Course Proposal Template

Course Name	Designing Gaming Simulations
Course Proposer Name(s)	Prof. Dinesh Babu J
Course Instructor Name(s)	Prof. Sebastiaan Meijer (Visiting Faculty) Prof. Dinesh Babu J (Faculty)
Course Type *(Select one)* *All course types except "Special Topics" go through the process for Academic Senate approval*	Select one from the following: • Special Topics
Credits	4 (TBD)
Grading Scheme	• 4-point scale (A,A-,B+,B,B-,C+,C,D,F)
Area of Specialization (if applicable) CS – Computer Science DS – Data Science NCE – Networking , Communication SE – Software Engineering	NCS and DS
Semester	Term: Fall Year:2014

Pre-Requisites (where applicable, specify exact course names)

The students are expected to have functional knowledge of one programming language and have a preliminary knowledge of discrete mathematics and numerical analysis.

Course Description

Gaming Simulations allow the participants to explore the solution space for complex socio-technical problems with the different stake-holders through a visual medium. The non-confrontational, yet realistic environs of games present scenarios that provide for multiple ideas to co-exist. This allows the participants and the creators to understand possible effects of policies. Gaming simulations have been used for training personnel and to create awareness. With the advent of the virtual medium, the power of gaming simulations has increased by allowing to create more analytical tools that can compute and present the participants with more realistic scenarios and feedback to their actions. Computational tools enable the use of gaming simulations in much more complex scenarios and help analyse the results from game sessions for policy design, training, learning and awareness.

At the end of the course each student should be capable of the following:

- Differentiate between gaming simulation and entertainment games.
- Assess what problems can be approached with a gaming simulation.
- Understand and differentiate between gaming simulation for education, design, policy making and hypothesis testing.
- Understand the limitations of gaming simulations and their validity requirements.
- Identify the constituent parts of a gaming simulation.

- Understand the process of conducting game-sessions, the different stages in game sessions, roles of facilitators, players and note-takers in game sessions.
- Understand collection and analysis of data from game sessions for research purposes.
- Draft the design specifications of a gaming simulation.

Course Content

Modules

#	Name	Description	Outline
1	Introduction (2 Lectures)	Games have been an integral part of society for a long time. There are various types of games: board games, card games, computer games, sports etc. Games are generally associated with 'fun' and recreation. The last few decades, however, have seen an increase in the use of games for purposes other than entertainment. Games/Gaming have been used for military purposes (war gaming), policy design, teaching and training, and participatory planning to name a few. The first part of the course will focus on the history of serious games and how they gained recognition.	• History • Uses • Various definitions of games • Different types of serious games • Characteristics of serious games • Problem areas that can be addressed: Wicked problems, Problem definition with multiple stakeholders, Negotiations, Behavioural analysis, Immersive training, Awareness and teaching
2	Design: Game elements and mechanics (6 Lectures)	As with any other fields, there are various ways to approach serious game design. A game framework also includes game elements, mechanics, objectives and the game model/data. Apart from defining the framework, one approach commonly followed is iterative design with play-testing.	• Introduction to different styles of designing serious games • Differences between designing for entertainment games and serious games. • Designing through paper-based prototypes. • Iterative design through play-testing • Objectives of the game • Game elements, mechanics • Involvement of the stakeholders • Documenting the process
3	Verification, Validation &	A good game should model the real world in just the necessary amount of	• Validity and Verification • Differences between

	When to play? (3 Lectures)	detail; simplify it too much and the game loses touch with reality; complicate it too much with various rules, elements etc., and the game becomes hard to play. Often, serious games are built with the dual objectives of research and learning. This can lead to issues around validity of the environment being modelled for the players. The game environment should be credible enough for the players to participate, provide the players with utility in the real-world and should provide them with "reasonably sound" reference points in the real-world. Although games have been used historically to understand problems in various fields, they cannot be used as a tool for every problem. Given any domain/problem, it is the responsibility of the game designer, along with domain experts, to understand whether or not games could be used to address the problem. Games have been used to address problems that involve multiple stakeholders and the interactions and negotiations between them. Training that requires immersive virtual reality could be done through games. Games have also been used widely for classroom teaching purposes. Developing games in each of these areas requires a different skill set.	gamification and serious games • Perception and acceptability
4	Analysing Group Dynamics (4 Lectures)	An integral part of game sessions are small group face-to-face interactions, where groups brainstorm or make decisions. Social psychology and organizational behaviour literature has long studied group dynamics and defined those constructs which define the composition of groups, how they communicate to each other and perform. Recently, thanks to new sensing, signal processing, and	

		machine learning techniques, automatic analysis of group dynamics is increasingly becoming a reality. In this module, students will be exposed to basics of small group dynamics in face-to-face interactions. Then, some basic tools for audio-visual signal processing and machine-learning will be introduced (without going into details). Finally, some sample automatic analysis results will be shared.	
5	Conducting game Sessions and analyzing results (1 Lecture)	The game facilitator is an integral part of games. In paper-based games, it is the role of the facilitator to inform the players about their roles in the game during briefing session, moderate the game session, and debrief the players about their performance in the game during debriefing session. As serious games are built with the objectives of research and learning, observing game sessions and the data from these observations (qualitative and quantitative) become crucial to the learning outcomes and to further the design of the game itself. For certain computer based games, the computer plays the role of the facilitator. Some computer games do require facilitation and the role of the facilitator varies according to the game.	• Briefing and de-briefing sessions • Moderating game sessions • Observation and notes • Feedback session • Analysis of game results and outcomes

Assessments (optional for Special Topics courses)

#	Name	Assignments
1	Introduction	• A review of a commercial game • A review of a serious game • Paper-based prototype to modify any game of their choice
2	Design: Game elements and mechanics	• Virtual prototype of the game that was submitted in the previous module • An analysis of two games, one paper based game and a virtual game to describe the game elements, rules and mechanics
3	Verification, Validation	• A 2 page description of the game that will be created by

	& When to play?	them at the end of the course. • Modify an existing serious game
4	Analysing Group Dynamics	
5	Conducting game Sessions and analyzing results	• Play-test the game developed in the previous modul modify the game based on the game sessions. • Submit final game proposal for the course

Final assignment
In the final 6 weeks, the students will create a gaming simulation based on the principles and will have to conduct a minimum of two game sessions for the games developed.

