Module 6 Industrial Design Professional Courses

Content

Option 1

Module designation	*Product CMF Design*
Semester(s) in which the module is taught	*5*
Person responsible for the module	*Xiaotao Shi*
Language	*Chinese*
Relation to curriculum	*Compulsory* *The product CMF design course is the core course of the product design major, and it is the skill required in the specific practice process of product design. The main contents of the course include: the connotation and significance of CMF design, product color design, overview and molding process of plastic materials, overview and molding process of metal materials, overview and molding process of ceramic glass and other materials, product surface decoration materials and surface treatment process, 3D printing, product prototype model making, etc. The course sorts out the development process and concepts of color, materials and surface technology in product design, introduces the subjective experience methods and research methods of color and materials, guides students to master the strategies and methods of CMF innovative design, lays a solid foundation for students to engage in CMF product design and CMF engineering design in the future, and cultivates application-oriented talents who meet the needs of modern enterprises.*
Teaching methods	*lecture, lesson, lab works, project, seminar etc.*
Workload (incl. contact hours, self-study hours)	*Contact hours:32 including lecture, exercise.Private study including examination preparation, specified in hours:58*
Credit points	*3 ECTS CP*
Required and recommended prerequisites for joining the module	*N/A*
Module objectives/intended learning outcomes	*Knowledge:Master the functional characteristics of CMF and be able to conduct comprehensive analysis in terms of aesthetic experience and practical effectiveness, taking into account other constraints such as process difficulty, cost, and environmental protection.*

	Skills: Able to develop, select and use appropriate technologies, resources, modern engineering tools and information technology tools for industrial design problems, including the prediction and simulation of complex industrial design problems, and be able to understand their limitations. *Competences: Be familiar with the development history and concept of CMF, and possess the ability to conduct basic analysis and research by applying the design elements of CMF.*
Content	*Chapter 1 The Concept of CMF Design* *1.1 The Concept and Development History of CMF* *1.2 The Current Situation of CMF* *1.3 The Development Direction of CMF* *1.4 The CMF Design Industry* *Chapter 2 Research Methods of CMF (Supporting Curriculum Objective 2)* *2.1 Basic Research of CMF* *2.2 Specific Research Methods of CMF Key Points and Difficulties* *Chapter 3 The Knowledge System and Fundamental Issues of CMF (Supporting Curriculum Objective 2)* *3.1 Investigation of CMF Information Requirements* *3.2 The Knowledge System and Fundamental Issues of CMF* *3.3 The Interrelationships between CMF and Other Design Factors Key Points and Difficulties: Requirements for Integrating Ideological and Political Education into Education: Aesthetic Standards Case: Comparison between Traditional Tools and Modern Tools* *Chapter 4 The Subjective Experience of CMF (Supporting Curriculum Objective 2)* *4.1 The Subjective Experience and Evaluation of Color* *4.2 The Subjective Experience and Evaluation of Material Texture* *Chapter 5 The Functional Characteristics of CMF (Supporting Curriculum Objective 2)* *5.1 The Functions of Color* *5.2 The Functions of Materials and Their Surfaces* *Chapter 6 Case Studies on CMF Design Applications* *6.1 CMF Research and Design Creativity for the Interiors of Transportation Vehicles* *6.2 CMF Research and Design Creativity for Electronic Products* *6.3 CMF Research and Design Creativity for Furniture Products* *Chapter 7 CMF Creative Design and Expression* *7.1 CMF Proposal Strategies and Guidance* *7.2 Guidance on the CMF Proposal Design Process*

Examination forms	*design project*
Study and examination requirements	*60%Final exams, 30%regular assignments, 10%attendance.*
Reading list	*1."CMF Design Tutorial", written by Li Yi wen, Huang Ming fu and Liu Rui, published by Chemical Industry Press in 2019.* *2."Introduction to CMF in Design Art", written by Zuo Heng feng, published by China Film Press in 2021.* *3."CMF (Color, Material and Process) Design of Creative Products", written by Jiang Bin, published by Publishing House of Electronics Industry in 2019.*

Module designation	*Product Development and Design*
Semester(s) in which the module is taught	*6*
Person responsible for the module	Yi Zhuang
Language	*Chinese*
Relation to curriculum	*Compulsory* *This course is a professional platform course for art and design disciplines such as product design and industrial design. This course is designed to develop students' product design and development skills. Students will learn about the entire process of product development, from market research to product design to manufacturing. The course focuses on cultivating students' market research ability, so that students can learn to understand consumer needs and market trends through market research, so as to better meet market demand in the product design stage. In addition, the course also emphasizes the cultivation of students' product design ability, including product functional design, appearance design and user experience design, etc., so that students can transform the results of market research into specific product solutions, and improve the competitiveness of products through continuous optimization and improvement. The main task of this course is to cultivate students' design practice ability based on the social background, exercise students' ability to think globally and "craftsman spirit", and be able to keep pace with the times.*
Teaching methods	*lecture, lesson, lab works, project, seminar etc.*
Workload (incl. contact hours, self-study hours)	*Contact hours:32ncluding lecture, exercise, and test.*

	Private study including examination preparation, specified in hours:58
Credit points	*3 ECTS*
Required and recommended prerequisites for joining the module	*N/A*
Module objectives/intended learning outcomes	*Knowledge: Master the professional knowledge of mathematics, natural sciences, engineering fundamentals and related disciplines required in the field of industrial design, and be able to apply this knowledge to solve applied engineering problems in the fields of material forming processes, mechanical analysis, electronics, model making, etc. in industrial design.* *Skills: Master the basic professional theoretical knowledge such as design history, design psychology, and ergonomics; master the general procedures and methods of industrial design; and master the comprehensiveness including hand-drawing, model making, layout reports, etc.* *Competences: Possess the ability to conduct integrated design and development by combining knowledge in various aspects such as user research, product definition, design, interaction, and service.*
Content	*Chapter 1 Products and Product Development* *Products and product development, the characteristics of the product development process, the indicators for evaluating product design and development, the toolset for product development; the necessary environment for technological or product development, the organizational forms of product development; development cases of national brand products.* *Chapter 2 Product Planning and Development Process* *Product strategy and platform planning, product development roadmap, product architecture design, product development types, preparation of development resources, technical preparation and pre-development technical research; necessary stages of product development, typical development processes, tasks and deliverables in the development stages, construction and management of the development process, and best practices of the development process.* *Chapter 3 Project Management, Requirement Management and Market Information Collection*

