ICS 03.180
CCS A 18

团 体 标 准

T/CEEAA 001—2022

工程教育认证标准

Engineering education accreditation criteria

2022-07-15 发布　　2022-07-15 实施

中国工程教育专业认证协会　发布
中 国 标 准 出 版 社　出版

目　　次

前　言

□□□□□ BT 1.1—2 2《□□□□□□□ □1□□:□□□□□□□□□□□□□》□□□□□。

□□□□□□□□□□□□□□□□□。□□□□□□□□□□□□□□□□□□。

□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□。

□□□□□□□:□□□□□□□□□□□□、□□□□□□□□□□□、□□□□□□□、□□□□□□、□□□□□□、□□□□□□□□、□□□□□□□□、□□□□□□、□□□□□□□□□、□□□□□□□□□□□□、□□□□□□□□、□□□□□□□□、□□□□□□□□、□□□□□□□□□□□、□□□□□□、□□□□□□□□□□、□□□□□、□□□□□□□□□□、□□□□□□□□、□□□□□□□□、□□□□□□□□□□□□□□□□、□□□□□□□□□、□□□□□□□□、□□□□□□、□□□□□□□□□、□□□□□□□□、□□□□□□□□□□□□□□、□□□□□□□□、□□□□□□□□、□□□□□□□□、□□□□□□□□、□□□□□□□□、□□□□□□□□□□□□□□□□、□□□□□□□□□□、□□□□□□、□□□□□□□□、□□□□□□□□□□□□□□□□□□□□□□□□□、□□□□□□□□□□□□□□、□□□□(□□□□)、□□□□□□□□、□□□□□□□□□、□□□□□□□□、□□□□□□□□□□□□□□□□□、□□□□□□□□、□□□□□□□□□(□□□□□□□□□)、□□□□□□□、□□□□□□□□、□□□□□□□□。

本文件主要起草人：范唯、周爱军、顾佩华、陈道蓄、王孙禺、王志华、王玲、乐清华、吕志伟、刘志军、李志义、李茂国、陈以一、雷庆、王天羿、孙谊、孟玉婵、戴先中、郑璇、赵自强、孙颖、贾茜、李涛、刘晶。

引　言

□□□□□□是□际□□□□□□□□□□□□度，也是实现□□□□□际互□□□□□□格□际互□□□□基础。我□□□□□□□□□□开始于2006年，是□□□□度□革□□□基础□□□□成□□。2016年，我□加入《华盛顿□议》成为正式成员。

开□□□□□□□□□□是：推□□□□□□□□□□障□□□□完善，推□□□□□□□□革，□一步□□□□□□□□；□立□□□□□度□衔接□□□□□□□□□，促□□□界□□□界□□□，增强□□□□□□□□对□□□□□适应□；促□□□□□□□□□际互□。

□□□□□□□□□□□□是□热□□□□□□□□□□团□□个□□愿□成□□□□、非营□□、□员□社□团□□□（以下简称“□□□□”）。

开□□□以来，□□□□□同□□□□，根据我□□□□□□实际情况，参考□际□□□□界□□□□□做法，□□实□□效□原□，□□□□了《□□□□□□□□》，以□□□□□□印□□□□形式执□。为适应□形　下□□□　□□□□□□□□，□一步□□□□□□□□□□，促□□际□　互□，根据□□□□□3□□3□4□□□□□□□3□□□□

考考

本文件在执行过程中的意见或建议反馈至中国工程教育专业认证协会秘书处(地址:北京市海淀区学院路30号,邮编:100083,邮箱:ceeaa@cast.org.cn)。

工程教育认

□□□、□□□□、□□□□□□□□□价□□□。

注：□采□□□□抽样方法，恰当使□直接□、间接□、□□□、非□□□手段，□□□效□□□。

3.4

评价 evaluation

对□□过□□所收集到□□□□□据□□解释□过□。

注：□价□果是□□□应□□措施□依据。

3.5

机制 mechanism

针对特□□□而□□□一套□□□处□流□。

注：包括□□、□□□□、□□□员、方法□流□□，对流□□□□□□□员□角□□□□□明确□□□。

3.6

复杂工程问题 complex engineering problem

必须□□□入□□□原□，经过□析□□得到解决□问题。

注：同时具备下述特征□□□或□□：

a) □□多方面□□□、□□□其 素，□□□□互□一□冲突；

b) 需□□过□立□适□抽象 □□解决，在□ 过□□需□□现□□□□；

c) □是 靠 □方法就□以完□解决□；

d) 问题□□□□ 素□□没□完□包 在□□□□实 □□□□□□□；

e) 问题□□各方□ □完□一 ；

f) 具□ □□ □□，包 多个□互□□□□问题。

4 通用标准

4.1 学生

该□应包括：

a) 具□ □ □□□□度□措施；

b) 具□完善□□□□习 □、□□□ 、就□ □、□□ □□方面□措施□□够 □执□ 实；

c) 对学生在整个学习过程中的表现进行跟踪与评估，并通过形成性评价保证学生毕业时达到毕业要求；
d) 有明确的规定和相应认定过程，认可转专业、转学学生的原有学分。

4.2 培养目标

该项应包括：
a) 有公开、符合学校定位、适应社会经济发展需要的培养目标；
b) 定期评价培养目标的合理性并根据评价结果对培养目标进行修订，评价与修订过程有行业或企业专家参与。

4.3 毕业要求

专业应有明确、公开、可衡量的毕业要求，毕业要求应支　培养目标的达成。专业制定的毕业要求应完全　　以下内容：
a) 工程知识：能够将数学、自　科学、工程基础和专业知识用于解决复　工程问题；
b) 问题分析：能够应用数学、自　科学和工程科学的基本原理，识别、表达并通过文　研究分析复　工程问题，以　得有效结　；
c) 设计/开发解决方　：能够设计针对复　工程问题的解决方　，设计　　特定需求的系　、单　（部件）或工　流程，并能够在设计环　中体现创新意识，考　社会、健康、安全、法　、文化以及环境等因素；
d) 研究：能够基于科学原理并采用科学方法对复　工程问题进行研究，包括设计实　、分析与解释数据，并通过信息综合得到合理有效的结　；
e) 使用现代工具：能够针对复　工程问题，开发、　与使用恰当的技术、资源、现代工程工具和信息技术工具，包括对复　工程问题的　测与模　，并能够理解其　限性；
f) 工程与社会：能够基于工程相关　　知识进行合理分析，评价

