Courses Approved as Social Data Analytics Electives – March 26, 2025

This list indicates courses approved as SoDA electives with designations as to the distribution requirements against which each may be counted. Students or faculty may request that the Social Data Analytics Program Committee consider any additional courses or designations.

Designations:

A counts against Analytics requirement

Q counts against Quantification requirement

C counts against Computational / Informational requirement

S counts against Social requirement

DC1 counts against Departmental Cluster 1 requirement

DC2 counts against Departmental Cluster 2 requirement

Departmental Clusters

Approved electives carrying any of the following prefixes meet the "STAT or primarily social science department" distribution requirement, or "DC1":

Eberly College of Science: STAT

College of Liberal Arts: APLNG, CAS, CLJ, CRIM, ECON, PLSC, PSY, SOC

College of Health and Human Development: HDFS

Intercollege: DEMOG

Approved electives carrying any of the following prefixes meet the "GEOG, IST, or primarily computer science or engineering department" distribution requirement, or "DC2":

College of Information Sciences & Technology: IST

College of Engineering: CMPSC, CSE, EDSGN, EE, IE

Intercollege: DS

Approved electives carrying any of the following prefixes do not fall into either departmental cluster:

Eberly College of Science: PHYS

Approved SoDA electives meeting the Analytics distribution requirement (A)

The following courses are approved as carrying the (A) designation without further approval required.

BAN	541	Data Mining for Business	No DC	+QC
DAAN	570	Deep Learning	No DC	+QC
STAT	508	Applied Data Mining and Statistical Learning	DC1	+QC
STAT	557	Data Mining: Techniques and Applications	DC1	+QC
STAT	558	Data Mining II	DC1	+QC
STAT	584	Machine Learning: Tools and Algorithms	DC1	+QC
CMPSC	448	Machine Learning and Algorithmic AI	DC2	+QC
CSE / IE / IST	561	Data Mining Driven Design	DC2	+QC
CSE	584	Machine Learning: Tools and Algorithms	DC2	+QC
EDSGN	561	Data Mining Driven Design	DC2	+QC
IST	557	Data Mining I	DC2	+QC
IST	558	Data Mining II	DC2	+QC

The following variable title courses (597, unless otherwise indicated) have received temporary (A) designations:

HDFS	Data Mining for Human Development & Family Studies (Brick)	DC1	+QCS
PLSC	Machine Learning (Desmarais)	DC1	+QCS
STAT	Statistical Learning Theory (Zue)	DC1	+QC
CSE	Advanced Big Data Analytics (Kifer)	DC2	+QC
CSE	Data-Mining and Analytics (Lee)	DC2	+QC
CSE	Machine Learning (Kifer)	DC2	+QC
CSE	Numerics of Data Mining and Image Processing (Barlow)	DC2	+QC
IST	Principles of Machine Learning (Honaver)	DC2	+QC
IST	Elements of Machine Learning (Silverman)	DC2	+QC

IST	Deep Learning (Giles)	DC2	+QC

Approved Social Data Analytics Electives with Designations (Q), (C), and (S)

The following courses are approved as carrying (Q) (C) and (S) designations.

APLNG	578	Computational and Statistical Methods for Corpus Analysis	DC1
PLSC	508	Political Networks	DC1

The following variable title courses (597, unless otherwise indicated) have received temporary (Q) (C) and (S) designations:

HDFS	Health Technology and Personal Data Collection [HDFS 497] (Brick)	DC1
HDFS	Bayesian Methods for Human Development & Family Studies (Oravecz)	DC1
HDFS	Data Mining for Human Development & Family Studies* (Brick)	DC1
PLSC	Big Data and the Law (Zorn)	DC1
PLSC	Big Data Approaches to the Study of Political Representation (Monroe) [PLSC 551]	DC1
PLSC	Political Events Data (Schrodt)	DC1
PLSC	Robust Methods* (Honaker)	DC1
PLSC	Social and Political Network Analysis (Desmarais)	DC1
PLSC	Text as Data (Monroe)	DC1
SOC	Methods of Social Network Analysis (Felmlee)	DC1
SOC	Spatial Networks and Computational Criminology (Graif)	DC1
STAT	Statistical Privacy in Large Databases (Slavkovic)	DC1
CSE	Computational Pragmatics (Passonneau)	DC2
CSE	Data Privacy, Learning and Statistical Analysis (Smith)	DC2
CSE	Social Network Data Analytics (Lee)	DC2
GEOG	Spatio-Temporal Movement Analysis (Andris) [GEOG 560]	DC2
GEOG	Big Data & Place (MacEachren)	DC2