	The relationship between project management and product development, the core concept of project management, the basic attributes and evaluation methods of projects, typical project documents, project execution and evaluation; product development requirements, request management and Carnot model, translation, decomposition and transmission of requirements, product requirements documents and quality function development, requirements realization evaluation standards; market information and market segmentation, market information collection methods, tools for processing market information, market information evaluation and driving. *Chapter 4 The Creative Process and Concept Selection* *Requirements understanding and the creative stage, the typical process of the creative stage, common innovation tools, concept design; criteria for concept selection, methods of concept selection, application of concept selection matrix, output of concept selection and subsequent planning, low-level concept design and architecture design, reverse engineering.* *Chapter 5 Initial Realization of Functions and Design of Intelligent Products* *Product function list and key features, axiomatic design, design evaluation and failure mode analysis, detailed product design, detailed design steps for physical products, bill of materials; Introduction to intelligent product scenarios, the underlying model and implementation principle of intelligent products.* *Chapter 6 Product Prototypes and Evaluation* *Making product prototypes, the differences between non-functional prototypes and functional prototypes, the preliminary evaluation of product prototypes, the concept of MVP (Minimum Viable Product), and case demonstrations.* *Chapter 7 Testing, Verification and Optimization* *Requirement analysis and test verification planning, introduction of the V&V (Verification and Validation) model, planning and implementation of test verification, evaluation of the results of test verification, optimization of product performance, and the application of statistics in the process of verification and optimization.* *Chapter 8 Intellectual Property and Management of the Lifecycle of Intellectual Products* *The importance of intellectual property rights to enterprises, the classification of intellectual property rights, intellectual property strategies and application procedures, management of intellectual property rights and methods for circumventing common problems.* *Chapter 9 Software Product Design*

	Characteristics of software products, differences from physical product development, development models and agile methods, interface design of software or systems, embedded software and integrated development models.
Examination forms	*design project*
Study and examination requirements	*70%Final exams, 20%regular assignments, 10%attendance.*
Reading list	*1 Miao Yuhong, "Product Design and Development" [M]. Publishing House of Electronics Industry. 2022.* *2. Written by Kart T. Ulrich and Steven D. Eppinger, translated by Yang Qing, Yang Na, etc., "Product Design and Development (Original 6th Edition)" [M]. China Machine Press. 2020.* *3.Liao Jianshang, Hu Kunrong, etc., "Intelligent Product Design and Development" [M]. Publishing House of Electronics Industry. 2021.*

Module designation	*Product Improvement Design*
Semester(s) in which the module is taught	5
Person responsible for the module	*Ziqiang Wang*
Language	*Chinese*
Relation to curriculum	*Compulsory* *This course is a professional course for product design majors, and the class is held in the first half of the third year of product design students. Product improvement design is a redevelopment design that optimizes, enriches, and improves the original traditional products. Therefore, product improvement design should start from the basic platform of investigation, analysis and understanding of existing products, and conduct objective and comprehensive analysis and judgment on the "shortcomings" and "advantages" of products. Distinguish between the past, present, and future use environment and conditions of the product. This course aims to develop students with a systematic and in-depth understanding of the concepts, methods and procedures of product improvement design. It also lays a solid foundation for students to engage in product design in the future, and also*

	prepares students to better apply the knowledge they have learned in the future to improve and enhance the lives of Chinese residents in China's socialist modernization.
Teaching methods	*lecture, lesson, lab works, project, seminar etc.*
Workload (incl. contact hours, self-study hours)	*Contact hours:48 including lecture, exercise, and test.* *Private study including examination preparation, specified in hours:72*
Credit points	*4 ECTS CP*
Required and recommended prerequisites for joining the module	*N/A*
Module objectives/intended learning outcomes	*Knowledge: Master the important design methods and relevant theoretical knowledge in the design discipline.* *Skills: On the basis of analyzing products, through innovative thinking and the application of various materials, we can propose new design solutions for new design solutions.* *Master the important design methods and related theoretical knowledge of the design discipline* *Competences: improve their professional ability, lay a solid foundation for future product design, and improve the overall quality of product design in China.* *Able to cooperate with different types of workers and complete design and development, master different communication techniques and necessary skills for cooperation and communication.*
Content	*Chapter 1, Basic Concepts of Product Improvement Design* *1.The basic concepts, refinement and innovation of product improvement design.* Chapter 2 Product Improvement Design Planning 1. Position the characteristics of the project and formulate the development flowchart. *Chapter 3, Sampling of Product Information* *1. The method of product appearance sampling, product color collection, original product material and surface processing process sampling, product function sampling, and original product operation mode sampling.* Chapter 4 Product Improvement Strategies *1. Analysis of product market characteristics.*

	2. Product improvement design. *3. Product improvement design.*
Examination forms	*design project*
Study and examination requirements	*60%Final exams, 30%regular assignments，10%attendance.*
Reading list	*1. Deng Wei, Product Improvement Design, Beijing Institute of Technology Press, 2020-08-01* *2. 2. Zhang Zhan, Product Improvement Design (2nd Edition), Shanghai Century Publishing Joint Stock Company Distribution Center, 2012-08;* *3. Chen Jianrong, Product Improvement Design, Higher Education Press, 2009-02*