实践和 杂 问题解决方案对社 、 、 、法律以 文 影响， 解应 ；

g) 和 ：够 解和 价针对 杂 问题 实践对 、社 影响；

h) 规范：具 文社 学素 、社 感， 够在 实践 解 遵守 德和规范，履 ；

i) 个 和团 ：够在多学 背景下 团 个 、团 成员以 负 角 ；

j) 沟通：够就 杂 问题 界同 社 众 效沟通和 流，包括撰写报告和 文稿、陈述 言、清晰 达或回应指令； 具备一定 际视野， 够在跨文 背景下 沟通和 流；

k) 管 ：解 掌握 管 原 经济决策方法， 在多学 应用；

l) 终身学习：具 学习和终身学习 ， 断学习和适应 。

4.4 持续改进

该 应包括：

a) 立 学过 监控 ，各 学 节 明确 ，定期开 和 价； 立 达成情况 价 ，定期开 达成情况 价；

b) 立 生跟踪反馈 以 统以外 各方参 社 价 ，对培 标 达成情况 定期 析；

c) 明 价 果被用于 。

4.5 课程体系

置应 达成， 或家参 。 应包括：

a) 适应 数学 然 学 （至少占

□□□□15%)；

b) 符□□□□□□□□□□□□□□□□、□□□□□□□□□□□□□（□少占□□□□30%）；□□□□□□□□□□□□□□□□□□□□□□然□□□□□□□□□□□□□，□□□□□□□□□统□□□□□□□□□□；

c) □□□践□□□□□（论□）（□少占□□□□20%）；□置□□□□践□□□□，□□□□□□，□□□□、□□，□□□□□□践□□□□□□□；□□□□（论□）选□□□□□□□□□□□□□□，□□□□□□□□□、□□精神□□综□□□□□□□□□□□□□□□□□；□□□□□（论□）□指□□□□□□□□□□□□□□□；

d) □□□□□□□□□□□□□（□少占□□□□15%），□□□□从□□□□□□□□□虑□济、□□、□律、伦□□□种□约□□。

4.6 师资队伍

□□□□□：

a) □□□□□满足□□□□，□□□□，□□□□□□□□□□□兼□□□；

b) □□□□足□□□□□□、□□□平、□□□验、沟□□□、□□□□□□，□且□□□□□□□践□□□□，□□□□□□；□□□□□背景□满足□□□□□□□；

c) □□□足□□□□□精□投□□□□□□□□指□□，□积极□□□□□□□□□；

d) □□□□□□供指□、咨询、□□，□□□□□□□涯□□□□从□□□□足□□指□；

e) □□□□□们□□□□□□升□□□□□□，□□□□□□。

4.7 支持条件

□□□□□：

a) 教室、实验室及设备在数量和功能上满足教学需要；有良好的管理、维护和更新机制，使得学生能够方便地使用；与企业合作共建实习和实训基地，在教学过程中为学生提供参与工程实践的平台；
b) 计算机、网络以及图书资料资源能够满足学生的学习以及教师的日常教学和科研所需；资源管理规范、共享程度高；
c) 教学经费有保证，总量能满足教学需 ；
d) 学校能够有效地支持教师队伍建设，吸引与稳定合格的教师，并支持教师本身的专业发展，包括对青年教师的指导和培养；
e) 学校能够提供达成毕业要求所必需的基础设施，包括为学生的实践活动、创新活动提供有效支持；
f) 学校的教学管理与服务规范，能有效地支持专业毕业要求的达成。

5 专业补充标准

5.1 注意事项

专业补充标准不应单独使用，开展认证时，专业应同时满足本文件规定的通用标准和相应专业领域的补充标准。

5.2 机械类专业

5.2.1 适用专业领域

按照教育部规定设立的，授予工学学士学位的机械类专业。

5.2.2 课程体系

课程设置应包含自然科学类课程、工程基础类课程和实践环节，并应满足：

a) 自然科学类课程包含物理、化学(或生命科学)等知识领域；
b) 工程基础类课程包含工程图学、理论力学、材料力学、热流体、

电工电子、工程材料等 识 ；

c) 践环节 工程训练、课程 验、课程设计、企业 、科技创新等，毕业设计(论文)以工程设计 主。

5.2.3 师资队伍

从事专业主干课程教学的教师， 有企业工作 或 从事 工程设计和研究的工程背景， 本专业 科学和技术的最新发展。

5.3 计算机类专业

5.3.1 适用专业领域

按照教育部规定设 的，授予工学学士学位的计算机科学与技术、软件工程等计算机类专业。

5.3.2 课程体系

课程设置 满足：

a) 支持学生 计算与计算系统 象以及自动计算 相关的 本 识， 离散结构、程序设计、 结构、计算机算 、计算机组 、操作系统、计算机网络、软件 发 程、 管理与 用等 的核心概念、 本 理，以及相关 本技术和 ；

b) 培养学生计算思维、 本算 、程序设计和系统能力，并能运用这些 识设计、 或者部署复杂计算系统；

c) 保证学生受 足 的训练， 课程作业与专业 践环节；

d) 专业课程， 别 类课程 有 量和难 与培养学生 复杂工程 能力相 的作业；

e) 专业 践环节 少 含：

- 两个 门课程综合、 有一定规模的系统设计与 发；
- 毕业设计(论文)(少占 学 的 8% 或 不少 14 周)，

选题应有明确的应用背景，能体现学生系统实现的综合能力培养。

5.3.3 师资队伍

大部分授课教师在其学习经历中至少有一个阶段是计算机类专业学历。

5.4 化工与制药类、生物工程类及相关专业

5.4.1 适用专业领域

按照教育部规定设立的，授予工学学士学位的化工与制药类、生物工程类以及应用化学、生物技术、生物信息学、石油工程、油气储运工程、海洋油气工程等专业。

5.4.2 课程体系

课程设置应满足：

a) 学生在毕业时能运用数学（含高等数学、线性代数等）、自然科学（含化学、物理、生物等）、工程科学原理（含信息、机械、控制）和实验方法，表达和分析化学、物理和生物过程中的复杂工程问题；

b) 学生能研究、模拟和设计化学、物理和生物过程，具有系统优化的知识和能力；

c) 学生能理解和分析在化学、物理和生物过程中存在的健康、安全与环境（HSE）风险和危害，了解现代企业 HSE 管理体系。

5.4.3 师资队伍

该项应包括：

a) 从事专业教学工作的 80％以上的教师，至少有 6 个月以上的企业工程实践经历；

b) 讲授安全、环保、工程设计等课程的教师具有与之相关的工程实践经验。

5.5 水利类专业

5.5.1 适用专业领域

按照教育部规定设立的，授予工学学士学位的水利类专业以及农业工程类的农业水利工程专业。

5.5.2 课程体系

课程设置应满足：

a) 符合工程逻辑，涵盖解决水利勘测、规划、设计、实施、管理、维护等全周期、全流程过程中复杂工程问题的知识、能力和素质培养，使学生能够考虑各种制约因素解决工程技术问题；

b) 具有生态、环境的基础知识和水利工程生态、环境的专门知识，能分析、评价水利复杂工程问题解决方案对生态、环境的影响，并能考虑生态、环境的制约因素；

c) 工程实践各环节注重工程能力的培养：

- 课程实验有综合实验项目；
- 实习包含对水利工程问题复杂性的了解；
- 课程设计不少于 4 个，其中专业类课程设计不少于 2 个；
- 做毕业论文的学生，至少有一门专业类课程设计能使其得到解决复杂工程问题的训练；
- 毕业设计（论文）的时间不少于 12 周，包括对所涉及的经济决策、生态环境影响的理解与评价。

