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| **COURSE** | **TITLE** | **DESCRIPTION** |
| COMM 506 | Research Methods in Communications | The scientific method; survey of basic concepts of theoretical and empirical research; variety of methodology; criteria for adequate research. |
| COMM 511 | Qualitative Research Methods in Mass Communications | This course focuses on the nature of qualitative research methodology for studying mass/mediated communication topics and to relevant research techniques. There is special emphasis on qualitative epistemology, ethnographic approaches, interviews, focus group, textual analysis, and mixed-method approaches. |
| COMM 516 | Introduction to Data Analysis in Communications | To understand and be able to use data analysis techniques common to research in communications. |
| COMM 517 | Psychological Aspects of Communication Technology | Investigation of psychological aspects of human‐computer interaction (HCI) and computer‐mediated communication (CMC). |
| CSE 543 | Computer Security | Specification and design of secure systems; security models, architectural issues, verification and validation, and applications in secure database management systems. |
| CSE 555(MATH 555) | Numerical Optimization Techniques | Unconstrained and constrained optimization methods, linear and quadratic programming, software issues, ellipsoid and Karmarkar's algorithm, global optimization, parallelism in optimization. |
| CSE 557 | Concurrent Matrix Computation | This course discusses matrix computations on architectures that exploit concurrency. It will draw upon recent research in the field. |
| CSE 565 | Algorithm Design & Analysis | An introduction to algorithmic design and analysis. |
| CSE 586 | Topics in Computer Vision | Discussion of recent advances and current research trends in computer vision theory, algorithms, and their applications. |
| CSE 597 | Special Topics | Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or term.  |
| EDLDR 586 | Qualitative Methods in Education Research | EDTHP 586/HI ED 586; Exploration of the theoretical framework undergirding qualitative research and its attendant practices and techniques. |
| EDLDR 588/ EDTHP 588/ HI ED 588Pre‐req: EDLDR/EDTHP/ HI ED 586 | Qualitative Methods in Educational Research II (3) | Advanced study of methods involved in executing and analyzing qualitative research in education. |
| EDSGN 548 | Interaction Design | Strategies in user‐centered design, ergonomic product analysis, statistical data analysis, low and high fidelity prototyping, and innovative design techniques. |
| **COURSE** | TITLE | DESCRIPTION |
| EE 556 | Graphs, Algorithms, and Neural Networks | Examine neural networks by exploiting graph theory for offering alternate solutions to classical problems in signal processing and control. |
| IST 503(for PhD) | Foundations for IST Research | Study of major methodological, normative, and theoretical issues in philosophy of science related to research in information sciences and technology. |
| IST 504(for PhD) | Foundations of Theories and Methods of Information Sciences and Technology Research | Provides the foundation to the research and theories of how technologies are used to meet society's, groups' and individuals' information needs. |
| IST 525 | Computer‐Supported Cooperative Work | Introduces theories, empirical findings, evaluation methods, and design frameworks in computer‐supported cooperative work. |
| IST 526 | Development Tools & Visualizations for Human‐Computer Interaction | Addresses concepts and tools for developing working user interface software and prototypes to provide effective information visualizations. |
| IST 541Pre-req: IST 501 | Qualitative Research in IST (3) | Assists IST researchers in their efforts to learn about and employ appropriate qualitative methods in their research. |
| IST 554 | Network Management & Security | Essential skills and knowledge for effectively utilizing networks and Internet technologies to facilitate, manage and secure data communications and applications. |
| IST 557 | Data Mining: Techniques and Applications | This course will introduce data mining techniques, including frequent pattern and association rule mining, some basic background on classification and clustering, and applications of data mining techniques in specific domains. The emphasis will be on applications in specific domains rather than fundamental methodologies. |
| IST 597 | Special Topics | Formal courses given on a topical or special interest subject which may be offered infrequently; several different topics may be taught in one year or semester. |
| IST 815 | Foundations of Information Security and Assurance | This course provides theoretical and applied foundations of information security and assurance. |
| STAT 500 | Applied Statistics | Descriptive statistics, hypothesis testing, power, estimation, confidence intervals, regression, one‐ and 2‐way ANOVA, Chi‐square tests, diagnostics. |
| STAT 501 | Regression Methods | Analysis of research data through simple and multiple regression and correlation; polynomial models; indicator variables; step‐wise, piece‐wise, and logistic regression. |
| STAT 502 | Analysis of Variance & Design of Experiments | Analysis of variance and design concepts; factorial, nested, and unbalanced data; ANCOVA; blocked, Latin square, split‐plot, repeated measures designs. |
| **COURSE** | TITLE | DESCRIPTION |
| STAT 503 | Design of Experiments | Design principles; optimality; confounding in split‐plot, repeated measures, fractional factorial, response surface, and balanced/partially balanced incomplete block designs. |
| STAT 506 | Sampling Theory & Methods | Theory and application of sampling from finite populations. |
| STAT 509 | Design and Analysis of Clinical Trials | An introduction to the design and statistical analysis of randomized and observational studies in biomedical research. |
| STAT 512 | Design & Analysis of Experiments | AOV, unbalanced, nested factors; CRD, RCBD, Latin squares, split‐plot, and repeated measures; incomplete block, fractional factorial, response surface designs; confounding. |
| STAT 513 | Theory of Statistics I | Probability models, random variables, expectation, generating functions, distribution theory, limit theorems, parametric families, exponential families, sampling distributions. |
| STAT 514 | Theory of Statistics II | Sufficiency, completeness, likelihood, estimation, testing, decision theory, Bayesian inference, sequential procedures, multivariate distributions and inference, nonparametric inference. |
| STAT 515 | Stochastic Processes and Monte Carlo Methods | Conditional probability and expectation, Markov chains, Poisson processes, Continuous‐time Markov chains, Monte Carlo methods, Markov chain Monte Carlo. |
| STAT 518 | Probability Theory | Measure theoretic foundation of probability, distribution functions and laws, types of convergence, central limit problem, conditional probability, special topics. |
| STAT 540 | Statistical Computing | Computational foundations of statistics; algorithms for linear and nonlinear models, discrete algorithms in statistics, graphics, missing data, Monte Carlo techniques. |
| STAT 544 | Categorical Data Analysis I | Two‐way tables; generalized linear models; logistic and conditional logistic models; log linear models; fitting strategies; model selection; residual analysis. |
| STAT 557 | Data Mining I | This course introduces data mining and statistical/machine learning, and their applications in information retrieval, database management, and image analysis. |
| STAT 561 | Statistical Inference I | Classical optimal hypothesis test and confidence regions, Bayesian inference, Bayesian computation, large sample relationship between Bayesian and classical procedures. |
| Other courses can be selected to fulfill the Methods Course requirement with prior approval from your advisor. |

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