IST	Data-Driven Approaches to Computational Theories of Language (Reitter)	DC2
IST	Foundations of Data Privacy (Rajtmajer, Xiong)	DC2
IST	Principles of Artificial Intelligence (Honavar)	DC2
IST	How the Mind Works (Reitter)	DC2
IST	Visualization and Advanced Analysis of Social Networks (Yen / Kropczynski)	DC2

** These courses also satisfy the analytics requirement (A).*

Approved Social Data Analytics Electives with Designations (Q) and (S)

The following courses are approved as carrying at least the (Q) and (S) designations.

BAN	830	DESCRIPTIVE ANALYTICS FOR BUSINESS
CAS	563	Pairs & Pairings; Quantitative Methods for Interdependent Data
CLJ / SOC	515	Research Methods in Criminology and Deviance
COMM	506	Introduction to Mass Communication Research
COMM	516	Data Analysis
EDPSY	558	Foundations and Applications of Structural Equation Modeling
PLSC	501	Methods of Political Analysis
PLSC	502	Statistical Methods for Political Research
PLSC	503	Multivariate Analysis for Political Research
PLSC	504	Topics in Political Methodology
PLSC	505	Time Series Analysis in Political Science
PLSC / SOC	518	Survey Methods I: Survey Design
PLSC / SOC	519	Survey Methods II: Analysis of Survey Data
PPOL	503	Statistics for Public Policy 1
PPOL	506	Statistics for Public Policy 2
HDFS	516	Methods of Research in Human Development

HDFS	517	HDFS 517: Multilevel Methods for Developmental Research
HDFS	519	Methods of Statistical Analysis in Human Development
HDFS	523	Strategies for Data Analysis in Developmental Research
HDFS	526	Measurement in Human Development
HDFS	527	Social Epidemiology
HDFS	528	Observational Methodologies for Development
HDFS	530	Longitudinal Structural Equation Modeling
HDFS	534	Person-Specific Data Analysis
HDFS	536	Research Methods in Developmental Processes
HDFS	575	Applied Longitudinal Data Analysis
MGMT	539	Social Networks and Organizations
SOC	513	Sociological Research Methods
SOC	572	Foundations in Causal Analysis in the Social Sciences
SOC	573	Demographic Techniques
SOC	574	Statistical Methods for Social Research
SOC	575	Statistical Methods for Nonexperimental Research
SOC	576	Applied Mathematical Demography
SOC	577	Techniques of Event History Modeling
SOC	578	Multilevel Regression Models
SOC	579	Spatial Demography
STAT	507	Epidemiological Research Methods
STAT	509	Design and Analysis of Clinical Trials
PSY	507	Analysis of psychological data 1
PSY	508	Analysis of psychological data 2
PSY	509	Seminar in Quantitative Methods

PSY	511	Introduction to Classical and Modern Test Theory
PSY	531	Multilevel Theory, Measurement, & Analysis
PSY	535	Research methods in I/O Psychology

The following variable title courses (597, unless otherwise indicated) have received temporary (Q) and (S) designations:

BBH	Multilevel Modeling (Mogle)
CAS	Measurement (Dillard)
COMM	Advanced Data Analysis (Oliver)
EDPSY	Introduction to Learning Analytics (Zou)
HDFS	Advanced Topics in Latent Class Analysis (Bray)
HDFS / STAT	Item Response Theory Models for College Testing Data (Loken)
HDFS	Person-Specific EMA (Molenaar)
HDFS	Quasi-Experimental Methods (Shores)
PPOL 897	Data Visualization for Public Policy (Hoffman)
PLSC	Causal Inference (Munger)
SOC	Causal Analysis (Firebaugh)
SOC	Spatial Analysis of Social Data (Chi)
SOC	Seminar in Longitudinal Analysis (Johnson)
STAT	Spatial Models (Shaby)
PSY	Introduction to exploratory data analysis and data management (Hallquist)
PSY	Structural equation modeling (Johnson)
PSY	Transparent, Open, and Reproducible Research Practices in the Social and Behavioral Sciences (Gilmore)
RPTM	Social Networks and Data Analytics (Pan)

Approved Social Data Analytics Electives with Designations (Q) and (C)

The following courses are approved as carrying at least the (Q) and (C) designations.