5.5.3 师资队伍

该项应包括：

a) 40％以上承担专业基础类、专业类课程教学的教师具有高级职称；聘请企业或行业专家为兼职教师承担培养方案中一定

□ □ □ □ □；

b) □ □ □ □ □ □ □ 一般至少□ 一个□ □ □ 领域□ □ 历，□ 讲□ □ 具□ □ □ □ 或□ 近□ □ 领域□ □ □ 方向□ 经历；

c) 85％以□ □ □ □ □ □ □ □ 具□ □ □ □ 领域□ □ 实践□ 经历，15％以□ 具□ 在□ □ □ □ □ □ □ 或□ 近□ □ 累□ 参加□ □ 实践半年以□ □ 经历；

d) 具□ □ □ 青年□ □ □ □ □ □、知□ □ □ □、□ □ □ □ □ □ □ □ 划。

5.6 环境科学与工程类专业

5.6.1 适用专业领域

□ □ □ □ □ □ □ □ 立□，授予□ □ □ 士□ □ □ □ □ □ □ □ □ □ □ □ □ □。

5.6.2 课程体系

□ □ □ 置应满足：

a) □ □ 在□ □ 时□ □ □ 数□（含□ □ 数□、线□ 代数、概 论□ 数□ 统□ □）、□ 然□ □（含□ □、□ □、□ □ □）、□ □ □ □ 原□ □ 实验方法、□ □ 知□（含□ □ □ □ □ □ □ □ □ □、□ 态修□ □）□ 经济决策、□ □ 管□ □ 知□ 以□ 现代□ 具；

b) 掌握□ □ □ □ □ □ □、□ □、□ □ □ □ □ □ □ □ 知□，具备开□ □ 态□ □ □ □ □、 □ □ □、□ 达、□ 划、管□、模拟、□ 析、□ 价、□ □、开□、□ □ □ 优□ □ □ □，□ □ 析、□ 价、控□ □ □ □ □ 对社□、□ □、□ □ □ □ □ □ 影响，□ 解应□ □ □ 社□ □ □；

c) 在实践□ □ □ 节□ 受到足够□ □ □ 实践□ 练。

5.6.3 师资队伍

该□ 应包括：

a) 讲授专业课程的教师原则 应具 本专业的学习经历；
b) 从事专业教学工作的教师 6 个月以 的相关工程实践经历。

5.7 安全科学与工程类专业

5.7.1 适用专业领域

按照教育部规定 立的，授予工学学士学 的安全科学与工程类专业。

5.7.2 课程体系

课程体系 置应确 学生在毕业时：
a) 能运用数学、 然科学、工程科学、管理科学知识和实验手段识别危险源；
b) 能为降低风险而分析、 计、 、 达和优化解决方案；
c) 能实施 计方案并评价实施绩效。

5.7.3 师资队伍

从事专业教学工作的教师，在其学习经历中至少 一个阶段是安全科学与工程类专业学历，或者具 两年以 本专业类的教育培 、科学 、工程或管理实践 工作背景。

5.8 电子信息与电气工程类专业

5.8.1 适用专业领域

按照教育部规定 立的，授予工学学士学 的电气类、电子信息类与 动化类专业。

5.8.2 课程体系

课程 置应满足：
a) 提供与专业名称相符的，具 相应的 度和 度的现代工程

；

b) □□数学、□ 学(　学,也 以包括 学、生□ 学、□ 学和 间 学) 知 领域 其应用,以 析和 计 专业□称 □ 对□(包括□件、 件和□件 件 成 系□)所必需 现代 程 ；

c) 各专业 □□以下知 领域：

- 类专业包括 □ □、□□原 知 领域,够支□在 程(包括 生 、□ 、应用) 知 、规□ 计、 □ 、 析计 、实□ □、□□□□ 培养；
- 类专业包括 机 、 □ 、 号/□□ 处 、 计 □□、通 □ 、□□互 、□ 应用 知 领域,够支□在 、 以 通 程(包括 、 、) 应 、□ 件、 、 号、 、□□ 应用 析 计 培养；
- 类专业包括 □、□ 、□ 、系□集成 应用 术 知 领域,够支□在现代 程 系 □ □、□ 、 处 析、 □ 、□ 决 □、系□集成以 □应用 培养；
- □来特 专业 课程 □□ □专业 知 领域或 □根据专业特 进 □。

5.8.3 师资队伍

该项应包括：

a) □□专业 课程 师了解 应专业领域 其 程实□ □ 进 ；

b) □□ 要 计类课程 师具 □够 □□和 计经 □,□□ 计类课程 学 □依□于 一 师。

5.9 交通运输类专业

5.9.1 适用专业领域

□□□□□□□□立□,授予□□□士□□□□□□□□□□。

5.9.2 课程体系

□□□置应满足:

a) 数□□□然□□□□□对微积□、几何□代数、概率□数□统□、大□□□□□□知□□□□□□□较好□撑;

b) □□基础□□□具□较好□□□□□、□□图□、□筹□□□基础,□对□□□□基础、□□□□基础、□□□□基础、□□□□□基础、□□控□□□基础□□□□□领域□□□□□较好□撑;

c) □置符□□□□□□□□□□□□□□□实践□节,实践□节应包括实验、□□□□、实习□□□□练□,□□□□(论□)以□□□□为□。

5.9.3 师资队伍

该□应包括:

a) 从□□□基础□、□□□□□□□□□讲□□,原□□具□硕士或博士□□;

b) 讲授□□□□□□□,每 3 年应□ 3 个月以□□□□实践经历;

c) □□□□□□级□称□□占□□□□□比例□低于 45%。

5.10 矿业类专业

5.10.1 适用专业领域

□□□□□□□□立□,授予□□□士□□□采□□□、□□加□□□、□□□□□□□□□□□□。

5.10.2 课程体系

□□□置应满足：

a) □□在□□时□习足够□□□□□、接受足够□□□□□□节□□练，满足□□非□固□□□□□（□包括□□□天然□田□液态□□）□开采□□□加□□需□；

b) □□□□□□□□□□□□匹配□□堂□□、□后□□□习以□□□□□□解决□杂□□问题□□□适应□□□□□□□□，□在□□□□大纲□成绩□□方法□□□□□□□明确□□且□效实施；

c) □□□□□□□时俱□且□断完善，以适应社□对现代□□□□□□□需□；

d) □□实践□□□节包含：

- 至少3次□现□同□□□□□校外实习（总□时□少于8周）；
- □□□□（论□）时间□少于12周，其□□□□□占□□□□□适应□比例，□且来□于□□□□□实践□选题比例□低于80%。

5.10.3 师资队伍

□□□□在其□习经历□至少□一个阶段是□□□□□□历，从□□□□□□□□□□应具□6个月以□□□□□□□□实践经历。

5.11 食品科学与工程类专业

5.11.1 适用专业领域

□□□□□□□□立□，授予□□□士□□□□□□□□□□□□□□。

5.11.2 课程体系

□□□置应满足：

a) 学生□毕业□□□工程制□、信息、机械工程、 □□作 □□的工程□□；

b) □□ 学体系能结 食品 业□ 业的工程□□□□，□工程□□ □，□化工程意 和 □工程□□□□。

5.11.3 师资队伍

□事专业课程□课的 师，□□学□□□ □□ □□□□□食品科学与工程类□相关专业学 ，□ 6□□□ 的相关工程□□□□。

5.12 材料类专业

5.12.1 适用专业领域

按照 部规定 □的，□□工学学□学 的材料类专业。

5.12.2 课程体系

课程 □□□ 学生□毕业□：

a) □□□用 □科学(□ 物理和 化学)、计算机 术和工程□理 □ 的能力；

b) 能系□理□ 能□□ □用 关材料(□□)□□ □与结构、性质、 □与制□(□工□□程)、□用(□□用性能) □□的科学与工程□理；

c) 能通□理□分□、□□和□ 、□□计算、□计□及 □□学□□ □□，□□ □与制□ 工□□程的材料□□、 计、工□(□ 工□ □程)及□□□定 材料(□□)□□□工程□□。

