Academic Year: 2023-2024	Semester: Spring	Starting Date: 20-02-2024
Course Name	Special alloys of Steel	
Module Language	English	
Instructor	Asst. Prof. Dr. Mohammedtaher Mulapeer	
Teaching Assistance(s)	None	
College/University	College of Engineering – Salahaddin University-Erbil	
Department	Mechanical & Mechatronic	
Semester Duration	15 weeks	
Course Overview	Special Alloys of Steel" is a comprehensive course designed for Master's students in Mechanical Engineering to develop an in-depth understanding of the properties, processing, and applications of advanced steel alloys. The course will focus on the characteristics and behaviors of various special alloys of steel, including stainless steels, tool steels, maraging steels, and high-strength low-alloy (HSLA) steels. Students will also explore the microstructural features, heat treatment methods, and mechanical properties of these special steel alloys. The impact of alloying elements, heat treatment processes, and microstructure on the performance of steel alloys in different engineering applications will be a crucial aspect of this course.	
Course Objectives	This course aims to equip students with the knowledge and skills essential for working with and innovating in the field of special steel alloys, enabling them to excel in their future careers in mechanical engineering.	
Course outcomes	After the completion of the course, the students must: 1. Acquire an in-depth understanding of the microstructural features and properties of special alloy steels. 2. Analyze and assess the impact of alloying elements on the mechanical, thermal, and corrosion properties of steel alloys. 3. Apply heat treatment techniques to tailor the microstructure and properties of special alloy steels for specific engineering applications. 4. Evaluate the suitability and performance of different special alloy steels in various industrial sectors, including automotive, aerospace, and construction. 5. Conduct research and development activities related to the enhancement of mechanical properties and performance of steel alloys.	
Textbooks and References	1- "Physical Metallurgy and Advanced Materials" by R. E. Smallman and A. H.W. Ngan 2- "Steels Microstructure and Properties" by H. K. D. H. Bhadeshia and Sir Robert Honeycombe	
Teaching Style	2 hrs. in Class 1hr Practical	

Requirements for credit points	For the award of credit points, it is necessary to pass the module exam. It contains: An examination during the academic semester, Quizzes, Assignments, and Final examination. Student's attendance is required in all classes.
Credit ECTS	6
Grade Distribution	The following grade system is used for the evaluation of the module exam: The module exam is based on the summation of two categories of evaluations: First: (50%) of the mark is based on the academic semester effort which includes **Option A: with Review Article** - Midterm Exam = 20%. - Quizzes = 5% - Seminar = 10% - Review article. = 15% **Option B: Without Review Article** - Midterm Exam = 20%. - Quizzes = 10% - Seminar = 10% - Report = 10% Second: (50%) of the mark is based on the final examination that is comprehensive for the whole of the study materials reviewed during the academic semester.
Workload	Workload [11hrs/week] (162hrs/semester): Contact face-to-face 3hrs/w (45hrs/s) and Non-Contact Self learning 7hrs/w (117hrs/s)