

# Course Descriptions

## ▣ Graduate Course

### ▣ Mandatory Major Courses

#### **GCT501 Introduction to Culture Technology**

This course discusses the basics of culture technology(CT). While culture technology refers to the technology for digital contents such as games, animation and movies, we extend its scope to the technology for various cultural artifacts, even to the technology for our everyday cultural activities. We shall also discuss how the traditional 'analog' cultural problems may find their effective solutions by incorporating the 'digital' approach.

### ▣ Elective Course

#### **GCT502 Aesthetics in the Digital Age**

This course deals with major aesthetical and technical issues to understand the art and culture in the 21st century. We cover the history and traditional concepts of aesthetics, review the latest trends in digital technology, and analyze the reaction to (or re-action on) the “desire” of current culture through multidisciplinary discussions including philosophy, psychoanalysis, arts, and digital technology.

#### **GCT504 Cyberpsychology**

Cyberpsychology is the study of the human mind and behavior in the context of human–technology interaction. It encompasses all psychological and social phenomena that are associated with or affected by emerging technologies, including the internet, mobile phones, online game, virtual world, digital media and any other technology, which has demonstrated an ability to alter human behaviors, lifestyles, and social changes. This course aims to provide with an in–depth understanding of how humans experience and interact with culture technology based on user's psychological and social experience centered perspective.

#### **GCT505 Human–Computer Interaction**

The overall process of analysis, design, and implementation of human–computer interaction is covered. Topics include reflecting cultural context and user needs, analyzing tasks, designing user interface, evaluating performances, and the recent research trends.

#### **GCT522 Computer Graphics Theory and Application**

This course is designed to study theories, techniques and application methods of Computer Graphics. It covers the general overview, the history, and the fundamental concepts of Computer Graphics. The students will have an opportunity to learn graphics programming based on Maya API, Python Scripting, and Mel. Maya is the most widely used 3D commercial software. Industry professionals from leading CG companies will be invited to explain how the Computer Graphics technology is applied to produce most recent movies or animated films.

#### **GCT523 Computing for CT**

This course is designed to provide the students with the essential computing knowledge and skill to conduct the research and learning at the Graduate School of Culture Technology. The course covers not only the programming techniques but also the fundamental knowledge on computing.

Rather than approaching computing from the algorithmic perspective, we shall begin with designing the services and contents, and then designing the computing architecture, and then prototyping the services and contents.

### **GCT525 Motion Graphics**

This course deals with representing, analyzing, and creating motions of virtual objects for computer animation, game, VR, and other interactive media. Students will learn computational theories and algorithms for modeling and animating particles, solid, fluid, and characters through course studies and projects.

### **GCT533 Sound Design and Programming**

This course is concerned with the basis of sound control and synthesis. MaxMSP is a graphical programming language created for use by sound designers, musicians and artists. Particularly useful is the real-time flexibility of audio processes and the ability to control the computer using midi instruments, sensors, networks and so on.

### **GCT535 Sound Technology for Multimedia**

This project-based course deals with both theory and practice of digital audio technology. Topics include the basic concepts of sampling, spectrum, sound analysis/synthesis, digital audio effects, psychoacoustics, and data mapping strategies for cross-modal display. Students will learn how to utilize sound to create/ understand information and art.

### **GCT536 Cognitive Science of Music**

Cognitive science of music concerns the sensation, perception and cognition of sounds that happen in the processing of music listening. this course will provide basic concepts of auditory cognition required for the development of music-related culture technology.

### **GCT543 Game Design**

This course covers the entire of processes of game design – from preliminary concept design to prototyping. The course begins with the essential properties of gaming, and proceeds to the discussion on each game design process. Students will learn the essential knowledge by working on game prototyping

### **GCT544 Game Studies (Ludology)**

Game studies (Ludology) are the discipline of studying games, players, their design and their roles in society and culture. These fields consist of multi- and inter-disciplinary research areas including computer science, psychology, sociology, anthropology, arts & literature, media studies, communication, theology and more. Introductory phase will be focused on basic overview of game studies such as history of games, changes of industry, basic concepts and theories that can form the basis for game field. In the deep understanding phase, based on diverse theoretical & case analysis approaches to the game areas, current trends and future directions of games can be considered.

### **GCT547 Dynamics of Human-Computer Interaction**

This class begins with strong questions about the cognitive psychological perspective that has dominated past human-computer interaction research. From a cognitive psychological perspective on human-computer interaction represented by Fitts` law or the Human Processor Model, humans are considered to be an extremely static, computer-like object that processes the given information. This class clearly demonstrates (1) the limitations of the existing view of human beings as an information processing unit, (2) the nature of man as a dynamic controller that

constantly controls his or her perception and the surrounding environment to achieve a given goal.