STAT	463	Applied Time Series Analysis	DC1
STAT	540	Statistical Computing	DC1
STAT	555	Statistical Analysis of Genomics Data	DC1
STAT	557	*Data Mining: Techniques and Applications (formerly Data Mining I	DC1
STAT	558	*Data Mining II	DC1
STAT	561	Statistical Inference 1	DC1
STAT / CSE	584	*Machine Learning: Tools and Algorithms	DC1/2
CMPSC	448	*Machine Learning and Algorithmic AI	DC2
CSE	550	Numerical Linear Algebra	DC2
CSE	551	Numerical Solution of Ordinary Differential Equations	DC2
CSE	552	Numerical Solution of Partial Differential Equations	DC2
CSE	553	Introduction to Approximation Theory	DC2
CSE	555	Numerical Optimization Techniques	DC2
CSE	556	Finite Element Methods	DC2
CSE	557	Concurrent Matrix Computation	DC2
CSE	560	Theory of Graphs and Networks	DC2
CSE / IE / IST	561	*Data Mining Driven Design	DC2
CSE	562	Probabilistic Algorithms	DC2
CSE	564	Complexity of Combinatorial Problems	DC2
CSE	583	Pattern Recognition—Principles and Applications (EE 552)	DC2
CSE	585	Digital Image Processing II (EE 555)	DC2

CSE	586	Topics in Computer Vision	DC2
DS	410	Data Analytics at Scale	DC2
DS	560	Principles of Causal Inference	DC2
EDSGN	561	*Data Mining Driven Design	DC2
GEOG	586	Geographic Information Analysis	DC2
IST	556	Web Analytics: Research Approaches for Online Data	DC2
IST	557	*Data Mining: Techniques and Applications (formerly Data Mining I)	DC2
IST	558	*Data Mining II	DC2
IST	562	Theoretical Foundations of Information Science	DC2
PHYS	580	Elements of Network Science and Its Applications	no DC

The following variable title courses (597, unless otherwise indicated) have received temporary (Q) and (C) designations:

STAT	Bayesian Studies (Lin)	DC1
STAT	High-Dimensional Modeling and Applications (R Li)	DC1
STAT	*Statistical Learning Theory (Zue)	DC1
CSE	*Advanced Big Data Analytics (Kifer)	DC2
CSE	Advanced Topics In Deep Learning for NLP (Zhang)	DC2
CSE	*Data-Mining and Analytics (Lee)	DC2
CSE	Natural Language Processing (Passonneau)	DC2
CMPSC 497	Introduction to NLP (Yin)	DC2
CSE	Deep Learning for Pattern Discovery	DC2
CSE	Graph Mining (Madduri)	DC2
CSE	*Machine Learning (Kifer)	DC2
CSE	*Numerics of Data Mining and Image Processing (Barlow)	DC2

CSE	Regularity on Interdisciplinary Large Data Sets (Liu)	DC2
CSE	Vision-Based Tracking (Collins)	DC2
GEOG	Advanced Observation of Earth [GEOG 497] (Cervone)	DC2
GEOG	GeoInformatics (Cervone)	DC2
GEOG	Spatiotemporal Studies in GIScience [GEOG 560] (Yu)	DC2
GEOG	Geospatial Big Data and GeoAI: Innovations and Applications [GEOG 560] (Li)	DC2
IST	Big Data Fundamentals (Yen / Giles)	DC2
IST	Artificial Emotional Intelligence (Wang)	DC2
IST	Reproducibility in Data Science (Rajtmajer)	DC2
IST	*Principles of Machine Learning (Honavar)	DC2
IST	Principles of Causal Inference (Honavar)	DC2
IST	Data Science for Researchers, Scholars, and Practitioners (Honavar)	DC2
IST	*Elements of Machine Learning (Silverman)	DC2
IST	Natural Language Processing for Sentiment, Semantics, and Discourse (Wilson)	DC2
MATH	Hierarchical Algorithms and Deep Learning (Xu)	no DC

** These courses also satisfy the analytics requirement (A).*

Approved Social Data Analytics Electives with Designations (C) and (S)

The following courses are approved as carrying at least the (C) and (S) designations.