5.12.3 师资队伍

□事专业课程 学的 师，专业□ □□□专业□□ 关 □与结构、性质、 □与制□(□工□□程)、□用(□□用性能) □□

。

5.13 □ □ □ □ □

5.13.1 □ □ □ □ □ □

规定 立 ,授予工学学士学 类专业。

5.13.2 □ □ □ □

课程 置应满足:

a) 支持学生掌握 获取、 处 和 用 基 知 ,包括传感 论与应用、 论与 试 术、 控系统与 智 化 其制 领域 概念、基 原 、基 术和基 方法;

b) 围绕准确获取 , 用基 知 析、 计、开 、应用 件(元件)、整机或 控系统,培养学生系统思维和 与 控系统性 价 ;

c) 专业实践 节 学生熟悉 计、制 过程,了解 生 方式和管 流程。

5.13.3 □ □ □ □

80%以 专 师具 在 业连续工 半年以 经历,或取得 专业工程 术系列 业资格,或通过 专业 术 员 平价。

5.14 □ □ □ □ □ □ □ □ □

5.14.1 □ □ □ □ □ □

规定 立 ,授予工学学士学 类专业。

5.14.2 课程体系

课程设□应□□：

a) 支持学生掌握地□空间信息科学与技术的基本知识，包括地理时空基准、□地测量与导航定位、工程与工业测量、□□测量与□感、地□制□与地理空间信息工程以及测绘地理信息技术在相关应用领域的核心□□、基本原理、技术、方法和测绘与地理信息服务相关□□、法规等；

b) 培养学生测绘地理信息的数据采集、处理、分析、服务能力；

c) 使学生□到□够的专业工程训□，包括专业实□环□；专业课程有培养学生解决复□工程问题能力的作业或设计；

d) 专业实□教学环□至□包□：

- 核心专业课程有工程□□分析和适当规□的程□设计作业；
- 有校企联合□运行□□的实训基地，有不□于2周的实训经历；
- 毕业设计(□文)完成时间不□于12周，□题有明确的应用□□。

5.14.3 师资队伍

该项应包括：

a) 专业课□课教师在其学习经历中至□有一个□段是测绘地理信息类专业学历；

b) □事核心专业课程□课的教师，应具有主持完成测绘地理信息工程项目的能力与相应经历。

5.15 地质类专业

5.15.1 适用专业领域

按照教育部规定设立的，□□工学学□学位的地质类专业。

5.15.2 课程体系

□□□置应满足：

a) 野外□□□□□□□□□基□□□□练，包括□□□□□基础□□实习□□□实践□节，且□□□□□基础□□实习野外□□时间□少于5周；

b) □□□□□□□□□□□□□□基□概念、原□□□析方法，观察、□析□描述野外□□现象□□□，掌握解决现场□□问题□方法□□□；

c) □□实践□节时间□排□少于5周，□野外、场□□室□□□□，□形成报告(□□/论□)，□□□□解决□□□□□问题□□□。

5.15.3 师资队伍

该□应包括：

a) 从□□□□□□□□□□在其□习经历□，至少□一个阶段是□□□□□□历；

b) 从□□□□□□□□ 80%以□□□，至少□累□1年以□□□□□□或□□实践(包括□□□□或完成□□□□□、应□型□□□□)经历。

5.16 纺织类专业

5.16.1 适用专业领域

□□□□□□□□立□，授予□□□士□□□□□□□□、□装□□□□□□非□□□□□□□□□□□□□。

5.16.2 课程体系

□□□置应确□□□在□□时：

a) 掌握揭示纤维□其集□□□□成□□、形态特征、□□演变□

其规□的纺织材料学知识集；

b) 掌握□□□个纺织生产□和全生□周□□□的纺织工程学知识集；

c) 掌握□顾科技和人文属性、□术和□能□一的纺织类产品设计学知识集，以及掌握□设计、制造到销售并集成信息、经□、社会等要素的纺织□理学知识；

d) 能□合运用上述知[redacted]原材料状□□制品状□□□过程中的复□工程问题，并注重制造过程的高效化、□细化及人体和环境友□。

5.16.3 师资队伍

该项应包括：

a) □事专业教学工作的70%以上的教师在其学习经历中，至□有一个□段是纺织类专业学历；

b) 80%以上的教师至□有6个□以上纺织类或相关企业工程实□经历。

5.17 核工程类专业

5.17.1 适用专业领域

按照教育部规定设立的，□□工学学□学位的核工程类专业。

5.17.2 课程体系

课程设□应□□：

a) 至□包□如下知识领域□一：理□力学、量子力学、电动力学、□计力学、流体力学、热力学、放射化学、化工原理；

b) 使学生掌握核物理、辐射探测、辐射□护的基础知识，具备相适应的实□、信息技术、电工电子技术和工程制□能力；

c) 专业课程体现核安全文化；

d) 毕业设计(□文)应一人一题。

5.17.3 师资队伍

该项应包括：

a) 从事专业课程教学的教师，具有核工程类或核物理专业的学历或进修经历，或者有在核工程类相关企业/研究院所的工作经历；

b) 从事专业教学（含专业实验教学）的教师，80％以上具有累计不少于半年相关企业或研究机构的工程实践经历；

c) 认证专业的专任教师中再列入其他认证专业的不得超过50％。

5.17.4 支持条件

专业所在学校应具有从事放射性工作的资质和许可证。

5.18 兵器类专业

5.18.1 适用专业领域

按照教育部规定设立的，授予工学学士学位的兵器类专业。

5.18.2 师资队伍

从事专业教学工作的教师在其学习经历中至少有一个阶段是兵器类专业学历，或具有兵器行业科研经历，或具有兵器行业工程实践经验。

5.19 土木类专业

5.19.1 适用专业领域

按照教育部规定设立

a) 学生在毕 时 够应用 学、 学、流 学、
、 、 图、 经济 基 原 方法；
b) 使学生掌握 施或 统 、 、维、管
概念 术；
c) 使学生具 综 用宽 径 知 和 、达、析
和解决 条 问题 。

5.19.3 师资队伍

该 应包括：
a) 从 课 学(含实践 学) ,在其学习经历 至
少 一个阶 是 学历；
b) 从 干/ 课 (含实践 节) 学 具
应 实践经历；
c) 课 学 骨干 明确稳定 方向；
d) 每年实际指 毕 学生 超过8 。

5.19.4 支持条件

满足 学需要 现 法规文件、 家标准、 标准和图集， 课 学和毕 所必需 正版 件， 对稳定校外 实习基 。

5.20 能源动力类专业

5.20.1 适用专业领域

规定 立 ,授予 学学士学 统 、 学 、储 学 、氢 学 、持续 。

5.20.2 课程体系

课 置应满足：

a) □□□□□□□□□□□、□□(□□□□□□□□)□□□□□;

b) □□□□□□□□□□□□□□□、□□□□□□、□□□□□□□□、□□□□□、□□□□□□□□□□□□□□□□;

c) □□□□□□□□□□□□□□□□□□□□□□□□□□点□□，□□□□□□□、□□□□、□□□(□□□□燃烧□)、□□□□□□□□□□□□□□□□□□□□□密切□□□□□□□□□;

d) □□□□□□□□□□□□、□□□□□□、□□□□、□□□□□□□□□□，□□□□(□□)□□□□□□□，□□□□□□□□□□□□□□□□□□□□。

5.20.3 师资队伍

□□□□□□□□□□□，□□□□□□□□□□□□□□□□，□□□□□□□□□□□□□□□□□□、□□□□□□□□、□□、□□□□□□□□□□，□□□□□□□□□□□□□□。

5.21 轻工类专业

5.21.1 适用专业领域

□□□□□□□□□□，□□□□□□□□□□□□□、□□□□、□刷□□、香□香□□□□□□、□妆□□□□□□□□□□□□□□□□□□□□□。

5.21.2 课程体系

□□□□□□□：

a) □□□□□□□□□□□□□□□、□□□□、□□□□□□□□□□□、□□□□□□□□□□□□;

b) □□□□□□□□□□□□□□□□□□□□□□□□□，

开展工程实践训练，强化工程意识和提供工程实践经历；

c） 课程教学内容要与时俱进地不断完善，以适应社会进步和科技发展对轻工类人才的需要。

5.21.3 师资队伍

该项应包括：

a） 从事专业主干课程教学的教师，具有企业工作经验或从事过相关工程实践和研究的经历，了解本专业领域科学和技术的最新发展；

b） 制定了青年教师工程能力、教学能力的培养计划。

ICS 03.180
CCS A 18

Organization Standard

Social

...ering education accreditation

...a

...2-07-15 Implementation date: 2022-07-15 Issue date: 202

...ineering Education Accreditation Association

...anghua University Press of China

Issued by: Chin...
Published by: S...

