上海建桥学院课程教学进度计划表

**一、基本信息**

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| 课程代码 | 2080394 | 课程名称 | 工程材料与成型技术（英语） |
| 课程学分 | 4 | 总学时 | 64 |
| 授课教师 | Iain Michael Fielden，范丽 | 教师邮箱 | 18126@jench.edu.cn |
| 上课班级 | 机制中美B21-1 | 上课教室 | 腾讯会议，机电201 |
| 答疑时间 | 周四20:00-21:30（外教在线答疑），周三下午13:30-15:30（中教答疑） |
| 主要教材 | ChenZhaoXia: Mechanical Engineering Materials. Southwest Jiaotong University Press. 2016 |
| 参考资料 | Kenneth G…Budinski. Engineering Materials: Properties and Selection. 2002 |

**二、课程教学进度**

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| 周次 | 教学内容 | 教学方式 | 作业 |
| 1 | Development and classification of materials.The main performance indicators of the material. | Lecture | Exercises |
| 1 | The crystal structure of the metal and the defects of the crystal, the concept and process of crystallization; | Lecture | Reading Report |
| 1 | Composition and phase of iron-carbon alloy; analysis of partial phase diagram of iron-carbon alloy steel, | Lecture | Exercises |
| 1 | Relationship between composition, structure and properties of iron-carbon alloy, application of phase diagram of iron-carbon alloy. | Lecture | Exercises |
| 2 | The structural transformation of steel during heating and cooling, and the isothermal continuous transformation curve of supercooled austenite; | Lecture | Exercises |
| 2 | The purpose, process and application of annealing, normalizing, quenching and tempering of steel;  | Lecture | Exercises |
| 2 | Hardenability and its influencing factors; | Lecture | Exercises |
| 2 | Surface quenching and chemical heat treatment of steel. | Lecture | Exercises |
| 3 | The role of alloying elements in steel | Lecture | Exercises |
| 3 | Classification and grades of carbon steel and alloy steel; | Lecture | Exercises |
| 3 | Grades and performance characteristics of alloy structural steel, alloy tool steel, special performance steel; | Lecture | Reading Report |
| 3 | Graphitization of cast iron, grades, organization, performance characteristics and applications of common cast iron | Lecture | Exercises |
| 4 | Performance characteristics, grades and applications of non-ferrous metals. | Lecture | Exercises |
| 4 | Classification, performance and application of non-metallic materials | Lecture | Exercises |
| 4 | Classification, performance and application of non-metallic materials | Lecture | Write a Paper |
| 4 | Characteristics of composite materials. | Lecture | Exercises |
| 5 | Functions and features of various new materials. | Lecture | Exercises |
| 5 | Selection principle of mechanical engineering materials | Lecture | Report |
| 5 | Method of material selection | Lecture | Exercises |
| 5 | .Sand casting method, characteristics, defects, selection of sand casting position, parting surface and casting process parameters, sketching process of typical castings; | Lecture | Exercises |
| 6 | 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 |
| 6 | 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 |
| 6 | Characteristics of common welding methods | Lecture | Exercises |
| 6 | New processes, new technologies and their development trends. | Lecture | Exercises |
| 7 | Mastering the whole process of metallographic sample preparation | Experiment | Exercises |
| 7 | Understanding the main factors affecting the inspection results of metallographic specimens | Experiment | Exercises |
| 7 | Understanding the basic principles of metallographic microscopy | Experiment | Report |
| 7 | Students are trained to use metallographic microscope correctly, to design and complete experiments independently, and to analyze and judge the sample structure | Experiment | Experiment report |
| 8 | Knowing the effects of different heat treatment processes on the mechanical properties of 45# steel | Experiment | Exercises |
| 8 | Observing the microstructure of carbon steel after heat treatment | Experiment | Exercises |
| 8 | Understanding the heat treatment mechanism | Experiment | Exercises |
| 8 | Training and improving students'ability to analyze and solve practical problems of heat treatment process | Experiment | Experiment report |

**三、评价方式以及在总评成绩中的比例**

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| General composition（1+X） | Evaluation method | Proportion |
| 1 | Final exam (Open book exam, full content, 120 minutes) | 50% |
| X1 | Course assignments (Twice) | 10% |
| X2 | Written test (Once) | 20% |
| X3 | Experiment report (Twice) | 20% |

备注：

教学内容不宜简单地填写第几章、第几节，应就教学内容本身做简单明了的概括；

教学方式为讲课、实验、讨论课、习题课、参观、边讲边练、汇报、考核等；

评价方式为期末考试“1”及过程考核“X”，其中“1”为教学大纲中规定的形式；“X”可由任课教师或课程组自行确定（同一门课程多位教师任课的须由课程组统一X的方式及比例）。包括纸笔测验、课堂展示、阶段论文、调查（分析）报告、综合报告、读书笔记、小实验、小制作、小程序、小设计等，在表中相应的位置填入“1”和“X”的方式及成绩占比。

任课教师   系主任审核：  日期：2022-02-17