#### **GCT551 Digital Design**

This course is designed to study fundamental design theories, principles and visual languages for creating digital media and contents. Through the course, students will acquire skills of developing creative design ideas using various visualization techniques. Students will also experience a basic digital media and contents design practice.

#### **GCT554 Digital Architecture**

Digital architecture is an approach to doing and understanding design that makes use of tools in mathematics, computer science, and linguistics. The digital approach also gives us ways to articulate the definition of the language; describe the designs. The first goal of the course is to develop the fundamentals and digital approaches based on the understanding of the underlying concepts of digital design, which is a new paradigm in the age of knowledge information. Students will learn basic techniques of analysis (understanding designs) and synthesis (making designs), using experimental digital design tools, and discuss the possibilities that affect the plausible applications and constructions. The second goal of the course is to show you the capabilities of computer-aided presentation skills based on the acquired knowledge.

#### **GCT555 3D Interaction Design**

This course is designed to study theories, methods and applications of 3D interaction design. It covers the general overview, the history, the fundamental concepts, and main issues of 3D interaction and its applications. It provides the interested students with the basic knowledge and skills to conduct the further researches in 3D Interaction through team projects.

#### **GCT556 Digital Fashion**

This course investigates how digital technologies affect fashion in terms of design, production and consumption. The course focuses on the design and construction of virtual garments and wearable computing, while introducing recent trends in technology applications and design methods as well as relevant contextual debates.

#### **GCT559 Computational Design**

This course will cover the introduction, research and state-of-art issues related to computational design. The student will get a comprehensive understanding of all the theories and approaches that have been investigated by related domain researchers such as cognitive psychologists, designers, aestheticians, computer scientists, human-computer interaction researchers, etc.

#### **GCT561 Scientific Concepts and Thinking**

This course attempts to introduce and to nurture the essential concepts and knowledges in science and technology so that students develop the scientific minds for understanding, designing and solving various cultural and artistic problems. This course is primarily for the students with various non-science backgrounds.

#### **GCT564 Introduction to Data Analytics Using R**

The ability to handle social data and analyse them statistically is crucial in the modern world. The social data basics and tools to analyze such data will be provided. Using the R statistical package, students can get experience to handle real data and visualize them.

#### **GCT565 Augmented Humans**

The main goal is to let students learn research process by proposing and implementing the idea of

'Augmented Human'. Through team projects students will analyze collected data from smart phone to realize 'quantified self' and then implement 'augmented human platform' that enhance humans capability in terms of 1) physically 2) intellectually 3) socially.

#### **GCT572 Computer-mediated Communication**

Introduction to the internet, language and communication in the context of the complex interactions of culture and technology. This course offers both theoretical approaches and case studies of these interactions from diverse domains, including computer science, linguistics, information technology, and mass media.

#### **GCT573 Cognition and Emotion**

When humans experience various cultural contents and technologies, the information is represented and appreciated according to the general principles of the human cognitive structure in the brain. Thus, in order to explain and predict how people react and feel about various contents, it is essential to understand the principles and theories of human cognition and emotion. This course will provide students with the opportunity to acquire advanced knowledge about the study of human cognition and emotion. Topics including perception, attention, memory, decision making, and emotion will be addressed, with the emphasis on the interaction and integration of emotion and each of the cognitive functions.

#### **GCT574 Story Design**

Nowadays Storytelling is adapted to PC game, web content, advertizement, marketing as well as traditional story art such as novel, drama and movie. There are many stories in our time, but good stories are so rare. This course offers theories and techniques of good story well told.

#### **GCT576 Social Computing**

In this course, we are going to discuss researches of social network services, along with sociological studies of human action. Sociological action theories will help social-computing researchers figure out the substantive meaning of their data analysis. Students will learn how to design a sociological data analysis framework on their own. Students will learn how to make theoretical interpretations from data on the basis of course reading and discussions.

#### **GCT582 Culture Content Industry**

This course deals with cultural content industry field such as film, animation, game, edutainment and digital media, etc, particularly focusing on applying established scholarly tradition theories and discourses to cultural content industries. The purpose and output of this course is for empowering ability to set up and improve your analysis and predictability toward cultural content and its industry. Participants must implement case studies with applicable discourses which is provided for this course.

#### **GCT583 Museum Technology in Digital Era**

This course is designed for students, on the basis of understanding of contemporary museological issues and trends, to do analysis and research on aspects of museum technology in a historical and cultural context so that they will be ready for newly created professions in the museum.