Contents

Foreword

This document is in accordance with the provisions of GB/T 1.1—2020 *Directives for standardization—Part* 1: *Rules for the structure and drafting of standardizing documents*.

Please note that some of the contents of this document may involve patents. The issuing agency of this document is not responsible for identifying patents.

This document was proposed by the China Engineering Education Accreditation Association (CEEAA) and the Education Quality Evaluation Agency of the Ministry of Education, and is managed by CEEAA.

Drafting organizations of this document: China Engineering Education Accreditation Association, Education Quality Evaluation Agency of the Ministry of Education, China Association for Standardization, Geological Society of China, China Society for Geodesy Photogrammetry and Cartography, China Electrotechnical Society, Chinese Society for Electrical Engineering, China Ordnance Society, China Electricity Council, Chinese Institute of Electronics, China National Textile and Apparel Council, Chinese Society for Composite Materials, China Iron and Steel Association, China Association of Higher Education, China Optics and Optoelectronics Manufacturers Association, Chinese Aerospace Society, China Nuclear Energy Association, China Nuclear Energy Society, China Environmental Protection Industry Association, China Environmental Science Society, China Mechanical Engineering Society, China Machinery Industry Association, China Architecture Society, China Construction Materials

Council，China Communications Education Institute，China C

Introduction

Engineering education accreditation is an internationally recognized quality assurance system for engineering education and an essential basis for international mutual recognition of engineering education and engineer qualifications. Engineering education accreditation in China began in 2006 and is the foundation and an essential part of the reform of the engineering system. In 2016, China joined the Washington Accord as a full signatory.

The goals of engineering education accreditation are: To promote the construction of an engineering education quality assurance system in China, to promote the reform of engineering education in China, and to further improve the quality of engineering education; To establish an engineering education accreditation system in conjunction with the engineer ing circles, to promote the link between education and industry, and to improve the adaptability of engineering talent training to industrial development; To promote international mutual recognition of Chinese engineering education in the world.

China Engineering Education Accreditation Association (CEEAA) is a voluntarily established, non-profit, national, membership-based social organization by associated groups and individuals committed to China's engineering education.

Since the naissance of engineering education accreditation in China,

CEEAA and associated agencies released the "*Criteria for engineering education accreditation*" in accordance with the education practices in China, based on the prevailing practices of the international engineering education community and the principle of substantial equivalence. According to the Council meeting decision of CEEAA, the "*Criteria for engineering education accreditation*" was revised and redesigned to form this document, which meets the relevant requirements of education evaluation in the new engineering era.

CEEAA will constantly revise this document.

The principles of this document have been implemented for many years and have undergone many revisions and iterations by many leaders, experts, and staff involved in this work. Due to the limited space, we are not able to list all the contributors. We would like to take this opportunity to express our gratitude to them.

Feedback, comments and suggestions on the document are welcome by CEEAA at the postal address of No.30, Xueyuan Road, Haidian District, Beijing, zip code: 100083, and e-mail of ceeaa@cast.org.cn.

Engineering education accreditation criteria

1 Scope

This document specifies the general criteria of the engineering education accreditation and the complementary program criteria.

This document applies to engineering education accreditation of engineering programs awarding bachelor's degree with four-year full-time study at higher education institutions.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

The following terms and definitions apply to this document.

3.1
educational objectives

Broad statements that describe what students are expected to attain within five years after graduation.

3.2
graduate outcomes

Statements that describe what students are expected to know and be able to do by graduation.

NOTE Statements relate to skills, knowledge and behaviors that students acquire as they progress through the program.

3.3
assessment

One or more processes that identify, collect and prepare data to evaluate the attainment of program course teaching, student training, graduate outcomes, educational objectives, etc..

NOTE Effective assessment uses relevant direct, indirect, quantitative and qualitative measures appropriate to the assessable outcome. Appropriate sampling methods may be used as part of an assessment process.

3.4
evaluation

One or more processes for interpreting the data and evidence accumulated through assessment processes.

NOTE Evaluation results in decisions and actions regarding program improvement.

3.5
mechanism

A set of standardized processing procedures for specific purposes.

NOTE Including purposes, relevant regulations, responsible personnel, methods and procedures, clearly defines the roles and responsibilities of personnel involved in the process.

3.6
complex engineering problem

The problem that cannot be solved without in-depth engineering knowledge and analysis.

NOTE With some or all of the following features:

a) It involves various technical, non-technical, and other factors, which have certain conflicts with each other;

b) It can only be solved by establishing an appropriate abstract model, and creativity needs to be reflected in the modeling process;

c) It cannot be solved entirely by standard methods;

d) The factors involved in the problem may not be fully included in the standards and specifications of professional engineering practice;

e) The stakeholders involved in the problem are not consistent;

f) It is highly comprehensive and contains many interrelated sub-problems.

4 General criteria

4.1 Students

This item includes the following factors:

a) The program must have policies and procedures to attract outstanding students;

b) The program must have enforced policies and procedures on learning advising, career planning, employment guidance and psychology counseling for students;

c) The program must track and evaluate student's outcomes throughout the learning process, and to ensure and document that students achieve the graduate outcomes through formative evaluation;

d) The program must have specific requirements and processes for awarding appropriate academic credits of transfer students.

4.2 Educational objectives

This item includes the following factors:

a) The program must have published educational objectives consistent with the mission of the institution and the needs of social and economic development;

b) The program must periodically review the educational objectives to en-

sure they remain consistent with the institutional mission and social & economic development. The review process must involve experts from industry or enterprises.