Module designation	*Transportation Vehicle Modeling Design*
Semester(s) in which the module is taught	*6*
Person responsible for the module	Jianghua Xu
Language	*Chinese*
Relation to curriculum	*Compulsory* *Carrier design is the main course of industrial design and product design, and its main content is to take the core values of socialism as the guide, master the elements, principles and methods of vehicle design, and cultivate students' mainstream values. Combined with practical problems such as the creative design of low-altitude aircraft and the cabin facilities of large aircraft, the original design scheme is proposed, and the original design style is formed to cultivate the original design spirit of students.*
Teaching methods	*lecture, lesson, lab works, project, seminar etc.*
Workload (incl. contact hours, self-study hours)	*Contact hours:48 including lecture, exercise, and test.* *Private study including examination preparation, specified in hours:72）*
Credit points	*4 ECTS CP*
Required and recommended	*N/A*

prerequisites for joining the module	
Module objectives/intended learning outcomes	*Knowledge: Master the professional knowledge of basic mathematics, natural science, engineering foundation and other related disciplines, and be able to solve complex engineering problems in the field of industrial design.* *Skills: The ability to develop, select, and use appropriate technologies, resources, and modern engineering and information technology tools for industrial design problems, including the prediction and simulation of complex industrial design problems, and the ability to understand their limitations* *Competences: Be able to study complex issues in the industrial design process using scientific research methods based on the basic principles of industrial design, including design plans, implementation plans, analysis of data, interpretation of data, and obtain reasonable and effective conclusions through information synthesis*
Content	*Chapter 1 Overview of Modeling Design of Carrier* *Classification and application of existing transport tools; Application of new technologies, new materials and new processes in the modelling design of transport tools. Integrating the characteristics of sea, land and air majors of Shanghai University of Engineering Technology, combined with the practice of secondary disciplines of industrial design, explain the concept of sustainable design of transport tools.* *Chapter 2: Elements, Principles and Methods of Vehicle Modeling Design* *Vehicle modeling design elements; Vehicle modeling design principles; Vehicle modeling design methods. Explore the way people travel in the future and form their own creative design style.* *Chapter 3, Creative Design of Aircraft* *Overview of aircraft; Creative design and bionics of aircraft; Embodiment of design culture in aircraft. Explain the design culture concept of "Creative Aviation, Green Aviation, Intelligent Aviation, Shangmei Aviation", explore aircraft aesthetics, and encourage students to design creative solutions for aviation equipment with local culture and Chinese characteristics.* *Chapter 4: Passenger Seat Design of Large Aircraft from the Perspective of System Design*

	Aircraft passenger seat system classification; Large aircraft passenger seat modeling safety man-machine design model; Large aircraft passenger seat layout design method. *Chapter 5: Case study of vehicle design and refinement of design concept* *Case study of classic carrier modeling design; aviation equipment design concept; Comment and guidance on design schemes; Guided on-machine modeling; Preparation of layouts and reports.* *Chapter 6 Comprehensive evaluation of vehicle modeling design works* *Principles for the evaluation of vehicle design works; Summary of aviation equipment design.*
Examination forms	*design project*
Study and examination requirements	*60%Final exams, 30%regular assignments, 10%attendance.*
Reading list	*1. Xue Wenkai, Ding Jian. Vehicle Design [M]. Beijing: Higher Education Press, 2024.* *2. Ding Jian, Du Haibin. Vehicle Design [M]. Beijing: Peking University Press, 2022.* *3. Zhang Guojun, Cheng Qiang, Zhang Jian. Reusable Design [M]. Beijing: Tsinghua University Press, 2022.* *4. Xu Jianghua. Research on man-machine design of aircraft cabin facility safety[M].Beijing:Beihang University Press,2022.*

Module designation	*Digital Cabin Design for Vehicles* *(The course description is not available in the school education system, because it is newly added and will be available by 2026 spring semester).*
Semester(s) in which the module is taught	*7*
Person responsible for the module	*N/A*
Language	*Chinses*
Relation to curriculum	*Compulsory*
Teaching methods	*N/A*

Workload (incl. contact hours, self-study hours)	*Contact hours:32 including lecture, exercise.Private study including examination preparation, specified in hours:58*
Credit points	*3 ECTS CP*
Required and recommended prerequisites for joining the module	*N/A*
Module objectives/intended learning outcomes	*N/A*
Content	*N/A*
Examination forms	*N/A*
Study and examination requirements	*N/A*
Reading list	*N/A*

Option 2

Module designation	*Product Improvement Design*
Semester(s) in which the module is taught	*5*
Person responsible for the module	*Wang Ziqiang*
Language	*Chinese*
Relation to curriculum	*Compulsory* *This course is a professional course for product design majors, and the class is held in the first half of the third year of product design students. Product improvement design is a redevelopment design that optimizes, enriches, and improves the original traditional products. Therefore, product improvement design should start from the basic platform of investigation, analysis and understanding of existing products, and conduct objective and comprehensive analysis and judgment on the "shortcomings" and "advantages" of products. Distinguish between the past, present, and future use environment and conditions of the product. This course aims to develop students with a systematic and in-depth understanding of the concepts,*

	methods and procedures of product improvement design. It also lays a solid foundation for students to engage in product design in the future, and also prepares students to better apply the knowledge they have learned in the future to improve and enhance the lives of Chinese residents in China's socialist modernization.
Teaching methods	*lecture, lesson, lab works, project, seminar etc.*
Workload (incl. contact hours, self-study hours)	*Contact hours:48 including lecture, exercise, and test.* *Private study including examination preparation, specified in hours:72*
Credit points	*4 ECTS CP*
Required and recommended prerequisites for joining the module	*N/A*
Module objectives/intended learning outcomes	*Knowledge: Master the important design methods and relevant theoretical knowledge in the design discipline.* *Skills: On the basis of analyzing products, through innovative thinking and the application of various materials, we can propose new design solutions for new design solutions.* *Master the important design methods and related theoretical knowledge of the design discipline* *Competences: improve their professional ability, lay a solid foundation for future product design, and improve the overall quality of product design in China.* *Able to cooperate with different types of workers and complete design and development, master different communication techniques and necessary skills for cooperation and communication.*
Content	*Chapter 1, Basic Concepts of Product Improvement Design* *1.The basic concepts, refinement and innovation of product improvement design.* *Chapter 2 Product Improvement Design Planning* *1. Position the characteristics of the project and formulate the development flowchart.* *Chapter 3, Sampling of Product Information* *2. The method of product appearance sampling, product color collection, original product material and surface processing*

	process sampling, product function sampling, and original product operation mode sampling. *Chapter 4 Product Improvement Strategies* *1. Analysis of product market characteristics.* *2. Product improvement design.* *3. Product improvement design.*
Examination forms	*design project*
Study and examination requirements	*60%Final exams, 30%regular assignments，10%attendance.*
Reading list	*3. Deng Wei, Product Improvement Design, Beijing Institute of Technology Press, 2020-08-01* *4. 2. Zhang Zhan, Product Improvement Design (2nd Edition), Shanghai Century Publishing Joint Stock Company Distribution Center, 2012-08;* *3. Chen Jianrong, Product Improvement Design, Higher Education Press, 2009-02*