Text Book / References

#	Name	Essential	Additional
1	Introduction	1. Serious Games, Clark Abt, Chapter 1: The Reunion of Action and Thought. 2. The Art of Computer Game Design, Chapter 1 "What is a game?" and 2 "Why do people play games?", Chris Crawford,1982. 3. Rules of Play: Game Design Fundamentals, Chapter 1 "What is this book about?" by Katie Salen, Eric Zimmerman, MIT Press, 2004; 4. Gaming: The future's language, Richard Duke, 1974; Preface and Chapter 1 "The problem". 5. Elverdam, C., & Aarseth, E. (2007). Game Classification and Game Design	1. Chapters 19 and 20, Optimal experience: Psychological studies of flow in consciousness. Csikszentmihalyi, I. S. (Ed.). (1992). Cambridge University Press. 2. History of Gaming from Florian Smolka on Vimeo: http://vimeo.com/18743950. 3. Ratan, R., & Ritterfeld, U. (2009). Classifying serious games. Serious games: Mechanisms and effects, 10-24.
2	Design: Game elements and mechanics	1. Rules of Play: Game Design Fundamentals by Katie Salen, Eric Zimmerman, MIT Press, 2004	1. Zyda, M. (2005). From visual simulation to virtual reality to games. Computer, 38(9),

		2. Triadic Game Design by Casper Harteveld, Springer, 2011. 3. Game Design Workshop: A Playcentric Approach to Creating Innovative Games by Tracy Fullerton, Christopher Swain, Steven Hoffman, Morgan Kaufmann, 2008. 4. Chapter 25: Good games are created through playtesting. The Art of Game Design: A book of lenses by Schell, J. (2008). CRC Press.	25-32. 2. Geurts, J. L., & Joldersma, C. (2001). Methodology for participatory policy analysis. European Journal of Operational Research, 128(2), 300-310. 3. Cecchini, A., & Rizzi, P. (2001). Is urban gaming simulation useful?. Simulation & Gaming, 32(4), 507-521.
3	Verification, Validation & When to play?	1. The gaming of policy and the politics of gaming, Igor Mayer, Simulation and Gaming, 2009 2. Wouters, P., van Nimwegen, C., van Oostendorp, H., & van der Spek, E. D. (2013). A Meta-Analysis of the Cognitive and Motivational Effects of Serious Games. Journal Of Educational Psychology, 105(2), 249-265. 3. Peters, V., Vissers, G., & Heijne, G. (1998). The validity of games. Simulation & Gaming, 29(1), 20-30. 4. Games for participatory planning, FoV white paper, 2012	1. Garson, G. D. (2009). Computerized Simulation in the Social Sciences A Survey and Evaluation. Simulation & Gaming, 40(2), 267-279. 2. Robinson, S. (2008). Conceptual modelling for simulation Part I: definition and requirements. Journal of the Operational Research Society, 59(3), 278-290. 3. Feinstein, A. H., & Cannon, H. M. (2002). Constructs of simulation evaluation.Simulation & Gaming, 33(4), 425-440. 4. Games for Health,

			FoV white paper, 2012 5. Games for Safety, FoV white paper, 2012. 6. Homo Ludens: A Study of the Play-Element in Culture by Johan Huizinga, Routledge, 2003.
4	Analysing Group Dynamics	1. Thiran, Jean-Philippe, Ferran Marqus, and Herve Bourlard. Multimodal Signal Processing: Theory and applications for human-computer interaction. Academic Press, 2009. 2. Gatica-Perez, Daniel. "Automatic nonverbal analysis of social interaction in small groups: A review." Image and Vision Computing 27, no. 12 (2009): 1775-1787. 3. iii. Jayagopi, Dinesh Babu. "Computational modeling of face-to-face social interaction using nonverbal behavioral cues." PhD diss., Ecole Polytechnique Fédérale de Lausanne, 2011.	
5	Conducting game Sessions and analyzing results	1. Chapter 13: Players play games through an interface and Chapter 14: Experiences can be judged by their interest curves. The Art of Game Design: A book of lenses by Schell, J. (2008). CRC Press. 2. Hofstede, G. J., & Meijer, S. (2007). Collecting empirical data	1. Breuer, J. S., & Bente, G. (2010). Why so serious? On the relation of serious games and learning. Eludamos. Journal for Computer Game Culture, 4(1), 7-24. 2. Bergeron, B. (2006). Developing Serious Games (Game

			with games. Organisation and learning through gaming and simulation: Proceedings of ISAGA, 111-121.	Development Series). 3. Crookall, D. (2010). Serious games, debriefing, and simulation/gaming as a discipline. Simulation & Gaming, 41(6), 898-920.

***Spring Term**: Jan – Apr; **Summer Term**: Jun – July; **Prep Term**: July; **Fall Term**: Aug – Nov*