4.3 Graduate outcomes

The program must have clearly documented, published and assessable graduate outcomes. The documented graduate outcomes prepare graduates to attain the program educational objectives. The documented graduate outcomes must include:

a) Engineering knowledge: Apply knowledge of mathematics, natural science, engineering fundamentals and engineering specialization to solve complex engineering problems;

b) Problem analysis: Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences;

c) Design/development of solutions: Design solutions for complex engineering problems and design systems, components, or processes that meet specified needs with appropriate societal, public health and safety, leg w y f l i m f

□）□□□

4.4 Continuous improvement

4.5 Curriculum

outcomes. The design of the curriculum must involve experts from the enterprises or industry. The curriculum must include:

a) Courses on mathematics and nature sciences consistent with the graduate outcomes (accounting for at least 15% of the total credits);

b) Courses on engineering foundation requisite, courses on subject foundation requisite and subject elective courses (accounting for 30% of the total credits). Courses on engineering foundation requisite and courses on subject foundation requisite may provide training in the ability to apply mathematics and natural science in solving complex problems related to the professional discipline. Subject elective courses can fully assume the role of training abilities in system design and implementation;

c) Engineering practice and graduate design (thesis) (accounting for 20% of the total credits). The program has a well-established practice education system and cooperate with enterprises to educate students on practical and innovative abilities. The topics of graduate design (thesis) are oriented from the practical engineering problem to educate students engineering awareness, cooperation and abilities to systematically utilize what they have learned to solve complex engineering problems. The guidance and evaluation of graduation design (thesis) involve experts from industry or enterprises;

d) Courses on humanities, social sciences and general education (accounting for at least 15% of the total credits) to enable students to consider the economic, environmental, legal, safety, health and ethical constraints in engineering practice.

4.6 Faculty

This item includes the following factors:

a) The faculty is sufficient and has a reasonable structure to meet the program's teaching requirements. The program must have part-time faculty members from industry or enterprises;

b) Each faculty member must have proper teaching, professional practice, communication, career development and engineering research abilities. The professional background of each faculty member must meet the program's teaching needs;

c) The faculty members must have sufficient time and effort devoted to undergraduate teaching and student advising and actively participate in research and reform on teaching;

d) The faculty members must provide student advising, counseling and service activities and accommodate adequate levels of career planning and professional education to the students;

e) The faculty members must understand their responsibilities in the program's quality improvement and continuously improve their work.

4.7 Supporting resources

This item includes the following factors:

a) Classrooms, laboratories, practice and exercise workshops, associated equipment are adequate to satisfy teaching needs. The

program must have well-established management, maintenance and update mechanism of the facilities enabling students to access. The program cooperates with enterprises to establish practice and exercise bases and provide the engineering practice platform for the student during the teaching process;

b) Computer facilities, network conditions, books and documents sufficient to satisfy the needs of teaching and scientific research of the students and faculty. These resources are systematically maintained and accessible, and have a high degree of sharing;

c) Financial resources must be sufficient to meet the needs of teaching;

d) The institution must attract and retain qualified faculty and effectively support faculty development, especially the guidance and training of young faculty;

e) The institution must have sufficient infrastructure to meet the needs of graduate outcomes and support students' practice and innovation activities;

f) The institution must have well-established teaching management and service to support the attainment of graduate outcomes.

5 Complementary program criteria

5.1 Precautions

The program must meet its corresponding complementary program

criteria. Complementary program criteria stipulate special re uire- ments on curriculum, faculty and supporting resources.

5.2 Complementary criteria for Mechanical and Similarly Named Engineering Programs

5.2.1 Applicable programs

These complementary program criteria apply to those programs established in accordance with the relevant regulations of the Ministry of Education, conferring a bachelor's degree in engineering. The program's name includes "mechanical" or similar modifiers such as machinery, material forming, process e uipment, and vehicles.

5.2.2 Curriculum

The curriculum should include natural science courses, basic engineering courses, practical lin s, and meets the following re uirements:

a) Natural science courses cover areas of nowledge such as physics, chemistry (or life sciences);

b) Engineering introductory courses cover nowledge fields such as engineering graphics, theoretical mechanics, mechanics of materials, thermofluids, electrical and electronics, engineering materials;

c) The practical activities include engineering training, course laboratory, course design, enterprise internship, innovations in science and technology, etc.. The graduation project (thesis) is

mainly based on engineering design.

5.2.3 Faculty

The faculty members of the major courses have professional experience in enterprises or engineering fields of technical design and research, and be aware of the latest developments in science and technology in the related field of the program.

5.3 Complementary criteria for Computer and Similarly Named Engineering Programs

5.3.1 Applicable programs

These complementary program criteria apply to the programs of computer science and technology, software engineering, and other computer-engineering-related ones authorized by the Ministry of Education, which award bachelor's degrees to students who meet the corresponding standards.

5.3.2 Curriculum

The curriculum must meet the following requirements:

a) To assist students in mastering fundamental knowledge of the characteristics of computer systems abstraction and automation, including core concepts, fundamental principles, appropriate methods, and technologies for the following disciplines: discrete structures, programming, data structures, computer algorithms, computer architecture, operating systems, computer networks, software

development procedures, data management, and applications;

b) To assists students in developing computational thinking, understanding fundamental algorithms, programming and systematic skills. Students can apply the appropriate knowledge to design, implement and/or use complex computer systems;

c) To ensure that students receive sufficient training, including course projects and professional practice;

d) Courses in the program, especially foundation courses, require students to complete specific homework assignments of an appropriate difficulty level to demonstrate their competency in solving complex engineering problems;

e) Professional practice includes, at a minimum:

- Two systems design and development projects with an appropriate amount of work requiring integrated knowledge from multiple courses;

- The project design/thesis (at least 8% of the total credits or more than 14 weeks) demonstrate a clearly defined application background and reflect the students' comprehensive system development skills training.

. . F t

. Co e ent r r ter or C e o e nd r ed n neer n ro r s

. . e ro r s

. . C rr

a)

b)

physical and biological processes wilh lhe knowledge and capacily of syslem optimization;

c) Sludents are able lo understand and analyze HSE risks and hazards in chemical, physical and biological processes, wilh knowledge of HSE management system of modern enterprises.

5.4.3 Faculty

The faculty must meet lhe following requiremenls:

a) More lhan 80% of leaching faculty members have engineering experience in enterprise for at leasl 6 months;

b) The faculty members of safety, environmenlal prolection and engineering design courses have engineering experience in relevant areas.

5.5 Complementary criteria for Water Conservancy and Similarly Named Engineering Programs

5.5.1 Applicable programs

These complementary program crileria apply to lhe programs that include water conservancy and agricultural water conservancy engineering in agricultural engineering, which are established in accordance wilh lhe regulations of lhe Minislry of Education to award the bachelor's degree in engineering.

5.5.2 Curriculum

The curriculum must meet the following requirements:

a) Conforming to engineering logic and covering the training of knowledge, ability, and quality to solve complex engineering problems in the whole cycle and whole process, including water conservancy survey, planning, design, implementation, management and maintenance, and enabling students to solve engineering problems considering various constraints;

b) Basic knowledge of ecology and environment and expertise in ecology and environment of water conservancy. Be able to analyze and evaluate the impact of solutions to solve complex engineering problems of water conservancy on ecology and environment, and consider the constraints of ecology and environment;

c) Each link of engineering practice pays attention to the cultivation of engineering ability:

- The course experiments have comprehensive experiment items;
- The practices include understanding the complexity of hydraulic engineering problems;
- There are no less than 4 course designs, including no less than 2 subject elective course designs;
- The student doing a graduation thesis have at least one subject elective course design that allows him to be trained

in solving complex engineering problems;

- The time of graduation design (thesis) is no less than 12 weeks, including the understanding and evaluating economic decision-making and ecological environment impact.

5.5.3 Faculty

The faculty must meet the following requirements:

a) More than 40% of the faculty members of courses on subject foundation requisite and subject elective courses have senior titles. Hiring enterprise or industry experts as part-time teachers undertake certain teaching tasks in the training program;

b) The faculty members of subject elective courses have at least one professional education background same as the relative major in different educational levels such as bachelor, master, PhD, and the teacher has the research orientation and professional experience the same as or similar to relative major;

c) More than 85% of the faculty members of subject elective courses have experience in engineering practice in their field, and more than 15% faculty members have accumulated more than half a year of engineering practice experience in water conservancy enterprises and institutions or similar units;

d) The program has a training plan to develop young teachers' engineering ability, knowledge integration ability, and teaching skills.

