Courses Approved as Social Data Analytics Electives – June 10, 2024

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.

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Distribution</th>
<th>Offered Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAN</td>
<td>541</td>
<td>Data Mining for Business</td>
<td>No DC</td>
<td>+QC</td>
</tr>
<tr>
<td>DAAN</td>
<td>570</td>
<td>Deep Learning</td>
<td>No DC</td>
<td>+QC</td>
</tr>
<tr>
<td>STAT</td>
<td>508</td>
<td>Applied Data Mining and Statistical Learning</td>
<td>DC1</td>
<td>+QC</td>
</tr>
<tr>
<td>STAT</td>
<td>557</td>
<td>Data Mining: Techniques and Applications</td>
<td>DC1</td>
<td>+QC</td>
</tr>
<tr>
<td>STAT</td>
<td>558</td>
<td>Data Mining II</td>
<td>DC1</td>
<td>+QC</td>
</tr>
<tr>
<td>STAT</td>
<td>584</td>
<td>Machine Learning: Tools and Algorithms</td>
<td>DC1</td>
<td>+QC</td>
</tr>
<tr>
<td>CMPSC</td>
<td>448</td>
<td>Machine Learning and Algorithmic AI</td>
<td>DC2</td>
<td>+QC</td>
</tr>
<tr>
<td>CSE / IE / IST</td>
<td>561</td>
<td>Data Mining Driven Design</td>
<td>DC2</td>
<td>+QC</td>
</tr>
<tr>
<td>CSE</td>
<td>584</td>
<td>Machine Learning: Tools and Algorithms</td>
<td>DC2</td>
<td>+QC</td>
</tr>
<tr>
<td>EDSGN</td>
<td>561</td>
<td>Data Mining Driven Design</td>
<td>DC2</td>
<td>+QC</td>
</tr>
<tr>
<td>IST</td>
<td>557</td>
<td>Data Mining I</td>
<td>DC2</td>
<td>+QC</td>
</tr>
<tr>
<td>IST</td>
<td>558</td>
<td>Data Mining II</td>
<td>DC2</td>
<td>+QC</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Course Title</th>
<th>Distribution</th>
<th>Offered Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS</td>
<td>Data Mining for Human Development &amp; Family Studies (Brick)</td>
<td>DC1</td>
<td>+QCS</td>
</tr>
<tr>
<td>PLSC</td>
<td>Machine Learning (Desmarais)</td>
<td>DC1</td>
<td>+QCS</td>
</tr>
<tr>
<td>STAT</td>
<td>Statistical Learning Theory (Zue)</td>
<td>DC1</td>
<td>+QC</td>
</tr>
<tr>
<td>CSE</td>
<td>Advanced Big Data Analytics (Kifer)</td>
<td>DC2</td>
<td>+QC</td>
</tr>
<tr>
<td>CSE</td>
<td>Data-Mining and Analytics (Lee)</td>
<td>DC2</td>
<td>+QC</td>
</tr>
<tr>
<td>CSE</td>
<td>Machine Learning (Kifer)</td>
<td>DC2</td>
<td>+QC</td>
</tr>
<tr>
<td>CSE</td>
<td>Numerics of Data Mining and Image Processing (Barlow)</td>
<td>DC2</td>
<td>+QC</td>
</tr>
<tr>
<td>IST</td>
<td>Principles of Machine Learning (Honaver)</td>
<td>DC2</td>
<td>+QC</td>
</tr>
<tr>
<td>IST</td>
<td>Elements of Machine Learning (Silverman)</td>
<td>DC2</td>
<td>+QC</td>
</tr>
</tbody>
</table>
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
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)  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
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.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Code (Section)</th>
<th>Course Title</th>
<th>School</th>
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<tbody>
<tr>
<td>STAT 463</td>
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<td>Applied Time Series Analysis</td>
<td>DC1</td>
</tr>
<tr>
<td>STAT 540</td>
<td></td>
<td>Statistical Computing</td>
<td>DC1</td>
</tr>
<tr>
<td>STAT 555</td>
<td></td>
<td>Statistical Analysis of Genomics Data</td>
<td>DC1</td>
</tr>
<tr>
<td>STAT 557</td>
<td></td>
<td>*Data Mining: Techniques and Applications (formerly Data Mining I)</td>
<td>DC1</td>
</tr>
<tr>
<td>STAT 558</td>
<td></td>
<td>*Data Mining II</td>
<td>DC1</td>
</tr>
<tr>
<td>STAT 561</td>
<td></td>
<td>Statistical Inference 1</td>
<td>DC1</td>
</tr>
<tr>
<td>STAT / CSE 584</td>
<td></td>
<td>*Machine Learning: Tools and Algorithms</td>
<td>DC1/2</td>
</tr>
<tr>
<td>CMPSC 448</td>