Module designation	*Product CMF Design*
Semester(s) in which the module is taught	*5*
Person responsible for the module	Shi Xiaotao
Language	*Chinese*
Relation to curriculum	*Compulsory* *The product CMF design course is the core course of the product design major, and it is the skill required in the specific practice process of product design. The main contents of the course include: the connotation and significance of CMF design, product color design, overview and molding process of plastic materials, overview and molding process of metal materials, overview and molding process of ceramic glass and other materials, product surface decoration materials and surface treatment process, 3D printing, product prototype model making, etc. The course sorts out the development process and concepts of color, materials and surface technology in product design, introduces the subjective experience methods and research methods of color and materials, guides students to master the strategies and*

	methods of CMF innovative design, lays a solid foundation for students to engage in CMF product design and CMF engineering design in the future, and cultivates application-oriented talents who meet the needs of modern enterprises.
Teaching methods	*lecture, lesson, lab works, project, seminar etc.*
Workload (incl. contact hours, self-study hours)	*Contact hours:32 including lecture, exercise.Private study including examination preparation, specified in hours:58*
Credit points	*3 ECTS CP*
Required and recommended prerequisites for joining the module	*N/A*
Module objectives/intended learning outcomes	*Knowledge:Master the functional characteristics of CMF and be able to conduct comprehensive analysis in terms of aesthetic experience and practical effectiveness, taking into account other constraints such as process difficulty, cost, and environmental protection.* *Skills: Able to develop, select and use appropriate technologies, resources, modern engineering tools and information technology tools for industrial design problems, including the prediction and simulation of complex industrial design problems, and be able to understand their limitations.* *Competences: Be familiar with the development history and concept of CMF, and possess the ability to conduct basic analysis and research by applying the design elements of CMF.*
Content	*Chapter 1 The Concept of CMF Design* *1.1 The Concept and Development History of CMF* *1.2 The Current Situation of CMF* *1.3 The Development Direction of CMF* *1.4 The CMF Design Industry* *Chapter 2 Research Methods of CMF (Supporting Curriculum Objective 2)* *2.1 Basic Research of CMF* *2.2 Specific Research Methods of CMF Key Points and Difficulties* *Chapter 3 The Knowledge System and Fundamental Issues of CMF (Supporting Curriculum Objective 2)* *3.1 Investigation of CMF Information Requirements* *3.2 The Knowledge System and Fundamental Issues of CMF* *3.3 The Interrelationships between CMF and Other Design Factors Key Points and Difficulties: Requirements for Integrating Ideological and Political Education into Education: Aesthetic*

	Standards Case: Comparison between Traditional Tools and Modern Tools *Chapter 4 The Subjective Experience of CMF (Supporting Curriculum Objective 2)* *4.1 The Subjective Experience and Evaluation of Color* *4.2 The Subjective Experience and Evaluation of Material Texture* *Chapter 5 The Functional Characteristics of CMF (Supporting Curriculum Objective 2)* *5.1 The Functions of Color* *5.2 The Functions of Materials and Their Surfaces* *Chapter 6 Case Studies on CMF Design Applications* *6.1 CMF Research and Design Creativity for the Interiors of Transportation Vehicles* *6.2 CMF Research and Design Creativity for Electronic Products* *6.3 CMF Research and Design Creativity for Furniture Products* *Chapter 7 CMF Creative Design and Expression* *7.1 CMF Proposal Strategies and Guidance* *7.2 Guidance on the CMF Proposal Design Process*
Examination forms	*design project*
Study and examination requirements	*60%Final exams, 30%regular assignments, 10%attendance.*
Reading list	1.*"CMF Design Tutorial", written by Li Yi wen, Huang Ming fu and Liu Rui, published by Chemical Industry Press in 2019.* *2."Introduction to CMF in Design Art", written by Zuo Heng feng, published by China Film Press in 2021.* *3."CMF (Color, Material and Process) Design of Creative Products", written by Jiang Bin, published by Publishing House of Electronics Industry in 2019.*

Module designation	*Commercial Kitchen Interior Design*
Semester(s) in which the module is taught	*6*
Person responsible for the module	*Shun Zeng*
Language	*Chinese*
Relation to curriculum	*Compulsory* *"Commercial Kitchen Interior Design" is one of the professional courses in the direction of industrial design and commercial kitchen, and its main task is to enable students to master the*

	basic skills and design methods of commercial kitchen interior design through the study of this course, so as to lay a good foundation for the future design of catering commercial kitchen space design projects and course projects.
Teaching methods	*lecture, lesson, lab works, project, seminar.*
Workload (incl. contact hours, self-study hours)	*Contact hours:32 including lecture, exercise. Private study including examination preparation, specified in hours:58*
Credit points	*3 ECTS CP*
Required and recommended prerequisites for joining the module	*N/A*
Module objectives/intended learning outcomes	*Knowledge: Detailed description of the interior design methodology for commercial kitchens. Learn about commercial kitchen interior design examples. Knowledge of important design methods and related theories in the discipline of industrial design.* *Skills: Mastering the basic methods of commercial kitchen interior design and space design, and applying the methods to the design of course projects.* *Competences: Mastery of innovation in the discipline of industrial design. Mastery of design practice in the discipline of industrial design. Through the systematic study of the course, we will have a systematic understanding of the comprehensive and design assessment of commercial kitchen interior design, enhance the students' comprehensive quality of design, and have a more in-depth understanding and demonstration of their personal abilities and socialist core values.*
Content	*Chapter 1 Basic Theory of Commercial Interior Design* *Commercial kitchen interior design, commercial kitchen interior design management, space design theory* *Chapter 2 Methodology of the Whole Cycle of Commercial Kitchen Interior Design* *Introducing the method of advancing the whole process cycle of commercial kitchen interior design and the significance and*