[illegible]

[illegible]

These complementary program criteria apply to programs that include environmental-related engineering programs leading to engineering education bachelor degree, as established consistent with the regulations of the Ministry of Education.

[illegible]

The curriculum must meet the following requirements:

a) Students, upon graduation, are capable of applying knowledge of mathematics (including advanced mathematics, linear algebra, probability theory, mathematical statistics, etc.), natural sciences (including chemistry, physics, biology, etc.), engineering science principles, and experimental methods, professional knowledge (including prevention and control of wastewater, waste gas and solid waste and their resources conservation-oriented utilization, ecological restoration, etc.), economic decision making, engineering management as well as modern tools;

b) Students have a good command of knowledge in project-related safety, health and sustainable development of the environment. They can identify, express, plan, manage, simulate, analyze, assess, research, develop, design and optimize ecological and environmental protection, and pollution prevention and control. They can analyze, assess and control the impacts of projects on

, societ , , ealt , , safet and environment, and understand t e social responsi ilities attri uta le to t em;

c) Students ave received sufficient specialt practice trainin in practice teac in .

5.6.3 Faculty

T e facult must meet t e followin re uirements:

a) T e facult mem ers of professional courses ave t e learnin e perience identical to t e specialt ;

) T e facult mem ers en a in in specialt teac in ave under one related en ineerin practice e perience of more t an 6 mont s.

5.7 Complementary criteria for Safety Science and Engineering and Similarly Named Engineering Programs

5.7.1 Applicable programs

T ese complementar pro ram criteria appl to pro rams of safet science and en ineerin t at are e r e r f l r i mm f

5.7.2 Curriculum

The curriculum must meet the following requirements:

a) Be able to identify hazards based on the academic knowledge of mathematics, natural science, engineering science, management science and experimental means;

b) Be able to analyze, design, study, express and optimize solutions for risk mitigations;

c) Be able to carry out the design schemes and evaluate implementation performance.

5.7.3 Faculty

The faculty members engaged in professional teaching work have at least one degree in safety science and engineering, or have more than two years of working experience in safety-related education and training, scientific research, engineering, or management practice.

5.8 Complementary criteria for Information, Electronic, Electrical and Similarly Named Engineering Programs

5.8.1 Applicable programs

These complementary program criteria apply to programs are established in accordance with the regulations of the Ministry of Education to award a bachelor degree of Engineering in information, electrical,

electronic and automation programs.

5.8.2 Curriculum

The curriculum must meet the following requirements:

a) Provide modern engineering education content with the required breadth and depth consistent with the program title;

b) Cover the knowledge fields and applications of mathematics and natural sciences (including physics, can also including chemistry, life science, earth science, space science, etc.), as well as the modern engineering content necessary for analyzing and designing complex systems and situations (including hardware, software, and systems composed of hardware and software) that are consistent with the program title;

c) Cover the following areas of knowledge:

- Electrical Engineering Programs include knowledge/courses such as electromagnetic theory and energy conversion principle, which support the cultivation of cognitive recognition, planning and design, operation control, analysis and calculation, experimental testing, simulation, and other abilities in Electrical Engineering (including electric energy production, transmission, application, etc.);

- Information, Electronics and Communication Engineering Programs include knowledge/courses such as physical mechanisms,

[illegible]

- [illegible]
- [illegible]

5.8.3 Faculty

[illegible]

a) [illegible]

b) [illegible]

5.9.3 Faculty

The faculty must meet the following requirements:

a) The main faculty members of courses on subject foundation requisite and subject elective courses, in principle, have a master's degree or doctoral degree;

b) The faculty members of professional courses have more than 3 months of engineering practice experience every 3 years;

c) The proportion of full-time faculty with intermediate and senior professional titles is no less than 45%.

5.1▪ g i 2 p g r ▪ E y 2 a g f i m g S 2 g p g g f i m g S 2

a) The students take enough professional courses and receive enough training to meet the requirements of the exploration and processing of coal and other solid mineral resources (excluding liquid resources such as oil and gas fields) before graduation;

b) The professional courses are equipped with classroom teaching, independent learning, and homework that develops the ability to solve complicated engineering problems. The grading standard and evaluation method are clearly specified in the syllabus and be strictly implemented;

c) Keep the course up-to-date to meet the demands for talents in modern mining;

d) The following aspects are included in practice teaching:

- Social practice with different teaching aims for 3 times at least (no less than 8 weeks in total);
- No less than 12 weeks for graduation project/thesis, among which the proportion of engineering design match the professional orientation; the proportion of selected topics in mining engineering practice should not be less than 80%.

□.□□.□ □□□□□□□

At least one stage of mining-learning experience with a professional degree is required for each full-time faculty member. At least 6 months of practical experience in mining engineering is required for faculty members who are engaged in professional teaching.

□.□□ □□□□□□□□□□□□□ □□□□□□□ □□□ □□□□ □□□ □□□□□□□□ □□□□□ □□□□□ □□□□□□□ □□□□□□□

□.□□.□ □□□□□□□□□□□ □□□□□□□□

These complementary program criteria apply to food and similarly named engineering programs established in accordance with the regulations of the Ministry of Education to award a bachelor’s degree in engineering.

□.□□.□ □□□□□□□□□

The curriculum must meet the following requirements：

a） Upon graduation，students have the engineering fundamentals of engineering drawing，information，mechanical engineering，unit operation，etc.；

b） The practical teaching can combine the actual engineering problems in the food industry or industry，carry out engineering prac n

5.11.3 Faculty

Faculty members of professional courses have at least one stage of their learning experience in food science and engineering or related professional degrees and have more than 6 months of relevant engineering practice experience.

5.12 Complementary criteria for Material and Similarly Named Engineering Programs

5.12.1 Applicable programs

These complementary program criteria apply to all of the material programs which are established in accordance with the regulations of the Ministry of Education and awarded the bachelor's degree in engineering.

5.12.2 Curriculum

The curriculum must meet the following requirements:

a) To apply advanced science (such as physics and chemistry), computational techniques and engineering principles to materials systems;

b) To systematically understand and comprehensively apply the scientific and engineering principles underlying the four major elements of the field: structure, properties, synthesis and preparation (including technological processes), and applications (including performance) to the field of materials (including metallurgy);

c） To apply and integrate knowledge from the above fou

urement and control system and instrument product intelligence and its manufacturing;

b) Be able to analyze, design, develop and apply instrument components (elements), complete machine or measurement and control systems by applying basic knowledge around accurately obtaining information, and cultivate students' system thinking ability and performance evaluation of instruments and measurement and control system;

c) Professional practice ensure that students are familiar with the instrument design and manufacturing processes, and understand the instrument production organization and management process.

5.13.3 Faculty

More than 80% of full-time faculty members must have more than half a year of continuous work experience in the enterprise, or have obtained the professional qualification of Engineering Technology in a relevant program, or have passed the level evaluation of relevant professional technicians.

5.14 Complementary criteria for Surveying, Mapping and Geoinformation and Similarly Named Engineering Programs

5.14.1 Applicable programs

These complementary program criteria apply to programs that include surveying, mapping and geoinformation engineering programs established in accordance with the regulations of the Ministry of Education to award a

bachelor's degree in engineering.

