary Value Problem for Parabolic and Hyperbolic PDE
Calculus of Variation, Fixed Point Theorems, Hamilton-Jacobi System, System of Conservation Laws, Navier-Stokes Equation, Nonlinear Wave Equations
Propositional Logic, Naive Set Theory, Brief Introduction to Axiomatic Set Theory and Category Theory
Simplicial Complexes, Borsuk-Ulam Theorem, Tucker's Lemma, Ham-Sandwich Theorem, Knesner's Conjecture, G-index, Nonembeddability, Bier Sphere, Chromatic Numbers
Measure Theory, Probability Spaces and Probability Distributions, Law of Large Numbers, Central Limit Theorems, Martingales
Gaussian Free Fields, Fock Space, Fock Space Fields, Virasoro Fields, SLE Theory

Physics	3.907	3.812	Classical Mechanics	4.150	4.000	(SSHS) Physics I	Highschool		highschool	A0	3
						(SSHS) Advanced Physics I	Highschool		highschool	A+	3
						Classical Mechanics I	Sophomore	221	21 spring	A+	3
						Classical Mechanics II	Sophomore	222	21 fall	A0	3
			Electro-magnetism	4.300	4.000	(SSHS) Physics III	Highschool		highschool	A+	3
						Classical Electromagnetism I	Sophomore	231	21 spring	A+	3
			Statistical Physics	4.000	3.900	(SSHS) Physics II	Highschool		highschool	A+	3
						Thermal Physics	Junior	311	22 spring	A0	3
						Statistical Physics	Junior	312	21 fall	A+	3
						Topics in Physics - Nonequilibrium Statistical Mechanics	Senior	489	23 spring	A-	3
			Modern Physics	3.750	3.675	(SSHS) Advanced Physics II	Highschool		highschool	A+	3
						(SSHS) Physics IV	Highschool		highschool	A+	3
						(SSHS) Special Lecture - Quantum Field Theory	Highschool		highschool	Pass	0
						Modern Physics	Sophomore	241	23 spring	A-	3
						Quantum Mechanics I	Junior	301	22 spring	A+	3
						Quantum Mechanics II	Junior	302	21 fall	A0	3
						Quantum Information I	Senior	475	23 spring	B0	3
						Nuclear and Elementary Particle Physics	Senior	450	Audited		
			Mathematical Physics	3.850	3.850	Mathematical Methods in Physics II	Sophomore	212	22 spring	A0	3
						Symmetry and Topology in Physics	Senior	465	22 fall	A-	3
			Physics Experiment	3.660	3.600	Physics Lab. I	Sophomore	251	22 fall	A-	2
						Physics Lab. III	Junior	351	23 spring	B+	2
						Lecture on Current Topics of Physics Research I	Senior	487	23 spring	A+	1

	(Original Textbook; Main Reference: Fowles - Analytical Mechanics)
	(Original Textbook)
Hawoong Jeong	Thornton, Marion - Classical Dynamics of Particles and Systems (First half)
Hawoong Jeong	Thornton, Marion - Classical Dynamics of Particles and Systems (Second half)
	(Original Textbook; Main Reference: Griffiths - Introduction to Electrodynamics)
Jae-yoon Choi	Griffiths - Introduction to Electrodynamics (First half)
	(Original Textbook; Main Reference: Schroeder - An Introduction to Thermal Physics, Halliday General Physics)
Myung-joon Han	Greiner, Neise, Stöcker - Thermodynamics and Statistical Mechanics (First half)
Myung-joon Han	Greiner, Neise, Stöcker - Thermodynamics and Statistical Mechanics (Second half)
Yong-woon Kim	Kerson Huang - Statistical Mechanics + Zwanzig - Nonequilibrium Statistical Mechanics
	(Original Textbook)
	(Original Textbook; Main Reference: Griffiths - Introduction to Quantum Mechanics)
	(Lecture Note)
Yong-hee Lee	Taylor, Wheeler - Spacetime Physics + Krane - Modern Physics
Heung-sun Sim	Townsend - A Modern Approach to Quantum Mechanics (First half)
Hyoungsoon Choi	Townsend - A Modern Approach to Quantum Mechanics (Second half)
Jaewook Ahn	Bergou, et al. - Quantum Information Processing + Hayashi, et al. - Introduction to Quantum Information Science
Hye-sung Lee	Thomson - Modern Particle Physics
Jaewon Song	Mathews, Walker - Mathematical Methods of Physics + Zee - Group Theory in a Nutshell for Physicists
Jaewon Song	(Lecture Note; Main Reference : David Tong Lecture Note SUSY Quantum Mechanics + Quantum Hall Effect)
Yeong-kwan Kim	N/A
Yeong-kwan Kim	N/A
Chan-ho Yang	N/A

Similar to Undergraduate Classical Mechanics I and II, excluding Lagrangian and Hamiltonian Mechanics
Lagrangian and Hamiltonian Mechanics, Major topics in Undergraduate Quantum Mechanics II (e.g. SHO, Perturbation Theory, ect.)
Classical Mechanics of Particle, Lagrangian and Hamiltonian Mechanics
Classical Mechanics of System, Solid Body Mechanics (including Euler equations)
Similar to Undergraduate Classical Electromagnetism I and II
Electrostatics, Laplace Equations, Electric Fields in Matter, Magnetostatics, Magnetic Fields in Matter
Similar to Undergraduate Thermal Physics + General Physics II Electromagnetism Part
Thermal Physics (Basic Laws, Entropy Legendre Transform, Free Energies, Introduction to Ensembles)
Statistical Physics (Ensembles, Gibbs Entropy, Fermi-Dirac Statistics, Bose-Einstein Statistics)
BBGKY Hierarchy, Boltzmann Equation, Quantum Kinetic Theory, Linear Response Theory, Stochastic Process
Introductory General Relativity
Similar to Undergraduate Quantum Mechanics I
Introductory Quantum Field Theory
Special Relativity, Introductory Quantum Mechanics, Introductory Statistical Mechanics
Quantum Mechanics (Schroedinger Equation, Matrix Mechanics, Angular Momentum Operator, Time Evolution, Spin)
Quantum Mechanics (Harmonic Oscillator, Symmetry, Perturbation Theory, Atomic Potential of H and He, Scattering), Introductory Quantum Field Theory
Quantum Information (Density Matrix, Entanglement, Quantum Gates, Physical Qubit, IBMQ Quantum Computer Exercise)
Fermi's Golden Rule, Relaticistic Quantum Mechanics, Quantum Field Theory, Scattering, Standard Model, Neutrino Oscillation
Complex Variables, Special Functions (Legendre, Bessel, Hypergeometric), PDE (Separation of Variables), Representation Theory
Symmetry and Topology in Quantum Field Theory, Quantum Hall Effect, Supersymmetric Quantum Mechanics
Mechanics and Thermodynamics Experiments
Electrodynamics, Optics and Solid State Physics Experiments
Introduction to current research topics by physics professors