<td></td>
<td>*Machine Learning and Algorithmic AI</td>
<td>DC2</td>
</tr>
<tr>
<td>CSE 550</td>
<td></td>
<td>Numerical Linear Algebra</td>
<td>DC2</td>
</tr>
<tr>
<td>CSE 551</td>
<td></td>
<td>Numerical Solution of Ordinary Differential Equations</td>
<td>DC2</td>
</tr>
<tr>
<td>CSE 552</td>
<td></td>
<td>Numerical Solution of Partial Differential Equations</td>
<td>DC2</td>
</tr>
<tr>
<td>CSE 553</td>
<td></td>
<td>Introduction to Approximation Theory</td>
<td>DC2</td>
</tr>
<tr>
<td>CSE 555</td>
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<td>Numerical Optimization Techniques</td>
<td>DC2</td>
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<tr>
<td>CSE 556</td>
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<td>Finite Element Methods</td>
<td>DC2</td>
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<tr>
<td>CSE 557</td>
<td></td>
<td>Concurrent Matrix Computation</td>
<td>DC2</td>
</tr>
<tr>
<td>CSE 560</td>
<td></td>
<td>Theory of Graphs and Networks</td>
<td>DC2</td>
</tr>
<tr>
<td>CSE / IE / IST 561</td>
<td></td>
<td>*Data Mining Driven Design</td>
<td>DC2</td>
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<tr>
<td>CSE 562</td>
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<td>Probabilistic Algorithms</td>
<td>DC2</td>
</tr>
<tr>
<td>CSE 564</td>
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<td>Complexity of Combinatorial Problems</td>
<td>DC2</td>
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<tr>
<td>CSE 583</td>
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<td>Pattern Recognition—Principles and Applications (EE 552)</td>
<td>DC2</td>
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<tr>
<td>CSE 585</td>
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<td>Digital Image Processing II (EE 555)</td>
<td>DC2</td>
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<tr>
<td>CSE 586</td>
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<td>Topics in Computer Vision</td>
<td>DC2</td>
</tr>
<tr>
<td>DS 410</td>
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<td>Data Analytics at Scale</td>
<td>DC2</td>
</tr>
<tr>
<td>EDSGN 561</td>
<td></td>
<td>*Data Mining Driven Design</td>
<td>DC2</td>
</tr>
</tbody>
</table>
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
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
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  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
* 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.

<table>
<thead>
<tr>
<th>DS</th>
<th>560</th>
</tr>
</thead>
</table>

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

<table>
<thead>
<tr>
<th>IST</th>
<th>Principles of Causal Inference (Honavar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IST</td>
<td>User Experience Evaluation (Gui)</td>
</tr>
<tr>
<td>STAT</td>
<td>Causal Inference (Lock Morgan)</td>
</tr>
</tbody>
</table>

**Approved Social Data Analytics Electives with Designation (S)**

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

Departmental Cluster DC1:

<table>
<thead>
<tr>
<th>CLJ</th>
<th>500, 501, 512, 558</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDFS</td>
<td>501, 502, 506, 509, 520, 522, 524, 525, 528, 529, 531, 532, 533, 537, 539, 540, 544, 546, 549, 565, 569, 577, 579</td>
</tr>
<tr>
<td>PLSC</td>
<td>534, 540, 541, 542, 550, 551, 552, 553, 554, 555, 556, 560, 561, 563, 564, 565, 566, 586</td>
</tr>
<tr>
<td>SOC</td>
<td>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</td>
</tr>
</tbody>
</table>

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

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