#### **GCT600 Augmented Reality Project**

This course is a project-based course that plans and implements Augmented Reality (AR) projects. In this course, we explore how to solve various Metaverse issues using 'DT (Digital Twin)-based AR technology'. The key goal is to teach students the AR research process by finding/defining problems,

proposing/implementing/evaluating possible solutions.

### **GCT606 Digital Performance**

This course provides theoretical knowledge and practical skills to plan, produce and stage a digital performance project. The course draws on theories and methods from performance studies, film and media studies, and human computer interaction to gain insights into various approaches to filming choreographed shots for performance, designing computer mediated interactions, and capturing human movements in live performance.

### **GCT611 Digital Heritage**

Digital heritage, or cultural archetype refers to the knowledge and technology concerned with the recovery, reconstruction, preservation and production of cultural heritage with the aid of the digital technology. This course emphasizes how we utilize digital heritage in order to create cultural contents.

### **GCT612 Cultural Archetype and Image Code**

The Cultural Archetype is to find out the common and universal elements such as cultural images and symbols in the basic patterns, ways and styles of the Culture and Civilization. We are going to make an analysis of how the images and symbols come to create the Cultural Archetype reflected on Myth, Legend, History, Society, Arts, Politics and Religion. In this course the students have to focus on getting the visions, perspectives and insights to analyze the Culture through images and symbols. Furthermore, the students will learn how to use culture archetype knowledges to develop digital contents, such as smart media, games and etc.

### **GCT622 Digital Creatures**

This course will give an overview of major research topics in digital human technology, such as facial animation, motion control, physically-based modeling and animation, modeling emotions and intelligent behaviors. Emphasis is on the computational techniques required to the simulation of human characters.

### **GCT623 Interaction Sensing Principle & Application**

This course will educate core principles of 3D & Physical sensing adopted for human-computer interaction. We will cover basic optics for 3D sensing and basic knowledge of each component for physical sensing. Also, we will look at applications where 3D & physical sensing is combined to provide interaction.

### **GCT633 Audio and Multimedia Programming**

This course deals with various topics of audio/multimedia programming. We explore the basics of programming tools and environments, software libraries, graphic user interface design, audio plug-in architecture, audiovisual integration, and control/communication over network.

### **GCT634 Musical Applications of Machine Learning**

This is a survey course to encompass various musical applications of machine learning such as audio classification, music transcription, algorithmic composition and audio signal processing. The machine learning algorithms will include deep learning, PCA, GMM, NMF and HMM which have been popularly used in recent music research.

### **GCT651 Media Interaction Design**

This course is designed to study the interactivity of multi-modalities (visual, sound, olfactory, and tactile), and to experience creative interaction design. Emphasis is given to experience tangible

interface design with the state-of-the-art of technology.

### **GCT653 Virtual Reality and Virtual Worlds**

The subjects of this course is virtual reality (technology) and virtual worlds (culture). This course will cover (1) the core technology and the characteristics of VR, and (2) the socio-humanities subjects on virtual worlds. Case studies on the various virtual worlds and the future perspectives will be discussed.

### **GCT662 Human-Robot Interaction**

As the robot technology advances rapidly, robots become robust and intelligent ever before. In this course, we shall go beyond the traditional HCI, and shall investigate various technological as well as socio-humanities issues as robots become one of the integral ingredients of our civilization.

### **GCT671 Social-aware Ubiquitous Computing**

Through this class, students will learn the concept and issues of the social aware ubiquitous computing, the evolutionary change of social applications including social networks and social media, and the impact on user behaviors in a new collective way.

### **GCT674 Knowledge-based System Design**

This course will examine the nature and principles of knowledge-based systems from performance and methodology perspectives. It will cover the basic elements of knowledge-based systems and discuss the factors that affect their design and construction. This course will use the specific programming language JESS.

### **GCT675 Theory and Applications in Culturoinformatics**

Culture-related data being actively archived owing to digital devices and high-throughput communication technology include piece-specific ones such as the color histogram in paintings, the genealogy of styles and schools, and the geographical distribution of monuments. This culturoinformatics class is dedicated to the analysis, visualization, and modelling of such data.

### **GCT684 Regional Culture Industry Studies**

The very notion of culture involves both global-ness and local-ness. This course explores how the region-specific culture can be exploited, and be materialized into cultural outcome. Various strategies will be studied with the field study.

### **GCT685 Venture Management in Culture Industry**

The students will study various issues in creating and managing the venture companies in the cultural industry. The topics to be discussed are: case study, processes and simulation.

### **GCT686 Exhibition Content Design**

Making exhibitions in the digital era cannot treat any more only with artefacts or art works. Exhibition developers, with the analysis on the purpose and intention of the event, should take into consideration the possibilities of digital technologies in planning and designing the exhibit content to meet with the needs for the institution and also for the public. This course will be composed of the basic principles to plan and design the exhibit as well as of practice experience through projects that students will present at the end of semester.