	impact of program completion; specific design contents of the whole process cycle of commercial kitchen interior design. *Chapter 3 Spatial Design and its Theory in the Context of Modern Design* *The market environment of modernized design; the theory of spatial design and market operation mechanism in the context of modernized design; case study of spatial design.* *Chapter 4 Comprehensive Design Thinking Mode of Commercial Interior Design.* *The overall assessment system of value in the process of commercial kitchen interior design; the means of creating commercial kitchen interior design; the establishment of thinking and comprehensive thinking of space design.*
Examination forms	*design project.*
Study and examination requirements	*60%Final exams, 30%regular assignments,10%attendance.*
Reading list	*1.Liu Hui, Wang Jing, and Zhang Yang. Interior Environment Design (Micro-course Edition). Tsinghua University Press, 2022.* *2.Ma Lei. Environmental Design Graphics and Drawing. Chongqing University Press, 2021.* *3.Hu Linhui, Yan Jiali, Wu Jiye. Artistic Expression in Environmental Design. China Architecture & Building Press, 2022.* *4.Home Creativity. 600 Examples of Kitchen and Dining Room Design (Illustrated Edition). Machinery Industry Press, 2023.*

Module designation	*Smart Kitchen Network System Design*
Semester(s) in which the module is taught	*6*
Person responsible for the module	*Guiping Xu*
Language	*Chinese*
Relation to curriculum	*Compulsory*

	This course is a basic compulsory course for the engineering design of smart commercial kitchen system in industrial design, through the study of this course, students will be deeply familiar with the basic logic, application scenarios, design direction and future development trend of intelligent networking in kitchen equipment on the basis of understanding intelligent kitchen, and cultivate forward-looking design talents in the field of industrial design professional commercial kitchen.
Teaching methods	*lecture, lesson, lab works, project, seminar*
Workload (incl. contact hours, self-study hours)	*Contact hours:32 including lecture, exercise. Private study including examination preparation, specified in hours:58*
Credit points	*3 ECTS CP*
Required and recommended prerequisites for joining the module	*N/A*
Module objectives/intended learning outcomes	*Knowledge: Knowledge of important design methods and related theories in the discipline of industrial design. It strengthens students' overall knowledge of commercial kitchens, enhances the current status and future possibilities of the application of intelligent equipment in commercial kitchens, and boosts their confidence and determination to learn specialized knowledge.* *Skills: Knowledge of and proficiency in the use of basic application software in the discipline of industrial design. Cultivate students' ability to think creatively about design, and the ability to visualize and present design ideas, and to demonstrate the effects in various software forms for application in equipment practice. Presenting design talents should have aesthetic literacy and software ability beyond the engineering foundation.* *Competences: Through the study of this course, students will be able to carry out the product design of the combination of Internet thinking + design creative thinking, and at the same time, they will be able to complete the whole process of building and designing the implementation of virtual 3D modeling and Netflix experience framework. Demonstrate the creative thinking and design ethics of industrial design professionals. Mastery of design as an interdisciplinary discipline, for the interdisciplinary integration and application*

	of engineering fundamentals and knowledge of net-connected systems
Content	*Chapter 1 Introduction to the Basics of Smart Grid Systems* *Basic Concepts of Intelligent Products and Connected Systems* *Chapter 2 Technical Basis of Intelligent Products and Their Design Applications* *Technologies related to the development of smart products, basic communication technologies and interaction design.* *Chapter 3 Artificial Intelligence and Big Data Technology* *Artificial Intelligence and the application of intelligent systems and big data technologies.* *Chapter 4 Functional Area Division and Rational Design in Commercial Kitchen System* *The overall area of the commercial kitchen is rationalized.* *Chapter 5 Equipment and Facilities of Each Functional Area in Commercial Kitchen System* *Equipment and facilities for each functional area in the commercial kitchen system.* *Chapter 6 Design Interaction in Commercial Kitchen Networked System.* *Interaction design in a commercial kitchen web-connected system.*
Examination forms	*design project.*
Study and examination requirements	*60%Final exams, 20%regular assignments,20%attendance.*
Reading list	*1.Li Zhengjun, Intelligent Product Design, Tsinghua University Press, 2024.5, ISBN: 978-7-302-655752-1.* *2.Tang Jianhua, Digital Intelligent Operation Management of Central Kitchen, China Machine Press, 2024.6, ISBN: 9787111756101.*

	3.Sun Lingyun, Intelligent Product Design, Higher Education Press, 2020.9, ISBN: 9787040543117. *4.Song Liang, Blue Book of Intelligent Network System Technology, Fudan University Press, 2023.7, ISBN: 787309164138.*

Module designation	*Smart Commercial Kitchen Construction and Management* *(The course description is not available in the school education system, because it is newly added and will be available by 2026 spring semester).*
Semester(s) in which the module is taught	*7*
Person responsible for the module	*N/A*
Language	*Chinses*
Relation to curriculum	*Compulsory*
Teaching methods	*N/A*
Workload (incl. contact hours, self-study hours)	*Contact hours:64 including lecture, exercise.Private study including examination preparation, specified in hours:56*
Credit points	*4 ECTS CP*
Required and recommended prerequisites for joining the module	*N/A*
Module objectives/intended learning outcomes	*N/A*
Content	*N/A*
Examination forms	*N/A*
Study and examination requirements	*N/A*
Reading list	*N/A*

