Class Syllabus – Spring Semester, 114 Academic Year

Department of Mechanical Engineering, National Chung Cheng University

<table>
<tr><td colspan="5">Course Name:： Machine Shop Practice (Ⅱ)</td><td>Dept.</td><td>IBPME</td></tr>
<tr><td colspan="5"></td><td>Course Code</td><td>4231053</td></tr>
<tr><td>Instructors</td><td>Hsiang-chiu Wu</td><td>Credits</td><td>1</td><td>Compulsory</td><td>Grade</td><td>First year student</td></tr>
<tr><td>EMI</td><td colspan="6">■ Yes □ No</td></tr>
<tr><td>Course type</td><td colspan="6">□ Humanistic Care Course
■ Problem-oriented Course
■ Integrate the curriculum
■ Internship
□ Competition Special Course
■ Topic-based courses
■ Practical courses
□ Other</td></tr>
<tr><td colspan="7">Prerequisites:
Machine Shop Practice (I)

Class Description：

This course serves as a continuation of the previous semester’s instruction on traditional machine tools. It is designed to enhance students’ ability to independently apply the machining knowledge and practical experience acquired during Factory Internship (I). Students will be required to independently complete assigned workpieces, adhering to specified dimensional and quality standards.

In addition to traditional machining practices, this course introduces students to Computer Numerical Control (CNC) machine tools. Instruction will include both theoretical knowledge and practical demonstrations, using the students’ own workpieces from Factory Internship (I) as teaching examples for CNC operation and programming.

Through this integrated approach, students will not only develop hands-on experience with CNC machining, but also gain a deeper understanding of its critical role in modern manufacturing and precision engineering.

Class Objective：

• Apply traditional machining techniques to complete precision components independently.
• Interpret technical drawings and specifications to meet required tolerances.
• Understand the operational principles and basic programming of CNC machine tools.
• Demonstrate the ability to set up and operate CNC machinery safely and effectively.
• Recognize the significance of CNC technology in the context of modern manufacturing processes.</td></tr>
<tr><td>Textbooks</td><td colspan="6">Instructor-compiled handouts</td></tr>
<tr><td colspan="7">An overview of the main points of teaching</td></tr>
<tr><td>Teaching Materials</td><td colspan="6">■ PPT
■ Self-edited textbooks
■ Self-made instructional videos
□ Course handouts
■ Teaching Procedures
□ Other</td></tr>
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Teaching Methods	☐ Lectures ☐ Group discussion ■ Oral presentation ☐ Problem-oriented learning ☐ Case studies ☐ Other
Evaluation Tools	■ Mid-term Exam ■ Final Exam ☐ In-class Quiz ■ In-class homework ☐ Homework ☐ Mid-term Report ☐ Final Report ☐ Special Report ☐ Other ☐ Scales
Teaching Resources	■ Course website ☐ Electronic files of textbooks are available for download ☐ Internship website
Instructor's Information	Hsiang-chiu Wu 0928911273 houselightnel@gmail.com

Course Outlines		Teaching Hours				Core Competence
Unit Title	Contents	Lectures	Demo	Practice	Other	
Conventional manual machining	• Hands-on Manual Lathe Machining • Hands-on Manual Milling Machine Machining • Hands-on Bench Work • Workpiece Machining Practice and Tolerance & Fit	3		6		B4, B5, B6, B7, B9
CNC Turning Operations	• Introduction to CNC Lathe Principles and Machine Structure • CNC Lathe Programming: Code Explanation and Practical Instruction • CNC Lathe Cutting Operations and Key Operating Considerations • Hands-on Practice in CNC Lathe Operation	3	3	12		B4, B5, B6, B7, B9
CNC Milling Operations	• CNC Milling Machine Basics • CNC Milling Programming • CNC Milling Operations & Safety • CNC Milling Practice	3	3	12		B4, B5, B6, B7, B9

Achievable Core Competence		Achievable Objective
B4	Programming & CAD skills	Basic NC programming
B5	Mechanical & opto-mechatronic design and process planning	Machining process & process planning
B6	Problem identification, analysis & solving	Lathe/mill/bench work/CNC operation planning & troubleshooting
B7	Hands-on implementation & innovation	Produce parts to drawing specifications

B9	Teamwork, communication & project management	Collaborate with teammates on methods & techniques

Core competencies of the University Division

B1 Possess the ability of basic engineering mathematics, solid mechanics, heat flow mechanics, automatic control, materials science and opto-mechanical integration engineering practical analysis

B2 Ability to absorb and integrate cross-domain knowledge

B3 Ability to perform solid force experiments, heat flow experiments, mechanical project implementation, optoelectronic engineering experiments and analyze data

B4 Ability to write programming languages and computer-aided design

B5 Mechanical and opto-electromechanical systems, component design and process planning capabilities

B6 Ability to identify, analyse and solve professional problems

B7 Ability to implement and innovate

B8 Ability to engage in scientific writing and presentations

B9 Ability to work as a team, communicate effectively and manage the program

B10 Learn general knowledge and demonstrate the ability of engineering ethics, social responsibility and sustainable development

Weekly teaching plan				
Course Time	Course Location	Grading	Office hour	Teaching quality evaluation method
Friday. 10:00~13:00	Machine Shop R102	1. Midterm Exam: 10% 2. Attendance: 30% 3. Hand-on work: 30% 4. Final Exam: 30%	Friday. 09:00~13:00	Questionnaire

Weeks	Teaching & Homework Progress	Note
1	Preparation Week / Course Overview & Semester Tasks	
2	Introduction to CNC Machine Principles and Machine Structure	
3	CNC Programming: Code Explanation and Practical Instruction	
4	Midterm Exam	
5	Semester Project Implementation / CNC Machining Operations	
6	Semester Project Implementation / CNC Machining Operations	
7	Semester Project Implementation / CNC Machining Operations	
8	Semester Project Implementation / CNC Machining Operations	
9	Semester Project Implementation / CNC Machining Operations	
10	Semester Project Implementation / CNC Machining Operations	
11	Semester Project Implementation / CNC Machining Operations	
12	Semester Project Implementation / CNC Machining Operations	
13	Semester Project Implementation / CNC Machining Operations	
14	Semester Project Implementation / CNC Machining Operations	
15	Semester Project Implementation / CNC Machining Operations	
16	Semester Project Implementation / CNC Machining Operations	
17	Final Exam(Hands-on operations)	
18	Final Exam(Hands-on operations)	