课程教学进度计划表

一、基本信息

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| 课程名称 | 工程材料及成型技术（英语） |
| 课程代码 | 2080394 | 课程序号 | 4387 | 课程学分/学时 | 4/64 |
| 授课教师 | Iain Michael Fielden，高强 | 教师工号 | 19460/23046 | 专/兼职 | 兼职（外教）专职 |
| 上课班级 | 机制（国教）B24-1、B24-2 | 班级人数 | 56 | 上课教室 | 6~10周 星期五 1~4节三教108；星期日 11~14节三教105；7~10周 星期一 9~10节三教108，星期五 5~8节机电116 |
| 答疑安排 | 周三下午 12:00-16:30（单周） |
| 课程号/课程网站 |  |
| 选用教材 | ChenZhaoXia: Mechanical Engineering Materials. Southwest Jiaotong University Press. 2016 |
| 参考教材与资料 | Kenneth G…Budinski. Engineering Materials: Properties and Selection. 2002 |

二、课程教学进度安排

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| 课次 | 课时 | 教学内容 | 教学方式 | 作业 |
| 1 | 2 | Development and classification of materials.The main performance indicators of the material. | Lecture | Exercises |
| 2 | 2 | The crystal structure of the metal and the defects of the crystal, the concept and process of crystallization; | Lecture | Reading Report |
| 3 | 2 | Composition and phase of iron-carbon alloy; analysis of partial phase diagram of iron-carbon alloy steel, | Lecture | Exercises |
| 4 | 2 | Relationship between composition, structure and properties of iron-carbon alloy, application of phase diagram of iron-carbon alloy. | Lecture | Exercises |
| 5 | 2 | The structural transformation of steel during heating and cooling, and the isothermal continuous transformation curve of supercooled austenite; | Lecture | Exercises |
| 6 | 2 | The purpose, process and application of annealing, normalizing, quenching and tempering of steel;  | Lecture | Exercises |
| 7 | 2 | Hardenability and its influencing factors; | Lecture | Exercises |
| 8 | 2 | Surface quenching and chemical heat treatment of steel. | Lecture | Exercises |
| 9 | 2 | The role of alloying elements in steel | Lecture | Exercises |
| 10 | 2 | Classification and grades of carbon steel and alloy steel; | Lecture | Exercises |
| 11 | 2 | Grades and performance characteristics of alloy structural steel, alloy tool steel, special performance steel; | Lecture | Reading Report |
| 12 | 2 | Graphitization of cast iron, grades, organization, performance characteristics and applications of common cast iron | Lecture | Exercises |
| 13 | 2 | Performance characteristics, grades and applications of non-ferrous metals. | Lecture | Exercises |
| 14 | 2 | Classification, performance and application of non-metallic materials | Lecture | Exercises |
| 15 | 2 | Classification, performance and application of non-metallic materials | Lecture | Write a Paper |
| 16 | 2 | Characteristics of composite materials. | Lecture | Exercises |
| 17 | 2 | Functions and features of various new materials. | Lecture | Exercises |
| 18 | 2 | Selection principle of mechanical engineering materials | Lecture | Report |
| 19 | 2 | Method of material selection | Lecture | Exercises |
| 20 | 2 | .Sand casting method, characteristics, defects, selection of sand casting position, parting surface and casting process parameters, sketching process of typical castings; | Lecture | Exercises |
| 21 | 2 | Metal plastic deformation and its influence on metal structure and properties, metal forging properties and its influencing factors; characteristics and process of free forging and hammering die forging, simple forgings. Characteristics of other die forging methods | Lecture | Exercises |
| 22 | 2 | Welding metallurgy process and its influence on the microstructure and properties of welded joints, weld stress and deformation of weldments, and measures for obtaining high-quality weldments; | Lecture | Exercises |
| 23 | 2 | Characteristics of common welding methods | Lecture | Exercises |
| 24 | 2 | New processes, new technologies and their development trends. | Lecture | Exercises |
| 25 | 2 | Metallographic sample preparation and microstructure observation | Experiment | Experiment report |
| 26 | 2 | Metallographic sample preparation and microstructure observation | Experiment | Experiment report |
| 27 | 2 | Observation and analysis of equilibrium microstructure of iron carbonalloy | Experiment | Experiment report |
| 28 | 2 | Observation and analysis of equilibrium microstructure of iron carbonalloy | Experiment | Experiment report |
| 29 | 2 | Hardness testing of materials | Experiment | Experiment report |
| 30 | 2 | Hardness testing of materials | Experiment | Experiment report |
| 31 | 2 | Heat Treatment and Hardness Testing of Carbon Steel | Experiment | Experiment report |
| 32 | 2 | Heat Treatment and Hardness Testing of Carbon Steel | Experiment | Experiment report |

三、考核方式

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| 总评构成 | 占比 | 考核方式 |
| X1 | 50% | Exam (Open book exam, full content, 120 minutes) |
| X2 | 25% | Homework & Attendance |
| X3 | 25% | Experiment report |

任课教师：  高强 （签名） 系主任审核： （签名） 日期：2025.2