Option 3

Module designation	*Product Development and Design*
Semester(s) in which the module is taught	*6*
Person responsible for the module	Yi Zhuang
Language	*Chinese*
Relation to curriculum	*Compulsory* *This course is a professional platform course for art and design disciplines such as product design and industrial design. This course is designed to develop students' product design and development skills. Students will learn about the entire process of product development, from market research to product design to manufacturing. The course focuses on cultivating students' market research ability, so that students can learn to understand consumer needs and market trends through market research, so as to better meet market demand in the product design stage. In addition, the course also emphasizes the cultivation of students' product design ability, including product functional design, appearance design and user experience design, etc., so that students can transform the results of market research into specific product solutions, and improve the competitiveness of products through continuous optimization and improvement. The main task of this course is to cultivate students' design practice ability based on the social background, exercise students' ability to think globally and "craftsman spirit", and be able to keep pace with the times.*
Teaching methods	*lecture, lesson, lab works, project, seminar etc.*
Workload (incl. contact hours, self-study hours)	*Contact hours:32including lecture, exercise, and test.* *Private study including examination preparation, specified in hours:58*
Credit points	*3 ECTS*
Required and recommended prerequisites for joining the module	*N/A*
Module objectives/intended learning outcomes	*Knowledge: Master the professional knowledge of mathematics, natural sciences, engineering fundamentals and related*

	disciplines required in the field of industrial design, and be able to apply this knowledge to solve applied engineering problems in the fields of material forming processes, mechanical analysis, electronics, model making, etc. in industrial design. *Skills: Master the basic professional theoretical knowledge such as design history, design psychology, and ergonomics; master the general procedures and methods of industrial design; and master the comprehensiveness including hand-drawing, model making, layout reports, etc.* *Competences: Possess the ability to conduct integrated design and development by combining knowledge in various aspects such as user research, product definition, design, interaction, and service.*
Content	*Chapter 1 Products and Product Development* *Products and product development, the characteristics of the product development process, the indicators for evaluating product design and development, the toolset for product development; the necessary environment for technological or product development, the organizational forms of product development; development cases of national brand products.* *Chapter 2 Product Planning and Development Process* *Product strategy and platform planning, product development roadmap, product architecture design, product development types, preparation of development resources, technical preparation and pre-development technical research; necessary stages of product development, typical development processes, tasks and deliverables in the development stages, construction and management of the development process, and best practices of the development process.* *Chapter 3 Project Management, Requirement Management and Market Information Collection* *The relationship between project management and product development, the core concept of project management, the basic attributes and evaluation methods of projects, typical project documents, project execution and evaluation; product development requirements, request management and Carnot model, translation, decomposition and transmission of requirements, product requirements documents and quality function development, requirements realization evaluation standards; market information and market segmentation, market information collection methods, tools for processing market information, market information evaluation and driving.* *Chapter 4 The Creative Process and Concept Selection*

	Requirements understanding and the creative stage, the typical process of the creative stage, common innovation tools, concept design; criteria for concept selection, methods of concept selection, application of concept selection matrix, output of concept selection and subsequent planning, low-level concept design and architecture design, reverse engineering. *Chapter 5 Initial Realization of Functions and Design of Intelligent Products* *Product function list and key features, axiomatic design, design evaluation and failure mode analysis, detailed product design, detailed design steps for physical products, bill of materials; Introduction to intelligent product scenarios, the underlying model and implementation principle of intelligent products.* *Chapter 6 Product Prototypes and Evaluation* *Making product prototypes, the differences between non-functional prototypes and functional prototypes, the preliminary evaluation of product prototypes, the concept of MVP (Minimum Viable Product), and case demonstrations.* *Chapter 7 Testing, Verification and Optimization* *Requirement analysis and test verification planning, introduction of the V&V (Verification and Validation) model, planning and implementation of test verification, evaluation of the results of test verification, optimization of product performance, and the application of statistics in the process of verification and optimization.* *Chapter 8 Intellectual Property and Management of the Lifecycle of Intellectual Products* *The importance of intellectual property rights to enterprises, the classification of intellectual property rights, intellectual property strategies and application procedures, management of intellectual property rights and methods for circumventing common problems.* *Chapter 9 Software Product Design* *Characteristics of software products, differences from physical product development, development models and agile methods, interface design of software or systems, embedded software and integrated development models.*
Examination forms	*design project*
Study and examination requirements	*70%Final exams, 20%regular assignments，10%attendance.*
Reading list	*1 Miao Yuhong, "Product Design and Development" [M]. Publishing House of Electronics Industry. 2022.*

	3. Written by Kart T. Ulrich and Steven D. Eppinger, translated by Yang Qing, Yang Na, etc., "Product Design and Development (Original 6th Edition)" [M]. China Machine Press. 2020. *3.Liao Jianshang, Hu Kunrong, etc., "Intelligent Product Design and Development" [M]. Publishing House of Electronics Industry. 2021.*

Module designation	*Product CMF Design*
Semester(s) in which the module is taught	*5*
Person responsible for the module	*Xiaotao Shi*
Language	*Chinese*
Relation to curriculum	*Compulsory* *The product CMF design course is the core course of the product design major, and it is the skill required in the specific practice process of product design. The main contents of the course include: the connotation and significance of CMF design, product color design, overview and molding process of plastic materials, overview and molding process of metal materials, overview and molding process of ceramic glass and other materials, product surface decoration materials and surface treatment process, 3D printing, product prototype model making, etc. The course sorts out the development process and concepts of color, materials and surface technology in product design, introduces the subjective experience methods and research methods of color and materials, guides students to master the strategies and methods of CMF innovative design, lays a solid foundation for students to engage in CMF product design and CMF engineering design in the future, and cultivates application-oriented talents who meet the needs of modern enterprises.*
Teaching methods	*lecture, lesson, lab works, project, seminar etc.*
Workload (incl. contact hours, self-study hours)	*Contact hours:32 including lecture, exercise.Private study including examination preparation, specified in hours:58*
Credit points	*3 ECTS CP*
Required and recommended	*N/A*