5.14.2 Curriculum

The curriculum must meet the following requirements:

a) Students are expected to know the basic knowledge of geoinformatics, including space-time datum, geodesy and navigation, engineering survey, photogrammetry and remote sensing, cartography and geoinformation systems, and surveying and mapping geographic information technology-related policies and regulations;

b) Students are able to collect, process, and analyze geoinformation and to serve geoinformation services;

c) Students are well trained for professional engineering training, including professional practices. These training and courses include tasks and designs to solve complex engineering problems;

d) Sessions for practical training include the following:

- Core professional courses include case analysis for technical projects and programming assignments;
- Courses have a well-established practice base in collaboration with companies, where students have at least two weeks of practice;
- The duration of the thesis is at least 12 weeks, and the

thesis topics are related to technical practice.

5.14.3 Faculty

The faculty must meet the following requirements:

a) The faculty members of professional courses have at least one degree in surveying, mapping and geospatial information;

b) The faculty members of core professional courses have the ability and appropriate experience to lead the implementation of surveying and mapping projects in geospatial information technology.

5.15 Complementary criteria for Geology and Similarly Named

5.16 Complementary criteria for Textile and Similarly Named Engineering Programs

5.16.1 Applicable programs

The complementary program criteria apply to textile programs such as textile engineering, fashion design and engineering, and non-woven materials and engineering, which are established in accordance with the relevant regulations of the Ministry of Education to award a bachelor's degree in engineering.

5.16.2 Curriculum

The curriculum must meet the following requirements:

a) Students are able to master the knowledge set of textile materials science that reveals the composition, structure, morphological characteristics, performance evolution and laws of fibers and their aggregates;

b) Students are able to master the knowledge of textile engineering covering the whole textile production chain and the whole life cycle control;

c) Students are able to master the knowledge set of textile product design that considers the unity of science and technology and humanistic attributes, art and function, and master the knowledge of textile management that integrates information, economy, society and other elements from design, manufacturing to sales;

d□ Students are able to comprehensively apply the above knowledge and principles□solve complex engineering problems in transforming fiber and fiber aggregate from raw material state to product state□and pay attention to the high efficiency□refinement and human and environmental friendliness of manufacturing process.

□.□□.□ □□□□□□□

The faculty must meet the following requirements□

a□ More than 70% of faculty members engaging in professional teaching work have at least one stage in their learning experience with a degree in textile□

b□ More than 80% of faculty members have at least 6 months of engineering experience in textile or related enterprises.

□.□□ □□□□□□□□□□□□□ □□□□□□□ □□□ □□□□□□□ □□□ □□□□□□□□ □□□□□ □□□□□□□□□□ □□□□□□□□

□.□□.□ □□□□□□□□□□ □□□□□□□

These complementary program criteria apply to nuclear engineering related programs established in accordance with the regulations of the Ministry of Education to award a bachelor□s degree in engineering.

□.□□.□ □□□□□□□□□□

The curriculum must meet the following requirements□

a) Courses cover at least one of the following fields of knowledge: Theoretical mechanics, quantum mechanics, electrodynamics, statistical mechanics, fluid mechanics, thermodynamics, radiochemistry and chemical engineering principles;

b) Courses that enable students to master the fundamental knowledge of nuclear physics, radiation detection, radiation protection, and have the corresponding experimental ability, and abilities in information technology, electrical and electronic technology and engineering drawing;

c) Professional courses reflecting the nuclear safety culture;

d) Graduation design (thesis), in which different projects are provided to each student.

5.17.3 Faculty

The faculty must meet the following requirements:

a) The faculty members of professional courses have educational qualifications or other education experience in nuclear engineering or nuclear physics, or work experience in nuclear engineering related enterprises/institutes;

b) More than 80% of faculty members engaging in professional teaching (including professional experiment teaching) have accumulated engineering practice experience in relevant enterprises or institutes for at least half a year;

c) No more than 50% of full-time faculty members are permitted to be counted in other accredited programs.

5.17.4 Supporting resources

The university/college to which the program belongs must qualify and license to engage in radioactive work.

5.18 Complementary criteria for Civil and Similarly Named Engineering Programs

5.18.1 Applicable programs

These complementary program criteria apply to civil engineering programs established in accordance with the regulations of the Ministry of Education to award a bachelor's degree in engineering.

5.18.2 Curriculum

The curriculum must meet the following requirements:

a) Upon graduation, students can apply the basic principles and methods of engineering mechanics, structural mechanics, fluid mechanics, engineering materials, engineering survey, engineering drawing, engineering economy, etc.;

b) Students understand the core concepts and professional technologies of the design, construction, operation and maintenance, and management of civil engineering facilities or systems;

c) Students are able to identify, express, analyze and solve complex civil engineering problems by com b

□.□□ [illegible]

□.□□.□ [illegible]

These complementary program criteria apply to programs in energy and power such as Energy and Power Engineering，Energy and Environmental System Engineering， New Energy Science and Engineering， Energy Storage Science and Engineering，Energy Service Engineering，Hydrogen Energy Science and Engineering，and Sustainable Energy，which are established in accordance with the regulations of the Ministry of Education to award a bachelor’s degree in engineering.

□.□□.□ [illegible]

The curriculum must meet the following requirements：

a） Natural science courses include the knowledge of physics，chemistry（or life science），etc.；

b） Courses on engineering foundation requisite include the knowledge of mechanical design，engineering mechanics，electrical and electronic technology，computer application，control engineering and environmental engineering，etc.；

c） Engineering science courses and engineering technology courses can be set up based on the academic advantages and characteristics of each school or institute，and include knowledge fields such as engineering thermodynamics，fluid mechanics，heat transfer（or combustion science），thermal energy and power engineering testing

technology, and other essential knowledge fields closely related to the majors set up;

d) Practices include experiments in the laboratory, innovation and entrepreneurship training, project design, enterprise or field internship, etc.. The graduation project (thesis) is carried out around engineering, in which research and design should be involved with a certain degree of comprehensiveness and complexity.

5.19.3 Faculty

Each faculty member of engineering technology courses must have an academic degree in the major and related engineering majors, or have over 2 years' experience in design, R&D, engineering or management practice in energy and power-related enterprises and research institutions, and are well-informed of the latest development of science and technology in the energy and power branch of engineering.

5.20 Complementary criteria for Light Industry and Similarly Named Engineering Programs

5.20.1 Applicable programs

These complementary program criteria apply to light industry programs, such as Light Chemical Engineering, Packaging Engineering, Printing Engineering, Flavor and Fragrance Technology and Engineering, Cosmetics Technology and Engineering, and Biomass Energy and Materials, which are established in accordance with the relevant

regulations of the Ministry of education to award a bachelor's degree in engineering.

5.20.2 Curriculum

The curriculum must meet the following requirements:

a) Ensure that students of this major have the engineering foundation of mathematics, natural science, engineering science principles and experimental methods, professional knowledge, etc. when they graduate;

b) Ensure that the practical teaching system can combine the actual engineering problems and needs of the light industry, carry out engineering practice training, strengthen engineering awareness and provide engineering practice experience;

c) The teaching contents of the courses are constantly improved with the times to meet the needs of social progress and scientific and technological development for light industry talents.

5.20.3 Faculty

The faculty must meet the following requirements:

a) The faculty members of professional core courses have enterprise work experience or experience in relevant engineering practice and research, and understand the latest development of science and technology in the field of their major;

b) The training plan for young faculties engineering ability and teaching ability have been formulated.