课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	**课程名称 Course Title**	**信息可视化与可视化分析 Information Visualization and Visual Analysis**
2.	**授课院系 Originating Department**	School of Design
3.	**课程编号 Course Code**	DS370
4.	**课程学分 Credit Value**	3
5.	**课程类别 Course Type**	专业选修课 Major Elective Courses **（请保留相应选项 Please only keep the relevant information）**
6.	**授课学期 Semester**	秋季 Fall
7.	**授课语言 Teaching Language**	英文 English **（请保留相应选项 Please only keep the relevant information）**
8.	**授课教师、所属学系、联系方式（如属团队授课，请列明其他授课教师） Instructor(s), Affiliation& Contact （For team teaching, please list all instructors）**	孙效华 SUN Xiaohua 讲席教授 Chair professor <sunxh@sustech.edu.cn>
9.	**实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact**	待公布 To be announced / **（请保留相应选项 Please only keep the relevant information）**
10.	**选课人数限额(可不填) Maximum Enrolment （Optional）**	

11.	授课方式 Delivery Method	讲授 Lectures	习题/辅导/讨论 Tutorials	实验/实习 Lab/Practical	其它(请具体注明) Other（Please specify）	总学时 Total
	学时数 Credit Hours	32		32		64

12.	先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	
13.	后续课程、其它学习规划 Courses for which this course is a pre-requisite	
14.	其它要求修读本课程的学系 Cross-listing Dept.	

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

Information visualization is the process of inventing novel visual metaphors to help discover underlying patterns in data by leveraging the strong visual cognition capabilities of humans. It draws from the fields of human-computer interaction, visual design, computer science, and cognitive science, among others. Information visualizations should take into account the needs of the target group in specific scenarios and the features of the dataset, as well as employ the most suitable visual encoding and metaphor to make the abstract, complex information understandable in visual form. This course covers the basics and existing techniques of information visualization and visual analysis through lectures and workshops. Students will also get hands-on experience on the process of research, design, implementation and evaluation through a course project.

Through this course, students will learn about:

1. An overview of the field of information visualization and existing techniques.
2. The design process and principles of information visualization.
3. Methods for exploring and analyzing a dataset.
4. Conducting formative studies through the analysis of application scenarios, user needs, and data characteristics.
5. Designing the visual encoding and interaction of an information visualization system.
6. Prototype development.
7. System evaluation.
8. Consolidating contributions to information visualization and visual analysis research.

信息可视化是将数据以视觉化的方式呈现，从而支持用户理解和分析数据的过程，它是人机交互、视觉设计、计算机科学和认知科学的交叉学科。信息可视化需要同时考虑到特定应用场景中的目标用户需求和数据本身的特点，运用或创造最合适的视觉隐喻来将抽象、复杂的数据转化为视觉化的表示，从而为用户提供最大的效用。本课程旨在带领学生学习信息可视化的基础知识和现有方法，并提供实践工作坊环节，引导学生设计和实现一个完整的信息可视化项目。

通过这门课，学生将学习以下内容：

1. 信息可视化的领域和方法概览

2. 信息可视化的设计流程和原则
3. 数据集的探索和分析方法
4. 如何通过需求、场景和数据特征的分析开展可视化设计的形成性研究
5. 信息可视化的视觉编码和交互方式设计
6. 可视化原型开发
7. 可视化系统评测
8. 可视化与可视分析研究贡献点凝练

16. 预达学习成果 Learning Outcomes

By the end of this course, students will be able to:

1. Demonstrate understanding of the basic process of conducting information visualization design and research.
2. Apply design principles and methods in the visualization design in a specific application scenario.
3. Prototype and evaluate the visualization system designed.
4. Consolidate research contributions of their course projects.

在本课程结束时，学生将能够：

1. 展示对信息可视化与可视分析设计与研究基本流程的理解。
2. 运用所学的可视化设计原则和方法针对特定应用场景进行信息可视化的设计。
3. 对设计进行原型开发与评测。
4. 对课程项目的研究贡献点进行凝练。

17. 课程内容及教学日历 （如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）
Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

Week	Content
1-2	**Lecture** Course introduction and overview. Introduction to information visualization and visual analysis system design. Current topics in information visualization and visual analysis.
3-4	**Lecture** The process and principles of designing information visualizations. **Workshop** Design practice and course project briefing.
5-6	**Lecture** Working with data and datasets. Data analysis methods **Workshop** Conducting exploratory analysis on the project dataset.
7-8	**Lecture** Conducting formative research for visualization design, including researching specific application scenarios, target user needs, and data characteristics. **Workshop** Drafting a formative research plan for your project.
9-10	**Lecture** Designing visual encoding. Designing interaction for visual analysis systems. **Workshop** Designing visual encoding and interaction based on your formative study findings.
11-12	**Lecture** Prototyping a visualization design. JavaScript and D3 coding basics. **Workshop** Coding lab.
13-14	**Lecture** Evaluating information visualization systems. **Workshop** Drafting an evaluation research plan for the project and practice with mock evaluations.

15-16	**Lecture** Consolidating and presenting your contributions to information visualization and visual analysis research. **Workshop** Finalizing the course project & writing lab. **Final review and project feedback** with invited guest.

18. **教材及其它参考资料 Textbook and Supplementary Readings**

Munzner, T. (2014). Visualization analysis and design: Principles, Techniques, and Practice. A K PETERS.

Ware, C. (2020). Information visualization: perception for design. Morgan Kaufmann.

课程评估 ASSESSMENT

（根据学院统一安排，10%是出勤，20%是期末考试，其他 70%您可以自行分配）

19.

评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance		10%		
课堂表现 Class Performance				
小测验 Quiz				
课程项目 Projects		70%		
平时作业 Assignments				
期中考试 Mid-Term Test				
期末考试 Final Exam		20%		

期末报告 **Final Presentation**				
其它（可根据需要改写以上评估方式） **Others (The above may be modified as necessary)**				

20. 记分方式 **GRADING SYSTEM**

√ A. 十三级等级制 **Letter Grading** □ B. 二级记分制（通过/不通过） **Pass/Fail Grading**

课程审批 REVIEW AND APPROVAL

21. **本课程设置已经过以下责任人/委员会审议通过**
This Course has been approved by the following person or committee of authority

教学负责人签字： **日期：2024 04 23**