prerequisites for joining the module	
Module objectives/intended learning outcomes	*Knowledge:Master the functional characteristics of CMF and be able to conduct comprehensive analysis in terms of aesthetic experience and practical effectiveness, taking into account other constraints such as process difficulty, cost, and environmental protection.* *Skills: Able to develop, select and use appropriate technologies, resources, modern engineering tools and information technology tools for industrial design problems, including the prediction and simulation of complex industrial design problems, and be able to understand their limitations.* *Competences: Be familiar with the development history and concept of CMF, and possess the ability to conduct basic analysis and research by applying the design elements of CMF.*
Content	*Chapter 1 The Concept of CMF Design* *1.1 The Concept and Development History of CMF* *1.2 The Current Situation of CMF* *1.3 The Development Direction of CMF* *1.4 The CMF Design Industry* *Chapter 2 Research Methods of CMF (Supporting Curriculum Objective 2)* *2.1 Basic Research of CMF* *2.2 Specific Research Methods of CMF Key Points and Difficulties* *Chapter 3 The Knowledge System and Fundamental Issues of CMF (Supporting Curriculum Objective 2)* *3.1 Investigation of CMF Information Requirements* *3.2 The Knowledge System and Fundamental Issues of CMF* *3.3 The Interrelationships between CMF and Other Design Factors Key Points and Difficulties: Requirements for Integrating Ideological and Political Education into Education: Aesthetic Standards Case: Comparison between Traditional Tools and Modern Tools* *Chapter 4 The Subjective Experience of CMF (Supporting Curriculum Objective 2)* *4.1 The Subjective Experience and Evaluation of Color* *4.2 The Subjective Experience and Evaluation of Material Texture* *Chapter 5 The Functional Characteristics of CMF (Supporting Curriculum Objective 2)* *5.1 The Functions of Color* *5.2 The Functions of Materials and Their Surfaces* *Chapter 6 Case Studies on CMF Design Applications*

	6.1 CMF Research and Design Creativity for the Interiors of Transportation Vehicles *6.2 CMF Research and Design Creativity for Electronic Products* *6.3 CMF Research and Design Creativity for Furniture Products* *Chapter 7 CMF Creative Design and Expression* *7.1 CMF Proposal Strategies and Guidance* *7.2 Guidance on the CMF Proposal Design Process*
Examination forms	*design project*
Study and examination requirements	*60%Final exams, 30%regular assignments, 10%attendance.*
Reading list	*1."CMF Design Tutorial", written by Li Yi wen, Huang Ming fu and Liu Rui, published by Chemical Industry Press in 2019.* *2."Introduction to CMF in Design Art", written by Zuo Heng feng, published by China Film Press in 2021.* *3."CMF (Color, Material and Process) Design of Creative Products", written by Jiang Bin, published by Publishing House of Electronics Industry in 2019.*

Module designation	*Interior Design*
Semester(s) in which the module is taught	*6*
Person responsible for the module	*Shun Zeng*
Language	*Chinese*
Relation to curriculum	*Compulsory* *"Interior Design" is one of the professional courses of industrial design, and its main task is to enable students to master the basic skills and design methods of interior design through the study of this course, so as to lay a foundation for better completion of design in architectural space design projects and course projects in the future.*
Teaching methods	*lecture, lesson, lab works, project, seminar*
Workload (incl. contact hours, self-study hours)	*Contact hours:64 including lecture, exercise, and test.* *Private study including examination preparation, specified in hours:56*
Credit points	*4 ECTS CP*

Required and recommended prerequisites for joining the module	*N/A*
Module objectives/intended learning outcomes	*Knowledge: Elaboration of interior design methods. Understanding Interior Design Cases. Knowledge of important design methods and related theories in the discipline of industrial design* *Skills: Master the basic methods of interior design and spatial design, and apply the methods to the design of course projects. Mastery of innovation in the discipline of industrial design. Mastery of design practice in the discipline of industrial design.* *Competences: Through the systematic study of the course, students will gain a systematic understanding of interior design synthesis and design assessment, enhance their comprehensive design qualities, and gain a deeper understanding and demonstration of their personal abilities and socialist core values.*
Content	*Chapter 1 Basic Theory of Interior Design* *Interior Design, Interior Design Management, Space Design Theory.* *Chapter 2 Methodology of the Full Cycle of Interior Design* *Introduction to the method of advancing the full interior design cycle and the significance and impact of program completion; specific design elements of the full interior design cycle.* *Chapter 3 Spatial Design and Its Theory in the Context of Modern Design* *The market environment of modernized design; the theory of spatial design and market operation mechanism in the context of modernized design; case study of spatial design.* *Chapter 4 A Comprehensive Design Thinking Model for Interior Design* *The overall evaluation system of value in the process of interior design; the means of creating interior design; the establishment of thinking and comprehensive thinking in spatial design*

Examination forms	*design project.*
Study and examination requirements	*60%Final exams, 30%regular assignments,10%attendance.*
Reading list	*1.Liu Hui, Wang Jing, and Zhang Yang. Interior Environmental Design (Micro-course Edition). Tsinghua University Press, 2022* *2.Ma Lei. Environmental Design Drawing and Diagramming. Chongqing University Press, 2021* *3.Hu Linhui, Yan Jiali, Wu Jiye. Artistic Expression of Environmental Design. China Architecture Industry Press, 2022* *4.Home Creativity. Kitchen and dining room design 600 cases (atlas edition). Machinery Industry Press, 2023*

Module designation	*Decorative materials and construction*
Semester(s) in which the module is taught	*6*
Person responsible for the module	*Xiaotao Shi*
Language	*Chinese*
Relation to curriculum	*Compulsory* *This course provides students with systematic knowledge of the characteristics of decorative materials, construction technology and project management, and is a bridge between theory and practice. Through the integration of industry and education and the empowerment of AI technology, the course strengthens practical ability and innovative thinking, and lays the foundation for subsequent professional courses. At the same time, it supports the cultivation of the ability to solve complex engineering problems in the graduation requirements, helps students adapt to the development trend of industry intelligence, and becomes high-quality professionals with interdisciplinary capabilities.*
Teaching methods	*lecture, lesson, lab works, project, seminar*
Workload (incl. contact hours, self-study hours)	*Contact hours:32 including lecture, exercise. Private study including examination preparation, specified in hours:58*

