Game Science and Design (GSND)

GSND 5110. Game Design and Analysis. 4 Hours.
Provides theoretical background and foundation for analyzing and designing games. Examines fundamental domains that are necessary to understand what games are and how they affect players, including but not limited to interface design, level design, narrative, learning, and culture. Presents relevant concepts and frameworks from a wide variety of disciplines—psychology, phenomenology, sociology, anthropology, media studies, affect theories, learning theories, and theories of motivation—for each domain. Explains the core elements of game design, introduces students to formal abstract design tools, explores several models of design process and iteration, and offers students an opportunity to practice game design in groups.

GSND 5111. Seminar for GSND 5110. 1 Hour.
Offers students an opportunity to discuss and analyze selected games, applying concepts from GSND 5110. Exposes students to a varied mix of AAA and indie titles and demonstrates how to analyze and appreciate them. Open to seniors; restricted to students in selected colleges.

GSND 5122. Business Models in the Game Industry. 1 Hour.
Examines the underlying business structure of the interactive digital entertainment industry and the characteristics of the various participants, notably developers and publishers. Seeks to deliver insight into key business models within the game industry and how the economic challenges interact. Explores the game business landscape across the industry spectrum, ranging from AAA, mobile, casual to indie development. Examines market strategies currently in practice and how they are linked with game analytics. Topics range from retail vs. online, free-to-play modes vs. pay-to-play, as well as basic monetization and distribution channels. Designed to serve as an overview of the various stakeholders in the industry and how they interact.

GSND 5130. Mixed Research Methods for Games. 4 Hours.
Focuses on methods and methodologies from human-computer interaction (HCI) and their use in different applications, including apps, web applications, games, and virtual worlds. Covers the basics of user-oriented evaluation, associated topics, and usability methods. Introduces the design process, usability heuristics, HCI paradigms, task models, and cognitive models. Examines quantitative and qualitative analysis of data. Offers students an opportunity to delve into experimental design, institutional review board approvals, ethics, research subject recruitment, and experiment implementations. Applies concepts through concrete projects, case examples, and exercises. Expects students to be running assignments continually and trying out different evaluation methods and methodologies.

GSND 6320. Psychology of Play. 4 Hours.
Explores theories of perception, motivation, needs, learning, goals, and belief systems as they pertain to games and play. Examines psychological principles, including visual and audio perception, emotions, behavior, personality, and the more recent scientific discoveries around psychological models explaining play behavior or motivation theories behind play. Introduces how players learn in and from games based on the relationship of play to learning theories. Forms a solid theoretical basis for a new segmentation tool—psychographics. Explores visual and cultural archetypes, digging into comics, movie sets, and cartoons to distillate what makes people tick in certain ways relating to universal theories of perception and gestalt theories. Applies the theories through critical analysis of play behavior and games.

GSND 6330. Player Experience. 4 Hours.
Focuses on topics of player psychology—cognition; memory; emotions; attention; and game-focused theories such as engagement, fun, user experience, player-need-satisfaction model, and flow. The development cycle of any game relies on the understanding of the players, the target market of the game product. Covers game usability engineering and game-specific evaluation methods, such as play testing, rapid iterative testing and evaluation (RITE), play-heuristic evaluation, and retrospective play reviews. Offers students an opportunity to learn how to analyze qualitative and quantitative data and to apply parametric and nonparametric statistical evaluation methods, qualitative data coding and analysis, and descriptive statistics. Requires students to apply visualization techniques of data and reporting.

GSND 6340. Biometrics for Design. 4 Hours.
Covers the domain of psychophysiological testing. Introduces theory and research in major areas of human psychology, including cognition, emotions, and attention. Studies the principles, theory, and applications of psychophysiological assessment inside and outside interactive digital entertainment. Offers students an opportunity to understand the basics of eye tracking—eye movements, fixations, saccades. Applies methods of data collection, cleaning, and analysis for both physiological and eye-tracking data. Covers all issues of using such measurements, including validity of conclusions and confounding variables. Covers the process of triangulation and repotting in-depth along the entire process of the game production life cycle.
GSND 6350. Data-Driven Player Modeling. 4 Hours.
Introduces the topic of game analytics, defined as the process of
discovering and communicating patterns in data with a goal of solving
problems and developing predictions in user behavior supporting
decision management, driving action, and/or improving game products.
Covers the fundamental tools, methods, and principles of game analytics,
including the knowledge-discovery process, data collection, feature
extraction and selection, pattern recognition to aid in prediction and
churn analysis, visualization, and reporting. Covers analytics across game
forms, notably online games and delivery platforms. Presents analytical
tools recommended during development and tools designed for ongoing
maintenance of games.

GSND 6984. Research. 1-4 Hours.
Offers students an opportunity to conduct research under faculty
supervision. May be repeated up to four times.

GSND 7976. Directed Study. 1-4 Hours.
Offers independent work under the direction of members of the
department on chosen topics. May be repeated without limit.

GSND 7990. Thesis. 4 Hours.
Focuses on preparing a master's thesis under faculty supervision.

GSND 7996. Thesis Continuation. 0 Hours.
Offers continued work on the thesis project.