BAN	831	Data Visualization for Business	No DC
GEOG	571	Intelligence Analysis, Cultural Geography, and Homeland Security	DC2
GEOG	588	Planning GIS for Emergency Management	DC2
GEOG	591	GIS for Health Analysis	DC2
IST	530	Foundations in Social Informatics	DC2
IST	555	Intelligent Agents and Distributed Decision Making	DC2

The following variable title courses (597, unless otherwise indicated) have received temporary (C) and (S) designations:

PSY	Transparent, Open, and Reproducible Research Practices in the Social and Behavioral Sciences [PSY 511] (Gilmore)	DC1
GEOG	Spatial Thinking (Klippel)	DC2
GEOG	*Visual Analytics: Leveraging Geo-Social Data (MacEachren / Hardisty)	DC2
GEOG	Representation and Analysis of Space-Time Dynamics [GEOG 560] (Peuquet)	DC2
GEOG	Virtual Reality for the Environmental and Spatial Sciences [GEOG 560] (Klippel)	DC2
IST	AI For Humanity (Yadav)	DC2

** These courses also satisfy the analytics requirement (A).*

Approved Social Data Analytics Electives with Designation (Q)

The following courses are approved as carrying the (Q) designation.

DS	560
STAT	500, 501, 502, 503, 504, 505, 506, 510, 511, 512, 513, 514, 515, 517, 518, 519, 525, 544, 551, 552, 553, 562, 565

The following variable title courses (597, unless otherwise indicated) have received temporary (Q) designations:

IST	User Experience Evaluation (Gui)	DC2
STAT	Causal Inference (Lock Morgan)	DC1

Approved Social Data Analytics Electives with Designation (S)

The following courses are approved as carrying the (S) designation.

Departmental Cluster DC1:

CLJ 500, 501, 512, 558

HDFS 501, 502, 506, 509, 520, 522, 524, 525, 528, 529, 531, 532, 533, 537, 539, 540, 544, 546, 549, 565, 569, 577, 579

PLSC 534, 540, 541, 542, 550, 551, 552, 553, 554, 555, 556, 560, 561, 563, 564, 565, 566, 586

SOC 501, 502, 512, 521, 522, 523, 524, 525, 526, 527, 528, 529, 540, 531, 532, 533, 534, 537, 538, 544, 546, 551, 553, 557, 560, 584

Departmental Cluster DC2:

GEOG 501B, 501C, 520

IST 520, 521, 525, 526, 556

No DC:

BBH 501

BBH 502

BBH 503

BBH 504

LDT 581

RSOC 525

PHIL 558

Courses with temporary (S) designation:

PLSC	Psychology of Terrorism (Hatemi)	DC1
IST	The Psychology of Deception—Deception in the Information Age	DC2
IST	Foundations in Technology Ethics, Law, and Policy (Susser)	DC2
IST	Fairness, Incentives, and Mechanism Design (Hosseini)	DC2

IST	Crowdsourcing & Crowd-AI Systems (Huang)	DC2
IST	Foundations of Technology Ethics and Policy (Susser)	DC2

Approved Social Data Analytics Electives with Designation (C)

The following courses are approved as carrying at least the (C) designation.

BAN	832	No DC
CSE	520, 522, 530, 531, 532, 537, 541, 542, 563, 565, 588	DC2
GEOG	463, 501D, 565, 580, 583, 584, 585	DC2
IST	441, 510	DC2
DAAN	871	No DC

The following variable title courses (597, unless otherwise indicated) have received temporary (C) designations:

CSE	Public Cloud Computing (Urgaonkar)	DC2
GEOG	Advanced Geographic Information Systems Modeling [GEOG 497] (Andris)	DC2
GEOG	Geovisual Analytics [GEOG 560] (Robinson)	DC2
GEOG	Core Spatial Programming [GEOG 560] (Greatrex)	DC2
GEOG	What Can Radar and Electro-optical Remote Sensing Do for You? [GEOG 560] (Cervone)	DC2
PSY	Seminar in Matlab	DC1