Credit points	*3 ECTS CP*
Required and recommended prerequisites for joining the module	*N/A*
Module objectives/intended learning outcomes	*Knowledge: Mastery of the basic theoretical knowledge of the core courses of the program. Through theoretical teaching, students can systematically master the characteristics, specifications, scope of application and price quotations of various types of decorative materials, and familiarize themselves with the process, technical points and quality standards of common decorative construction techniques.* *Skills: Master and apply emerging technologies (e.g. AI) to solve professional problems. Combined with the "AI+" course content, students are able to skillfully use AI tools for decorative material selection, construction process simulation and quality control, master the application of AI technology in the field of decoration, enhance the ability of interdisciplinary integration, and lay a foundation for future work in intelligent decoration design and construction management.* *Competences: Establishment of environmental awareness and sustainable development concepts, with good professional ethics. Hands-on ability to solve real-world engineering problems. Through experimental training and practical teaching, students are able to reasonably select decorative materials according to the design scheme, plan the construction process, have the ability to solve problems related to materials and processes in decorative construction, and cultivate practical ability and innovative thinking.*
Content	*Chapter 1 Fundamentals of Decorative Materials* *The classification and development trend of decorative materials, including the introduction of traditional materials and new smart materials. Basic properties of materials (physical, chemical, mechanical properties) and their effects on construction. Material selection principles, combined with AI technology to optimize the material selection process.* *Chapter 2 Decorative Wall Materials and Construction* *Characteristics and construction technology of wall coatings (latex paint, art paint, etc.). The material characteristics and*

	laying process of wallpaper wall cloth. Construction method of ceramic tile stone and application of AI in construction process optimization. *Chapter 3 Floor Decoration Materials and Construction* *Characteristics of flooring materials (solid wood, laminate, etc.) and installation process. Types of floor tiles, performance indicators and paving process. Carpet material characteristics and laying methods, combined with AI technology to optimize the construction program.* *Chapter 4 Decorative Materials and Construction of Ceiling* *Characteristics and installation methods of ceiling keel materials (wood keel, light steel keel). Properties and installation process of ceiling panels (gypsum board, aluminum buckle board). The process of ceiling construction and the application of AI in quality control.* *Chapter 5 Decorative Materials and Construction of Doors and Windows* *Characteristics and selection of door and window materials (aluminum alloy, plastic steel, solid wood). Function and installation points of door and window hardware accessories. Installation process of doors and Windows and application of AI in construction optimization.* *Chapter 6 New Decorative Materials Design and Application* *Decorative material color type and choice. Application of different materials in construction. Smart material development and application cases.* *Chapter 7 Decoration Construction Management and Quality Control* *Construction organization design and schedule plan. Construction safety management and risk prevention. Construction quality control and acceptance standards, combined with AI technology to optimize the quality control process.* *Chapter 8 Integrated Program Practices*

	Project task layout: complete the selection of decorative materials, construction process planning and quality control plan formulation with AI technology. *Project implementation: Use AI tools for material analysis, construction simulation, quality monitoring and other operations.* *Project results display and evaluation: Through student self-evaluation, mutual evaluation and teacher evaluation, the experience and problems in project practice are summarized.*
Examination forms	*essay, design project.*
Study and examination requirements	*60%Final exams, 30%regular assignments,10%attendance.*
Reading list	*1.Lv Congna, Hui Bo. Decorative materials and construction technology. Beijing: Tsinghua University Press, 2020.* *2.Dong Zhanjun, Gu Qunye, Li Guangfu, Wang Yanan. Introduction to Artificial Intelligence Design. Beijing: Tsinghua University Press,2024.* *3.Song Zhichun. Decoration materials and construction (2nd edition). Peking University Press,2015.*

Module designation	*Product Improvement Design*
Semester(s) in which the module is taught	5
Person responsible for the module	Ziqiang Wang
Language	*Chinese*
Relation to curriculum	*Compulsory* *This course is a professional course for product design majors, and the class is held in the first half of the third year of product design students. Product improvement design is a redevelopment design that optimizes, enriches, and improves the original traditional products. Therefore, product improvement design should start from the basic platform of investigation, analysis and understanding of existing products, and conduct objective and comprehensive analysis and*

	judgment on the "shortcomings" and "advantages" of products. Distinguish between the past, present, and future use environment and conditions of the product. This course aims to develop students with a systematic and in-depth understanding of the concepts, methods and procedures of product improvement design. It also lays a solid foundation for students to engage in product design in the future, and also prepares students to better apply the knowledge they have learned in the future to improve and enhance the lives of Chinese residents in China's socialist modernization.
Teaching methods	*lecture, lesson, lab works, project, seminar etc.*
Workload (incl. contact hours, self-study hours)	*Contact hours:48 including lecture, exercise, and test.* *Private study including examination preparation, specified in hours:72*
Credit points	*4 ECTS CP*
Required and recommended prerequisites for joining the module	*N/A*
Module objectives/intended learning outcomes	*Knowledge: Master the important design methods and relevant theoretical knowledge in the design discipline.* *Skills: On the basis of analyzing products, through innovative thinking and the application of various materials, we can propose new design solutions for new design solutions.* *Master the important design methods and related theoretical knowledge of the design discipline* *Competences: improve their professional ability, lay a solid foundation for future product design, and improve the overall quality of product design in China.* *Able to cooperate with different types of workers and complete design and development, master different communication techniques and necessary skills for cooperation and communication.*
Content	*Chapter 1, Basic Concepts of Product Improvement Design* *1.The basic concepts, refinement and innovation of product improvement design.* Chapter 2 Product Improvement Design Planning 1. Position the characteristics of the project and formulate the development flowchart.

	Chapter 3, Sampling of Product Information *3. The method of product appearance sampling, product color collection, original product material and surface processing process sampling, product function sampling, and original product operation mode sampling.* Chapter 4 Product Improvement Strategies *1. Analysis of product market characteristics.* *2. Product improvement design.* *3. Product improvement design.*
Examination forms	*design project*
Study and examination requirements	*60%Final exams, 30%regular assignments，10%attendance.*
Reading list	*5. Deng Wei, Product Improvement Design, Beijing Institute of Technology Press, 2020-08-01* 6. *2. Zhang Zhan, Product Improvement Design (2nd Edition), Shanghai Century Publishing Joint Stock Company Distribution Center, 2012-08;* *3. Chen Jianrong, Product Improvement Design, Higher Education Press, 2009-02*