### **GCT687 New Media and Heritage**

New Media Technologies are applied to cultural heritage not only for the preservation and management purpose but also for dissemination of its value and meaning through exhibition and learning. This class will focus on three subjects : information construction, interpretation of its value and meaning as well as dissemination methodology.

#### **GCT688 Global Cultural Marketing**

This course begins with the traditional marketing agenda such as marketing theory, marketing models and promotion management, and proceeds to the issues that arises in global marketing. Focus will be given to the global marketing for cultural artifacts, especially cultural contents.

#### **GCT689 Managerial and Cultural Economics**

This course is concerned with the understanding of basic principles in business economics. Business economics considers how individuals, firms, the government, and other organizations make choices. In addition, economic forces are a fundamental determinant of firms' profitability and growth, and economic thinking should be a fundamental influence in nearly every managerial decision. In this course, we will examine the principles of microeconomics, and illustrate how they apply to managerial decision-making. By the end of semester, students should understand the main logical arguments in business economics and be able to use these tools to analyze business and public policy problems.

#### **GCT700 Topics in Culture Technology project planning**

This course is designed to develop Culture Technology related project through analyzing and understanding various digital media. Students will participate in real CT projects and they can gain experience and know-how of real CT projects.

#### **GCT703 Topics in Culture Technology I**

This course is concerned with the emerging issues in the theoretical and practical aspects of culture technology. The course may be offered throughout the entire semester, or may proceed in a relatively short time span, covering the same amount of material. Typical topics include content technologies, cultural management, cultural policies, content design, techno-culture, and scientific communications.

#### **GCT704 Topics in Culture Technology II**

This course is concerned with the emerging issues in the theoretical and practical aspects of culture technology. The course may be offered throughout the entire semester, or may proceed in a relatively short time span, covering the same amount of material. Typical topics include content technologies, cultural management, cultural policies, content design, techno-culture, and scientific communications.

#### **GCT711 Topics in Digital Socio-Humanities**

#### **GCT721 Topics in Computer Graphics**

This course deals with the emerging issues in 3D interactive graphics and animation. The primary subjects are rendering, modeling, motion control and 3D interaction techniques.

#### **GCT722 Topics in Virtual Reality**

A primary goal of this class is to study fundamental theories, algorithms, recent advances and research issues in "realizing virtual reality in ubiquitous computing environment." This class will cover key issues in the areas of ubiquitous virtual reality, which will be : (i) pervasive sensing, (ii) intelligent signal processing, (iii) multimodal interface/interaction (iv) context-aware

information display, and (v) U–VR applications.

#### **GCT731 Topics in Music Technology**

This course covers both the theory and the practice of digital instruments and performance. Students will learn how to implement digital interfaces for music and practice various data mappings, design new instruments, and finally conduct a performance using the result.

#### **GCT741 Topics in Human–Computer Interaction**

#### **GCT742 Topics in Game**

In order to complete successful games development, collaboration between many different areas is a prerequisite. Well–balanced contribution from various disciplines is such an important factor in the field. Ideas from various fields have infinite potential to trigger innovative thinking for current and future game media. This course will provide innovative ideas and insights from various disciplines for future game media, such as tangible games. During this course, various types of tangible game and serious game design will be assigned.

#### **GCT752 Topics in Digital Contents**

#### **GCT753 Topics in Computational Design**

This course will cover the introduction, research and state–of–art issues related to computational design. The student will get a comprehensive understanding of all the theories and approaches that have been investigated by related domain researchers such as cognitive psychologists, designers, aestheticians, computer scientists, human–computer interaction researchers, etc.

#### **GCT787 Topics in Cultural Planning**

This course considers how art museums reveal the social and cultural ideologies of those who build, pay for, work in, and visit them. We will study the ways in which art history is (and has been) constructed by museums acquisitions, exhibitions, and installation. We will also consider the ways in which art museums are changing by looking at the world–wide boom in museum architecture, and by examining the relationship between contemporary art and museums. The analysis of some of major art museum examples will give the insight to the students on the relationship between the cultural contexts of viewer and object, the nature of languages or aesthetic discourse.

#### **□ Research**

#### **GCT960 Master's Thesis**

This is an independent research work supervised by the advisor(s), toward the Master's thesis.

#### **GCT966 Seminar, Master's**

#### **GCT967 Individual Study, Master's**

#### **GCT980 Doctoral Dissertation**

This is an independent research work supervised by the advisor(s), toward the Ph.D.'s dissertation.

#### **GCT986 Seminar, Ph.D.'s**