课程大纲
COURSE SYLLABUS

1.	**课程代码/名称** **Course Code/Title**	机器人设计科学与社会价值 Designing Robots for Social Good
2.	**课程性质** **Compulsory/Elective**	专业选修课 Major Elective Courses
3.	**开课单位** **Offering Dept.**	School of Design
4.	**课程学分/学时** **Course Credit/Hours**	3/48
5.	**授课语言** **Teaching Language**	中英双语 English & Chinese
6.	**授课教师** **Instructor(s)**	万芳，助理教授，创新创意设计学院，wanf@sustech.edu.cn Fang Wan, Assistant Professor, School of Design
7.	**开课学期** **Semester**	秋季 Fall
8.	**是否面向本科生开放** **Open to undergraduates or not**	否 No
9.	**先修要求** **Pre-requisites**	（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.） 无

10. 教学目标
Course Objectives

（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.）

The goal of this course is to exemplify the technical and ethical guidelines in designing robots for social good. The course introduces the principles, materials, design, modeling of robotic agent for physical interactions with the environment, helping students understand the basic concepts, core technologies of robotics. The course further takes a theme-based and case-driven approach to help the students identify the key factors in designing robots for social goods and practice them in design challenge.

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

1. Conduct analysis of robotic systems in terms of technical and ethical aspects.
2. Adopt advanced technologies in designing robotic systems.
3. Demonstrate ability to align technical and ethical guidelines in designing robots for social good.

11. 教学方法
Teaching Methods

（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.）

课堂教学，主题前沿讲座，课程项目实践与报告。
Teaching methods include classroom lectures with multimedia presentation, theme-based frontier seminars, and course project applying design practice (written report and oral presentation).

12. 教学内容
Course Contents
（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the

difference.）

Section 1 (4 hours)	Robotic Agent for Physical Interactions with the Environment
Section 2 (2 hours)	Ethical Guidelines in Design for Social Good
Section 3 (4 hours)	Design Practice on Ethical Guidelines in Design for Social Good
Section 4 (2 hours)	Physical Embodiment of Robots as an Agent of the Human: on Soft Robotics and Material Innovations
Section 5 (4 hours)	Design Practice on Physical Embodiment of Robots
Section 6 (2 hours)	Environmental Consideration in Advanced Robot Design: on Soft Robotics and Material Innovations
Section 7 (4 hours)	Design Practice on Environmental Consideration in Robot Design
Section 8 (2 hours)	Structured Representation and Privacy Protected Design
Section 9 (4 hours)	Design Practice on Structured Representation and Data Design
Section 10 (2 hours)	Algorithmic Safeguards against Manipulation of Predictors
Section 11 (4 hours)	Design Practice on Algorithmic Safeguards and Predictions
Section 12 (2 hours)	Robot Design Life-Cycle and Incremental Deployment
Section 13 (4 hours)	Design Practice on Robot Life-Cycle and Deployment Management
Section 14 (2 hours)	Industry Standards in Robot Design against Engineering Reality
Section 15 (4 hours)	Design Practice on Implementing Industry Standards
Section 16 (2 hours)	Final Demonstration, Presentation, and Course Review

13. 课程考核
Course Assessment

（①考核形式 Form of examination；②.分数构成 grading policy；③如面向本科生开放，请注明区分内容。If the course is open to undergraduates, please indicate the difference.）

1、考核形式 Form of examination：等级制 Letter Grading

2、分数构成 grading policy：
出勤 Attendance 10%
平时作业 Assignments 20%
期末报告 Final Presentation 70%

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

教材及参考材料：

1. 《 Ethically Aligned Design: A Vision for Prioritizing Human Well-being with Autonomous and Intelligent systems》
2. 《Designing Robots, Designing Humans》
3. Soft robotics tookit (https://softroboticstoolkit.com/)
4. Coyle, Stephen, et al. "Bio-inspired soft robotics: Material selection, actuation, and design." Extreme Mechanics Letters 22 (2018): 51-59.